1955 The Memorial Union is dedicated, commemorating 128 UC Davis students lost in military service during World War II.

1967 Two London double-decker buses are purchased by ASUCD.

1979 The Last Resort Restaurant and Pub opens on campus.

1987 The first UC Davis Prize for Undergraduate Teaching and Scholarly Achievement is awarded to history professor F. Roy Willis.

1990 The UC Davis Principles of Community are adopted.

1993 The Aggie Pack is formed by students to promote athletics and Aggie pride for UC Davis.

1995 The 57-year-old dairy barn is converted to the Silo snack bar and rec center.

2002 The Robert and Margrit Mondavi Center for the Performing Arts opens.

2004 The Activities and Recreation Center (ARC) opens. Recreation Hall, now known as the Pavilion, had opened in 1977.

2007 Aggie Stadium opens, and UC Davis begins its first year of NCAA Division I competition.

2008–2009 The Whole Earth Festival is created to celebrate the first Earth Day.
## UC Davis Academic Calendar 2008–2010*

<table>
<thead>
<tr>
<th>Period</th>
<th>Fall 2008</th>
<th>Winter 2009</th>
<th>Spring 2009</th>
<th>Fall 2009</th>
<th>Winter 2010</th>
<th>Spring 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Schedule and Registration Guide and Registration appointment times available</td>
<td>May 5</td>
<td>Oct 20</td>
<td>Feb 2</td>
<td>May 4</td>
<td>Oct 19</td>
<td>Feb 1</td>
</tr>
<tr>
<td>Pass 1 Registration (assigned appointments)</td>
<td>May 12</td>
<td>Oct 27</td>
<td>Feb 9</td>
<td>May 11</td>
<td>Oct 26</td>
<td>Feb 8</td>
</tr>
<tr>
<td>Pass 2 Registration (assigned appointments)</td>
<td>Aug 23</td>
<td>Nov 17</td>
<td>Mar 2</td>
<td>Aug 24</td>
<td>Nov 16</td>
<td>Mar 1</td>
</tr>
<tr>
<td>Last day to:</td>
<td>Sep 18</td>
<td>Dec 29</td>
<td>Mar 23</td>
<td>Sep 17</td>
<td>Dec 28</td>
<td>Mar 22</td>
</tr>
<tr>
<td>• Pay fees and enroll without incurring a $50 late fee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Petition for classification to resident status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quarter begins</td>
<td>Sep 22</td>
<td>Jan 2</td>
<td>Mar 26</td>
<td>Sep 21</td>
<td>Jan 4</td>
<td>Mar 25</td>
</tr>
<tr>
<td>Orientation</td>
<td>Sep 22–24</td>
<td>Jan 2</td>
<td>Mar 26</td>
<td>Sep 21–23</td>
<td>TBD</td>
<td>Mar 25</td>
</tr>
<tr>
<td>Instruction begins</td>
<td>Sep 25</td>
<td>Jan 5</td>
<td>Mar 30</td>
<td>Sep 24</td>
<td>Jan 4</td>
<td>Mar 29</td>
</tr>
<tr>
<td>• Last day to file for PELP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Last day to:</td>
<td>Oct 8</td>
<td>Jan 16</td>
<td>Apr 10</td>
<td>Oct 7</td>
<td>Jan 15</td>
<td>Apr 9</td>
</tr>
<tr>
<td>• Pay late fee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Drop 10-day-drop courses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Change student status (part-time/full-time)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Last day to add courses</td>
<td>Oct 10</td>
<td>Jan 21</td>
<td>Apr 14</td>
<td>Oct 9</td>
<td>Jan 20</td>
<td>Apr 13</td>
</tr>
<tr>
<td>Last day to drop 20-day-drop courses</td>
<td>Oct 22</td>
<td>Feb 2</td>
<td>Apr 24</td>
<td>Oct 21</td>
<td>Feb 1</td>
<td>Apr 23</td>
</tr>
<tr>
<td>Last day to:</td>
<td>Oct 29</td>
<td>Feb 9</td>
<td>May 1</td>
<td>Oct 28</td>
<td>Feb 8</td>
<td>Apr 30</td>
</tr>
<tr>
<td>• Opt to take courses on a P/NP basis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• File to take courses on a S/U basis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instruction ends</td>
<td>Dec 5</td>
<td>Mar 16</td>
<td>Jun 4</td>
<td>Dec 4</td>
<td>Mar 15</td>
<td>Jun 3</td>
</tr>
<tr>
<td>Final examinations</td>
<td>Dec 8–12</td>
<td>Mar 17–21</td>
<td>Jun 6, 8–11</td>
<td>Dec 7–11</td>
<td>Mar 16–20</td>
<td>Jun 5, 7–10</td>
</tr>
<tr>
<td>Quarter ends</td>
<td>Dec 12</td>
<td>Mar 21</td>
<td>Jun 11</td>
<td>Dec 11</td>
<td>Mar 20</td>
<td>Jun 10</td>
</tr>
<tr>
<td>Commencement</td>
<td>Dec 13</td>
<td>Jun 12–14</td>
<td>Dec 12</td>
<td>Jun 11–13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filing for Candidacy (Graduation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filing period for those who expect to complete work for a bachelor's degree to file for candidacy with the Registrar †</td>
<td>Jun 1–Oct 8</td>
<td>Nov 1–Jan 16</td>
<td>Feb 1–Apr 10</td>
<td>Jun 1–Oct 7</td>
<td>Nov 1–Jan 15</td>
<td>Feb 1–Apr 9</td>
</tr>
<tr>
<td>Last day to file minor with the Dean's Office †</td>
<td>Oct 8</td>
<td>Jan 16</td>
<td>Apr 10</td>
<td>Oct 7</td>
<td>Jan 16</td>
<td>Apr 9</td>
</tr>
<tr>
<td>Undergraduate Admission—Readmission</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Summer Sessions

#### 2009

- **Jun 22–Jul 31**
- **Aug 3–Sep 11**

#### 2010

- **Jun 21–Jul 30**
- **Aug 2–Sep 10**

### Financial Aid Filing Period

- Filing period for grants, loans, work-study and California Student Aid awards for 2009–2010: Jan 1–Mar 2

### Key to Symbols

* Dates are subject to change and should be checked with appropriate Class Schedule and Registration Guide.
† For students graduating Sep 2009, the filing period is May 17–Jul 8.
‡ For students graduating Sep 2009, the deadline to file a minor program with Dean's Office is Jul 8.
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The University of California, Davis, will provide assistance to the visually impaired regarding the information contained in this catalog. Questions should be directed to the office or department concerned.

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University of California, Davis
2828 Cowell Blvd., Davis, CA 95616-4902
(530) 752-2944
http://bookstore.ucdavis.edu/

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Mediaworks

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FROM THE CHANCELLOR

Welcome to UC Davis. We're delighted you've chosen our campus as the place to pursue your academic goals. All of us—faculty, staff and alumni—are committed to helping you toward their successful attainment.

In the time you spend at UC Davis, you will acquire knowledge and skills that will help you shape the rest of your life. In whatever program you study, you will receive an exceptional education and a degree that is respected by graduate schools and employers around the world. Our philosophy of learning, discovery and engagement means that you will graduate with an academic foundation strengthened by research and internships. It also ensures that you will understand how your learning is relevant to the greater world. UC Davis has a century of commitment to public service and seeking solutions to today's critical issues, and we encourage you to integrate these goals into your educational plan.

Students who get involved love UC Davis! While you're here, you'll make lifelong friends and have experiences that will determine the direction of your growth as a human being and as a member of the larger community in which you live. It's your passion and vision that energize and inspire the campus and make your time here meaningful.

We are very proud of UC Davis. Our alumni have made significant and lasting contributions to society as leaders in government, business, technology, media and the arts. They share their knowledge and resources with the campus and help students build social and career networks before they graduate. Members of our faculty have won MacArthur genius grants, Pulitzer prizes, Fulbright scholarships and election to the nation's top academies of the arts and sciences. They connect to students in the classroom, through freshman seminars and through research, arts and honors activities.

UC Davis continues to grow and offer new opportunities. Residence halls and dining facilities, a multipurpose stadium, new math and sciences buildings and the Mondavi Center for the Performing Arts are a few of the developments that reflect our commitment to offering the best educational experience available.

Together, we are using our talents and ingenuity to build a community that honors our diversity as individuals and reflects our belief in a shared set of values. I'm happy you're joining our community.

Congratulations on becoming an Aggie!

Larry N. Vanderhoef
Chancellor
ADDRESS DIRECTORY

University of California
One Shields Avenue
Davis, California 95616
(530) 752-1011 (main campus number)
http://www.ucdavis.edu

Visitor Services Office
Buehler Alumni and Visitors Center
(530) 752-8111
(Campus tours, maps and information)

Campus Information Center
Memorial Union
(530) 752-2222

Offices of the Chancellor and Provost
Fifth Floor, Mrak Hall
(530) 752-2065

College of Agricultural and Environmental Sciences
150 Mrak Hall
(530) 752-0108

College of Biological Sciences
202 Life Sciences
(530) 752-0410

College of Engineering
1050 Kemper Hall
(530) 752-0553

College of Letters and Science
200 Social Sciences and Humanities Building
(530) 752-0394
Academic Counseling: (530) 752-0392

Graduate Studies
250 Mrak Hall
(530) 752-0650

Graduate School of Management
106 AOB 4
(530) 752-7399

School of Law
1013 King Hall
(530) 752-0243

School of Medicine
4610 X Street, Sacramento
(530) 752-0331

School of Veterinary Medicine
Surge IV
(530) 752-1360

Office of Summer Sessions
207 Third Street, Suite 220
(530) 757-3305

University Extension
1333 Research Park Drive
(530) 757-8777

News Service
334 Mrak Hall
(530) 752-1930

Legal Analyst—Residence Matters
University of California Office of the President
1111 Franklin Street, 8th Floor
Oakland, CA 94607-5206

Admissions
Undergraduate
Undergraduate Admissions
178 Mrak Hall
(530) 752-2971
Education Outreach Program (EOP)
Office of Admissions
179 Mrak Hall
(530) 752-3710

Graduate
Office of Graduate Studies Admissions
252 250 Mrak Hall
(530) 752-0655

Law
School of Law Admissions
119 King Hall
(530) 752-6477

Management
Graduate School of Management Admissions
106 AOB 4
(530) 752-7399

Medicine
School of Medicine Admissions and Outreach
4610 X St., Sacramento
126 Medical Sciences 1-C
(530) 752-2717
(916) 734-4800

Veterinary
School of Veterinary Medicine Admissions
(530) 752-1383

Office of the University Registrar
12 Mrak Hall
(530) 752-3639
TDD: (530) 752-5149

Financial Aid Office
Dutton Hall
Undergraduate: (530) 752-2390
Graduate: (530) 752-9246
Student Employment: (530) 752-2396

Undergraduate Scholarship Office
Dutton Hall
(530) 752-2804

Fellowships and Graduate Scholarships
Graduate Studies
Dutton Hall
(530) 752-7481

Teaching and Research Assistantships
Write to department or group concerned.

Associated Students of the University of California, Davis (ASUCD)
347 Memorial Union
(530) 752-1990

Student Disability Center
160 South Silo
(530) 752-3184
TTY: (530) 752-6833

Student Health Service
Cowell Student Health Center
(530) 752-2300

Student Housing Office
160 Student Housing
(530) 752-2033


CONTENTS

Academic Calendar 1
From the Chancellor 5
Address Directory 6
Degrees Offered By UC Davis 10
Minor Programs Offered by UC Davis 12

Introduction 13

Introduction 14
The University of California 14
A Place for Learning 14
A Place for Discovery 14
Life in Davis 14
Visiting the Campus 15
The Undergraduate Colleges 15
The College of Agricultural and Environmental Sciences 15
The College of Biological Sciences 15
Principles of Community 16
Philosophy of Purpose 17

Educational Objectives for Students 18
The College of Engineering 19
The College of Letters and Science 20
Graduate Study 20
Professional Study 20

Academic Resources 20
The University Library 20
UC Davis Arboretum 21

Information and Educational Technology 21
Research Programs and Resources 22
Organized Research Units 22
Air Quality Research Center 22
Bodega Marine Laboratory and Reserve 22
California National Primate Research Center 23
Center for Health and the Environment 23
Crocker Nuclear Laboratory 23
Institute for Data Analysis and Visualization 23
Institute of Governmental Affairs 23
Institute of Transportation Studies 23

Nanomaterials in the Environment, Agriculture and Technology (NEAT) 24
John Muir Institute of the Environment 24
Program in International and Community Nutrition 24

Additional Research Centers and Resources 24
Adult Fitness Program 24
Advanced Highway Maintenance & Construction Technology Center (AHMCT) 24
Advanced Transportation Infrastructure Research Center Facility (ATIRCF) 24
Agricultural Sustainability Institute 24
California Agricultural Experiment Station 24
Center for Advanced Laboratory Fusion Science and Engineering (CALFUSE) 25
Center for Biophotonics Science and Technology 25
Center for Child and Family Studies 25
Center for Computational Fluid Dynamics 25
Center for Developmental Nutrition 25
Center for Environmental & Water Resources Engineering 25
Center for Future Information Technology 25
Center for Geotechnical Modeling 25
Center for Information Technology in the Interest of Society (CITRIS) 26
Center for Molecular Genomic Imaging (CMGI) 26
Center for Neuroscience 26
Center on Polymer Interfaces and Macromolecular Assemblies (CPIMA) 26
Computer Security Laboratory 26
Fuel Cell, Hydrogen, and Hybrid Vehicle (FCH2V) GATE Center of Excellence 27
Health Sciences Research Laboratories 27
Human Performance Laboratory 27
Humanities Institute 27
Institute for Ultra-Scale Visualization 27
Mann Laboratory 27
Materials Science Central Facilities 28

Natural Reserve System 28
Northern California Nanotechnology Center 28
Nuclear Magnetic Resonance Facility 28
Pavement Research Center 28
Social Science Data Service 29
Tahoe Environmental Research Center (TERC) 29
UC Agricultural Issues Center 29
UC Davis Center for Plant Diversity 29
UC Davis Energy Institute 29
UC Davis J. Amoroso Hydraulics Laboratory (JAHL) 29
Veterinary Genetics Laboratory (VGL) 29
Veterinary Medicine Teaching and Research Center (VMTRC) 30
X-Ray Crystallographic Facility 30

Undergraduate Admission 31

Applying to UC Davis 32
Application Fees 32
Admission as a Freshman 32
UC Freshman Eligibility for California Residents 32
Eligibility in the Statewide Context 32
Eligibility in the Local Context 33
Eligibility by Examination Alone 33
UC Freshman Eligibility for Non-California Residents 33
Transfer Credit 37
Advanced Placement Examinations 34
International Baccalaureate Examinations 34
Admission as a Transfer Student 34
UC Transfer Eligibility for California Residents 34
Alternatives for UC Transfer Eligibility 34
UC Transfer Eligibility for Non-California Residents 37
Transfer Credit 37
Advanced Placement Examinations 37
International Baccalaureate Examinations 37
Limited Status 37
Second Baccalaureate 37
Special Status 38
UC Intercampus Transfer 38
Admission as an International Student 38
International Freshman Applicants 38
International Transfer Applicants 38
Required International Academic Records 38
English Proficiency 38
After you Apply for Admission 39
Required Academic Records for All Students 39
Special Programs 39
Deferred Enrollment 39
Readmission 39

Fees, Expenses and Financial Aid 41

Fees and Expenses 42
Course Materials Fees 42
Part-Time Students 42
UC Employee-Student Fees 43
Motor Vehicle Parking Permit and Bicycle Licensing Fees 43
Costs for a Year at UC Davis 43
International Student Expenses 43

Fee Refunds 43
Cancellation, Withdrawal and Fee Refunds 43

Planned Educational Leave Program (PELP) 44
Schedule of Refunds 44
Student Health Insurance Plan (SHIP) Coverage and Refund of SHIP Fees 44

Financial Aid 45
UC Education Finance Policy for Undergraduates 45
Graduate Student Funding 45
Satisfactory Academic Progress 45
Types of Financial Aid 45
Federal Work-Study 47

Student Life 48

Living at Davis 49
On-Campus Housing 49

7
Academic Advising 58
College Advising 59
College of Agricultural and Environmental Sciences 59
College of Biological Sciences 59
College of Engineering 59
College of Letters and Science 60
Advising Services 61
South Hall 61
South Silo 62
Student Conduct and Grievances 62
Misconduct and Discipline 62
Student Responsibilities 63
Discrimination/Harassment 63
Resolving Academic Problems 63
Grade Changes 63
Other Academic Problems 63
ASUCD Student Advocacy Grievance Center 63
Committee on Student–Faculty Relationships 63
Tutoring and Learning Resources 63
EOP Services 63
Learning Skills Center 64
Special Transitional Enrichment Program 64
Student Housing Computer Centers 64
Internships and Career Services 64
Internship Programs 64
The Internship and Career Center (ICC) 64
Graduate Student and Postdoctoral Career Services 64
Human Corps Program 65
Academic Resources 65
Education Abroad Center 65
Freshman Seminar Program 65
Mathematics and Science Teaching Program (MAST) 65
Student Farm 65
Student Resource and Information Centers 65
Campus Violence Prevention Program 65
Center for Leadership Learning 66
Cross-Cultural Center 66

Undergraduate Education 82
Undergraduate Education 83
College of Agricultural and Environmental Sciences 83
The Undergraduate Programs 83
College of Biological Sciences 84
The Undergraduate Programs 84
Collegewide Programs 85
College of Engineering 86
The Undergraduate Programs 86

Academic Information 67
Registering at UC Davis 68
Registration 68
Late Registration 68
Enrolling in Courses 68
Adding and Dropping Courses 68
Late Drop 68
Late Add 68
Retroactive Drop 68
Retroactive Add 69
Course Load 69
Part-Time Student Status 69
The Major 69
Declaration of Major 69
Change of Major Within a College 70
Change of Major Accompanied by Change of College 70
Multiple Majors 70
Cross-College Majors 71
Individual Major 72
The Minor 72
Academic Credit 72
Units of Credit 72
Credit by Examination 73
Concurrent Credit from Another Institution 73
Intercampus Visitor Program 73
Summer Sessions 73
UC/CSU/Community College Cross Enrollment 73
Open Campus (Concurrent) Program 74
UC Davis Extension 74
Examinations 74
Midterms 74
Final Examinations 74
Grades 75
Grade Points 75
Grade Point Average (GPA) 75
Passed/Not Passed (P/NP) Grading 75
Satisfactory/Unsatisfactory (S/U) 76
In-Progress (IP) Grading 76
Incomplete Grades 76
Retroactive Grade Changes 76
Repeating Courses 76
Mid-Term Grade Standing 77
Final Grades 77
Transcripts 77
Probation and Dismissal 77
Scholastic Deficiencies 77
Dismissal 78
Honors and Prizes 78
Scholarships 78
Deans' Honors Lists 78
Graduation Honors 78
The Honors Program of the College of Letters and Science 79
College of Engineering 79
Davis Honors Challenge 79
Integrated Studies Honors Program 79
Prizes and Awards 79
Chancellor's Award for Excellence in Undergraduate Research 80
Honorary Societies 80
Leaving UC Davis 80
Graduation 80
Leave of Absence: Planned Educational Leave Program (PELP) 81
Withdrawal 81

Lesbian, Gay, Bisexual and Transgender Resource Center 66
Services for International Students and Scholars (SISS) 66
Women's Resources and Research Center (WRRC) 66

Extracurricular Activities 52
Recreation 52
The Department of Campus Recreation 52
Campus Unions 53
The Games Area 53
The Memorial Union (MU) 53
Silo Union 53
The UC Davis Activities and Recreation Center (ARC) 53
UC Davis Intramural Sports and Sport Clubs 54
Intercollegiate Athletics 54
Arts 54
Robert and Margrit Mondavi Center for the Performing Arts | UC Davis 54
Music 54
Dramatic Art and Dance 54
Art Galleries 54
Student Government 55
Associated Students (ASUCD) 55
UC Davis Administrative Advisory Committees 56
Graduate Student Association (GSA) 56
Student Organizations 56
Student Programs and Activities Center (SPAC) 56
Cal Aggie Student Alumni Association (SAA) 57

Registration 68
Late Registration 68
Enrolling in Courses 68
Adding and Dropping Courses 68
Late Drop 68
Late Add 68
Retroactive Drop 68
Retroactive Add 69
Course Load 69
Part-Time Student Status 69
The Major 69
Declaration of Major 69
Change of Major Within a College 70
Change of Major Accompanied by Change of College 70
Multiple Majors 70
Cross-College Majors 71
Individual Major 72
The Minor 72
Academic Credit 72
Units of Credit 72
Credit by Examination 73
Concurrent Credit from Another Institution 73
Intercampus Visitor Program 73
Summer Sessions 73
UC/CSU/Community College Cross Enrollment 73
Open Campus (Concurrent) Program 74
UC Davis Extension 74
Examinations 74
Midterms 74
Final Examinations 74
Grades 75
Grade Points 75
Grade Point Average (GPA) 75
Passed/Not Passed (P/NP) Grading 75
Satisfactory/Unsatisfactory (S/U) 76
In-Progress (IP) Grading 76
Incomplete Grades 76
Retroactive Grade Changes 76
Repeating Courses 76
Mid-Term Grade Standing 77
Final Grades 77
Transcripts 77
Probation and Dismissal 77
Scholastic Deficiencies 77
Dismissal 78
Honors and Prizes 78
Scholarships 78
Deans' Honors Lists 78
Graduation Honors 78
The Honors Program of the College of Letters and Science 79
College of Engineering 79
Davis Honors Challenge 79
Integrated Studies Honors Program 79
Prizes and Awards 79
Chancellor's Award for Excellence in Undergraduate Research 80
Honorary Societies 80
Leaving UC Davis 80
Graduation 80
Leave of Absence: Planned Educational Leave Program (PELP) 81
Withdrawal 81

Undergraduate Education 82
Undergraduate Education 83
College of Agricultural and Environmental Sciences 83
The Undergraduate Programs 83
College of Biological Sciences 84
The Undergraduate Programs 84
Collegewide Programs 85
College of Engineering 86
The Undergraduate Programs 86
DEGREES OFFERED BY UC DAVIS

Undergraduate majors are administered by the colleges of Agricultural and Environmental Sciences (A&ES), Biological Sciences (CBS), Letters and Science (L&S) and Engineering. Professional studies are administered by the schools indicated. All graduate programs are administered by the Office of Graduate Studies. The list below indicates the major or discipline, the degree(s) offered and the school or college offering the major.


* = closed to new students, † = graduate degree offered under Engineering, **Master's degree offered only en route to Ph.D.

<table>
<thead>
<tr>
<th>College</th>
<th>Major/Program</th>
<th>Degree(s) Offered</th>
<th>School or College</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biochemistry and Molecular Biology</td>
<td></td>
<td>B.S., M.S., Ph.D.</td>
<td>CBS</td>
</tr>
<tr>
<td>Biological Sciences</td>
<td></td>
<td>A.B. or B.S.</td>
<td>Engineering</td>
</tr>
<tr>
<td>Biological Systems Engineering</td>
<td></td>
<td>B.S., M.S., M.Engr., Ph.D.</td>
<td>Engineering</td>
</tr>
<tr>
<td>Biomedical Engineering</td>
<td></td>
<td>B.S., M.S., Ph.D.</td>
<td>Engineering</td>
</tr>
<tr>
<td>Biophysics</td>
<td></td>
<td>Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Biostatistics</td>
<td></td>
<td>M.S., Ph.D.</td>
<td></td>
</tr>
<tr>
<td>Biotechnology</td>
<td></td>
<td>B.S.</td>
<td>A&amp;ES</td>
</tr>
<tr>
<td>Cell and Developmental Biology</td>
<td></td>
<td>M.S.</td>
<td>A&amp;ES</td>
</tr>
<tr>
<td>Cell Biology</td>
<td></td>
<td>B.S.</td>
<td>CBS</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td></td>
<td>A.B. or B.S.</td>
<td>L&amp;S</td>
</tr>
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### Minor Programs Offered by UC Davis

Minor programs are offered by the College of Agricultural and Environmental Sciences (A&ES), the College of Biological Sciences (CBS) and the College of Letters and Science (L&S). The College of Engineering (ENGR), the School of Education (SOE) and the Graduate School of Management (GSM) each offer one undergraduate minor. The list below indicates the minor program, the offering department (if the department name is different than the name of the minor) and the college offering the minor.

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<td>Fiber and Polymer Science (Textiles and Clothing)</td>
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<td>Film Studies</td>
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<td>Geophysics (Geology)</td>
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<td>Human Development (Human &amp; Community Development)</td>
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<td>Textiles and Clothing</td>
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<td>M.S., Ph.D.</td>
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<td>D.V.M.</td>
<td>School of Veterinary Medicine</td>
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INTRODUCTION

1961 Cover of the first general catalog printed only for UC Davis. The previous catalogs were all part of UC Berkeley's catalog.
INTRODUCTION

Welcome to UC Davis. Founded as the University Farm amid the fertile fields of the state’s Central Valley, UC Davis initially emerged as an acknowledged international leader in agricultural, biological, biotechnological and environmental sciences and has now gained similar recognition for excellence in the arts, humanities, social sciences, engineering, education, health, sciences, law and management. U.S. News & World Report ranks UC Davis 11th among public universities nationally and the campus is among a select group admitted into the prestigious Association of American Universities. Membership in this group of 62 institutions of higher learning is by invitation only.

The campus owes much of its strength to its deep traditional roots in agriculture and the impressive diversity of academic programs that emerged from this foundation. A distinguished faculty of scholars and scientists, a treasured sense of community and a dedication to the land-grant values of creative, responsive and innovative teaching, research and public service are hallmarks of UC Davis, as is interdisciplinary collaboration; many faculty hold cross-departmental appointments and students are challenged to explore the relationships between fields of study.

THE UNIVERSITY OF CALIFORNIA

UC Davis is one of 10 campuses of the University of California, which was chartered as a land grant college in 1868 and has become the country’s premier system of public higher education. Together, the campuses have an enrollment of more than 200,000 students, with more than 1.4 million alumni living and working around the world. Some 150 laboratories, extension centers, research and field stations strengthen teaching and research while providing public service to California and the nation. The collections of the more than 100 UC campus libraries are surpassed in size in the United States only by that of the Library of Congress.

A Place for Learning

Providing a rich and challenging learning experience for undergraduate and graduate students is critical to UC Davis’ mission and is a cherished commitment of the campus. Several programs support this aim, including a $35,000 prize awarded to a faculty member each year by the UC Davis Foundation in recognition of outstanding undergraduate teaching and scholarly achievement and a campuswide Davis Honors Challenge program through which students elect special courses and have closer contact with faculty.

UC Davis offers more than 100 undergraduate majors and 86-plus graduate programs in the College of Agricultural and Environmental Sciences, the College of Biological Sciences, the College of Engineering and the College of Letters and Science. UC Davis’ five professional schools—the School of Education, the School of Law, the Graduate School of Management, the School of Medicine and the School of Veterinary Medicine—are a combination unique within the University of California system.

A Place for Discovery

Research is an integral part of teaching at UC Davis. Faculty members share their research findings in the classroom and students learn firsthand about discovery while working with professors in the laboratory and field. A number of undergraduate research programs offer students the opportunity to work on a research project in a faculty laboratory, in some cases as early as their freshman year.

Research at UC Davis supports California’s economic, intellectual and social development. The campus’s varied research programs explore and seek solutions to today’s critical issues in areas such as agriculture, resource management, the environment, health, medicine, engineering, business, the economy and public policy.

UC Davis scholars also explore the intellectual frontiers of the physical, biological and social sciences, the humanities and the arts.

The campus’s reputation has attracted a distinguished faculty of scholars and scientists in all fields. UC Davis ranks 10th in research funding among public universities in the United States, receiving more than $532 million in 2006-2007.

Life in Davis

Life at UC Davis is as diverse as the members of our university community. Students enjoy sports, community internships, public service, outdoor activities, concerts and clubs. And, through running several key campus services and sharing their opinions with leadership, they are integral players in the life of the institution.

In 2007, UC Davis made the transition to Division I of the National Collegiate Athletic Association. UC Davis sponsors 14 varsity sports for women and 12 for men. Thirty-six club sports, organized by students, compete against other area colleges and amateur clubs are recreational and focus on skill development and social interaction. Intramural sports annually draw some 14,500 students who participate in 57 different men’s, women’s and coed activities.

Some 70 percent of UC Davis students interested in gaining work experiences participate in internships locally, nationally and globally through the campus’s Internship and Career Center, among the largest campuswide academic internship programs in the country. UC Davis is known for its student-run facilities; the Coffee House, the radio station KDVS and the Unitrans bus service provide paid employment and real-world experience to hundreds of students each year.

A cultural center in the region, the Robert and Margrit Mondavi Center for the Performing Arts features internationally known artists and speakers and showcases offerings of the university’s music and theatre and dance departments. Museums and galleries—all 10 of them—house valuable teaching, research and general interest collections that range from the Bohart Museum of Entomology’s insects to contemporary Native American art at the C.N. Gorman Museum.
Through the Campus Community Book Project, faculty, students and staff each year read a book that challenges their own assumptions as a way to create a better sense of community. Cultural days held each spring celebrate Native American, Asian, African American, Hispanic and Latino heritage.

A city of nearly 65,000 people, Davis is known as an environmentally aware, physically fit and socially innovative community. The city was named best bicycle community in the U.S. by the League of American Bicyclists (the only city ever to receive platinum recognition) and has more than 103 miles of dedicated bike lanes and paths and nearly 500 acres of parks and greenbelts. Davis’ proximity to Sacramento, the state’s capital, to Lake Tahoe and to the San Francisco Bay Area makes it easy to take advantage of big-city attractions while enjoying the lifestyle of a university town.

Davis offers high-performing K-12 schools, cultural amenities for a variety of tastes and plentiful recreational activities. A twice-weekly farmers market offers a variety of locally grown produce, flowers and fresh-baked goods.

**VISITING THE CAMPUS**

Visitor Services Office
Buehler Alumni and Visitors Center
(530) 752-8111; [http://www.visit.ucdavis.edu](http://www.visit.ucdavis.edu)

Weekend tours depart from the Buehler Alumni and Visitors Center at 11:30 a.m. Weekday tours depart at 10 a.m. and 2 p.m. Register for tours one week in advance by calling (530) 752-8111 or at [http://visit.ucdavis.edu](http://visit.ucdavis.edu). You may also see our Virtual Tour Web site at [http://vtour.ucdavis.edu](http://vtour.ucdavis.edu). If you have questions about application procedures or entrance requirements, write or visit Undergraduate Admissions and Outreach Services in 178 Mrak Hall.

**THE UNDERGRADUATE COLLEGES**

**The College of Agricultural and Environmental Sciences**

College Office
150 Mrak Hall
(530) 752-0108; [http://www.caes.ucdavis.edu](http://www.caes.ucdavis.edu)

The College of Agricultural and Environmental Sciences offers a diverse program of majors and courses and is committed to education that emphasizes a spirit of discovery. Based on the premise that tomorrow’s citizens will need to anticipate, understand and solve emerging societal problems and contribute to the discovery and application of new knowledge, the college fosters:

- Critical thinking and an appreciation for diversity in thought and approaches to problem solving.
- An ethos of lifelong learning—of teaching oneself and others while confronting challenges and solving problems.
- An ability to move beyond either/or thinking and to pursue innovative and integrative understanding of the agricultural sciences, environmental sciences and human sciences.
- Intellectual skills that prepare individuals to secure a life-affirming physical and cultural environment based on sound, respectful management of resources.
- A commitment to serve the public with informed and open-minded dedication to understanding, critiquing and addressing complex societal needs and interests.

The college is proud of its rich agricultural history. From this foundation, it has expanded its educational offerings to encompass programs that highlight interconnections among the environment, plant and animal sciences, biological sciences and human sciences. Through a wide array of major programs, the college prepares high-potential students for advanced studies in diverse disciplines and leadership in such arenas as public policy; research and development; managerial and natural resource economics; agricultural systems; environmental protection, safety and design; human nutrition, health and development; and the food, fiber, textile and apparel industries.

Undergraduate students enjoy early contact with faculty advisers, graduate students and postgraduate researchers, enriching and broadening the educational experience of all.

Several levels of academic advising are available that are designed to enhance your undergraduate experience. Advisers help you plan your courses, meet degree requirements and take maximum advantage of the resources available at UC Davis. You are encouraged to meet regularly with your assigned faculty adviser and with the Advising Associates and departmental peer advisers. Through a shared commitment to education for service to society, college faculty, staff and students work together to improve the relationship between humanity and the natural world.

**The College of Biological Sciences**

Dean’s Office
202 Life Sciences
(530) 752-0410; [http://biosci.ucdavis.edu](http://biosci.ucdavis.edu)

The mission of the College of Biological Sciences is to prepare students to fully engage and actively participate in all areas of the exciting and rapidly expanding field of biology. Courses offered by the college span the basic biological disciplines of biochemistry, cell biology, evolution, ecology, genetics, physiology and neurobiology and apply these concepts to the study of microbes, plants and animals ranging from genetic model organisms to humans. Recent additions to the curriculum, including courses in genomics, bioinformatics and computational biology, reflect the profound changes sweeping biology as new technologies enable new areas of research.

Coursework in the college’s majors is rich in hands-on laboratory instruction as well as lectures and seminars. Every department in the College offers laboratory courses in the new Sciences Laboratory Building—a state-of-the-art facility featuring advanced instrumentation and a student-friendly environment. In addition, many students in the college participate in laboratory research and internships that enable them to bridge classroom experiences to life beyond the university.

Biology is integral to a multitude of career options. Whether interested in a professional career in the health sciences, a career in research in education, environmental work or pharmaceutical sales, students in the College of Biological Sciences receive the attention and preparation they need to excel in their chosen field.

To learn more about the nine majors offered through the College of Biological Sciences, see our Web site at [http://biosci.ucdavis.edu](http://biosci.ucdavis.edu), select Undergraduate Students, and then select Majors & Minors.
THE UNIVERSITY OF CALIFORNIA, DAVIS, is first and foremost an institution of learning and teaching, committed to serving the needs of society. Our campus community reflects and is a part of a society comprising all races, creeds, and social circumstances. The successful conduct of the University’s affairs requires that every member of the University community acknowledge and practice the following basic principles:

WE AFFIRM THE DIGNITY inherent in all of us, and we strive to maintain a climate of justice marked by respect for each other. We acknowledge that our society carries within it historical and deep-rooted misunderstandings and biases, and therefore we will endeavor to foster mutual understanding among the many parts of our whole.

WE AFFIRM THE RIGHT of freedom of expression within our community and also affirm our commitment to the highest standards of civility and decency towards all. We recognize the right of every individual to think and speak as dictated by personal belief, to express any idea, and to disagree with or counter another’s point of view, limited only by University regulations governing time, place, and manner. We promote open expression of our individuality and our diversity within the bounds of courtesy, sensitivity, and respect.

WE CONFRONT AND REJECT all manifestations of discrimination, including those based on race, ethnicity, gender, age, disability, sexual orientation, religious or political beliefs, status within or outside the University, or any of the other differences among people which have been excuses for misunderstanding, dissension, or hatred. We recognize and cherish the richness contributed to our lives by our diversity. We take pride in our various achievements, and we celebrate our differences.

WE RECOGNIZE that each of us has an obligation to the community of which we have chosen to be a part. We will strive to build a true community of spirit and purpose based on mutual respect and caring.

The “Principles of Community” were prepared and adopted after extensive discussion within the campus community about the need for a statement that reflects UC Davis’ commitment to a learning environment characterized by diversity, understanding and the acceptance of all people. This statement of common principles was published on April 20, 1990, carrying the endorsement of Chancellor Theodore L. Hullar and the leadership of the Davis Division of the Academic Senate, the Academic Staff Organization, the UCD Staff Assembly, the UCDMC Staff Assembly, the Associated Students of UC Davis (ASUCD), and the Graduate Student Association.
Mission Statement:  
Philosophy of Purpose

The central purpose of UC Davis, as a comprehensive research university, is the generation, advancement, dissemination and application of knowledge. In this, UC Davis is committed to developing and sustaining leading programs in:

- The arts, humanities, biological and physical sciences and social sciences—disciplines at the core of all universities;
- Agricultural and environmental disciplines and engineering;
- Professional studies in education, law, management, medicine and veterinary medicine.

In these programs, the campus integrates three purposes: teaching students as a partnership between faculty mentors and young scholars; advancing knowledge and pioneering studies through creative research and scholarship; and applying that knowledge to address the needs of the region, state, nation and globe. UC Davis is committed to the tradition of the land-grant university, the basis of its founding. This tradition—built on the premise that the broad purpose of a university is service to people and society—guides today the campus’s special commitments and emphases.

UC Davis has a history of focused attention on undergraduate education. The central elements of a liberal education—the arts and languages, history and philosophy and the sciences—offer the opportunity for a broad general education combined with specialization in a scholarly discipline. Coupled with this are manifold opportunities for personal development through programs for academic enrichment, including undergraduate research, work-learn experiences and extracurricular student life.

Dedicated to scholarship, the furtherance of knowledge and the education of graduate students who will advance the next generations of research, UC Davis offers a diverse array of post-baccalaureate programs. Drawing upon the wide range of specialized academic fields, stimulating cross-disciplinary approaches, and using its distinctive graduate groups, a structure that permits students to pursue lines of inquiry that cross traditional disciplinary lines, UC Davis continues to follow and redefine the mandate of a major research university.

The campus has a commitment to advancing teaching and scholarly work in the arts, humanities and the social sciences, studies that also enrich the life of each person and society as a whole. Infusing the pursuit of careers in education, law, management and medicine with these insights and values is also emphasized.

Because of its prominence in the biological, physical and engineering sciences—and building on its distinguished programs in the agricultural and environmental sciences—UC Davis plays a leadership role in modern biology, focusing its strength on basic research and related studies in agriculture, human and animal health and the environment. Consonant with this emphasis is UC Davis’ enhancement of its strength in the engineering and physical sciences, reflecting the importance of these disciplines for the economic vitality of California and the nation.

The life of UC Davis extends beyond teaching and study to service to the region, state, nation and the world. This is given in many forms: cooperative extension to agriculture and education; medical services to central California and beyond through the multifaceted UC Davis Health System in Sacramento; diverse educational programs of UC Davis Extension that share knowledge with the region; voluntary contributions of faculty, staff and students; and athletic and cultural programs for the campus and community at large. UC Davis is surrounded by vibrant, local communities and its proximity to Sacramento, the state capital, gives this outreach urgency and opportunity. Collaborative studies and cooperation between UC Davis and state agencies and the Legislature are both a special responsibility and a unique opportunity.

UC Davis is characterized by a distinguished faculty, a dedicated and high-achieving staff and students of great potential and accomplishment. As we move forward, we recognize that our continued excellence is dependent upon our ability to diversify our university community, consonant with the citizenry of California.

UC Davis remains committed to its human values: caring and personal relationships, collaborative and thoughtful work, all within a human-scale environment. These special qualities are sustained by intellectual strength within a collegial community whose members share a deep desire for teaching and learning, for an abiding commitment to discovering and applying new knowledge.
Educational Objectives for Students

- Develop effective communication skills:
  Written, oral, interpersonal, group

- Develop higher cognitive skills:
  Critical thinking, creativity, analytical ability

- Cultivate the virtues:
  Ethics, responsibility, honor, tolerance, respect for others, empathy

- Develop focus and depth in one or more disciplines

- Develop leadership skills:
  Ability to stimulate and direct collaborative learning and collaborative action

- Develop a global perspective:
  Broad intellectual and cultural experience through active engagement, an understanding of the interactions among the individual, society, and the natural world

- Prepare for lifelong learning:
  Independent thinking and learning, learning to find information, asking the right questions
The College of Engineering

Dean's Office
1050 Kemper Hall
(530) 752-1979; http://engineering.ucdavis.edu

The College of Engineering at UC Davis is among the top engineering colleges in the nation.

With a strong record of academic excellence, a rich tradition of interdisciplinary research and a diverse and distinguished faculty, the College’s undergraduate program has earned a place among our nation’s top twenty public undergraduate colleges of engineering and among the top forty public university graduate engineering programs.

With an enrollment of approximately 3,000 undergraduates and 1,100 graduate students, the College is one of the largest undergraduate engineering colleges in the University of California system.

We have 209 engineering faculty, with 13 current and emeriti members named to the National Academies of Engineering, Science and Medicine.

Our eight departments offer the greatest number of ABET accredited majors (12) in the University of California system. Three recent additions include majors in optical science and engineering, biomedical engineering and computational applied sciences.

The Engineering Accreditation Commission of ABET (111 Market Place, Suite 1050, Baltimore, MD 21202-4012; (410) 347-7700) accredits the following programs:

- Aeronautical Science and Engineering
- Biochemical Engineering
- Biological Systems Engineering
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Electrical Engineering/Materials Science and Engineering
- Materials Science and Engineering
- Mechanical Engineering
- Optical Science and Engineering

The Engineering Accreditation Commission and the Computing Accreditation Commission of ABET accredit the following program:

- Computer Science and Engineering

The following programs are not accredited by a Commission of ABET:

- Biomedical Engineering
- Computational Applied Science
- Chemical Engineering/Materials Science and Engineering
- Civil Engineering/Materials Science and Engineering
- Mechanical Engineering/Materials Science and Engineering

The College maintains a long-standing commitment to undergraduate students, preparing them to contribute to the engineering professions as well as ongoing engineering research. To that end, our academic programs balance the fundamentals of engineering theory with practice, visionary research with practical application-preparing students for entry into engineering practice and graduate-level research.

Nine graduate engineering programs benefit from state-of-the-art research facilities and a unique graduate group approach that brings together faculty and students from a broad spectrum of disciplines university-wide to develop more effective, real world solutions to society’s most complex problems.

In the proud tradition of America’s great land-grant research universities, the UC Davis College of Engineering integrates teaching, research and service to society. While advancing the leading edge of engineering knowledge, the College trains the next generation of engineers who will make a difference in our world.

- The Department of Applied Science instructs students in broad areas of scientific technology and offers an innovative program for undergraduates in optical science and engineering and computational science that prepares students for careers in industry, national research laboratories to pursue graduate work leading to advanced degrees.
- The Department of Biological and Agricultural Engineering combines study in engineering with instruction in the biological sciences to solve challenging environmental and technical problems.
- The Department of Biomedical Engineering educates students in a highly interdisciplinary combination of the biological sciences and engineering as this combination applies to medicine.
- The Department of Chemical Engineering and Materials Science offers curricula integrating knowledge of chemistry, biological sciences or materials science and engineering that enable students to solve problems in both current and future manufacturing technologies or to analyze the structure, properties and behavior of materials.
- The Department of Civil and Environmental Engineering educates students to plan and design systems that have a direct impact on health and human productivity and on the quality of human life.
- The Department of Computer Science offers programs in all aspects of design and use of computer hardware and software systems. The department also plays a significant service role for programs throughout the campus.
- The Department of Electrical and Computer Engineering offers programs in research and education crucial for the continued success of high technology industries in California and the nation, preparing students to design, analyze and use electronic and computer systems effectively.
- The Department of Mechanical and Aeronautical Engineering educates students in the design and manufacture of complex engineering systems for transport, industry or energy and to design, manufacture and operate aircraft and aeronautical structures.

Every effort has been made to provide engineering students with the maximum flexibility consistent with rigorous professional education standards. The key to flexibility is academic advising. You are expected to attend the Summer Orientation program, held the summer before your first quarter on campus. Summer Orientation sessions can provide you with the information you need to make your academic experience rewarding and effective. As an incoming student, you will be given the name and office hours of your departmental staff adviser; you should arrange to meet with your adviser before you register for courses for the first time. Aca-
demic advisers in the Undergraduate Advising Office, in 1050 Kemper Hall, and a well-developed peer advising system supplements departmental advisers.

Undergraduate education in engineering at UC Davis serves as a sound basis for beginning professional practice in engineering design and development, as a preparation for careers in corporate or governmental operations as a foundation for graduate study. To these ends, the college emphasizes fundamental sciences to give students the maximum postgraduate flexibility. Technological developments in recent years have made it clear that engineering education must be based on fundamentals or rapidly become obsolete.

Engineers will continue to face new challenges as society demands improvements in the quality of life and as our state and nation demand greater participation by engineers in efforts toward competitiveness in a global market. As part of a land-grant institution, the College of Engineering must help maintain the technological leadership long enjoyed by the United States, while advancing technology for the benefit of all.

The College of Letters and Science

Office of the Deans
200 Social Sciences and Humanities Building
(530) 752-0392; http://www.l.ucdavis.edu

The College of Letters and Science provides students with the opportunity to actively engage the central academic disciplines of the university. The largest of the four undergraduate colleges at UC Davis, the College of Letters and Science offers the majority of the campus's general education courses, more than 40 major programs of study and thousands of courses per year across a broad range of subject areas. Its nearly 500 faculty members are organized into three Divisions—Humanities, Arts and Cultural Studies; Mathematical and Physical Sciences; and Social Sciences. The college confers Bachelor of Arts (A.B.), Bachelor of Science (B.S.) and Bachelor of Arts and Science (B.A.S.) degrees.

The College of Letters and Science is a community of scholars and students sharing a commitment to liberal education rather than to specialized, vocationally oriented training. The college exposes you to the worlds of human experience, of ideas, of artistic accomplishments and of matter and things. Within this curriculum you are able to explore a variety of academic fields, engage in the pursuit of fundamental knowledge and gain the capacity for independent study and thought. By learning to think carefully and critically, you will be able to continue the ongoing process of education that begins in the classroom but continues over a lifetime. You will have learned how to learn—the ultimate objective of a liberal arts education.

The educational goals of the college are reflected in the three primary groups of requirements established by the faculty: the English Composition Requirement, the Foreign Language and Area Requirements and the Major Requirements.

The English Composition Requirement ensures that you are well versed in written communication skills.

The Foreign Language and Area Requirements provide you with a broad background of knowledge, guide you in an exploration of the interdependencies of knowledge and acquaint you with other cultures.

The College of Letters and Science acknowledges the value of language learning and encourages students to acquire proficiency in a foreign language before graduating from UC Davis. The goals of language learning are the following: communicating complex ideas in the target language; acquiring understanding of a variety of cultural perspectives and differences; fostering intercultural communicative competence; gaining access to cultural production from another time and place; enhancing knowledge of other disciplines through the target language; recognizing the nature and structure of languages, including one's own; and developing the capacity to participate actively in multilingual communities both at home and abroad.

The Major Requirements provide you with intellectual depth and competence in a selected area of study.

The college has a well-developed system of faculty advisers, student peer advisers and professional staff advisers who are available for individual consultations with undergraduates in a variety of settings, from the deans' office to departmental offices to campus residence halls.

The strength of the college lies in the faculty's commitment to advancing the frontiers of human knowledge through research, artistic expression and other creative endeavors and to the effective communication and application of that knowledge through teaching and public service. Together, faculty and students in the College of Letters and Science create a climate that enables students to achieve their highest potential.

GRADUATE STUDY

Office of Graduate Studies
250 Mrak Hall
(530) 752-0650; http://www.gradstudies.ucdavis.edu

Graduate students at UC Davis have the opportunity to work with and learn from accomplished faculty, recognized for their contributions to research in their fields. The Office of Graduate Studies oversees nearly 90 graduate programs leading to master's or doctoral degrees, which together enroll more than 4,000 graduate students. Many graduate programs are offered through graduate groups, an interdisciplinary concept that allows students to study and work in interrelated areas to broaden their intellectual experiences; see Graduate Studies, on page 103.

PROFESSIONAL STUDY

UC Davis has three professional schools—the School of Law (J.D.), the School of Medicine (M.D.) and the School of Veterinary Medicine (D.V.M., M.P.V.M.)—and the Graduate School of Management offers the M.B.A. degree. These schools and programs are described in later chapters.

ACADEMIC RESOURCES

The University Library

(530) 752-6561; http://www.lib.ucdavis.edu

The General Library at UC Davis is one of the premier research libraries in North America. In addition to Peter J. Shields Library, there are four other General Library facilities: the Physical Sciences & Engineering Library, the Loren D. Carlson Health Sciences Library, the Agricultural and Resource Economics Library and the Blaisdell Medical Library in Sacramento. The combined collections of the various General Library facilities total more than 3.3 million volumes and more than 38,000 periodical and journal
Shields Library houses the collections in the humanities, arts, social sciences, biological sciences, agricultural sciences, mathematics and computer science. The Physical Sciences & Engineering Library collections support teaching and research in engineering, chemistry, geology and physics. The Carlson Health Sciences Library serves the Schools of Medicine and Veterinary Medicine and programs in public health. The Blaisdell Medical Library at the UC Davis Medical Center provides a collection of more than 44,000 volumes serving the hospital and clinics as well as the future School of Nursing. The law library, administered by the School of Law, is located in King Hall.

The General Library’s HARVEST catalog identifies campus library resources, while the MELVYL online catalog identifies the library collections at UC Davis and the other nine UC campuses. The HARVEST catalog, MELVYL and other electronic resources, including more than 19,000 full-text journals can be searched in the libraries, at campus locations and remotely via the Internet. Workstations with Internet access are available for patron use in all library facilities. A wireless network in Shields Library, the Physical Sciences & Engineering Library, the Carlson Health Sciences Library and the Blaisdell Medical Library connects authorized laptop users to library and campus resources and services.

Information about library services, full text electronic books and journals, and important subject-specific Internet sites are available at the Library’s Web site. The Library provides classes on the use of the HARVEST catalog, MELVYL and subject specific electronic journals and databases. Librarians are available for consultation to effectively and efficiently identify and use information resources for research projects and dissertations.

**UC Davis Arboretum**

Arboretum Headquarters  
(530) 752-4880; [http://arboretum.ucdavis.edu](http://arboretum.ucdavis.edu)

The 95-acre UC Davis Arboretum is a living museum with a documented collection of more than 22,000 trees, shrubs and perennials from Mediterranean-climate areas throughout the world, displayed in a series of gardens along Putah Creek’s historic north fork. The Arboretum has winding paths for walkers, joggers, or bicyclists, benches where visitors can sit and enjoy the view, and picnic tables for casual gatherings. Demonstration gardens of drought-tolerant flowering perennials and collections of oaks, acacias, conifers, and eucalyptus, along with trees native to the site, are resources for teaching and research. Outstanding plant collections include Shields Oak Grove, Mary Wattis Brown Garden of California native plants, Ruth Risdon Roster Garden: A Valley-Wise Garden, T. Elliot Weier Redwood Grove, and Arboretum Terrace home demonstration garden. Arboretum education programs promote sustainable and environmentally-appropriate gardening practices. Internships are available in nursery management, landscape design and maintenance, environmental education, Integrated Pest Management (IPM) and Geographic Information Systems (GIS).

**Information and Educational Technology**

IT Express  
182 Shields Library  
(530) 754-HELP (4357); ihelp@ucdavis.edu; [http://scg.ucdavis.edu](http://scg.ucdavis.edu)

Information and Educational Technology (IET) provides a wide range of services and support to undergraduate and graduate students. Here’s an overview. For more information and to access those services, see the online Student Computing Guide at [http://scg.ucdavis.edu](http://scg.ucdavis.edu).

**Taking Care of Business Online**

- Enroll in classes, add or drop courses, view and print your class schedule
- Access course grades
- View and print your unofficial academic record
- Check balances, view bills, make payments, and manage your student account
- Apply for and view financial aid awards
- Chart and plan your degree
- Make campus bookstore purchases

**Learning and Teaching with Technology**

- Online course management & collaboration—Explore SmartSite. You’ll be able to communicate online with your instructors and with your fellow students; collaborate on papers and projects; manage your assignments and study with classmates; or just set-up your own project site. Some tools: wikis, forums, chat rooms, online tests and quizzes, and course Web sites; see [http://smartsite.ucdavis.edu](http://smartsite.ucdavis.edu)
- Group projects. Use TeamSpot software to share files via laptops onto a big screen; see [http://teamspot.ucdavis.edu](http://teamspot.ucdavis.edu)
- Searchable electronic databases. There are more than 330 at Shields Library. You’ll have free, easy access from on- or off-campus; see [http://www.lib.ucdavis.edu](http://www.lib.ucdavis.edu)
- iTunes and podcasting. Digital audio recording equipment is installed in several lecture halls and portable digital recorders are available. Podcasting services are available to all instructors and campus groups; see [http://itunes.ucdavis.edu](http://itunes.ucdavis.edu) & [http://podcast.ucdavis.edu](http://podcast.ucdavis.edu)
- Classroom technology. All 124 general assignment classrooms have audio, network and projection capabilities, and include a projector, CD player, DVD player, VCR, built in microphone and laptop hookup.

**The Essentials: Computers, E-mail, Software, Labs**

- E-mail. Every student has a free Web-based e-mail account; see [http://email.ucdavis.edu](http://email.ucdavis.edu)
- Desktop and laptop purchases. Our recommendations can help guide your purchases. Financial aid is available for qualified applicants; see [http://computerownership.ucdavis.edu](http://computerownership.ucdavis.edu)
- Discounts. Educational discounts on computer hardware, software, and accessories at the bookstore; see [http://bookstore.ucdavis.edu](http://bookstore.ucdavis.edu)
• **Software.** Free licenses for Sophos anti-virus and Endnote bibliographic software. Other programs available free of charge or at a discount; see [http://my.ucdavis.edu/software](http://my.ucdavis.edu/software)

• **Multimedia.** You'll want to check out the video, audio, and graphic design software, as well as printers, scanners, etc. in the Meyer Media Lab; see [http://meyermedialab.ucdavis.edu](http://meyermedialab.ucdavis.edu)

• **Computer rooms.** There are 16 of them, with both Mac and PC computers, and many have extended hours during the week; see [http://iet.ucdavis.edu/rooms](http://iet.ucdavis.edu/rooms)

• **Printing.** Available in all central computer rooms. Print up to 90 sheets per quarter for free. For color printing, head over to Meyer Media Lab; see [http://clm.ucdavis.edu/rooms/printing](http://clm.ucdavis.edu/rooms/printing)

• **Wireless printing** is also available; see [http://wirelessprinting.ucdavis.edu](http://wirelessprinting.ucdavis.edu)

**Networking**

• **Wireless Internet.** MoobilenetX is the campus secure wireless network. You can access it throughout much of the central campus, including Shields Library and the Memorial Union. For access requirements and instructions, see [http://wireless.ucdavis.edu](http://wireless.ucdavis.edu)

• **Wired Internet.** You can also access the Internet by connecting to network access modules (NAMs), located in many study areas and libraries. And students living on campus can connect directly to the Internet from their rooms by using ResNet, the high-speed residence hall network. Each residence hall also has a computer center with computers, printers, and scanners.

**Security**

**Computer security.** Guarding against computer viruses and preventing unauthorized access to computing systems have become important parts of campus computing life. Keep up with the latest campus security efforts and review instructions on how to maintain your computer system and prevent security issues, including compromised passwords and identity theft; see [http://security.ucdavis.edu](http://security.ucdavis.edu)

**Technical Support**

**IT Express.** Free computing help with almost anything related to campus tech. For contact information, see above and [http://itexpress.ucdavis.edu](http://itexpress.ucdavis.edu)

**Computer maintenance & repair.** Consulting and repair services (fees apply) for help with viruses and malware; software installation, patching and maintenance; data recovery; etc.; see [http://desktop.ucdavis.edu/repair.php](http://desktop.ucdavis.edu/repair.php)

All information above is current as of spring 2008. For the latest updates and tech news, please see the Student Computing Guide at [http://scg.ucdavis.edu](http://scg.ucdavis.edu)
**California National Primate Research Center**

Primate Center  
(530) 752-0447; [http://www.cnprc.ucdavis.edu](http://www.cnprc.ucdavis.edu)

The California National Primate Research Center (CNPRC) investigates selected human health problems for which the nonhuman primate is the animal model of choice. Research programs include behavioral and neurobiology, developmental and reproductive biology, respiratory diseases, virology and immunology, stem cell biology, gene therapy, genetics and a variety of biomedical collaborative research projects. Self-sustaining breeding colonies of macaques are available for study of spontaneously occurring disorders.

**Center for Health and the Environment**

(formerly Institute of Toxicology and Environmental Health)  
(530) 752-1340

The Center for Health and the Environment (CHE) coordinates interdisciplinary research on the effect of environmental agents, including chemicals and radiation, on the health of humans, animals and other organisms. Researchers conduct epidemiologic studies in human populations and experiments are performed with whole animals as well as organisms, cells and molecules to measure environmental exposures and health outcomes associated with them. Research on the development of agents for population control of humans and wildlife seek to mitigate the adverse effects of overabundance on the environment. Studies on toxic, radioactive, mutagenic, carcinogenic and teratogenic compounds are carried out in special animal holding facilities. Laboratories are equipped for studies in analytical chemistry, biochemical toxicology, cell and molecular biology, endocrinology, inhalation toxicology, morphology and reproductive and developmental biology. The center houses a major universitywide program and federally funded center in occupational medicine and a School of Medicine program in reproductive biology.

**Crocker Nuclear Laboratory**

(530) 752-1460

This facility is an interdepartmental laboratory for the application of nuclear science to a variety of disciplines. The laboratory has research programs in nuclear physics and chemistry, air pollution analysis, use of pulsed ultra-violet light as an alternative to pesticides and insecticides, biology, material damage studies, the effect of background radiation on computers and historical studies.

**Institute for Data Analysis and Visualization**

2343 Academic Surge; (530)752-6298  
Kenneth Joy, Director; kjoy@ucdavis.edu  
http://idav.ucdavis.edu

The mission of the Institute is the integration of research efforts at UC Davis in data analysis and visualization. The Institute draws students and faculty from a variety of departments and colleges, allowing researchers to work together on real-world, applied problems that deal with the massive data analysis and visualization problems encountered in science, engineering, and other fields. The integration of the two fields, especially in biological applications of high throughput biological assay data such as gene expression arrays, proteomics, metabolomics and NMR spectroscopy, produce methods that impact a substantial number of scientific fields. In neuroscience, computer science, computational science, computational physics, and engineering applications, the Institute contributes data exploration and problem-solving methods through visualization, computer graphics, data analysis, and expressive interfaces that enable discovery and analysis from massive information streams. The collaborative efforts of the faculty and students of the Institute enable the University to address a wide-variety of application areas and contribute methods that enable scientists and engineers to make decisions from their data.

**Institute of Governmental Affairs**

Alan L. Olmstead, Director  
360 Shields Library  
(530) 752-2042; Fax (530) 752-2835; [http://www.iga.ucdavis.edu](http://www.iga.ucdavis.edu)

The Institute of Governmental Affairs (IGA) serves as a research base for social science faculty at UC Davis. IGA serves approximately 60 faculty from 10 campus departments as well as scholars visiting from throughout the United States and around the world.

Located in the core of the UC Davis campus, IGA houses eight formal research programs: Center for International Data; Center for State and Local Taxation; Center for the Evolution of the Global Economy; Conflict Processes Group; Economy, Justice and Society (EJS); Migration Dialogue; Program on Decision-making, Communication and Uncertainty; and Rural Economies of the Americas Program (REAP).

Specialized services include grant advising, preparation and administration; research program development; library and data services; social science computing, programming and statistical consulting; seminar, workshop and conference organization; and much more. The institute sponsors an active public affairs program and enhances the education of students by providing research opportunities. IGA serves as the UC Davis liaison to the systemwide program, Institute on Global Conflict and Cooperation (IGCC) and the All-UC Group in Economic History.

**Institute of Transportation Studies**

2028 Academic Surge; (530) 752-6548  
Dan Sperling, Director; dsperling@ucdavis.edu  
[http://www.its.ucdavis.edu](http://www.its.ucdavis.edu)

The Institute of Transportation Studies conducts multidisciplinary research on complex problems related to traffic congestion and local and global pollution and disseminates research results to the broader academic and professional community. Research priorities are travel behavior, alternative-fueled vehicle technology and policy, energy and environmental projects and advanced vehicle and highway systems. About 60 faculty members and 100 graduate students from more than 13 academic disciplines, including four Engineering departments, Economics, Environmental Science and Policy, Ecology, Agricultural and Resource Economics, and the Graduate School of Management, participate in the research activities of the Institute. The Institute administers a graduate program in Transportation Technology and Policy, and a number of research centers, including the U.S. DOT Sustainable Transportation Center (STC), the U.S. DOE Graduate Automotive Technology Education (GATE) center, the UC Davis Energy Efficiency Center (EEC), the UC Davis Plug-In Hybrid Electric Vehicle (PHEV) Center, and the Sustainable Transportation Energy Pathways (STEPS) program.
**Introduction**

**Nanomaterials in the Environment, Agriculture and Technology (NEAT)**

4415 Chemistry Annex; (530) 752-3292
Alexandra Navrotsky, Director; anavrotsky@ucdavis.edu
http://neat.ucdavis.edu/

NEAT is a multidisciplinary research and education program which links the fundamental physics, chemistry, and engineering of small particles and nanomaterials to several challenging areas of investigation including (1) applications in ceramic, chemical, electronic, environmental, and agricultural technology, (2) environmental transport and transformation and resulting roles in environmental pollution and remediation, (3) interactions with the biosphere, especially microorganisms and (4) effects on health.

**John Muir Institute of the Environment**

Deb A. Niemeier, Director
(530) 752-5643

The John Muir Institute of the Environment (JMIE) supports innovation and discovery aimed at solving real-world environmental problems. The institute’s faculty are committed to strengthening the scientific foundation for environmental decision making through collective entrepreneurship, a team-oriented approach that recognizes the complexities of environmental problems and the societal context in which they occur. JMIE champions science and technological innovation, provides campus-wide leadership, hosts centers and projects, and seeds research and educational initiatives to solve real-world environmental problems. The institute links science and technology to policy by providing the intellectual setting for interactions between researchers, regulatory agencies, policy-makers and the public.

**Program in International and Community Nutrition**

Kathryn G. Dewey
3253 Meyer Hall
(530) 752-1992; Fax (530) 752-3406; kgdewey@ucdavis.edu
http://www.nutrition.ucdavis.edu/picn/

Faculty members of the Program in International and Community Nutrition are studying the epidemiology and causal mechanisms of the major nutritional problems of human populations in low-income countries and in disadvantaged ethnic minority groups in the United States, with the ultimate objective of planning, implementing and evaluating programs to ameliorate these problems. Current areas of research include maternal and child nutrition, control of micronutrient deficiencies, determinants of food intake, nutrition and infection, nutritional assessment, and food and nutrition programs and policy.

**ADDITIONAL RESEARCH CENTERS AND RESOURCES**

**Adult Fitness Program**

UC Davis Sports Medicine Program
(916) 734-6805

The UC Davis Adult Fitness Program is designed to help individuals improve their health and physical fitness to prevent disease and improve quality of life. Our team of exercise specialists includes sports medicine physicians, exercise physiologists and nutritionists trained by UC Davis Sports Medicine, Exercise Biology and Nutrition Faculty in exercise testing and prescription and sports nutrition. This program exists to provide a public health service to the university and surrounding communities; to provide clinical learning opportunities for UC Davis students; to provide opportunities to study the benefit of exercise and proper nutrition in the prevention of disease and assist individuals in evaluating their progress through discounted repeat testing and evaluation.

**Advanced Highway Maintenance & Construction Technology Center (AHMCT)**

Academic Surge 1003; (530) 752-9891
Steve Velinsky, Director; savelinsky@ucdavis.edu
http://www.ahmct.ucdavis.edu/

In cooperation with state, federal, and private agencies, the center performs research and development on equipment and methods to improve the safety of highway systems, including their construction and maintenance.

**Advanced Transportation Infrastructure Research Center Facility (ATIRC)**

Center Under Construction; West Campus
Director John Harvey; jtharvey@ucdavis.edu

The UC Davis Advanced Transportation Infrastructure Research Center (ATIRC) project will provide a facility for two research programs: the Pavement Research Center (PRC) and the Advanced Highway Maintenance and Construction Technology Research Center (AHMCT). Research at the PRC will be conducted in a variety of areas including geotechnical engineering, construction engineering and management, traffic engineering, material mechanics, performance modeling, system analysis and economics, information management, and planning.

**Agricultural Sustainability Institute**

Thomas P. Tomich, Director
143 Robbins Hall
(530) 752-3915, Fax (530) 752-2829; asi@ucdavis.edu
http://asi.ucdavis.edu/

The Agricultural Sustainability Institute (ASI) provides a hub that links initiatives and education in sustainable agriculture and food systems across all divisions of the College of Agricultural and Environmental Sciences at UC Davis, across the University of California, and with other partners across the state. ASI includes:

- UC ANR Sustainable Agriculture Research & Education Program (SAREP)
- UC Davis Russell Ranch Sustainable Agriculture Facility
- UC Davis Student Farm
- Advising office for proposed UC Davis undergraduate major in sustainability (targeted to begin fall 2009)

The institute distributes a three-times-per-year newsletter entitled Sustainable Agriculture; http://sarep.ucdavis.edu/newsletters/newsletters.htm.

**California Agricultural Experiment Station**

College of Agricultural and Environmental Sciences
(530) 752-1610

The California Agricultural Experiment Station has branches on the UC Davis, UC Riverside and UC Berkeley campuses. The UC Davis branch includes approximately 500 faculty and CE Specialists in more than 30 departments and units in the College of Agricultural and Environmental Sciences, the College of Biological Sciences and the School of Veterinary Medicine. In addition to laboratory facilities, it has approximately 3,000 acres devoted to agricultural research in the areas of experimental crops, orchards and animal facilities. The Experiment Station facilitates research in agricultural production, food processing, nutrition, animal care
and disease prevention, consumer sciences and community development and environmental quality, with emphasis on resource conservation and management, water and soil pollution and regional planning.

**Center for Advanced Laboratory Fusion Science and Engineering (CALFUSE)**

Hertz Hall; Lawrence Livermore National Laboratory
1104 Engineering III; 3182-1209 Kemper; 160 Walker; (530) 754-9069
Neville Luhmann, Director; ncluhmann@ucdavis.edu
David Hwang, Director; dphwang@ucdavis.edu
http://calfuse.ucdavis.edu/

Numerous climate studies have concluded that the heavy use of fossil fuels to meet the world's ever-increasing energy demand may have the consequence of deleterious global climate change. To limit carbon dioxide emissions, alternative energy sources must be developed. Many prominent environmentalists and politicians view the use of nuclear energy as the best solution to curb greenhouse effects on global climate. Currently, nuclear energy is produced commercially in fission reactors. However, energy production by nuclear fusion rather than fission may have significant advantages. In contrast to fission, fusion offers the potential of energy production with enormously reduced environmental impact. Unlike the enriched uranium used in fission reactors, the fuel used for fusion is comparatively safe, abundant and widely distributed geographically. Fusion reactions, and the conditions required to create them, are scientifically well understood; the most familiar fusion reactor is the Earth's sun, whose energy is provided by hydrogen fusion. For controlled nuclear fusion on Earth, the deuterium found in seawater would be sufficient to supply the world's energy needs for billions of years.

In order to create a commercially successful fusion reactor, many physics questions will need to be answered, and new technologies must be developed. The purpose of the CALFUSE Center is to coordinate all facets of fusion science and engineering research, and to participate in worldwide fusion energy development. The Center will enlist all areas of research and welcome all research organizations which may have fusion-related applications.

**Center for Biophotonics Science and Technology**

2700 Stockton Blvd. Suite 1400
Sacramento, CA 95817; (916) 734-8600
Dennis Matthews, Director; dlmatthews@ucdavis.edu
http://cbst.ucdavis.edu/

Research and development applications utilizing biophotonics—the science of using light to understand the inner workings of cell and tissues in living organisms. Applications of biophotonics range from using light to selectively treat tumors, to sequencing DNA, biochemical studies and identifying single biomolecules within cells.

**Center for Child and Family Studies**

West House of Center for Child and Family Studies
(530) 752-2888; http://ccfs.ucdavis.edu

The Center for Child and Family Studies (CCFS) houses the Early Childhood Laboratory (ECL), a research, teaching and demonstration laboratory of the Division of Human Development and Family Studies in the Department of Human and Community Development. At the ECL, students enrolled in human development courses learn observational techniques and participate with peers, children, parents and professionals in developmental programs for infants through preschoolers. Students study early development in a naturalistic setting, linking research and theory to principles of interaction and development recognizing of and respect for individual differences. Selected undergraduate students participate in faculty and graduate student research at the laboratory. The CCFS also houses several research and outreach facilities, such as the Eichhorn Family House, and a computer lab for Human and Community Development students.

**Center for Computational Fluid Dynamics**

2132 Bainer Hall; (530) 752-0580
Department of Mechanical and Aeronautical Engineering;
http://mae.ucdavis.edu/research/cfd/

The Center uses modern computation facilities, including a Massively Parallel Supercomputer, to explore complex motions of fluids. Applications are to fluid flows and aeronautics, including mesh generation, analysis and design of aerodynamic configurations, turbulence modeling, electromagnetism, chemically reacting flows, biological fluid dynamics computations, and wind energy research.

**Center for Developmental Nutrition**

TB 33
(530) 752-7516

The Center for Developmental Nutrition supports predoctoral and postdoctoral research in nutrition and development. The laboratory promotes collaborative research on the study of how nutrients influence the development of individuals at multiple life stages.

**Center for Environmental & Water Resources Engineering**

2063 Kemper Hall; (530) 754-8380
Prasant Mohapatra, Director; http://cewre.engr.ucdavis.edu/

Current research includes dynamic modeling of quality characteristics of surface waters; mixing processes in surface waters; contaminant transport in the subsurface; surface chemistry of soils with particular emphasis on organic sorption and desorption; environmental restoration; atmospheric dispersion and air pollution control systems; combustion by-product formation; disinfection using ultraviolet radiation; microbial denitrification of domestic water supplies; microbial degradation of vapor phase contaminants; and analysis of economic impacts of stormwater quality management programs.

**Center for Future Information Technology**

2063 Kemper Hall; (530) 754-8380
Prasant Mohapatra, Director; http://cfit.ucdavis.edu/

On our tenets of open collaboration and interdisciplinary participation, our vision for the center is to innovate the future of information technology through vital research that has cross-cutting impact on the broad applications of information technology; through university and industrial working partnerships, set an imaginative direction, yet influence a pragmatic roadmap for the future of IT that has intellectual, societal, environmental and commercial value.

**Center for Geotechnical Modeling**

2655 Brooks Road; (530) 752-7929
Bruce Kutter, Director; http://cgm.engineering.ucdavis.edu/

The center performs research in the broad area of geotechnical engineering, but focuses on earthquake engineering problems such as effects of ground shaking and liquefaction and soil-foun-
dation-structure interaction for buildings, bridges, dams, tunnels, and port facilities. The center performs numerical simulations using advanced computational tools, develops design procedures and new techniques for site characterization, but emphasizes physical modeling using one of the world’s largest and most advanced geotechnical centrifuge facilities. The centrifuge is available for shared use by researchers from around the country and is supported by the George E. Brown, Jr., Network for Earthquake Engineering Simulation.

Center for Information Technology in the Interest of Society (CITRIS)

3179 Kemper Hall, (530) 752-7063
Ben Yoo, Director; yoo@ece.ucdavis.edu
http://ucdavis.citris-uc.org

CITRIS is one of the California Institutes of Science and Innovation involving a partnership between four UC campuses (UC Davis, UC Berkeley, UC Merced, and UC Santa Cruz), industry and the state to create and harness information technology to tackle society’s most critical needs. CITRIS research focuses on problems that have a major impact on the economy, quality of life, and future success of California: conserving energy; education; saving lives, property, and productivity in the wake of disasters; boosting transportation efficiency; advancing diagnosis and treatment of disease; and expanding business growth through richer personalized information services.

Center for Molecular Genomic Imaging (CMGI)

451 Health Sciences Drive; (530) 754-8960
Simon Cherry, Director; srcherry@ucdavis.edu
http://imaging.bme.ucdavis.edu/

The CMGI offers the research community state-of-the-art imaging technologies for in vivo small animal research. With the use of increasingly sophisticated animal models of human disease, imaging studies are expected to provide new insights in many areas of biomedical research, including oncology, cardiology, neuroscience and pharmacology. It is anticipated that molecular and genomic imaging will lead to advances in basic science, as well as to the development of new diagnostic and therapeutic tools for use in the clinical setting. The CMGI currently provides and supports positron emission tomography (microPET), x-ray computed tomography (microCT), ultrasound, and optical (bioluminescent and fluorescent) scanning procedures for non-invasive imaging of small research animals. CMGI also supports magnetic resonance imaging (MRI) at the adjacent UC Davis NMR Facility. In addition, a satellite facility at the California National Regional Primate Center houses a microPET scanner for imaging non-human primates. The CMGI operates a biomedical cyclotron and radiochemistry facility for synthesizing short-lived radiotracers for PET imaging. CMGI staff provide services that include consultation, protocol planning and experimental design, animal handling and physiologic monitoring, injection of contrast agents and radiopharmaceuticals, scanning, data reconstruction and visualization, image analysis and data backup. The CMGI facilities are open to all researchers at UC Davis, and are also open, on a space-available basis, to external researchers. CMGI is supported in part by grants from the National Cancer Institute.

Center for Neuroscience

Edward G. Jones, Director
1544 Newton Ct.
Davis, CA 95616
(530) 757-8708, Fax (530) 757-8827;
http://www.neuroscience.ucdavis.edu

The Center for Neuroscience is an interdisciplinary unit that serves as the focal point for the study of the neurosciences at UC Davis. Faculty affiliated with the Center are from 13 departments and sections. The center sponsors a seminar series, conferences and symposia, distributes a quarterly newsletter, provides research space for center members and supports graduate students, postdoctoral scholars and distinguished visitors. Faculty and students are engaged in the study of brain mechanisms responsible for normal human cognitive and perceptual processes and in the study of fundamental aspects of nerve cell function and development. A core group of cognitive neuroscientists uses various imaging techniques and electrophysiological techniques to study both the normal and lesioned cerebral cortex to understand how the normal brain controls behavior. Other faculty members use either animal models to understand how information is processed in the brain or simple systems to study the fundamental biology of nerve function and development and disorders affecting them.

Center on Polymer Interfaces and Macromolecular Assemblies (CPIMA)

Department of Chemical Engineering and Material Science;
(530) 754-6348
Marjorie Longo, Director; mlongo@ucdavis.edu
http://cpima.stanford.edu/

CPIMA, a Materials Research Science and Engineering Center of the National Science Foundation, is an academic-industrial partnership comprised of UC Davis, Stanford University, UC Berkeley and IBM Almaden Research Center. The research focus is on interface science of polymers and low-molecular weight amphiphiles, biomolecular materials and hybrid, nanostructured materials with applications in information storage, microelectronics and spatially resolved microanalytical chemistry.

Computer Security Laboratory

2063 Kemper Hall; seclab-contact@cs.ucdavis.edu
Matt Bishop, Hao Chen, Karl Levitt, Felix Wu, Directors;
bishop@ucdavis.edu, levitt@ucdavis.edu, wu@ucdavis.edu, hchen@ucdavis.edu
http://seclab.ucdavis.edu/

The mission of the UC Davis Computer Security Laboratory is to improve the current state of computer and information security and assurance through research and teaching. The Security Lab investigates security problems in the network infrastructure, in computer security, and in information assurance in general. Current projects include intrusion detection and response, vulnerabilities analysis, software security, security of various routing and network protocols (especially wireless network protocols), cellular network security, and malware analysis and defense. The Security Laboratory also researches and detects malicious code (viruses, worms, time bombs, etc.) in programs and detects attempts to penetrate or misuse computer systems. Research projects are supported by corporate and government organizations.
Fuel Cell, Hydrogen, and Hybrid Vehicle (FCH2V) GATE Center of Excellence

2028 Academic Surge, Institute for Transportation Studies; (530) 754-9000
Are Gjellan, Director; ajgellan@ucdavis.edu
http://gate.its.ucdavis.edu/

Established in 2005, the FCH2V GATE Center is focused on research, education, industrial collaboration and outreach within automotive technology. A systems integration philosophy is guiding the FCH2V Center’s education and research activities. The center is using its knowledge and understanding of systems to identify critical research needs and design efficient and effective research and education initiatives. It is integrating the latest thinking on fuel cell and hybrid vehicle systems with hydrogen energy systems modeling. The focus is on training students to approach their work from both micro and macro perspectives—to understand vehicle design at the component as well as systems integration level.

The Center of Excellence is funded by Department of Energy for five years and the center is currently building an industrial partnership to provide opportunity to participate in training the next generation of advanced automotive engineers.

Health Sciences Research Laboratories

The Health Sciences Research Laboratories are biological science facilities with research staff and assistance for faculty, staff and students.

Animal Surgery Laboratory

Buildings H and J; Center for Laboratory Animal Science
(530) 752-7736; lataherv@ucdavis.edu
esdavis@ucdavis.edu

This unit is a surgical research facility in compliance with NIH, AAALAC and USDA standards. Instruction in surgical techniques is available including multiple training stations for larger groups. Surgical instruments, drapes, anesthesia machines, scrub suits, and equipment for monitoring vital signs and physiologic parameters are available. Staff are available to perform or assist with both survival and non-survival surgical procedures depending on the investigator’s requirements. Staff are also available for post-operative care, data and sample collection as required, and assistance with preparation of the IACUC Protocol for Animal Care and Use.

Human Performance Laboratory

164 Hickey Gym
(530) 752-2748, (916) 734-5632

The Human Performance Laboratory (HPL) was founded in 1963 and has a long history of basic and applied research and outreach in exercise physiology, biomechanics and sports psychology. The HPL has been involved in a variety of research areas since its inception including metabolism, heat stress, fluid balance, injury prevention, body composition and health benefits of physical activity and fitness. The HPL is represented by full-time and adjunct faculty members with varying research backgrounds and scientific interests. The HPL facilities allow measurement of a comprehensive list of human performance characteristics. Investigators have access to advanced data acquisition systems for evaluation in the areas of biomechanics, motor learning, environmental physiology, cardiopulmonary and thermoregulatory physiology, human nutrition and exercise and muscle metabolism. Specific technologies and capabilities include a biochemistry lab, extensive computing facilities, high speed 3-D video motion analysis, ground reaction force measurement, ultrasound imaging, a temperature and humidity controlled environmental chamber and systems for measurement of oxygen consumption, body composition and psychomotor performance. The HPL meets the needs of today’s creative researcher and has the capacity to assist in answering tomorrows research questions.

Humanities Institute

Carolyn de la Peña, Director
Jennifer Langdon, Associate Director
227 Voorhies Hall
(530) 752-2295; Fax (530) 752-4263

The Davis Humanities Institute (DHI) is an interdisciplinary research center that fosters intellectual collaborations and facilitates access to resources for faculty and graduate students who are actively engaged in research and teaching in the humanities, the arts, cultural studies and the humanistically-oriented social sciences. It advocates for the humanities within the UC Davis community and works with funding agencies to secure individual and programmatic resources for HaRCs faculty. The Institute sponsors faculty research seminars on designated themes as well as seventeen working research clusters to explore emerging research areas and provide collaborative opportunities for faculty and graduate students. The Institute also organizes conferences, workshops and lectures, including the Public Intellectuals Forum, and a graduate student research symposium, and provides partial funding for events that serve humanities scholars at UC Davis. The DHI is also the home of the California Cultures Initiative, which supports community-based media projects and engaged scholarship on regional issues and works to build connections between humanities scholars at UC Davis and the surrounding region.

Institute for Ultra-Scale Visualization

2127 Kemper Hall; (530) 754-8579
Kwan-Liu Ma, Director; ma@ultravis.org
http://www.ultravis.org

The SciDAC Ultra-Scale Visualization Institute, established on September 15, 2006, is a 3-year research and outreach effort sponsored by the DOE SciDAC program. Its mission is to address the upcoming peta and exa-scale visualization challenges facing computational science and engineering. The Institute will foster the exchange of knowledge between universities, DOE laboratories, and industry to make advanced visualization an integrated component in scientific discovery. The Institute will revolutionize the very process of scientific discovery by equipping scientists with tools that shed light on the knowledge hidden in previously incomprehensible datasets.

Mann Laboratory

103 Mann Laboratory
(530) 754-8313; Fax (530) 752-4554

Plant scientists in the Louis K. Mann Laboratory study the physiology, biochemistry, microbiology and molecular biology of pre-harvest and harvested fruits, ornamentals, and vegetables to improve and maintain their quality and safety during harvest, storage, processing, distribution and marketing. The six faculty housed in this facility are members of the Department of Plant Sciences and one USDA/ARS research scientist. Research and extension activities are supported by students, postdoctoral researchers and visiting scientists. Research ranges from the basic molecular biology to practical storage technologies for horticultural crops, including whole and lightly processed products. Results are of interest to other researchers in the plant sciences and food science as well as to growers, shippers, transportation and logistics provid-
ers, marketers and consumers of fresh fruit and vegetables. The facility is equipped with 18 controlled-temperature rooms, eight research laboratories, specialized postharvest analytical equipment, advanced rapid test equipment for human pathogens, and a small conference room.

**Materials Science Central Facilities**

Kemper Hall: lower level rooms 108-167  
Mike Meier, Director; mlmeier@ucdavis.edu  
http://www.matscicf.ucdavis.edu

Central Facilities is a group of eight laboratories that provide many essential resources for the faculty, students and researchers. Major equipment at MSCF includes a Scintag XDS-2000 powder diffractometer, an SEM (Philips FEI XL30 SFEG) one TEM (Philips CM-12), a TEM/STEM (JEOL 2500 SE), FT-IR and FT-micro-Raman spectrometers (Bruker RFS 100) and a small-angle x-ray scattering system (Bruker AXS). MSCF is also fully equipped for metallography and electron microscopy sample preparation including a new ion milling system. The goal in developing these laboratories was to provide an infrastructure that could serve the wide range of ongoing research activities in this department and in collaborations with researchers in other departments and institutions. All equipment in this facility are available to users from both within and outside UC Davis at nominal hourly rates. This infrastructure is also a key part of our laboratory teaching program. Students get to use professional, research-grade instruments to do modern, sophisticated experiments similar to those they will be doing in their future employment or in their graduate studies.

**Natural Reserve System**

Virginia Boucher, Manager  
The Barn  
(530) 752-6949; http://nrs.ucdavis.edu; http://nrs.ucop.edu

The UC Davis campus administers six reserves that are available for teaching and research.

- **Bodega Marine Reserve**, located at Bodega Bay, 100 miles west of campus, consists of coastal dune vegetation and bay and coastal tidal areas with facilities for overnight and longer stays; see Bodega Marine Laboratory and Reserve, on page 22.
- **Eagle Lake Biological Field Station** is on the shore of Eagle Lake in northeastern California and has boats, a small laboratory and facilities for overnight and longer stays.
- **Jepson Prairie Reserve**, located in Solano County 13 miles south of Dixon, consists of native California bunchgrass grasslands, vernal pools, playa lakes and freshwater sloughs.
- **Donald and Sylvia McLaughlin Reserve**, located near Clear Lake about 70 miles northwest of campus, consists of Inner Coast Range habitat with a mix of serpentine and non-serpentine soils. The reserve has a facility for long-term overnight stays with a well-equipped kitchen, full bath and a camping area for class groups.
- **Quail Ridge Reserve** consists of Inner Coast Range habitat located about 30 miles west of campus on a peninsula jutting into Lake Berryessa. The reserve has a facility with a well-equipped kitchen, full bath, 3 four-wheel drive vehicles and camping areas for groups.

- **Stebbins Cold Canyon Reserve**, located about 24 miles west of campus, has representative populations of several different plant communities found in California’s Inner and Outer Coast Ranges.

The university maintains over 35 reserves throughout the state, many of which are available for teaching and research.

**Northern California Nanotechnology Center**

West Wing Kemper Hall; Office 1125 Kemper Hall; (530) 754-9518  
Frank Yaghmaie, Director; fyaghmaie@ucdavis.edu  
http://ncnc.engineering.ucdavis.edu

The Northern California Nanotechnology Center (NCNC), a new research/teaching/industry facility for nanotechnology and microfabrication, is housed in the College of Engineering at UC Davis. NCNC is a world class center for the synthesis, fabrication, and analysis of nanoscale devices and materials for applications in:

- Electronic devices
- Medicine
- Biology
- Environment
- Optics

Opened in 2004, the Northern California Nanotechnology Center operates a 10,000+ square foot class 100 cleanroom laboratory. The laboratory is available for use by UC Davis faculty, students and staff on a recharge basis. Students, research staff and research faculty may use any tool in the facility after they have passed a training/certification module. Local industry may also be interested in using the facility by becoming an Industrial Affiliate.

**Nuclear Magnetic Resonance Facility**

Medical Sciences 1D  
(530) 752-7677; http://www.nmr.ucdavis.edu

The Nuclear Magnetic Resonance Facility provides access to state-of-the-art NMR instrumentation for spectroscopy and imaging to researchers in the biological, medical and physical sciences. At present, the facility operates ten spectrometers of varying purposes and capabilities at field strengths from 300 to 800 MHz. Applications include structural characterization of organic molecules, determination of protein structure and dynamics, imaging and in vivo spectroscopy of small animals, plants, and materials, and spectroscopy of solids. The Facility also has workstations for offline data processing. Four full-time staff members are available to assist campus researchers in utilizing the instrumentation.

**Pavement Research Center**

3153 Engineering III; (530) 754-6409  
John Harvey, Director; UC Davis Site; jharvey@ucdavis.edu  
http://www.its.berkeley.edu/pavementresearch/

The Pavement Research Center uses innovative research and sound engineering principles to improve pavement structures, materials and technologies. Work at the PRC focuses on asphalt and concrete pavements, including design, materials, rehabilitation, life cycle, maintenance and reconstruction; pavement cost analysis and strategy selection, effects of pavement activities on traffic in urban areas and pavement performance modeling.
Social Science Data Service

105 Social Sciences and Humanities Building
(530) 752-4009; http://www.ssd.s.uca.davis.edu

The Social Science Data Service (SSDS) is a unit of the Institute of Governmental Affairs (IGA). SSDS provides quantitative computing and consulting services in support of faculty and graduate students involved in social science research on the UC Davis campus. SSDS provides consulting services for the wide range of software used by social scientists and assists with questions regarding the use of SSDS computers and statistical and data-related programming. SSDS manages a UNIX system and a PC research lab used for quantitative social science computing. Specialized support is available for extramurally funded research projects managed by IGA.

Tahoe Environmental Research Center (TERC)

UC Davis Administration Office; Watershed Sciences Building;
(530) 754-8372
TERC, site Laboratories in Incline Village, NV (775) 881-7560
Geoffrey Schladow, Director; gschladow@ucdavis.edu
http://terc.ucdavis.edu/

The Tahoe Environmental Research Center is dedicated to research, education and public outreach on lakes and their surrounding watersheds and airsheds. Lake ecosystems include the physical, biogeochemical and human environments, and the interactions among them. The Center is committed to providing objective scientific information for restoration and sustainable use of the Lake Tahoe Basin.

UC Agricultural Issues Center

249 Hunt Hall
(530) 752-2320; agissues@ucdavis.edu
http://www.aic.ucdavis.edu

The UC Agricultural Issues Center is a university-wide research and outreach unit that draws on expertise from many disciplines. The Center focuses on California’s agricultural issues related to science and technology, international trade and markets, agribusiness trends, rural-urban issues, natural resources and the environment, human resources and agricultural policy.

UC Davis Center for Plant Diversity

Formally the UC Davis Herbarium
Dr. Dan Potter, Director; Ellen Dean. Curator
1026 Sciences Laboratory Building, Department of Plant Sciences
(530) 752-1091; http://herbarium.ucdavis.edu

The UC Davis Center for Plant Diversity provides information on the names, uses, toxicity and distribution of plants. Anyone can visit the Herbarium to use its dried plant collections (300,000 specimens), botanical library and microscopes, but a phone call is suggested to make sure staff will be available to assist you. The collections are used most commonly to check plant identifications, but they are also used by campus faculty and students for teaching and research in plant systematics and ecology. Herbarium staff answer hundreds of public service requests each year (especially identification of weeds and poisonous plants). Collections include vascular plants, bryophytes, lichens and algae. The majority of these specimens are angiosperms (flowering plants), mainly from California, but the collections are worldwide in scope, with strong holdings from North America, Ecuador, Baja California and regions with Mediterranean climate regimes. The herbarium is well known for its collection of weeds and poisonous plants, although it also has world-class collections of grasses, oaks and spurgers. The Herbarium’s support group, the Davis Botanical Society, hosts a wide range of botanical events, workshops and trips each year.

UC Davis Energy Institute

1850 Research Park Drive, Suite 300; (530) 747-3973
Bryan Jenkins, Interim Director; bjenkins@ucdavis.edu
http://energy.ucdavis.edu

The Energy Institute at UC Davis has been established for the purposes of focusing and coordinating energy research and education on the campus and facilitating interactions with other institutes, laboratories and programs across the nation and around the world. The breadth and depth of energy research on the campus supports the vision for building a world-class institute in energy with particular focus on sustainable energy system design. The Institute will also serve as home to a new Energy Graduate Group providing advanced degrees in energy science, technology and policy.

UC Davis J. Amoroso Hydraulics Laboratory (JAHL)

Dept. of Civil and Environmental Engineering; (530) 752-2385
M. Levent Kavvas, Director; mlkavvas@ucdavis.edu
http://jahl.ingr.ucdavis.edu/

UC Davis J. Amoroso Hydraulics Laboratory’s research areas include engineering hydraulics, fisheries protection, and ecological and environmental hydraulics. UC Davis JAHL was built to perform hydraulic modeling studies for the California State Water Project in the 1960s. It has been conducting hydraulic investigations through scaled physical models, prototype models and numerical models to provide modeling service to federal, state, local water agencies and private entities. Recently conducted research include sturgeon passage study, debris removal/trashrack/traveling screen study, fish treadmill study of fish behaviors near long fish screens, Devil Canyon power plant afterbay hydraulics, and Gorman Creek flood control channel hydraulics, etc. UC Davis JAHL has been actively participating in the development of solutions to fish protection technologies for the Bay Delta river system. Researchers in UC Davis JAHL, including fish biologists and hydraulic engineers, have many years of experience on testing Sacramento River and Bay Delta fish species under various hydraulic and environmental conditions. They also have extensive experience in handling invasive water plant species that occur in the Delta fish facilities, such as Egeria. Researchers at UC Davis JAHL, with the help of the state and federal agencies, has been pursuing the application of new fish protection technologies and developing a better understanding of the hydraulic and biological issues in the Sacramento River and Bay Delta system.

Veterinary Genetics Laboratory (VGL)

DNA Laboratory, Old Davis Road
(530) 752-2211

The laboratory is recognized for its pioneering research on animal blood groups and biochemical polymorphisms. Current research activities include studies of genetics, genomic and forensic research of domestic and wildlife animal species, including horses, cattle, sheep, goats, camelids, dogs, cats, wild felids and canids, bears, birds and primates. Activities include DNA genotyping and mitochondria sequencing for applications in animal identification, parental verification, forensic analyses, population structure and genetic diversity. Projects include, among others, mapping of phe notypic traits, coat color and disease genes in horse, dogs and cats; identification of causative mutations; development and validation of microsatellite and single nucleotide polymorphism markers for several species; development of robust diagnostic and genotyping
DNA tests; population and breed relationship studies through allele frequency and mitochondria sequence analyses; the genetic structure of wild populations; development of software for DNA genotyping and implementation of electronic data interchange for reporting of laboratory results. VGL is also involved in high profile criminal cases both nationally and internationally through their Forensic Unit.

**Veterinary Medicine Teaching and Research Center (VMTRC)**

UC Davis VMTRC
18830 Road 112
Tulare, CA 93274
559-688-1731; [http://www.vmtrc.ucdavis.edu](http://www.vmtrc.ucdavis.edu)

The Veterinary Medicine Teaching and Research Center (VMTRC) is a clinical teaching and research center within the UC Davis School of Veterinary Medicine. The center offers a forum for teaching, research and service programs for D.V.M. students, M.P.V.M. students, graduate students, residents, university faculty and visiting researchers interested in food animal production and agroecosystem health. VMTRC programs emphasize herd health medicine, epidemiology and preventive medicine, production management, agricultural economics, environmental protection, food safety/defense, animal health and well-being, and renewable energy.

**X-Ray Crystallographic Facility**

James C. Fettinger, Ph.D.
Department of Chemistry
(530) 754-7822

The X-Ray Crystallographic Facility, located in the Department of Chemistry, provides crystal structure determinations for researchers. Single crystals from all branches of chemistry are studied. The facility is equipped with two X-ray diffractometers, a Bruker SMART1000 and a Siemens P4 equipped with a rotating Cu anode source and possesses a stereo-microscope. Access to a Bruker ApexII diffractometer is also available. All instruments possess variable low temperature systems. Consultation and collaboration on a variety of single crystal related projects can be arranged.
1908 University Farm Buildings in 1908 include a dining hall (East Hall), a dormitory (North Hall), a creamery and a stock pavilion. The university is open to anyone at least 17 years old and courses have no entrance requirements “except an earnest desire to learn and to make the best use of the opportunities freely offered by the State through its university.”

1911 Students form an entity for self governance, the Associated Students of the University Farm School, to manage student affairs and encourage athletics.
UNDERGRADUATE ADMISSION

Undergraduate Admissions
One Shields Avenue
University of California
Davis, CA 95616-8507
(530) 752-2971; Fax (530) 752-3712
http://admissions.ucdavis.edu

APPLYING TO UC DAVIS

You can apply online at http://www.universityofcalifornia.edu/apply, or you can download a printable copy of the application at http://www.universityofcalifornia.edu/admissions/undergrad_adm/apply/download.html.

You may request a mailed copy of the UC application for undergraduate admission and scholarships. E-mail your request to ucinfo@application.net and include your name, address, the term for which you’re applying and your planned applicant status (freshman or transfer).

The initial filing periods to apply for admission and scholarships at UC Davis are as follows:

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Initial Filing Period (prior year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>November 1-30</td>
</tr>
<tr>
<td>Winter</td>
<td>July 1-31</td>
</tr>
<tr>
<td>Spring</td>
<td>October 1-31</td>
</tr>
</tbody>
</table>

For up-to-date details regarding winter and spring quarters, and tips on completing the UC application for admission and personal statement, see http://admissions.ucdavis.edu/admissions/apply.

After applying, transfer students are required to update their grades and course records online to ensure that the campuses have the most current academic information available. See http://www.universityofcalifornia.edu/admission/appupdate for details and deadlines.

APPLICATION FEES

The application fee of $60 for domestic students and $70 for international students entitles you to apply to one University of California campus. If you want to apply to more than one UC campus, you must pay an additional fee for each campus you select. These fees are not refundable. Applicants who apply online will be prompted to pay the fee before submitting the application. If you submit the application by mail, attach a check or money order made payable to the Regents of the University of California to the application form.

The University of California will waive application fees for up to four campuses for qualified students who otherwise would be unable to apply for admission. To be accepted for the fee waiver program, you must meet specific requirements related to your family income and size. The fee waiver program is for United States citizens and permanent residents only. If you are filing a paper application, please see http://www.universityofcalifornia.edu/admissions/undergrad_adm/apply/how_apply/apply_fees.html.

ADMISSION AS A FRESHMAN

The University of California defines a freshman applicant as one who is either currently enrolled in, or has graduated from, a high school and has not registered in a regular session at any collegiate-level institution since high school graduation. An applicant who has completed college courses while in high school or in a summer session immediately following high school graduation is considered a freshman applicant.

The University of California will accept the Certificate of Proficiency or the General Education Development (GED) certificate awarded by the State Department of Education in lieu of the regular high school diploma. However, you must also meet all other university entrance requirements (subject, scholarship and examination).

Admission requirements for California residents are different from those for nonresidents. Nonresidents must meet higher scholarship requirements.

Meeting the UC eligibility criteria qualifies you for admission to a UC campus, but does not guarantee admission to UC Davis. Due to limited enrollment space and the extraordinary size and strength of the UC Davis applicant pool, many qualified candidates are denied admission. Applicants who are admitted generally well exceed UC eligibility criteria. The selection criteria that UC Davis considers as part of its comprehensive review process for each UC-eligible applicant are available at http://admissions.ucdavis.edu/admissions/fr_selection_process.

UC Freshman Eligibility for California Residents

A California resident applying to UC as a freshman has three ways to satisfy the university's minimum admission requirements:

1. Eligibility in the Statewide Context,
2. Eligibility in the Local Context (ELC), and
3. Eligibility by Examination Alone.

Eligibility in the Statewide Context

Most students attain UC eligibility through Eligibility in the Statewide Context. To be eligible, you must satisfy the following subject, scholarship and examination requirements.

Subject Requirement: a–g

The following courses must be completed with a C grade or better, and for California residents, must be on your high school's UC-approved course list. View your school's UC-approved course list at http://ucop.edu/doorways. If you submit courses from an out-of-state school, Undergraduate Admissions will determine if your courses fulfill the Subject Requirement. At least seven of the 15 units (one unit equals one year of study) of the “a–g” requirements must be taken during the last two years of high school.

Courses taken in the 9th grade and completed with a grade of C or better can satisfy a subject requirement; however, the grades will not be used in computing your grade point average. If you receive a grade of D or lower in a 9th-grade course, you have not satisfactorily completed the subject requirement until you repeat the course (or, in some cases, complete a more advanced course) with a grade of C or better.

a. History/Social Science—2 years required

One year of United States history, or one-half year of United States history and one-half year of civics or American government; and one year of world history, cultures and geography.

b. English (or Language of Instruction)—4 years required

If attending a foreign high school where instruction is not in English, literature/composition courses in the native language may be substituted.
c. Mathematics—3 years required; 4 years recommended  
Must include algebra, geometry and second-year advanced algebra.

d. Laboratory Science—2 years required; 3 years recommended  
Must include at least two of these three subject areas: biology, chemistry, physics.

e. Language other than English—2 years; 3 years recommended  
The second year or higher of the same language must be completed to fulfill this requirement (e.g., Spanish I and Spanish II, not Spanish I and French I).

f. Visual and Performing Arts—1 year required  
If two separate semester courses of VPA are taken, both courses must be from a single VPA area (dance, drama/theater, music or visual arts).

g. College Preparatory Electives—1 year required  
Choose from UC-approved college preparatory electives.

Scholarship Requirement  
UC freshman eligibility is determined by a combination of grade-point average (GPA) in “a-g” courses and the UC score total, which is a conversion of the scores you earned on the ACT Assessment plus Writing OR SAT Reasoning Test, AND SAT Subject Tests.

The Scholarship Requirement is satisfied if your GPA is 3.000 or higher and achieves the qualifying UC score total that corresponds to your GPA on the UC Eligibility Index. The index is available at http://universityofcalifornia.edu/admissions/scholarshipreq, along with an online calculator you can use to assess your eligibility.

Your UC GPA calculation is determined by assigning point values to the grades you earn in “a-g” subjects completed in the 10th and 11th grades. Courses completed in the 9th grade with a C grade or better will be used to meet the Subject Requirement, but will not be calculated into your UC GPA.

Examination Requirement  
Freshman applicants are required to take:

- The ACT Assessment plus Writing (for the UC Eligibility Index, see http://www.universityofcalifornia.edu/admissions/scholarship_req OR
- The SAT Reasoning Test; highest reading, math and writing score from one sitting.

AND

- Two SAT Subject Tests in two different subject areas; highest two test scores in two different subject areas from any sitting (e.g., science and literature. If mathematics, must be Level 2).

Applicants for fall must take all of the required tests no later than the prior December. Official scores must be received by the end of January. You are responsible for making sure that testing agencies send your scores directly to each campus to which you apply.

Make arrangements to take the required ACT exams with your high school or at the ACT Web site at http://www.act.org. The UC Davis ACT code is 0454. Make arrangements to take the required SAT Reasoning Test and SAT Subject Tests at the College Board Web site at http://www.collegeboard.org. The UC Davis' College Board code is 004834.

Eligibility in the Local Context  
Under the Eligibility in the Local Context (ELC) pathway, the top four percent of graduating students at each participating California high school are designated UC-eligible. More information about ELC is available online at http://www.ucop.edu/sas/elc.

Eligibility by Examination Alone  
If you do not meet the requirements for Eligibility in the Statewide Context or Eligibility in the Local Context (ELC), you may be able to qualify for admission to UC by examination alone. To be eligible by examination, you must achieve high scores on the required ACT/SAT examinations for freshman admission.

You must satisfy the same examination requirement as students who are eligible in the statewide context, and achieve a UC score total, as calculated by the UC Eligibility Index, of at least 410, or 425 for nonresidents.

In addition, you must earn a minimum UC score of 63 or each component of the ACT or SAT Reasoning Test and on each SAT Subject Test. Calculate your UC score at http://universityofcalifornia.edu/admissions/scholarshipreq.

You cannot qualify for admission by examination alone if you have completed 12 or more units of transferable coursework at a college or university following high school graduation or if you have taken transferable college courses in any subject covered by the SAT Subject Tests before taking the exams. It is rare that an applicant is selected for admission to UC Davis based on test-score eligibility alone.

UC Freshman Eligibility for Non-California Residents  
If you are an out-of-state resident you must attain a 3.400 GPA or higher in the “a-g” required courses and achieve the qualifying UC score total that corresponds to your GPA on the UC Eligibility Index, available at http://www.universityofcalifornia.edu/admissions/scholarship_req. You can also become UC eligible by examination alone; please refer to the criteria described in Eligibility by Examination Alone, on page 33.

Transfer Credit  
Transfer credit may be granted to a freshman applicant for an acceptable college course taken while in high school when an official transcript is received from the college that conducted the course. Transfer credit is granted for each College Board Advanced Placement (AP) Examination completed with a score of 3, 4 or 5. Students completing the International Baccalaureate (IB) Diploma with a score of 30 or above will receive 30 quarter (20 semester) units total toward their UC undergraduate degree. The university grants 8 quarter (5.3 semester) units for students who receive IB certificates with scores of 5, 6 or 7 on Higher Level exams. If students take a combination of college courses, Advanced Placement or International Baccalaureate Examinations in the same subject areas, transfer credit may be limited due to duplication of credit.
Advanced Placement Examinations

If you take a College Board Advanced Placement (AP) Examination and score 3, 4 or 5, you will be awarded college credit. The credit will become part of the minimum 180 quarter units you need in order to receive a bachelor's degree. The credit from the AP Examinations may also be used to satisfy specific degree requirements.

See College Board Advanced Placement (AP) Examination Credit, on page 35, to learn how many units you may receive for an AP Examination; see the Credit Toward Degree column heading. How those units will be applied toward specific degree requirements in each college is explained for each exam category and in the notes below each exam listing. Please note that the courses for which AP credit has been granted may not be used as a substitute for courses required as part of the UC Davis General Education Requirement; see General Education Requirement, on page 91.

In general, you may not earn university credit for college courses that duplicate credit already earned through AP. There are, however, a few exceptions to this general rule. Since it is often difficult to know exactly which UC Davis course you should take when you have earned AP credit, you should talk with an academic adviser in your major department or dean's office before selecting and enrolling in classes.

International Baccalaureate Examinations

UC Davis recognizes the International Baccalaureate (IB) examinations for college credit. Higher Level examinations presented with scores of 5, 6 or 7 receive degree credit and in specific instances are deemed comparable to various lower-division courses. Students completing the International Baccalaureate (IB) diploma with a score of 30 or above will receive a maximum of 30 quarter (20 semester) units. The credit will apply toward the minimum 180 quarter units needed to receive a bachelor's degree.

See International Baccalaureate (IB) Higher Level Examination Credit, on page 36, to learn how many units you may receive for an acceptable IB examination. The table also specifies which UC Davis lower-division course an IB examination is comparable to. Please note that the courses for which IB credit have been granted may not be used as a substitute for courses required as part of the UC Davis General Education Requirement; see General Education Requirement, on page 91.

In general, you may not earn university credit for college courses that duplicate credit already earned through IB. Similarly, students will not receive duplicate credit for comparable AP Examinations if granted IB credit. Additionally, each college may have special restrictions on the use of IB examinations. Please check with your dean's office and department adviser to determine any restrictions in their use toward breadth requirements and lower-division major course requirements.

ADMISSION AS A TRANSFER STUDENT

The University of California defines a transfer applicant as a student who has been a registered student in a regular term at a college, university or in college-level extension classes since graduating from high school. Summer session attended immediately following high school graduation is excluded in this determination. If you are a transfer applicant, you may not disregard your college record and apply for admission as a freshman.

California residents must meet the requirements that follow. If you are not a California resident, see UC Freshman Eligibility for Non-California Residents, on page 33.

UC Davis gives highest priority to transfer applicants from California community colleges. To apply to majors in the College of Biological Sciences, College of Engineering and the College of Letters and Science, students must be junior-level applicants with a minimum of 90 quarter (60 semester) units of transferable coursework, including courses planned or in progress. In the College of Agricultural and Environmental Sciences, junior-level applicants will be given highest priority, but lower-division applicants may be considered if space allows.

Meeting the transfer eligibility requirements for UC qualifies you for admission to a UC campus, but does not guarantee admission to UC Davis. Due to limited enrollment space, transfer applicants who are admitted generally well exceed UC eligibility criteria. Foremost is the applicant's academic performance and preparation for the selected college and major. To be competitive, you must maintain a GPA of 2.800 or higher. In some cases, personal characteristics, experiences and circumstances will also be considered.

Applications far exceed the number of spaces available in majors such as biological sciences, biotechnology, communication, engineering, international relations, psychology and viticulture and enology. Applicants must complete specific lower-division preparation courses with a specific GPA in the major and an overall required GPA.

To see our selective majors and their specific requirements for admission, please see http://admissions.ucdavis.edu/admission/tr_select_majors.

UC Transfer Eligibility for California Residents

To be eligible for admission to UC as a junior transfer student, you must fulfill both of the following criteria:

1. Complete 90 quarter (60 semester) units of transferable credit with a minimum 2.400 GPA. No more than 21 quarter (14 semester) units may be taken Pass/No Pass.

2. Complete the following seven transferable college courses, earning a grade of C, or better, in each course:
   - Two courses in English composition;
   - One course in mathematical concepts and quantitative reasoning;
   - Four courses chosen from at least two of these subject areas: arts and humanities, social and behavioral sciences, and physical and biological sciences.

Each course must be worth at least 4.5 quarter (3 semester) units. Completing the IGETC before transferring to UC may satisfy the required seven-course pattern for UC eligibility, depending on the courses you take. For more information, see http://www.assist.org.

Alternatives for UC Transfer Eligibility

If you were eligible for admission to UC when you graduated from high school—meaning you satisfied the subject, scholarship and examination requirements, or were identified by UC during the senior year as Eligible in the Local Context (ELC)—you are eligible to transfer if you have a C (2.000) average in your transferable college coursework.
### College Board Advanced Placement (AP) Examination Credit

<table>
<thead>
<tr>
<th>Examination</th>
<th>Score</th>
<th>UC Davis Course Equivalencies</th>
<th>Continuing Course</th>
<th>Credit Toward Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ENGLISH-Language and Composition</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English Language and Composition</td>
<td>5, 4, or 3</td>
<td>English 1, University Writing Program</td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>College of Agricultural and Environmental Sciences</td>
<td>4 units</td>
<td>Satisfies first half of English composition requirement.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Biological Sciences</td>
<td>4 units</td>
<td>Satisfies lower-division units of the English Composition requirement.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Engineering, Design, and Environmental Sciences</td>
<td>4 units</td>
<td>Satisfies English 1, University Writing Program 1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Letters and Science</td>
<td>4 units</td>
<td>Satisfies first course toward English Composition requirement.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FOREIGN LANGUAGES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinese Language and Culture</td>
<td>5, 4, or 3</td>
<td>Determined by consultation with advisor</td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>French Language</td>
<td>5, 4, or 3</td>
<td>French 22</td>
<td>French 23, or consultation with advisor</td>
<td></td>
</tr>
<tr>
<td>German Language</td>
<td>5, 4, or 3</td>
<td>German 21</td>
<td>German 22, or consultation with advisor</td>
<td></td>
</tr>
<tr>
<td>Italian Language</td>
<td>5, 4, or 3</td>
<td>Determined by consultation with advisor</td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>Japanese Language and Culture</td>
<td>5, 4, or 3</td>
<td>Determined by consultation with advisor</td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>Latin</td>
<td>5, 4, or 3</td>
<td>Latin 2</td>
<td>Determined by consultation with Classics advisor</td>
<td></td>
</tr>
<tr>
<td>Spanish Language</td>
<td>5, 4, or 3</td>
<td>Spanish 22</td>
<td>Spanish 23, or consultation with advisor</td>
<td></td>
</tr>
<tr>
<td><strong>HUMANITIES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Agricultural and Environmental Sciences</td>
<td>4 units</td>
<td>Satisfies breadth requirement and/or University electives for each humanities examination passed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Studio Art</td>
<td>3</td>
<td>Art Studio 2, 3</td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>United States History</td>
<td>5, 4, or 3</td>
<td>History 1A, 1B</td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td><strong>MATHEMATICS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Biological Sciences</td>
<td>5, 4, or 3</td>
<td>Mathematics 12, 16A, 17A, or 21A</td>
<td>Mathematics 10B, 11B, or 21B</td>
<td>8 units</td>
</tr>
<tr>
<td>Mathematics 16A, 17A, or 21A</td>
<td>8 units</td>
<td>May be taken for full credit. Credit for Mathematics 16A, 17A, or 21A electives may serve as prerequisite for Mathematics 10B, 11B, or 21B.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics 12, 16A, 17A, or 21A</td>
<td>8 units</td>
<td>May be taken for full credit. Credit for Mathematics 16A, 17A, or 21A electives may serve as prerequisite for Mathematics 10B, 11B, or 21B.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics 12, 16A, 17A, or 21A</td>
<td>8 units</td>
<td>May be taken for full credit. Credit for Mathematics 16A, 17A, or 21A electives may serve as prerequisite for Mathematics 10B, 11B, or 21B.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PHYSICS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Agricultural and Environmental Sciences</td>
<td>4 units</td>
<td>Satisfies breadth requirement and/or University electives for each social science examination passed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States Government</td>
<td>5, 4, or 3</td>
<td>Political Science 1</td>
<td></td>
<td>4 units</td>
</tr>
<tr>
<td><strong>STATEWIDE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comparative Government</td>
<td>5, 4, or 3</td>
<td>Political Science 2</td>
<td></td>
<td>4 units</td>
</tr>
<tr>
<td>Economics</td>
<td>5, 4, or 3</td>
<td>Economics 1A</td>
<td>Economics 100</td>
<td>4 units</td>
</tr>
<tr>
<td>Economics</td>
<td>5, 4, or 3</td>
<td>Economics 1B</td>
<td>Economics 105</td>
<td>4 units</td>
</tr>
<tr>
<td>Psychology</td>
<td>5</td>
<td>Psychology 1</td>
<td></td>
<td>4 units</td>
</tr>
</tbody>
</table>

**NOTE:** Courses for which AP credit has been granted may not be used as a substitute for courses required as part of the UC Davis General Education Requirement; see Advanced Placement Examinations, on page 34.
### International Baccalaureate (IB) Higher Level Examination Credit

<table>
<thead>
<tr>
<th>Examination</th>
<th>Score</th>
<th>UC Davis Course Equivalencies</th>
<th>Continuing Course</th>
<th>Credit Toward Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ENGLISH</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English A1</td>
<td>5, 6, 7</td>
<td>English 3</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>English A2</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>English A8</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td><strong>College of Agricultural and Environmental Sciences:</strong> Satisfies first half of English Composition requirement.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>College of Biological Sciences:</strong> Satisfies 4 lower-division units of the English Composition requirement.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>College of Letters and Science:</strong> Examination A1 satisfies first course toward English Composition requirement.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LANGUAGES</strong></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Classical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classical Greek</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>Latin</td>
<td>5, 6, 7</td>
<td>Latin 1, 2, 3</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td><strong>A1 (native language; for English see above)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>French A1</td>
<td>5, 6, 7</td>
<td>French 21, 22, 23</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>German A1</td>
<td>5, 6, 7</td>
<td>German 1, 2</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>Italian A1</td>
<td>5, 6, 7</td>
<td>Italian 4, 5</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>Portuguese A1</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>Spanish A1</td>
<td>5, 6, 7</td>
<td>Spanish 28</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td><strong>A2 (second language; for English see above)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>French A2</td>
<td>5, 6, 7</td>
<td>French 21, 22</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>German A2</td>
<td>5, 6, 7</td>
<td>German 1, 2</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>Italian A2</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>Portuguese A2</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>Spanish A2</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td><strong>B (non-native language; for English, see above)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>French B</td>
<td>5, 6, 7</td>
<td>French 1, 2, 3</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>German B</td>
<td>5, 6, 7</td>
<td>German 1, 2</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>Italian B</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>Portuguese B</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>Spanish B</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td><strong>College of Biological Sciences:</strong> French and Latin examinations satisfy the Foreign Language requirement for A.B. degree.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>College of Letters and Science:</strong> Foreign Language requirement (A.B. degree) satisfied by following examinations: French A1, A2, B, Italian A1, Latin, Spanish A1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HUMANITIES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dance</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>Design Technology</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>Film</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td><strong>History</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Africas</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>Americas</td>
<td>5, 6, 7</td>
<td>History 17A, 17B</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>East/South Asia and Oceania</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>Europe</td>
<td>5, 6, 7</td>
<td>History 4C</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>Islamic World</td>
<td>5, 6, 7</td>
<td>History 6</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>South Asia and the Middle East</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>Music</td>
<td>5, 6, 7</td>
<td>Music 10</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>Theater Arts</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>Visual Arts</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td><strong>College of Biological Sciences:</strong> Music examination partially satisfies Area (Breadth) requirement for A.B. degree.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>College of Letters and Science:</strong> Music examination partially satisfies Area (Breadth) requirement for A.B. degree.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NATURAL SCIENCES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biology</td>
<td>5, 6, 7</td>
<td>Biological Science 10</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>Chemistry</td>
<td>5, 6, 7</td>
<td>Chemistry 10 (5, 6); Chemistry 2A (7)</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>Computer Science</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>Mathematics</td>
<td>6, 7</td>
<td>Math 21A, 21B (credit for one math series only)</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td></td>
<td>5, 6, 7</td>
<td>Math 17A, 17B (credit for one math series only)</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td></td>
<td>5, 6, 7</td>
<td>Math 16A, 16B (credit for one math series only)</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>Physics</td>
<td>5, 6, 7</td>
<td>Physics 1AB or 10</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td><strong>College of Letters and Science:</strong> 4 units of credit toward Natural Sciences.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Credit or Preparatory Course Work allowed for science majors for each Natural Sciences examination passed, except 8 units of credit allowed for Mathematics and Physics examinations.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SOCIAL SCIENCE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business and Management</td>
<td>5, 6, 7</td>
<td></td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>Economics</td>
<td>5, 6, 7</td>
<td>Economics 1A and 1B</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>Geography</td>
<td>5, 6, 7</td>
<td></td>
<td></td>
<td>8 units</td>
</tr>
<tr>
<td>Philosophy</td>
<td>5, 6, 7</td>
<td>Philosophy</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>Psychology</td>
<td>5, 6, 7</td>
<td>Psychology</td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td>Social &amp; Cultural Anthropology</td>
<td>5, 6, 7</td>
<td></td>
<td>Determined by department or major adviser</td>
<td>8 units</td>
</tr>
<tr>
<td><strong>IB Diploma with a score of 30 or higher</strong></td>
<td></td>
<td></td>
<td></td>
<td>30 units</td>
</tr>
</tbody>
</table>

The aforementioned is not a comprehensive list, as annually new tests are possible. If your examination is not listed, it will be determined by adviser consultation.

**Duplicate credit:** Students should be aware that IB exams, AP exams, and college courses taken prior to or after enrolling at the University may be duplicative. In these cases, the University will award credit for only one of these.

**Credit Limitations:** A student may receive eight units maximum for Higher Level IB exams that are duplicative.

**NOTE:** Courses for which IB credit have been granted may not be used as a substitute for courses required as part of the UC Davis General Education Requirements; see International Baccalaureate Examinations, on page 37.
If you met the Scholarship Requirement in high school, but did not satisfy the 15-course Subject Requirement, you must take transferable college courses in the missing subjects, earn a C or better in each required course and maintain a 2.000 GPA to be eligible to transfer.

**UC Transfer Eligibility for Non-California Residents**

The eligibility requirements for nonresident transfer applicants are very similar to those for residents. Nonresidents must have a GPA of 2.800 or higher in all transferable college coursework.

**Transfer Credit**

Coursework from other colleges and universities is considered transferable if the applicant completed the course at an institution that is recognized by the University of California. In addition, the coursework must be comparable to courses offered within the University of California.

A total of 105 quarter (70 semester) transferable units toward a university degree may be earned at a community (two-year) college. You can find information about transferable credit from California community colleges at [http://www.assist.org](http://www.assist.org). Only subject credit will be granted for courses taken in excess of this amount.

If you have completed 120 quarter (80 semester) units or more of transferable community and/or four-year college units, your admission is subject to approval by the respective dean for majors in the College of Agricultural and Environmental Sciences, College of Biological Sciences and College of Letters and Science.

**Advanced Placement Examinations**

If you take a College Board Advanced Placement (AP) Examination and score 3, 4 or 5, you will be awarded college credit. The credit will become part of the minimum 180 quarter units you need in order to receive a bachelor's degree. The credit from the AP Examinations may also be used to satisfy specific degree requirements.

See [College Board Advanced Placement (AP) Examination Credit, on page 33](#) to learn how many units you may receive for an AP Examination; see the Credit Toward Degree column heading. How those units will be applied toward specific degree requirements in each college is explained for each exam category and in the notes below each exam listing. Please note that the courses for which AP credit has been granted may not be used as a substitute for courses required as part of the UC Davis General Education Requirement; see General Education Requirement, on page 91.

In general, you may not earn university credit for college courses that duplicate credit already earned through AP. There are, however, a few exceptions to this general rule. Since it is often difficult to know exactly which UC Davis course you should take when you have earned AP credit, you should talk with an academic adviser in your major department or dean’s office before selecting and enrolling in classes.

**International Baccalaureate Examinations**

UC Davis recognizes the International Baccalaureate (IB) examinations for college credit. Higher Level examinations presented with scores of 5, 6 or 7 receive degree credit and in specific instances are deemed comparable to various lower-division courses. Students completing the International Baccalaureate (IB) diploma with a score of 30 or above will receive a maximum of 30 quarter (20 semester) units. The credit will apply toward the minimum 180 quarter units needed to receive a bachelor’s degree.

See [International Baccalaureate (IB) Higher Level Examination Credit, on page 36](#) to learn how many units you may receive for an acceptable IB examination. The table also specifies which UC Davis lower-division course an IB examination is comparable to. Please note that the courses for which IB credit have been granted may not be used as a substitute for courses required as part of the UC Davis General Education Requirement; see General Education Requirement, on page 91.

In general, you may not earn university credit for college courses that duplicate credit earned through IB. Similarly, students will not receive duplicate credit for comparable AP Examinations if granted IB credit. Additionally, each college may have special restrictions on the use of IB examinations. Please check with your dean’s office and department adviser to determine any restrictions in their use toward breadth requirements and lower-division major course requirements.

**Limited Status**

Students in limited status are those whose special attainments qualify them to take certain courses in the university toward a definite and limited objective. To apply for limited status admission, you must either have a bachelor’s degree (but not be a candidate for an advanced degree), or have completed a substantial amount of college work with a satisfactory grade point average. You must submit a UC undergraduate application with fee. As a limited status student you will be expected to maintain a certain scholarship average during a predetermined time of enrollment.

Application filing dates are the same as those for new undergraduate applicants. Fees for limited status students are the same as those for new applicants. You will not be admitted to limited status for the purpose of raising a low scholarship average.

Admission to the College of Agricultural and Environmental Sciences requires the approval of the Undergraduate Admissions director and the dean of the college.

*The College of Biological Sciences, College of Engineering and the College of Letters and Science do not accept limited status applicants.*

**Second Baccalaureate**

If you have a bachelor’s degree substantially equivalent to one that is granted by the University of California, you may be allowed to enroll as an undergraduate seeking a second bachelor’s degree. Admission in this category will depend upon a superior academic record and clear evidence of a change in objective.

Admission to the College of Agricultural and Environmental Sciences and College of Engineering requires the approval of the Undergraduate Admissions director and the dean of the college. You must submit a UC undergraduate application with fee.

Application filing dates are the same as those for new undergraduate applicants. Fees for second baccalaureate students are the same as those for new applicants.

*The College of Engineering will consider applicants if their first degree is not in engineering and if they complete the lower-division engineering program at a California community college. The College of Letters and Science and the College of Biological Sciences do not accept second baccalaureate applicants.*
Special Status

The special status classification is for applicants 21 years of age or older who have not had the opportunity to complete a satisfactory high school program or who have not completed a substantial amount of college work, but by reason of special attainment or background may be prepared to undertake certain courses at UC Davis toward a definite and limited objective.

You will not be admitted to special status for the purpose of fulfilling requirements for admission as a regular student. Conditions for admission are determined by the Undergraduate Admissions director and are subject to approval by the dean of the College of Agricultural and Environmental Sciences. Admission is for a specified time only and a prescribed scholastic average must be maintained. You must submit a UC undergraduate application with fee.

Application filing dates are the same as those for new undergraduate applicants. Fees for special status students are the same as those for new applicants.

The College of Engineering, the College of Letters and Science and the College of Biological Sciences do not accept special status applicants.

UC Intercampus Transfer

If you are an undergraduate student currently or previously registered at another UC campus and have not since been registered in another institution, you may apply for transfer to the UC Davis campus. Filing dates, the application, fees and admission requirements are the same as those listed for new applicants.

ADMISSION AS AN INTERNATIONAL STUDENT

International students attend the University of California, Davis, from many countries around the world. There were 117 different countries represented on the UC Davis campus in the 2007-2008 academic year, by an international student population of approximately 2,000 students, as well as approximately 2,300 international faculty and researchers.

International Freshman Applicants

Non-immigrants studying in the United States must meet the same requirements as domestic California and non-California residents. Students studying outside the United States must complete secondary school, earn superior marks in academic subjects, sit for the UC required exams and may be required to demonstrate English proficiency. For more information, see http://admissions.ucdavis.edu/international.

International Transfer Applicants

International students applying to transfer to UC Davis from California colleges or universities are considered for admission using the same eligibility criteria as domestic students. Applicants who have attended foreign and U.S. colleges and universities will be evaluated using courses and grades from both institutions.

Priority is given to prospective California community college transfer students who are prepared to begin their junior or third year of study. Coursework from other colleges and universities is considered transferable if the applicant completed the course at an institution that is recognized by the University of California. In addition, the coursework must be comparable to courses offered within the University of California. For more information, see http://admissions.ucdavis.edu/international.

Required International Academic Records

International students are responsible for providing UC Davis with official academic transcripts and/or certificates beginning with secondary school records. College and university records should indicate subjects taken; grades or marks earned; rank in class; number of academic terms per year; number of weeks in each academic term; and number of hours per week devoted to lecture and laboratory. Certifications must be provided for any university or government examinations the student has undertaken. Note: It is not possible to disregard any college or university work undertaken within the United States or abroad.

English Proficiency

Applicants must demonstrate English proficiency if they have been studying in the United States for less than two years, English is not their native language, and/or the language of instruction prior to study in the United States was not English. Applicants may demonstrate proficiency in one of the following ways:

• Complete two transferable college courses (3 semester or 4–5 quarter units each) in English composition with C grades or better at an accredited U.S. college or university.
• Achieve a minimum score of 550 on the paper-based Test of English as a Foreign Language (TOEFL) or 213 on the computer-based TOEFL or 80 on the Internet-based TOEFL. For more information, see http://www.toefl.org.
• Achieve a minimum score of 7 (academic module) on the International English Language Testing System (IELTS).
• Achieve a minimum score of 560 on the Writing component of the SAT Reasoning Test.
AFTER YOU APPLY FOR ADMISSION

A few weeks after you apply, the University of California will notify you that your application has been received and processed. UC Davis will also notify you once the application has been received at our campus and that you can check your application and admission status online at http://myadmissions.ucdavis.edu. MyAdmissions is a secure site for current applicants and admitted students to UC Davis. Admitted students can use MyAdmissions to check deadlines for the following and to complete all pre-enrollment tasks including:

- eFAN—Electronic Financial Aid Notice and Scholarships
- Student Housing
- Statement of Legal Residence
- High School Transcripts
- International Records
- AP/IB Exam Results
- Test Scores
- Accommodation for a Disability (if necessary)
- Health Insurance Requirement
- Hepatitis B Statement
- Orientation

After applying, transfer students are required to update their grades and course records online to ensure that the campuses have the most current academic information available. For details and deadlines, see http://www.universityofcalifornia.edu/admission/appupdate.

Required Academic Records for All Students

It is not possible to disregard any AP or IB exams, or college or university work undertaken within the United States or abroad. Freshman applicants are required to submit official scores for the following examinations:

- ACT plus Writing
  OR
- SAT Reasoning Test
  And
- SAT Subject Tests

For more information regarding ACT, see http://www.act.org; the UC Davis ACT code is 0454. For more information regarding SAT, see http://www.collegeboard.org; the UC Davis CEEB code is 004834.

If you are admitted to UC Davis, we will request official transcripts. You do not need to submit transcripts before this time. All students must provide official:

- High school transcripts
- College transcripts

All students completing the following examinations will be required to submit official scores:

- Advanced Placement
- International Baccalaureate

International Applicants will be required to submit scores for the following examination:

- TOEFL
  OR
- IELTS

Submit official documents and test scores to:

Undergraduate Admissions
University of California
One Shields Avenue
Davis, CA 95616-8307

SPECIAL PROGRAMS

Deferred Enrollment

The Deferred Enrollment program allows newly admitted undergraduate students to postpone their initial enrollment at the university for up to one year. The purpose is to allow time to pursue other activities and opportunities that will assist students in clarifying their educational goals (e.g., job opportunities, non-collegiate experience, time to resolve personal or medical problems). Students are not allowed to enroll in another college or university during this time. To be eligible for deferred enrollment, students must return their affirmative Statement of Intent to Register (SIR) with the deposit by the deadline, and must satisfy all university admission and entrance requirements. A Deferred Enrollment application must also be submitted along with a $60 processing fee prior to the first day of instruction of the quarter to which the student was admitted. For more information, please contact Undergraduate Admissions at (530) 752-2971.

READMISSION

If you are a former UC Davis undergraduate student planning to resume studies at the UC Davis campus as an undergraduate, you must file an application for readmission, available in the Office of the University Registrar, and pay a nontransferable, nonrefundable fee of $60. You are a former student if you have interrupted the completion of consecutive terms of enrollment on the UC Davis campus.

Official transcripts of all work you may have attempted in the interim must be submitted to the Office of the University Registrar.

Students applying for readmission must file their applications on or before the following deadlines:

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Deadline Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2008</td>
<td>Jul 31, 2008</td>
</tr>
<tr>
<td>Winter 2009</td>
<td>Oct 30, 2009</td>
</tr>
<tr>
<td>Spring 2009</td>
<td>Jan 30, 2009</td>
</tr>
<tr>
<td>Fall 2009</td>
<td>Jul 31, 2009</td>
</tr>
<tr>
<td>Winter 2010</td>
<td>Oct 30, 2009</td>
</tr>
<tr>
<td>Spring 2010</td>
<td>Jan 29, 2010</td>
</tr>
</tbody>
</table>
Admission Checklist

1. Apply via the Internet at
   http://www.universityofcalifornia.edu/apply. You can
   also download a printable copy of the application at http://
   www.universityofcalifornia.edu/admissions/undergrad_adm/
   apply/download.html. You may request a mailed copy of the
   UC application for undergraduate admission and scholar-
   ships. E-mail your request to ucinfo@application.net and
   include your name, address, the term for which you’re
   applying, and your planned applicant status (freshman or
   transfer).

2. Complete the application, the personal statement, and list
   the college and major you prefer. You may pay the appli-
   cation fee online. If you apply with the paper application,
   attach a check or money order to cover the application
   fees with your application materials. Mail the application
   materials and fee during the priority filing period for the
   quarter in which you are interested; do not attach any
   other documents.

3. Keep a copy of your application and personal statement.

4. Keep the notices you receive from both the UC Under-
   graduate Application Processing Service and the Under-
   graduate Admissions office, including those received by
   e-mail.

5. If you are applying from high school, do not send a pre-
   liminary transcript unless asked to do so by Undergradu-
   ate Admissions. Please arrange to have official test scores
   forwarded by the testing agency. If you are applying as a
   transfer student, arrange to have all official college or uni-
   versity transcripts sent to each UC campus to which you
   applied.

6. High school applicants for the fall quarter should take the
   ACT Assessment plus Writing or the SAT Reasoning Test
   (critical reading, mathematics and writing). In addition,
   all applicants must complete two SAT Subject Tests in
   two different subject areas: history/social science, English
   literature, mathematics, laboratory science or language
   other than English. All exams must be taken no later than
   December of the year before you plan to enroll at UC
   Davis. We strongly encourage you to complete these tests
   before or on the November test date.

7. Undergraduate Admissions may request additional infor-
   mation, such as official transcripts, or confirmation of
   work in progress. Send this information right away so
   your application can be evaluated without delay. Your
   eligibility for admission cannot be evaluated until all your
   application materials are received; i.e., completed applica-
   tion form, filing fee, essay, official transcripts (if required),
   work in progress, and test scores (if required).

8. If you are admitted, keep your admission letter for your
   records.

9. Use MyAdmissions at http://myadmissions.ucdavis.edu to
   check your admission status to UC Davis. If you have
   been admitted, declare your Statement of Intent to Reg-
   ister (SIR), check your financial aid and scholarship
   status, and pay your nonrefundable advance deposit of
   $100 (if required). Sign up for an e-mail account, com-
   plete your “Statement of Legal Residence” (SLR) form,
   Hepatitis B Immunization Statement form (if applicable),
   and other required forms. Once you complete these
   forms, you will be able to complete registration and
   obtain housing. You will also be linked to information
   regarding the UC student health insurance requirement.
South Hall dormitory is built. The cost to attend the Farm School for eight months is estimated at $250 for board and room, fees and books.
FEES AND EXPENSES

Give careful consideration to the total financing of your university education. If you will need funds beyond those that you and your family can provide, you should apply for financial aid well in advance of enrollment. The deadlines for applying for financial aid (grants, loans, Work Study and scholarships) are listed on the following pages.

The most up-to-date student fee information is available at http://www.ormp.ucdavis.edu/studentfees. At the time of registration each quarter, every student must pay the quarterly fees. A Registration Fee Deferred Payment Plan (RFDPP), which allows students to pay quarterly fees in three monthly installments, is available.

Course Materials Fees

Students may be charged fees in some courses for the use, rental or consumption of materials, tools or equipment, or for the costs of materials or services necessary to provide a special supplemental educational experience. For example, course materials fees may cover the purchase of chemicals and glassware for a science laboratory or of art supplies for an art studio class. They might also cover film rentals, field trips, or the purchase or rental of specific equipment. Courses that may be subject to the course materials fee are listed in the Class Schedule and Registration Guide (CSRG).

Part-Time Students

Students approved for enrollment on a part-time basis pay the same fees as full-time students, but pay only one-half of the Educational Fee. Part-time nonresidents pay one-half of the Nonresid-

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### Student Fees

As a result of regental, legislative, gubernatorial, and/or campus actions, these fees may change without notice. For up-to-date fee information, see http://www.ormp.ucdavis.edu/studentfees. Programs and courses may have fees that are not listed here, check with your advisor.

<table>
<thead>
<tr>
<th>Undergraduate 4</th>
<th>Graduate Law 1</th>
<th>Veterinary Medicine</th>
<th>Master of Public Health 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration Fee</td>
<td>$288.00</td>
<td>$288.00</td>
<td>$288.00</td>
</tr>
<tr>
<td>Educational Fee</td>
<td>$2,108.00</td>
<td>$2,394.00</td>
<td>$2,498.00</td>
</tr>
<tr>
<td>ASUCD Fee</td>
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<td>$35.00</td>
<td>$35.00</td>
</tr>
<tr>
<td>GSA Fee</td>
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<td>$12.00</td>
<td>$12.00</td>
</tr>
<tr>
<td>ESA Fee</td>
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<td>$30.00</td>
<td>$30.00</td>
</tr>
<tr>
<td>Legal Education Enhancement and Access Program Fee</td>
<td>$42.73</td>
<td>$42.73</td>
<td>$42.73</td>
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<tr>
<td>Campus Expansion Initiative</td>
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<td>$134.60</td>
<td>$134.60</td>
</tr>
<tr>
<td>Student Services Maintenance Fee and Student Activities &amp; Services Initiative Fee</td>
<td>$103.30</td>
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</tr>
<tr>
<td>Student Facilities Safety Fee</td>
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<tr>
<td>Student Health Services Fee</td>
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<tr>
<td>Student Health Services Fee</td>
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<tr>
<td>Health Insurance 2</td>
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<tr>
<td>Disability Insurance</td>
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<td>$61.00</td>
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</tr>
<tr>
<td>Professional School Fee</td>
<td>$9,219.50</td>
<td>$3,746.00</td>
<td>$3,602.00</td>
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<tr>
<td>Special Fee</td>
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<td>$94.00</td>
</tr>
<tr>
<td>Veterinary Medicine Course Materials Fee</td>
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<tr>
<td>School of Medicine Course Materials Fee</td>
<td>$123.00</td>
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<td>$123.00</td>
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<tr>
<td>Total Full-time Student Fees, CA Resident</td>
<td>$3,184.20</td>
<td>$3,358.30</td>
<td>$3,532.45</td>
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<tr>
<td>Nonresident Tuition</td>
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<td>$4,898.00</td>
<td>$4,082.00</td>
</tr>
<tr>
<td>Nonresident Tuition</td>
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<td>$8,380.30</td>
<td>$8,082.00</td>
</tr>
<tr>
<td>Total Part-time Student Fees, Nonresident</td>
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<td>$2,361.30</td>
<td>$2,394.00</td>
</tr>
<tr>
<td>Nonresident Tuition</td>
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<td>$4,862.30</td>
<td>$4,862.30</td>
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<tr>
<td>Total Employee-Student</td>
<td>$848.95</td>
<td>$944.50</td>
<td>$944.50</td>
</tr>
</tbody>
</table>

1 The Law School operates on the semester system. Fees reflected above are spring semester fees.
2 Undergraduate and Graduate students are automatically in the Student Health Insurance Plan (SHIP) unless they are able to prove comparable coverage under another insurance plan. More information is available at http://healthcenter.ucdavis.edu/insurance. Medical School students should contact the Office of Medical Education at (916) 734-4102 for information.
3 Students enrolled in the Graduate School of Management Working Professionals Program pay a flat rate per course in lieu of the fees above. More information is available at http://www.gsm.ucdavis.edu/.
4 A course materials fee may apply to some undergraduate and graduate courses. See the Class Schedule and Registration Guide (CSRG) or http://www.ormp.ucdavis.edu/studentfees/documents/special/course_materials_fees.pdf.
5 Nonresident Master of Public Health students pay an Educational Fee of $2,498 per quarter.
dent Tuition Fee. Undergraduate and graduate students file their part-time petition with the Office of the University Registrar in 12 Mrak Hall.

**UC Employee-Student Fees**

Reduced fees are available to UC career employees and certain UC retirees who are qualified for admission to the university. Once admitted, the employee-student must file a petition for the reduction in fees before each quarter of enrollment. Employee-students pay one-third of the full-time Registration Fee and one-third of the full-time Education Fee. Employee-students also pay the Memorial Union Fee and the Student Facilities Safety Fee.

Employee students may enroll for up to nine units or three courses per quarter or semester, whichever is greater. Information is in *Personnel Policies for Staff Members* (section 51), available in department offices, at Shields Library, the Staff Development and Professional Services Office, and on the Internet. Petitions are also available on the Internet.

**Motor Vehicle Parking Permit and Bicycle Licensing Fees**

Parking permit rates are available at Parking Services, [http://www.taps.ucdavis.edu](http://www.taps.ucdavis.edu) or call (530) 752-8277.

A California State bicycle license fee is required for all bicycles on campus (initial license, $8; renewals, $4). For more information, call (530) 752-2453.

**Costs for a Year at UC Davis**

The costs listed in *Average Student Costs Annually*, on page 44, are average costs and your own living expenses may differ somewhat from these. Cost of living expenses are adjusted annually and fees are subject to change without notice. More information on living expenses can be found in the section on housing or from the Financial Aid Office.

**International Student Expenses**

International students are responsible for all of their expenses while studying at UC Davis. The expenses include non-resident tuition, educational fees, room and board and a modest amount for personal expenses. For the 2008-2009 academic year, we estimate the cost will be $47,600 for an undergraduate student, and $44,200 for graduate students. Because the exact cost for tuition and fees is not determined until just before the beginning of the academic year, these amounts are only preliminary figures. This minimum allowance may be increased without advance notice.

During the admission process, most international undergraduate students are required to complete the “Confidential Financial Statement” form certifying that funds are available for twelve months support. It is very important that students have adequate, reliable and continuing financial support for the whole time they are here. After students arrive in the United States, it is extremely difficult to obtain additional funding. The university does not offer grants or financial aid to international undergraduate students.

All students need to be aware that there are numerous initial expenses during the first few months, including tuition and fees, an initial down payment for housing, food and personal expenses. We suggest that you have a minimum of $10,500 available for immediate expenses. Careful budgeting is essential for international students.

**FEE REFUNDS**

**Cancellation, Withdrawal and Fee Refunds**

To cancel your registration before the first day of instruction or to withdraw from the university on or after the first day of instruction, you must complete a Cancellation/Withdrawal form and return the form to the Office of the University Registrar. If you don’t submit a Cancellation/Withdrawal form, you will be liable for fees according to university policy (below). No exceptions will be made to this policy.

For students who pay fees and then cancel or withdraw with official approval before the end of any quarter, fees may be refunded according to the Schedule of Refunds, on page 44.

The effective date for determining a refund of fees is the date you file a completed Cancellation/Withdrawal form with the Office of the University Registrar and it is presumed that no university services will be provided to you after that date. The percentage of fees that may be refunded is determined by the number of calendar days (not school days) elapsed, beginning with the first day of instruction.

If you enrolled in classes, you will be dropped from all of your courses automatically when the Cancellation/Withdrawal form is processed. If you enrolled but have not paid fees in full by the tenth day of instruction, your registration will be cancelled for non-payment and you will be officially withdrawn from the university.
New Undergraduate Students

The nonrefundable $100 deposit paid when you accepted admission and returned your Statement of Intent to Register (SIR) is withheld from the registration fee and the Schedule of Refunds is applied to the balance of fees assessed.

Thus, before or on the first day of instruction, registration fees paid are refunded in full minus $100. After the first day of instruction, the nonrefundable $100 deposit is withheld from the registration fee and the Schedule of Refunds is applied to the balance of fees assessed.

All Continuing Students, Readmitted Students and New Graduate Students

On or before the first day of instruction, registration fees are refunded in full minus a $10 service charge for cancellation/withdrawal. After the first day of instruction, the Schedule of Refunds is applied to the total of fees assessed.

Planned Educational Leave Program (PELP)

The Schedule of Refunds also applies to students who participate in the Planned Educational Leave Program (PELP). Thus, for a full refund of registration fees paid, you must file a completed approved PELP form with the Office of the University Registrar before or on the first day of instruction; see Leave of Absence:

Planned Educational Leave Program (PELP), on page 81 in the Academic Information chapter.

Schedule of Refunds

The Schedule of Refunds applies to all continuing and readmitted students and new students who do not receive federal financial aid.*

The Schedule of Refunds refers to calendar days beginning with the first day of instruction. The number of days elapsed is determined from the date the completed Notice of Cancellation/Withdrawal form is returned to the Office of the University Registrar. Percentages listed (days 1-35) should be applied respectively to University Registration Fee, Educational Fee, Nonresident Tuition and other student fees.

### Elapsed Calendar Days Percentage of Fees Refunded

<table>
<thead>
<tr>
<th>Days</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>0–1</td>
<td>100% less $10.00</td>
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<tr>
<td>2–7</td>
<td>90%</td>
</tr>
<tr>
<td>8–18</td>
<td>50%</td>
</tr>
<tr>
<td>19–35</td>
<td>25%</td>
</tr>
<tr>
<td>36 days and over</td>
<td>0%</td>
</tr>
</tbody>
</table>

*New students who receive federal financial aid and withdraw during their first academic term may be refunded fees according to a Modified Fee Refund Schedule, available at the Financial Aid Office.

Student Health Insurance Plan (SHIP) Coverage and Refund of SHIP Fees

All registered students are automatically enrolled in the Student Health Insurance Plan (SHIP) and are charged the SHIP fee. If you have comparable insurance and want to waive SHIP coverage, you must submit a waiver application at [http://healthcenter.ucdavis.edu/insurance/](http://healthcenter.ucdavis.edu/insurance/) by the published deadline; see the Academic Calendar, on page 1. Waiver applications must be filed each academic year. An approved waiver is effective for the duration of the current academic year only.

If you file a completed Notice of Cancellation/Withdrawal form or Planned Educational Leave Program (PELP) form BEFORE THE QUARTER BEGINS, your Student Health Insurance Plan (SHIP) coverage will be cancelled as of your status change (first day of the quarter), and your SHIP fee will be fully refunded.

If you are a registered student at the beginning of the quarter, and you file for PELP cancellation or withdrawal ON OR AFTER THE FIRST DAY OF THE QUARTER, your SHIP coverage will continue to the end of the quarter and your SHIP fee will not be refunded. SHIP fee refunds will not be granted for retroactive status changes. Note that the first day of the quarter is not the same date as the first day of classes. For applicable dates, refer to the Office of the University Registrar’s academic calendar at [http://Registrar.ucdavis.edu/html/academic_calendar.html](http://Registrar.ucdavis.edu/html/academic_calendar.html).

Students who go on PELP and who qualify for a SHIP refund may elect to continue their SHIP coverage for ONE QUARTER ONLY. You must apply within five business days of your registration status change. For more information, see [http://healthcenter.ucdavis.edu/insurance/eligibility.html](http://healthcenter.ucdavis.edu/insurance/eligibility.html) or call the Insurance Services message line at Cowell Student Health Center (530) 752-6055.

Students who cancel or withdraw their registration as a UC Davis student and receive a refund of SHIP fees are not eligible to continue SHIP coverage.
FINANCIAL AID
Financial Aid Office
1100 Dutton Hall
(530) 752-2390, (530) 754-6073 (Hearing Impaired)
http://financialaid.ucdavis.edu

The Financial Aid Office provides financial assistance in the form of scholarships, loans, grants and Work-Study employment. To apply, undergraduates and graduate students are required to file the Free Application for Federal Student Aid (FAFSA), available at http://www.fafsa.ed.gov.

The priority-filing period is January 1 to March 2 each year; however, students are encouraged to apply even if the deadline has passed. Although state and university funding may be depleted, Federal Pell Grants and Direct Loans are available throughout the year for eligible applicants.

UC Education Finance Policy for Undergraduates

UC Davis uses the University of California Education Finance Policy to determine financial aid awards for undergraduates. The policy looks at four factors to choose the type and amount of aid for each student:

1. Cost of attendance
2. Expected Family Contribution (EFC) as assigned by the federal processor based on the FAFSA
3. Federal and state grant eligibility based on the FAFSA
4. Undergraduate Self-Help and Loan Contribution, which is the amount that undergraduates are expected to contribute toward their cost of education at UC Davis

The Financial Aid Office can assist students with dependents or child care costs that exceed the standard student budgets.

Undergraduates with outstanding academic records are encouraged to apply for scholarships. For information about scholarship applications, see Undergraduate Scholarships and Awards, on page 47.

Graduate Student Funding

Graduate students and students in the professional schools at UC Davis (Medicine, Law, Veterinary Medicine and the School of Management) apply for financial aid by completing the Free Application for Federal Student Aid (FAFSA). Financial need is based on the information provided on the FAFSA and the student is sent a Student Aid Report (SAR) with the Student Contribution (SC) assigned by the federal processor. The SC is subtracted from the UC Davis Student Expense Budget (for the student's graduate program) to determine need-based eligibility. Graduate scholarships, fellowships and teaching and research assistantships are administered through the Office of Graduate Studies.

Satisfactory Academic Progress

Federal regulations require that undergraduate and graduate student financial aid recipients meet the published Standards for Satisfactory Academic Progress for Financial Aid concerning units, grade point average and maximum quarters of attendance allowed to obtain a degree. A copy of these standards is available at http://financialaid.ucdavis.edu/undergraduate/students/SAP.html. Review the policy in detail and discuss it with your academic adviser.

For more information, contact the Financial Aid Office. Regulations and deadlines are subject to change.

Types of Financial Aid

Grants

A grant is an award that does not have to be repaid as long as the student remains eligible. Whenever criteria and funding levels permit, a student's financial aid award includes grants.

Federal Pell Grants. All undergraduate financial aid applicants are required to apply for a Federal Pell Grant each year by filing the FAFSA. Recipients must be enrolled at full time to receive the full amount of awarded Pell Grant and must maintain good academic standing and make satisfactory academic progress. Eligibility is determined by the federal government according to a formula developed by the Department of Education and approved annually by Congress. The UC Davis electronic Financial Aid Notice (eFAN) informs the student of the Pell Grant award amount.

Cal Grants. All undergraduate financial aid applicants who are California residents are encouraged to apply for a Cal Grant by submitting the FAFSA and a GPA Verification form before March 2. Cal Grants are awarded by the California Student Aid Commission (CSAC) and may be renewed each year for four years. For more information, see http://www.csac.ca.gov.

- Cal Grant A awards are based on financial need and academic achievement and can be extended for one year for students entering a teaching credential program. Cal Grant A pays partial registration fees.
- Cal Grant B awards are based on financial need and are for undergraduate students primarily from low-income backgrounds. Recipients are required to complete at least 12 units each quarter. Cal Grant B pays a quarterly stipend for living expenses for first-year students and a portion of the registration fees plus a quarterly stipend for living expenses for students in their second through fourth years.

Cal Grant A and B recipients who plan to enroll in a Teaching Credential Program (TCP) may be eligible to renew their Cal Grant award for an additional year. The additional year of payment is provided to students who are seeking an initial teaching credential and cannot be used for other graduate level courses of study.

University Grants (UC Grant). The university determines grant eligibility for undergraduates by subtracting a student and parent contribution, any federal or state resources the student receives, and a standard work and loan contribution from the cost of attendance. Any remaining eligibility would be funded with UC Grant. UC Grant funding for graduate students is awarded by the Office of Graduate Studies. Students in the professional schools and the School of Education are awarded grants by the Graduate Financial Aid Office.

The Academic Competitive Grant (ACG) makes funds available for low income college students who meet the general Pell Grant program guidelines, as well as additional specific criteria. ACG is awarded to first and second year college students who have successfully completed a rigorous secondary school program.

The National Science and Mathematical Access to Retain Talent Grants (SMART) are federal funds awarded to third and fourth year college students who are majoring in specific majors recognized by the U.S. Department of Education such as mathematics, science, technology, engineering, or critical foreign languages. In addition, to receive this grant the student must be a U.S. citizen,
eligible for Pell Grant funding, attending full-time (enrolled in 12 or more units per quarter), and maintaining a 3.00 GPA.

For more details about ACG and SMART grants, see http://financialaid.ucdavis.edu/undergraduate/types/ACG_SMART.html.

Bureau of Indian Affairs (BIA) Grants are awarded to students who are at least one-fourth American Indian, Eskimo or Aleut as recognized by a tribal group served by the Bureau of Indian Affairs and who show financial need. Applicants must submit a Free Application for Federal Student Aid (FAFSA) and provide supporting documents. Students are advised to write to the agency that administers their tribal affairs to request a BIA Higher Education Assistance application. The BIA Financial Aid officer on campus can help complete the application. The amount of BIA grant depends on need and availability of funds at each BIA agency.

Loans

Financial Aid almost always includes a long-term loan. Awards are dependent on funding available. Some loan fund sources do not receive allocations each year. Repayment of these loans (with the exception of Federal Direct PLUS loans) begins after graduation or withdrawal from school. Students are encouraged to work as much as possible (while remaining full-time students) and to develop modest personal budgets to keep final loan indebtedness within a manageable range.

Health Profession Student Loans (HPSL) are awarded to students in the School of Veterinary Medicine who demonstrate financial need. Parental income information is required for all applicants regardless of age and dependency status.

- $2,500 plus fees maximum
- 5% interest
- Repayment begins twelve months after receipt of the degree or withdrawal

Federal Direct Subsidized and Unsubsidized William D. Ford Student Loans (Direct Loans) are available through the Financial Aid Office. Subsidized loans are based on financial need and interest accrued while the student is in school is paid by the federal government. Unsubsidized loans are available to students regardless of income and assets, and there is no interest subsidy.

- Undergraduate students may borrow up to annual maximums of $3,500 for freshmen, $4,500 for sophomores, and $5,500 for juniors and seniors, up to a maximum aggregate indebtedness of $23,000.
- Independent undergraduate students may borrow unsubsidized Direct Loans up to annual maximums of $4,000 for freshmen and sophomores, and $5,000 for juniors and seniors.
- Graduate and professional students may borrow unsubsidized Direct Loans up to an annual maximum of $12,000. Health professionals students may borrow higher amounts dependent on the length of their academic year.
- Graduate and professional students may borrow unsubsidized Direct Loans up to an annual maximum of $10,000.
- Variable interest rate is adjusted annually, capped at 8.25%.
- A 2.5% loan fee is charged on all Direct Loans. The fee is deducted proportionately from each disbursement.
- For Direct Loans, repayment begins six months after graduation or withdrawal from school.

Federal Direct Parent Loans for Students (Direct PLUS) are government-insured loans that are made to parents of dependent students.

- Parents may borrow Direct PLUS up to the cost of education minus other financial aid received during the years the dependent student is an undergraduate.
- The maximum interest rate is 9%. There is no interest subsidy for this loan.
- A 4% loan fee is charged and deducted proportionately from each disbursement.
- Repayment begins within 60 days after loan disbursement.

Direct Grad Plus Loans. The Grad Plus Loan is provided by the William D. Ford Direct Loan Program. (Students in Teaching Credential programs are not eligible for Graduate Plus loans.)

- The interest rate is fixed at 7.9%, no annual or aggregate borrowing limits (other than cost of attendance less other financial aid received).
- Credit checks are required to be eligible for the Grad Plus. Students who do not meet the credit requirements for a Grad Plus may still obtain the loan with an endorser who does meet the credit requirements.
- A 2.5% origination fee is deducted from the loan amount.
- Repayment period begins 60 days after loan disbursement.

Federal Perkins Loans are for U.S. citizens or permanent U.S. residents. Loans may be limited to a percentage of student's need because of demand and limited funds. This is a subsidized loan, which means the federal government pays the interest on the loan while the student is enrolled in school. Repayment starts nine months after graduation or withdrawal from school and may be extended over 10 years. Additional deferments are possible for temporary total disability or volunteer service in a private, nonprofit organization, VISTA or the Peace Corps. Some teachers of students from low-income families and full-time teachers of handicapped children may also qualify for partial loan cancellation.

Annual Federal Perkins Loan Limits

- $4,000 for undergraduate students
- $6,000 for graduate/professional students

Aggregate (Maximum) Loan Limits

- $8,000 for a student who has not completed the first two years of undergraduate work and for programs that are less than two years in length
- $20,000 for a student who has successfully completed two years of a program of education leading to a bachelor's degree but who has not completed degree work
- $40,000 for a graduate/professional student (includes loans borrowed at the undergraduate level)

Short-Term Loans meet temporary or emergency financial needs of registered students. Loan funds are provided by UC Davis alumni, ASUCD, the Cal Aggie Foundation, the Regents of the University of California and private donors.

- Emergency Loans: $300 maximum. The maximum repayment period is 30 days.
- Short-Term Loans: $300 maximum; exceptions to the maximum amount can be made if financial aid funds are expected. The maximum repayment period is five months or the end of the academic year.
- Assistant Loans: graduate students who are in the teaching
assistant, research assistant, readership, associate-instructor or postgraduate researcher classifications can apply for a maximum of one month's salary. The maximum repayment period is six months or the end of the academic year, whichever occurs first. For applications and more information about applying, see http://financialaid.ucdavis.edu.

**Federal Work-Study**

Student Employment Center
1210 Dutton Hall
(530) 752-0520; sec@ucdavis.edu; http://jobs.ucdavis.edu

**Undergraduate Work-Study**

The Federal Work-Study program allows students to earn part of their financial aid through part-time employment. To participate, students must file a Free Application for Federal Student Aid (FAFSA) and receive Work-Study as a part of their financial aid package. Work-Study awards offer both money for education and work experience. Work-Study recipients should obtain a Work-Study job or ask to defer the Work-Study before December 1 or the award will be canceled. The Student Employment Center coordinates the Federal Work-Study program for undergraduates at UC Davis.

**Community Service.** A wide variety of community service jobs are available for students who apply for Work-Study funding. These jobs provide educational and rewarding work experience and help students connect with the community at large. Students applying for community service jobs also receive priority consideration for Work-Study funding.

**Graduate Work-Study**

Work-Study funds for graduate students are allocated directly to the chairpersons of the graduate programs. Graduate students seeking Work-Study funding should contact their respective departments for further information. Students must file a FAFSA and have financial need to be considered for Work-Study funding.

**Undergraduate Scholarships and Awards**

Undergraduate Scholarship Office:
Dutton Hall
(530) 752-2804; ugcholof@ucdavis.edu; http://financialaid.ucdavis.edu/scholarships/

Mailing address:
Undergraduate Scholarship Office
University of California
One Shields Avenue
Davis, CA 95616-8696

UC Davis recognizes outstanding students with scholarships awarded on the basis of academic excellence and exceptional promise. The Scholarship Office administers approximately 220 different undergraduate scholarships. Many more scholarships are handled through outside agencies.

Committees made up of students and faculty choose scholarship recipients. In addition to academic records (a minimum grade point average of 3.25 is required), selection may be based on letters of recommendation, test scores and a personal essay in which your university goals and objectives are stated. Some awards are limited to students in specific majors or colleges, residents of certain geographical areas, students of a particular class standing, or students with demonstrated financial need. Most scholarships are not renewable and you must reapply each year for scholarship aid.

Students applying to the university are considered for scholarships using the same forms completed for admission purposes. The undergraduate scholarship application for continuing students becomes available online in October and is due in early December. See the Scholarship Office Web site for instructions and the application. Scholarship recipients will be notified beginning in April.

Graduate students are also eligible for various scholarships and fellowships; see the Graduate Studies chapter.

**Regents Scholarships,** among the highest honors that undergraduates at the university can receive, are granted to exceptionally promising freshmen or juniors enrolling in the fall quarter. Awards may be honorary (honoraryum) or may be accompanied by a stipend (for students demonstrating financial need), which generally covers the difference between family resources and yearly educational costs. These scholarships are renewable as long as students maintain a 3.250 cumulative grade point average.

- Dollar amounts vary, but the stipend may cover up to the full cost of attendance for California residents
- 2-year and 4-year renewable scholarships

**Alumni Scholarships** provided by the alumni association in cooperation with the university, are based primarily upon leadership and scholastic achievement. Your financial need and extracurricular activities may also be considered.

- $1,000 minimum
- New undergraduates only
- Selection by local alumni association chapters

**Military Scholarships** are awarded to outstanding high school seniors without regard to financial need, as well as to UC Davis students who have demonstrated exceptional leadership and scholastic achievement during their freshman and/or sophomore years. Eligible high school seniors apply for the full 4-year scholarship and must file applications by November. UC Davis scholarship students participate in the Military Science (ROTC) Program. Information and applications are available from the Department of Military Science in 125 Hickey Gymnasium (530) 752-3211.

- Full fees, books and supplies
- $1,000 per year for miscellaneous expenses
- 1-, 2-, 3- or 4-year scholarships

**Other Scholarships** are made possible by individual donors, private corporations and various agencies. Many organizations and groups conduct their own scholarship programs. In most cases, you apply directly to these sponsoring groups. Free scholarship search services are available through our Web site.

- Generally $300 to $4,500

**Special Prizes** at UC Davis recognize outstanding performance, achievement and promise in special programs or majors. The most prestigious prize is the University Medal, presented to the most outstanding graduating senior.

- Plaques or certificates and cash awards
- College and school medals to outstanding graduates
1938 Hickey Gym and swimming pool are completed.

1966 Experimental College begins.
LIVING AT DAVIS

ON-CAMPUS HOUSING

Residence Halls

Student Housing Office
(530) 752-2033; studenthousing@ucdavis.edu

Living on campus adds a measure of convenience to your life and helps familiarize you with the campus. Some 4,500 undergraduate students live on campus each year, including about 90 percent of freshman students. In each of the residence hall complexes, students and staff help create and maintain an environment conducive to personal growth and educational achievement.

Rooms are furnished with a bed and mattress, desk and chair, bookcase, chest of drawers, study lamp and wastebasket for each resident. Cost depends on room occupancy (single, double or triple) and which of the eight meal plans you choose. Rates for the next academic year have not yet been formally approved.

All new freshmen whose Statements of Intent to Register (SIR) are received on time are guaranteed residence hall housing as long as they complete all of the instructions that accompany their contracts and return the materials and reservation fee by the due date. Freshmen housing contract offers will be mailed out between May 5 and May 16. Transfer students that have submitted their Statement of Intent to Register will be offered a housing contract on a space available basis. Interested students are encouraged to contact the Student Housing office to be placed on a waiting list. Student Housing information is included with your admissions packet. If you have a special need, such as a medical condition, disability, dietary requirement, or circumstance that requires special accommodation, or consideration, please send a detailed letter of explanation to Student Housing, 160 Student Housing, One Shields Avenue, University of California, Davis, CA 95616-8712, once you have submitted your housing contract.

Student Housing

Orchard Park/Solano Park Apartments
(530) 752-2033

Orchard Park and Solano Park Apartments offer 476 university-operated, unfurnished, on-campus apartments located in serene park surroundings for UC Davis students with children.

- Orchard Park; two-bedroom unfurnished apartments
- Solano Park; one-and two-bedroom unfurnished apartments

New rates subject to approval by the UC Regents will be available in mid-May. The new rates will be listed at http://studenthousing.ucdavis.edu/prospective/fees_parks.htm. Once approved, they will be effective starting August 1. While our first priority is to house students with children, Student Housing supports the University’s commitment to provide on-campus housing to graduate students. Our waiting list is prioritized as follows: students with children; married or domestic partnership students, graduate students; undergraduate students. Vacancies in Orchard Park/Solano Park Apartments are filled from a waiting list based on the date the application is received. For a fall assignment, you should apply at least six to nine months in advance. For an assignment during the remainder of the year, the waiting period is usually shorter. You may submit an application before you are admitted to the university. If a member of your family has a physical disability that requires special housing accommodation, please attach a detailed letter of explanation to your application.

Russell Park

(530) 753-7322

Privately owned and managed on-campus living accommodations are available for student families. Russell Park features one-, two- and three-bedroom unfurnished units.

Primero Grove

(530) 754-8455
primero@ucdavis.edu

Privately owned and operated, Primero Grove offers affordable on-campus housing for continuing undergraduate, graduate and professional students. Apartment sizes range from studios through four bedrooms.

Graduate Student Apartment Housing

The Atriums
(530) 753-0659

The Atriums offers on-campus living accommodations for single graduate students. The privately owned and managed apartments feature studio and two-bedroom unfurnished units.

OFF-CAMPUS HOUSING

The majority of UC Davis students live off campus. The City of Davis has ample apartments for rent, from one-person studio apartments to five- or six-person suites. Townhouses, duplexes and houses throughout the city are also available for student rental. ASUCD maintains a list of available community housing.

TRANSPORTATION AND PARKING

Transportation and Parking Services (TAPS)
North Dairy Road
(530) 752-8277; http://www.taps.ucdavis.edu

Motorist Assistance Program: (530) 752-8277
Bicycle Program: (530) 752-BIKE (2453)

The central campus is closed to motorized vehicles. Walking and bicycling are the most common ways to traverse the campus.

Bicycles. All bicycles ridden or parked on campus must have a current California state bicycle license. You may buy a license or renewal tag at TAPS. Bicycle traffic and parking regulations are strictly enforced. Bikes may be parked only in designated parking areas and may only be secured to bike racks and pods. The Bicycle Program rents bicycle lockers on a quarterly or annual basis for storage of bicycles only. The ASUCD Bike Barn offers repairs and rentals, and sells used bikes, bicycle parts and accessories. Students can also check out tools to do their own repairs or maintenance.

Parking. If you park a vehicle (including a motorcycle or moped) on campus, you must display a valid UC Davis parking permit or pay for time at a meter. Parking is permitted in marked spaces only, with permits displayed so all information is visible through the front window. You may purchase a daily visitor permit at permit dispensers in any visitor parking lot or at Parking Services. Visitor permits are valid in visitor lots and in “C” areas. After 5 p.m., they are also honored in “A” permit areas and at meters. All other lots require long-term permits, which you may purchase at Parking Services. Parking lots on campus are financed solely by user fees collected from parking permits sales and meter use.
Motorist Assistance Services. TAPS provides complimentary on-campus motorist assistance services including vehicle lock-outs, battery jumps, gasoline retrieval and tire inflation services.

Ridesharing. UC Davis encourages ridesharing. Registered carpoolers and vanpoolers receive reduced parking rates and preferential parking. For information on transportation alternatives, public pools and vanpools, call (530) 752-5413; (6453).

Shuttles. The UC Davis/UC Davis Medical Center Shuttle provides hourly service Monday through Friday between the UC Davis campus and the medical center in Sacramento. The shuttle is available to all members of the UC Davis community. You may purchase shuttle passes at Parking Services or the Cashier's Office. Departmental business passes are available at Parking Services.

The Intracampus Bus provides transportation between the UC Davis campus and the UC Berkeley campus for university employees, registered students and other university affiliates. Call Fleet Services at (530) 752-8287 for schedule information and reservations.

Buses
Unitrans
5 South Hall
(530) 752-BUSS; http://www.unitrans.com

Unitrans, operated entirely by undergraduate students, provides year round public transit service on 14 lines on the UC Davis campus and the City of Davis. Unlimited access is provided to undergraduate students with a valid UC Davis registration card; others may ride by paying the single-ride cash fare or by purchasing discounted multi-ride passes from TAPS or at the Campus Box Office. Full service is provided each UC Davis school day (Monday–Friday, 7:00 a.m.–7:30 p.m.) and at nights (Monday–Thursday, 7:30 p.m.–11:30 p.m.) during the regular school year. Reduced schedule service operates during the summer, finals week, all academic break periods and on Saturdays. Unitrans also operates a shuttle from Amtrak on Sundays and designated holidays. Schedules are available at the MU Campus Information Center, bus terminals, Davis City Hall, the Unitrans office and at http://www.unitrans.edu.

STUDENT EMPLOYMENT
Student Employment Center
First Floor, Dutton Hall
(530) 752-0520; http://jobs.ucdavis.edu

Many employment opportunities are available at UC Davis, and with private employers. Full-time or part-time students, students on PELP and students with a letter of acceptance for the following quarter who have not yet registered are eligible. With a part-time job, students are able to borrow less loan and still meet their Self-Help Contributions. Most students work 10-12 hours a week while attending school, many in jobs on campus. The center also offers a wide variety of community service jobs, which can be both educational and personally rewarding.

Computers are conveniently available in 1210 Dutton hall to assist with the job search online at http://jobs.ucdavis.edu. Students are welcome to stop by the Student Employment Center for job search assistance.

CHILD CARE AND FAMILY SERVICES (WORKLIFE)

Human Resources Administration Building
(530) 752-5415; http://www.hr.ucdavis.edu/Work_Life

WorkLife is the principal resource on campus for information, referrals, and advising, and serves as the university’s liaison with the on-campus day care centers and City of Davis Child Care Services.

On-Campus Child Care Programs and Resources
• Hutchison Child Development Center; (530) 752-3301; robin.sweeney@brighthorizons.com; http://www.hr.ucdavis.edu/Work_Life/hutchison-child-development-center
• LaRue Park Child Development Center; (530) 753-8716; laruecdc@ucdavis.edu; http://www.davischildcare.org/
• Russell Park Child Development Center; (530) 753-2487; russellcdc@ucdavis.edu; http://www.davischildcare.org/

Privately owned and operated with university oversight, serving infants through kindergarten-age children.

• The Center for Child and Family Studies; (530) 752-2888; A teaching and research laboratory for the Department of Human and Community Development, offers part-time programs for children aged six months to five years. Children are selected from a waiting list according to criteria designed to meet academic goals.

• The UC Davis Breastfeeding Support Program; (530) 752-5415; Provides lactation sites with electric breast pumps, registration and orientation sessions, private consultation, and sales of supplies for mothers who wish to continue breastfeeding their infants after returning to school or work.

• The Student Employment Center; (530) 752-0520; http://jobs.ucdavis.edu

Posts listings for parents seeking license-exempt providers.

Community Child Care Programs
City of Davis Child Care Services
600 A Street
Davis, CA 95616
(530) 757-5695; http://www.city.davis.ca.us/pcs/childcare

City of Davis Child Care Services maintains information on licensed family child care homes, day care centers, nursery schools, playgroups, support groups and other family-related services for all of Yolo County. Additional services include parenting workshops and handouts; a bi-monthly newsletter; a parenting resource library; and a book, video and toy lending library. The program provides referrals to licensed family child care homes and administers the UC Davis Child Care Subsidy Program and the Child Care Grant, both of which can help low-income families pay for child care. Applications for subsidies are available at the grant office in 600 A Street.
COUNSELING AND HEALTH SERVICES

Counseling and Psychological Services (CAPS)
219 North Hall
(530) 752-0871; http://www.caps.ucdavis.edu
Counseling and Psychological Services (CAPS) offers confidential psychological and psychiatric services to all registered students experiencing problems or concerns that affect their academic progress and sense of well-being. Staff members provide short-term individual counseling and group counseling for academic, personal and interpersonal concerns. Students often seek counseling to examine issues such as relationships, family problems, stress, cultural differences, assertiveness, self-esteem, intimacy, depression and anxiety. Additionally, staff can assist with educational concerns such as coping with university life, academic performance, test anxiety and reentry adjustment. Services for relationship issues are also offered to students and their partners. Psychiatry services are available to students by referral. Staff can provide assistance with off-campus referrals.

Confidentiality is strictly maintained in accordance with state laws and ethical standards. To use CAPS' services, students should contact the receptionist for an appointment. If immediate assistance is needed, walk-in (urgent care) services are available Monday–Friday from 8:00 a.m.–4:45 p.m. After hours phone consultation is also available by calling our main number. In addition, Peer counseling services are also available Monday–Friday from 8:00 a.m.–3:00 p.m. through The House.

Students, faculty or staff who are concerned about a student or desire consultation or assistance in making a referral are encouraged to contact CAPS. Parents who are concerned about their UC Davis student's emotional reactions or behavior can also call CAPS to discuss their concerns.

Cowbell Student Health Center

Cowbell Student Health Center
(530) 752-2300; http://healthcenter.ucdavis.edu
Cowbell Student Health Center houses the Student Health Services program and is conveniently located on campus. Student Health Services supports students' academic goals by providing UC Davis students with wellness, illness and injury care at affordable rates. Services are available to all registered students regardless of insurance coverage. Student fees subsidize the services of Student Health Services and students pay small fees for most services.

Advice Nurse, Acute Care and After Hours (530) 752-9649.
Services are available for acute medical illness and injury care. Appointments are not required, but students are encouraged to call the Advice Nurse before coming for care. Patients are seen according to severity and urgency. In addition, our Advice Nurse service is free for all UC Davis students to discuss health concerns and the need for medical care. Some issues may be resolved through self-care or over the counter treatment.

Primary Care Clinics & Specialty Clinics (530) 752-2349.
Appointments can be scheduled for routine primary care, nutrition and fitness, men's/women's health and physical exams, allergy care, sports medicine, travel immunizations and other services. Physician specialists are available upon referral from a primary care provider. Services include dermatology, gynecology, internal medicine, orthopedics, minor surgery, podiatry, neurology and endocrinology.

Other Services. Laboratory, x-ray, pharmacy, physical therapy, massage therapy, acupuncture and dietitian services are also available through Student Health Services at Cowbell Student Health Center.

Health Insurance Requirement. The University of California requires that all students have health insurance. To help you meet this requirement, UC Davis automatically enrolls all registered students in the Student Health Insurance Plan (SHIP). Fees for SHIP coverage are charged to your student account each term along with your registration fees.

- If you want to enroll in SHIP, you are automatically enrolled—no action is required.
- If you have comparable insurance and do not want to be enrolled in SHIP, you must apply for a SHIP waiver by the published deadlines. If your waiver is approved, your SHIP enrollment will be waived through the end of the academic year. The services at Cowbell Student Health Center are available to all students, even if you waive SHIP.

More information can be found at http://healthcenter.ucdavis.edu/insurance or by visiting the Insurance Services office in Cowbell Student Health Center.

Health Education and Promotion

Cowbell Student Health Center, Cowbell Annex
(530) 752-9652; http://healthcenter.ucdavis.edu/hep
Health Education and Promotion (HEP) helps enhance your wellness to meet your academic goals through student-centered education and creating health-promoting environments. HEP covers topics such as nutrition, exercise, sexual health, contraception, alcohol, tobacco and other drugs, wellness, sleep, and stress management. Call or drop by to talk with HEP staff to get your questions answered. HEP also offers educational programs on various college health topics. All services are confidential and provided free of charge to registered students and organizations.

Anonymous HIV Counseling and Antibody Testing Program
(530) 754-7000. HEP offers anonymous HIV counseling and antibody testing to registered UC Davis students. Free, oral, rapid testing is available weekly during the academic year.

Alcohol and Drug Abuse Prevention and Treatment (ADAPT) provides assessments, education and referrals for students with identified needs related to alcohol or other drug (AOD) issues. ADAPT conducts educational programs and one-on-one educational treatment. ADAPT offers Education Groups where students discuss AOD issues, alcohol poisoning, how to help a friend and decision-making skills. This group provides a confidential, safe and nonjudgmental environment. ADAPT also provides trainings on safe party management, how to be a good renter and how to help students with addiction issues. For more information on safer partying, see http://safeparty.ucdavis.edu.

East Quad Farmers Market (530) 752-9652. HEP cosponsors a campus farmers market during fall and spring quarters. Fresh fruits, vegetables, nuts, and flowers are available on Wednesdays, from 11 a.m.–2:30 p.m. on the UC Davis East Quad.

Outreach Presentations (530) 752-9652. Peer Health Educators and professional staff are available to facilitate small and large group presentations and workshops for residence halls, fraternities, sororities and other student organizations. Call for a complete list of programs offered or to schedule a program.
Student Internships. HEP provides an excellent opportunity to develop skills in: conducting group presentations, changing health-related policies and influencing media. Transcript notation and/or academic credit are available. The internship requires a three quarter commitment. Check our Web site in winter quarter regarding internship opportunities.

The House

Temporary Building 16 (two-story house by Student Housing) (530) 752-2790

The House is a professionally supervised peer counseling program of CAPS. Students receive confidential support, information and referrals regarding personal or social problems. Well-trained student volunteers assist fellow students through individual peer counseling and a wide variety of workshops held in an informal setting. Stress reduction and wellness resources include a meditation room, a video and listening room with relaxation and educational compact discs and an automatic massage chair. No appointment is necessary and services are offered on a drop-in or telephone basis Monday-Friday from 8:00 a.m.–5:00 p.m. during fall, winter and spring quarters.

Volunteers for peer counselor positions at the House are selected winter quarter. Students are trained in basic counseling skills and can receive units for training. Transcript notation is also available for quarters working as a peer counselor volunteer.

EXTRACURRICULAR ACTIVITIES

By participating in extracurricular activities on the UC Davis campus, you can benefit from numerous opportunities for educational, personal, cultural and social enrichment. In general, UC Davis students who are registered and enrolled may participate in extracurricular activities sponsored by the campus. Some extracurricular activities have additional eligibility criteria, so you are encouraged to inquire about the particular eligibility requirements of the groups and programs that interest you.

RECREATION

The Department of Campus Recreation

The Activities and Recreation Center (ARC)
232 ARC, One Shields Ave, Davis CA 95616
(530) 752-1730; http://campusrecreation.ucdavis.edu

The UC Davis Department of Campus Recreation provides many healthy activities and programs including social, physical, creative, intellectual and cultural activities to offset the stresses associated with a rigorous academic environment. These programs complement the academic mission of the university and enhance the quality of life for the campus.

The following facilities are managed through The Department of Campus Recreation:

- The ARC
- The Pavilion
- The Equestrian Center
- The Outdoor Center
- The Craft Center
- Hickey Pool
- Recreation Pool
- Intramural Fields

The following programs are offered through The Department of Campus Recreation:

Campus Recreation Memberships, Informal Recreation and Fitness & Wellness Programs

The ARC (530) 752-1730

The ARC information desk is the place to purchase memberships, ask about informal recreational opportunities and sign up for healthy fitness and wellness programs offered through The Department of Campus Recreation. For more information on the above programs, please see the Department of Campus Recreation Web site.

Events & Conferencing

The ARC & The Pavilion

The Department of Campus Recreation staff manages all conference and event needs related to the meeting rooms and ballroom located in the Activities and Recreation Center. The Pavilion, formerly called Recreation Hall, is a 150,000 square-foot reservable arena, as well as the home court for UC Davis NCAA Basketball & Volleyball. From concerts to career fairs, it's the ideal space to host any large event. For more information, please see the Department of Campus Recreation Web site.

Intramural Sports and Sport Clubs

The ARC (530) 752-1730

The mission of the Intramural Sports and Sport Club office is to provide the students, faculty and staff of UC Davis the opportunity to participate in a variety of competitive and recreational sports on campus.

The UC Davis Sport Club program promotes student participation in a wide variety of athletic activities, provides opportunity for student competition at various levels of play and fosters the development of student leadership. Sport Clubs are comprised of student, faculty and staff of the University.

Outdoor Adventures

The Barn (on the corner of California and Hutchison) (530) 752-1995

Outdoor Adventures will help you enjoy time with friends in California's scenic natural areas, develop your outdoor skills and plan your outdoor excursion. You can rent professional-quality equipment and arrange for custom-designed trips and group rates. An up-to-date library contains topographic maps, trail guides and other materials. Classes, excursions and clinics in backpacking, rock-climbing, whitewater rafting, sea kayaking, mountaineering, cross-country skiing and other sports are offered. Outdoor Adventurers also offers training classes in wilderness first aid, EMT, AED, CPR and swift water rescue.

Equestrian Programs

Garrod Drive (southwest of Veterinary Medical Teaching Hospital) (530) 752-2372

The Equestrian Center is open year round, offering trail rides, practice sessions and instruction in both English and Western riding. Group and private lessons are available for beginning through advanced levels, along with training in horse care and stable management. The Equestrian Center sponsors clinics, horse shows, summer youth equestrian camps and special events.
Craft Programs

South Silo
(530) 752-1475/1730

The Craft Center is an ideal place to channel your creative energy. Facilities are available on a day or quarter use basis. Ceramics is available for quarter use only. Workshops and classes are offered each quarter in woodworking, weaving, jewelry making, art and graphics, computer imaging, ceramics, photography, silk-screen printing, welding, leather working, stained glass and other crafts.

Aquatics

Recreation Pool, Corner of La Rue Road and Hutchison Drive
(530) 752-2695; (530) 752-1706—Aquatic Director

Located on campus, the Rec Pool’s distinctive shape allows for a wide variety of water activities. The pool includes lap lanes, diving boards, an island, a large grass area for sunbathing and a shallow wading pool. Picnic tables and a barbecue are also available on a first come first served basis. The Rec Pool offers aqua aerobics classes and swim lessons for all ages. The pool opens for the season in mid-April and closes in mid-October.

Hickey Pool, located in the courtyard of Hickey Gymnasium Building (central campus)
(530) 752-3893, (530) 752-1706—Aquatic Director

Hickey Pool is a seven-lane, 33 and 1/3 yard pool with a moveable bulkhead previously used as the competitive pool on campus, housing six Intercollegiate Athletic teams, physical education classes, Intramural Sports and Club Sports, and University extension classes. With the addition of the new Ted and Rand Schall Aquatic Center, Hickey Pool’s schedule now accommodates limited lap swimming hours that vary during the academic year. Entrance is free to currently registered students and at a minimal fee for staff and faculty.

CAMPUS UNIONS

Memorial Union Auxiliary Services
457 Memorial Union, One Shields Ave, Davis CA 95616
(530) 752-2324, http://muauxiliaries.ucdavis.edu

Campus Unions manages a number of programs and facilities to serve the campus:

The Games Area

Games Area (located below the UC Davis Bookstore)
(530) 752-2580/1730

The Games Area features bowling lanes, a billiards room, a video arcade, lounge space and storage lockers. The Games Area conducts bowling leagues, classes, clinics and tournaments for all ages from beginning through advanced skill levels. The facility is fully accessible to those with disabilities.

The Memorial Union (MU)

MU Campus Information Center
(530) 752-2222

The MU complex serves as the community center for the campus. The MU Campus Information Center’s student staff can refer you to people, places, programs and services on and off campus and maintains an up-to-date database of 1,000 on and off campus organizations. The complex houses the UC Davis Corral gift shop, Coffee House, MU Conference Center, Campus Box Office (where you can purchase tickets for campus events), and Campus Events and Visitors Services (CEVS) Griffin Lounge serves as a comfortable space for studying, getting together with friends, and special events like: Open Mic Night; Poker Tournaments; Comedy Shows; and Video Game Tournaments

The Loft, on the second floor, provides a comfortable and relaxed lounge, popular for studying, enjoying student art and board games. The loft has a large collection of vintage vinyl LP’s for listening pleasure.

Freeborn Hall, an assembly hall in the MU complex, is used for performing arts, concerts, dances, banquets, lectures and conferences.

The Memorial Union operates several facilities that can be rented for group gatherings. With its wood-paneled interior and ceiling-high windows, Rec Pool Lodge is an ideal location for meetings, lectures or dances. The covered patio surrounding the lodge offers a shaded environment for outside dining during the warm weather. Putah Creek Lodge, secluded in the Arboretum, provides a relaxing atmosphere for lectures, banquets, weddings or dances. The spacious lawn surrounding the lodge is suitable for volleyball and games, receptions, and picnics. The lodges have kitchens and outdoor barbecues.

Silo Union

The Silo Union houses food services, meeting/conference facilities, lounges and the campus pub. Student will enjoy programs like Trivia Night and Karaoke, to name just a few. The food services in the Silo include both quick, popular and familiar fast food, such as Taco Bell, Carl’s Jr. and Pizza Hut, as well as a large selection of fresh and healthy prepared items, Starbucks Coffee and a custom sandwich line. In the South Silo are the ASUCD Experimental College (530) 752-2568; Student Special Services (530) 752-2007; Graduate Student Association (530) 752-6108; and a branch of the Bookstore serving the School of Law (530) 752-2961. To reserve space in the Silo, call Campus Events and Information at (530) 752-2813.

THE UC DAVIS ACTIVITIES AND RECREATION CENTER (ARC)

(530) 752-6071; http://arc.ucdavis.edu

The Activities and Recreation Center (ARC) hosts many recreational activities for UC Davis students, faculty and staff. The building itself has four indoor basketball courts (convertible to volleyball and badminton), eight four-wall courts, a multi-use activity center (MAC), an indoor track, large fitness/weight areas and an indoor climbing wall. In addition, the complex includes group exercise, dance and martial arts studios, student lounges with computer terminals and wireless access points, a large ballroom, and small conferencing center. Food service is provided in the lobby area along with a pro shop. The building is separated into three distinct areas: the controlled area, the conferencing/union area and The Pavilion. All fitness related activities comprise the controlled area that is open to all students with a valid UC Davis identification card. Faculty and staff members can purchase membership to the ARC for an annual or monthly fee. The conferencing/union area is open-use and is accessible through the main entrance to ARC or through a smaller corridor on the Northeast side of the building that leads into the conferencing area.

The UC Davis Pavilion (formally Recreation Hall) hosts athletic competitions, concerts, trade shows, conferences and miscellaneous spectator events each year. The Pavilion houses approxi-
mately 149,000 square feet of space and encompasses the home court of the UC Davis Aggies volleyball team, gymnastics team, and men’s and women’s basketball teams. The Pavilion hours and access vary depending upon the event being hosted. More information regarding ARC can be found at the ARC Web site, calling the number listed or by stopping by the information desk located in the lobby area.

UC DAVIS INTRAMURAL SPORTS AND SPORT CLUBS

UC Davis Activities and Recreation Center (ARC)  
(530) 752-3500; http://imsports.ucdavis.edu

The UC Davis Intramural Sports and Sport Club Program offers over 30 different Intramural Sports activities ranging from the traditional team sports like football, basketball and soccer to individual or duel sports such as racquetball, table tennis and golf. Additionally, we offer some non-traditional activities like inner tube water polo, floor hockey and Quickball (our version of Wiffleball). All UC Davis students are eligible to participate in intramural activities. The majority of our activities are free; however there are a few sports that require an entry fee for participation. Each club is formed, developed, directed and controlled by its members within University guidelines. Stop by the office or see our Web site for a complete list of clubs.

INTERCOLLEGIATE ATHLETICS

264 Hickey Gymnasium  
(530) 752-1111

Although Intercollegiate Athletics at UC Davis benefits the campus by fostering school spirit, its primary role is to provide personal development opportunities for as many student-athlete participants as facilities and resources permit. Currently, the program consists of varsity teams in 12 men’s sports and 14 women’s sports. UC Davis is an active member of Division I. A majority of the varsity sports will compete in the Big West Conference. Approximately 700 students compete on varsity teams each year.

ARTS

Whether you want to participate, be entertained or be inspired, an abundance of musical, theater, art, design and dance offerings take place on campus all year long.

Robert and Margrit Mondavi Center for the Performing Arts | UC Davis

Mondavi Center Administration Building  
(530) 754-5000; http://www.mondaviarts.org

The Mondavi Center brings a wide variety of world-class performing artists to UC Davis to serve the campus and surrounding communities. During the academic year, Mondavi Center offers concerts and recitals by classical, jazz and folk music artists; drama; classical and modern dance; and lectures by eminent public figures. Tickets for events may be purchased at the Mondavi Center Ticket Office at (530) 754-2787 or toll free at (866) 754-2787.

Music

Department of Music  
(530) 752-5337; http://music.ucdavis.edu

The Department of Music sponsors the UC Davis Symphony Orchestra, Chorus and Chamber Singers, Early Music Ensemble, Gospel Choir, Concert Band and Wind Ensemble, Jazz Band and chamber music groups. Music majors and other interested students can receive credit for participating in these groups, which perform at concerts and recitals open to the university community. The department sponsors artists-in-residence who give concerts, recitals and lectures. Free noon concerts featuring individual performers and ensembles—both professional musicians and music students—are a favorite weekly event during the school year. The Empyrean Ensemble is in residence on campus. The Department of Music sponsors nearly 100 public concerts each year.

Dramatic Art and Dance

Department of Theatre and Dance  
(530) 752-0888; http://theatredance.ucdavis.edu

The Department of Theatre and Dance has one of the finest theater facilities in California, with an unusually good stock of scenery, props, costumes, and state-of-the-art lighting and sound equipment. Facilities are complemented by an excellent faculty, the Granada Artists-in-Residence program (which brings a major director, choreographer or playwright to the department each quarter), Shakespeare’s Globe, London, exchange program, and graduate students working on Master of Fine Arts degrees in acting, directing, choreography or design, and Ph.D. degrees in 20th Century Performance and Culture, all of whom contribute to the fine quality of UC Davis drama and dance productions.

Each year’s schedule includes undergraduate festivals in theatre, dance and film; opportunities to work with professional directors and choreographers in three main stage productions; and performance projects and established scripts developed by M.F.A. students. These productions take place on our proscenium (Main), thrust (Wyatt), black box (Arena), performance studio (University Club) stages as well as in the Mondavi Center’s Studio Theatre and Jackson Hall. These productions are part of the academic program of the department and serve an important purpose in the study of theatre and dance. Participation is open to all students.

Art Galleries

Memorial Union Art Gallery

Second floor of the MU; (530) 752-2885

The Memorial Union Art Gallery features a changing series of contemporary and historical art exhibits throughout the academic year. Works by professional artists as well as students are on display for periods of approximately six weeks. The gallery sponsors print sales, special programs and lectures, and offers internships for those interested in career work in an art gallery or museum.

Design Museum

First floor, Walker Hall;  
(530) 752-6150; http://designmuseum.ucdavis.edu

The Museum features changing exhibitions of national and international design-related material, including architecture, clothing, graphic design, textiles, new media, and popular culture. Exhibitions reflect the curriculum of the Design Program and are dedicated to furthering our understanding of design, and the contributions design makes to shaping our experiences, environment and culture. The museum serves as a laboratory for experimental exhibition installation, interpretation and practice. The Design Collection is a supporting resource for the Design Museum.
Richard L. Nelson Gallery
First floor, Art Building; (530) 752-8500
The Richard L. Nelson Gallery, named in honor of the first chair of the Department of Art, organizes regularly changing exhibitions of historical and contemporary works of art. The gallery's program reflects and complements the teaching program of the Department of Art and brings art to the university community and the Northern California area at large. The Nelson has a permanent collection of over 4,000 objects.

Fine Arts Collection
Art Building, adjacent to the Nelson Gallery; (530) 752-8500
The Fine Arts Collection, representing various historical periods and cultures, is the UC Davis campus' major collection of art.

Basement Gallery
Art Building basement
The Basement Gallery is a student-directed gallery that exhibits the artwork of advanced UC Davis art majors. There are approximately three shows per quarter.

C.N. Gorman Museum
1316 Hart Hall; (530) 752-6567; http://gormanmuseum.ucdavis.edu
Monday–Friday, 12–5 p.m.
The C.N. Gorman Museum is committed to exhibiting contemporary artworks by leading Native American artists from throughout North America, as well as Indigenous artists globally. Established in 1973, the museum is named after Carl Nelson Gorman, a Navajo artist, World War II code talker and one of the founders of the Department of Native American Studies.

STUDENT GOVERNMENT
Associated Students (ASUCD)
Student Government Administrative Office
348 Memorial Union; (530) 752-3632
ASUCD Student Services Office
347 Memorial Union; (530) 752-1990; http://asucd.ucdavis.edu
The Associated Students of the University of California, Davis (ASUCD), authorized by the regents and the chancellor, represents all undergraduate students and is responsible for over $10 million used to enhance the student experience. Graduate and law students also have access to all ASUCD commercial activities. Funds allocated to ASUCD provide activities and services that make life as a student a little easier, less expensive or just more fun.

ASUCD operates more than 40 activities, including the Unitrans bus system, The California Aggie newspaper, the Bike Barn repair services, travel service, free legal advice for undergraduate students, The Aggie Student Store, Campus Copies, Classical Notes, Project Compost, Cal Aggie Camp, Book Exchange, U.S. Post Office and the Coffee House, among others.

The ASUCD-sponsored Experimental College offers a variety of nontraditional classes each quarter for students interested in diversifying their educational experience. Radio KDFS stereo 90.3 FM, the student-run campus radio station, broadcasts at 5,000 watts. Other ASUCD activities include Entertainment Council and the Whole Earth Festival.

Picnic Day, a UC Davis tradition since 1909, is the largest student-run event in the nation. This annual spring open house features more than 100 exhibits and cultural displays, including a parade, a fashion show, sports, sheep dog trials, dachshund races, food, music and dancing.

You can find information about ASUCD programs at their Web site http://asucd.ucdavis.edu, in the Student Directory, which combines details about ASUCD services and organizations with the ASUCD student telephone directory or by visiting the ASUCD Student Services Office in the Memorial Union.

Allocated funds are budgeted through the ASUCD Senate. Based on a modified federal form of government, the senate consists of 12 elected senate members and the ASUCD president and vice president. The senate is the policy-making body for ASUCD and supervises all aspects of the association. The ASUCD president is the chief administrative officer and is assisted by the vice president. ASUCD is the liaison for the undergraduate student body and represents the students with other universities, the UC Office of the President and the regents.

The ASUCD Senate is the policy making body of the student government and are responsible for allocating funds through their annual budget hearings. The Senate consists of 12 members who serve year-long terms with elections held during the fall and winter quarters.

Seven commissions and one committee advise the senate and assist the governing board with its decisions by researching legislation and making recommendations. Commission chairs are ex-officio members of the senate. Each commission also involves itself with various projects that relate to its specific area.

• Academic Affairs advocates students' rights in the area of academics, including dealing with the Academic Senate and with issues such as grading policies, tenure and teacher evaluations. Academic Affairs also sponsors the popular “Last Lecture Series.”
• Business and Finance makes recommendations to the Senate on all financial matters and conducts audits on ASUCD commercial units.
• Environmental Policy and Planning addresses all issues and concerns that pertain directly to the environment.
• Ethnic and Cultural Affairs makes recommendations on policies and programs concerning UC Davis’ ethnic community, acts as a liaison between on-campus and off-campus bodies affecting ethnic students and their quality of life at the university.
• External Affairs deals with off-campus concerns including the regents, UC Office of the President, and the Davis City Council.
• Internal Affairs recommends policies to improve ASUCD operations and the quality of nonacademic student life on campus.
• The Gender and Sexuality Committee actively promotes awareness of gender and sexuality issues, and prevention of sexual assault through outreach efforts and education programs.
• The Elections Committee ensures the fair administration of ASUCD online elections. The committee coordinates candidate and ballot measure forums and provides unbiased election information.
The ASUCD President is the chief administrative officer and is assisted by the Vice President. ASUCD is the liaison for the undergraduate student body and represents the students with other universities, the community, the UC Office of the President and the regents.

The judicial branch consists of the ASUCD Student Court. The nine member court the responsibility to carry out all rules designated to it in the ASUCD Constitution and its bylaws. ASUCD Court Members serve “life” terms, lasting four years or their entire academic career at UC Davis.

UC Davis Administrative Advisory Committees

Office of the Chancellor; http://chancellor.ucdavis.edu/aac/

The Office of the Chancellor encourages students to participate in issues affecting the campus community by applying for membership on an administrative advisory committee. Each committee focuses on a specific area, such as athletics, childcare, disability issues, Regents’ scholarships or student services and fees. The committees respond to requests for advice, identify needs or concerns within the charge of the committee and recommend action to the campus administration.

Applications are accepted each winter for service on committees the next academic year. Undergraduate students should contact ASUCD Student Advocacy. Graduate students should contact the Graduate Student Association.

Graduate Student Association (GSA)

Graduate Student Association (GSA)
Room 253, South Silo
(530) 752-6108; Fax (530) 752-5158; gsa@ucdavis.edu; http://gsa.ucdavis.edu

The Graduate Student Association (GSA) is the officially recognized student government for UC Davis graduate students. GSA provides a forum for addressing the concerns of graduate students and promotes communication with campus administrators. GSA also serves as an advocate at all levels of the university on behalf of graduate students. Funded by graduate student fees, GSA provides services to all academic graduate students and to professional students in the Graduate School of Management. Services include new student orientation, legal service, travel awards, newsletters and assorted social events. Other professional students are eligible to join GSA by paying a fee.

GSA General Assembly representatives are designated by other students in their department or graduate group. General Assembly meetings are held once a month and are open to all graduate and professional students. Each year the General Assembly elects the members of the Executive Council, who serve in a variety of positions to carry out the policies and functions of the organization.

STUDENT ORGANIZATIONS

Student Programs and Activities Center (SPAC)

4th floor, Memorial Union
(530) 752-2027; http://spac.ucdavis.edu

Studies have shown that college students who are involved in campus life through activities and organizations feel more connected to the campus, are more satisfied with their college experience and are more likely to graduate than non-involved students. The Student Programs and Activities Center (SPAC) provides students with opportunities for campus involvement, leadership development, community service, cross-cultural competence and collaboration by supporting a wide variety of student organization and campus programs.

Student Organizations

More than 465 student organizations are registered at UC Davis through SPAC. They consist of cultural, social, religious, political, ethnic, academic, professional, international, recreational, performing arts and service groups, that provide students and the entire campus with important educational experiences. SPAC provides educational programs, consultation, training, event planning, leadership development, conflict resolution, resources and campus policies. More information about each registered student organization or how to start a club is available at the Web site listed above.

Activities Faire

(530) 752-2027; http://spac.ucdavis.edu/af

The Activities Faire held every October is an ideal opportunity to learn how to get involved, meet new people and try new activities, with over 190 student organizations and campus programs providing information and recruiting members.

Cal Aggie Marching Band-Uh!

Cal Aggie Marching Band-Uh!
(530) 752-6469; http://camb.ucdavis.edu

The Cal Aggie Marching Band Uh! celebrates campus traditions and entertains spectators at athletic, campus and community events. As one of the few student-run bands in the nation, the band has a style and personality indicative of UC Davis.

Culture Days

(530) 752-2027; http://spac.ucdavis.edu

The annual Culture Days programs strive to build an inclusive and welcoming campus community through programs that raise awareness and celebrate our cultural diversity. Programs include Asian Pacific Culture Week, Black Family Week, La Raza Cultural Days and Native American Culture Days. Everyone is invited to share in these programs featuring speakers, workshops, films, entertainment and family events.
**Danzantes del Alma**

(530) 752-2027; [http://spac.ucdavis.edu/programs/danzantes](http://spac.ucdavis.edu/programs/danzantes)

This popular student folklórico dance troupe celebrates the culture and heritage of Mexico through performances on campus and throughout northern California. All students are invited to participate and no prior dance experience is required.

**Greek Life**

(530) 752-2027; [http://spac.ucdavis.edu/programs/greek](http://spac.ucdavis.edu/programs/greek)

Affiliation with fraternities and sororities provides a connection to campus through friendships, a support group for academic and personal growth, leadership opportunities and involvement in campus activities and traditions.

**The Student Recruitment and Retention Center**

16 South Hall  
(530) 754-6836; [http://thecenter.ucdavis.edu](http://thecenter.ucdavis.edu)

The Student Recruitment and Retention Center is a student-run program serving historically underrepresented students. Programs include Southeast Asians Furthering Education (SAFE); (BRIDGE) Filipino Outreach and Retention; American Indians for Recruitment and Retention (Ne’ Ue); African Americans and Africans Cultivating Education (ACE); Yik’al Kuyum—The Chicano and Latino Holistic Student Support Program; and Graduate Academic Achievement and Advocacy Program (GAAAP). The SRRC family is a group of culturally diverse students striving to develop and implement projects that will foster educational equity. We provide middle school and high school tutoring, mentoring, community college transfer outreach programs, leadership retreats, workshops, studypaloozas, and much more. Join our staff or volunteer and receive internship units or transcript notation.

**Cal Aggie Student Alumni Association (SAA)**

Walter A. Buehler Alumni and Visitors Center  
(530) 752-0115 or (530) 752-0286; [http://www.alumni.ucdavis.edu](http://www.alumni.ucdavis.edu)

All UC Davis students are encouraged and welcome to become SAA members. SAA follows the mission of “advancing student-alumni relations” by building community between past and present Aggies, providing student leadership opportunities, upholding Aggie traditions and offering benefits and services. Programs include Aggie Diner, Take an Aggie to Lunch, Take an Aggie to Work, alumni panels, Distinctly Davis Tours, Aggie Welcome events, Pajamarino and community service opportunities. You may join SAA any time during the academic year; the annual membership cost is $25 and includes 10 percent off UC Davis imprinted merchandise at the UC Davis Bookstore, a 10 percent discount at Watermelon Music, 15 percent off at Woodstock’s Pizza, access to our Aggie Flower Club and $100 off Princeton Review test prep, just to name a few.
1970 1990

1973 The First Resort—a student staffed, peer advising center—and the Womens Center open.

1993 The Cross Cultural Center opens.
ACADEMIC ADVISING

UC Davis offers many different types of academic advising to help you get the most from your education. College advisers can assist you in meeting degree requirements and taking maximum advantage of the resources available at the university. A conference at least once a quarter with your faculty or staff adviser is especially desirable during your first year and during your final quarters preceding graduation.

COLLEGE ADVISING

College of Agricultural and Environmental Sciences

Office of the Dean
150 Mrak Hall
(530) 752-0108; http://www.caes.ucdavis.edu

In the dean's office you will find:

- Staff advisers who can help with university and college rules, regulations and policies and procedures that affect students.
- Academic advising; in-depth advice regarding probation/dismissal status, admission to the college, readmission, second bachelor's, and limited and regular status.
- Advice and action on petitions.
- Other services including college English requirement check, release of holds on registration packets and final evaluation for graduation.

Associate Dean of Undergraduate Academic Programs

Diane Ullman, Associate Dean
150 Mrak Hall
(530) 752-0108

The college has an associate dean of undergraduate academic programs and advising staff who welcome the opportunity to become acquainted and to talk with individual students. They can also help you with academic problems if you are placed on probation or subject to dismissal.

Faculty Advisers/Staff Advisers. You will be assigned a faculty adviser to help you plan a program that corresponds to your individual educational interests. The master advisers coordinate advising within a major. Staff advisers in the department can advise you on courses, specific requirements of majors and career opportunities. You are strongly urged to consult with your faculty adviser or staff adviser each quarter before selecting your courses.

As educational objectives evolve, you may, in consultation with the master adviser for your major, choose a new faculty adviser whose area of expertise corresponds more directly to your specific objectives.

Undeclared/Exploratory Program (non-degree program)

150 Mrak Hall
(530) 752-0610

Are you unsure what major you really want to pursue? If so, you may want to register in the Undeclared/Exploratory Program. With the help of staff in the dean's office and the major advisers, you can explore specialized options, develop your decision-making abilities and select the major best suited to your needs. For registration purposes, indicate "Undeclared/Exploratory" on your admissions materials. You must declare a major before you complete 90 units; see Declaration of Major, on page 69, in the Academic Information chapter.

College of Biological Sciences

Dean's Office
202 Life Sciences
(530) 752-0410; http://biosci.ucdavis.edu

The Associate Dean and staff in the Dean's office offer complete academic advising services for students working on a major administered by the College of Biological Sciences. We advise on college and university requirements, policies, and procedures, including PELP, withdrawal, readmission, change of major or college, multiple majors and late actions. We evaluate transfer work, discuss petitions for variance and provide degree checks for graduation purposes.

The office is also responsible for the academic progress of all students majoring in the college. If you have any problems (personal, medical, financial) that are affecting your academic performance, or if you are on academic probation, we invite you to make an appointment to see one of the advisers in the Dean's office.

Advising for the Major. Students who declare or intend to declare majors in Biochemistry and Molecular Biology; Cell Biology; Evolution, Ecology and Biodiversity; Exercise Biology; Genetics; Microbiology; Neurobiology, Physiology, and Behavior; or Plant Biology should contact the specific department office for academic advising services, where both faculty and staff advisers are available.

Students who declare or intend to declare a major in Biological Sciences or students who are in the Undeclared-Life Sciences program should consult with the staff in the Dean's office for program planning and major requirements.

Peer Advisers. Peer advisers are available in each department office. Biological Sciences houses its peer advisers in the Dean's Office.

College of Engineering

Undergraduate Advising Office
1050 Kemper Hall
(530) 752-1979

Information and assistance on academic, career and personal matters is available in the Undergraduate Advising Office, either through direct assistance from one of the staff advisers or through referral to other offices on campus. The Undergraduate Advising Office handles student petitions, transfer evaluation, articulation and degree certifications.

Advising. Before you register for courses for your first quarter, you should consult with your departmental staff adviser, whose name and office hours you can obtain at the department office. The departmental staff adviser is aware of the requirements for your major and can assist you with planning your program.

Mandatory Advising. The College has implemented a mandatory advising system that is enforced through the online registration system. You are required to meet with your adviser once a year, during a specific quarter, which is determined by the first letter of your last name (A-G = Fall; H-N = Winter; O-Z = Spring). Students are notified of the hold by checking SISWEB at the time of registration. If you fail to clear your hold during your specified period, you may be unable to make changes to your current registration and to register for future quarters. If you meet with your adviser during this quarter and have your hold released, there should be no difficulties with subsequent registration. You have approximately four months to clear an advising hold. For more informa-
tion on mandatory advising, call the Undergraduate Advising office at (530) 752-1979.

Peer Advisers. A well-developed peer advising system complements faculty and staff advising. Peer advisers are available in 1050 Kemper Hall. They are also available during designated hours in the residence halls. To speak with a peer adviser, call the Undergraduate Advising Office at (530) 752-0553.

College of Letters and Science

Office of the Deans/Undergraduate Education and Advising Office
200 Social Sciences and Humanities Building
(530) 752-0392; http://www.ls.ucdavis.edu/Students

The deans and staff in the Undergraduate Education and Advising Office can help you with issues relating to your academic goals and experiences. You can consult the Advising Office on matters such as program planning, selection of a major, exceptions to regulations and academic enrichment opportunities. To find answers to your questions and other useful information, including contact information and how to arrange to meet with an adviser, see http://www.ls.ucdavis.edu/Students.

The Undergraduate Education and Advising Office also provides a number of additional services:

- Determines how your transfer credits from other institutions apply towards completion of breadth and unit requirements for the bachelor's degree. Applicability of transfer credit toward the major is determined by your major faculty adviser.
- Provides degree checks to identify remaining college requirements and certifies graduation.
- Acts on petitions requiring the dean's approval.
- Reviews the records of students who are subject to disqualification and determines whether such students may continue at UC Davis.

Advisers. All new students who have selected a major will be assigned an adviser within that major department. New students should contact their department or program office during the first quarter of residence on the UC Davis campus to meet with their adviser. If your adviser is not available when you need assistance, or if you wish to consult an adviser in a major program other than the one represented by your assigned adviser, contact the department or program office for help.

New students are encouraged to see their faculty adviser at least once every quarter during their first year on campus to discuss their educational goals, course program and progress.

Continuing students who have completed three quarters in residence in the college should consult with an adviser at certain important checkpoint stages in their academic careers. You are urged, however, to maintain regular contact with an adviser in your major to avoid program errors that may delay graduation. Seniors should maintain close contact with their advisers to ensure that they are meeting the major requirements.

Academic Options Program. Students who have not yet selected a major are automatically placed in the L&S Academic Options Program which provides academic advising to lower division students. Residence Hall Advising Team sites are located in on-campus residence hall areas. Each site is staffed by a team of L&S Peer Advisers who will be available to Academic Options Program students living in that residence hall complex. Through individual advising, group sessions, and programs, this team will work with you over the next several quarters. They will help you with your academic planning, ensuring progress toward your educational goals and satisfaction of degree requirements. They also can assist you in exploring your options before you select your major.

L&S Academic Options Program students not living in a university residence hall complex will receive academic advising from the L&S Undergraduate Education and Advising Office. Advisers there also are available to provide academic assistance to all students in the College of Letters and Science.

Advising Checkpoints. You should consult with your faculty adviser at two, possibly three, critical stages in your academic career:

- Before you complete 90 units of degree credit, including transfer work, you must develop in consultation with your faculty adviser, a proposal for a quarter-by-quarter program of courses showing how you will meet your educational goals and graduation requirements. You must also have declared a major by this time. Filing this plan with your adviser does not preclude subsequent modifications of the plan or a change of major.
- When you complete 135 units of degree credit, including transfer work, you may pick up Degree Check materials from the Letters and Science Advising Office and consult your adviser concerning course selection and satisfaction of requirements in the major.
- Before you complete 195 units of degree credit, including transfer work, you must develop in consultation with your faculty adviser, a firm study plan in the form of a quarter-by-quarter program that will satisfy all remaining degree requirements as expeditiously as possible. This plan will be filed with your adviser. If the plan indicates that you will have to register beyond the 225-unit limit in order to meet degree requirements, you must contact the Undergraduate Education and Advising Office immediately. Exceptions to the 225-unit limit are granted by the dean only rarely. Typically, approval is granted only to allow completion of minimum degree requirements.

If you have not met with your faculty adviser before these established checkpoints, a hold may be placed on your registration as a reminder.

Peer Advisers. Student-to-student advising is an important part of the university advising services. The College of Letters and Science deans' office peer advisers are available in the Undergraduate Education and Advising office, in 200 Social Sciences and Humanities Building, and on a weekly basis in the campus residence halls to talk with students about their academic concerns.
ADVISING SERVICES

South Hall
1st floor, South Hall
(530) 752-3000; http://advisingservices.ucdavis.edu

Academic Peer Advising (530) 752-9201, places Peer Advisors in over 70 departments and Dean's offices to help students find the answers to their questions about major requirements, courses and university regulations. The Academic Peer Advisor complements faculty advising by providing a student perspective. The Academic Peer Advising staff is trained to provide information and assistance about graduate schools, career opportunities and college requirements.

Career and Graduate Study Resource Center (530) 754-6028, is an extensive reference library co-managed by Advising Services and the Internship and Career Center. Resources include numerous graduate and professional school catalogs and program directories, admission test materials, fellowship directories and books and journals related to law, business, health careers and other fields. Also available are job listings, general career information materials and information about companies who recruit at UC Davis. Several personal computers are available to search the Internet for information on graduate and professional study and job opportunities.

Educational Opportunity Program (EOP) (530) 752-9711, offers an array of services to help students adapt both academically and socially to the University setting and successfully achieve their educational goals. EOP provides a caring and supportive environment for students to meet with peer and staff advisers and network with other students. Services include:
- Orientation and welcome activities
- Academic assistance
- Personal and social support
- Workshops
- Support network for former foster youth
- Tutoring and supplemental instruction through the Learning Skills Center
- Connection with campus resources and programs

Students interested in learning more about EOP may inquire at eop@ucdavis.edu or see http://eop.ucdavis.edu. The office is located in 106 South Hall, and visitors are always welcome. No appointment is necessary.

The EOP Guardian Scholars Program (GSP) provides academic and personal support to former foster youth, wards of the court and orphans. The program offers services to help students transition to the University and increase their potential to succeed. The staff adviser serves as the liaison between students and various campus units, providing assistance with academic planning, financial aid, housing and other campus resources. The Guardian Scholars office is located in 102 South Hall.

Mentorships for Undergraduate Research in Agriculture, Letters and Science (MURALS) is a pre-graduate opportunity program designed to enrich the research experience of students who are "situational disadvantaged" in their access to graduate school. The mission of MURALS is to encourage students to further their education beyond the baccalaureate degree. By working with a faculty mentor, students not only have an opportunity to participate in academic research, but their experience may give them an incentive to pursue graduate work leading to a master's or doctoral degree. Students must be a junior or senior with a GPA of 3.000 and 90 units and meet additional eligibility requirements. For more information, please see the MURALS Web site at http://murals.ucdavis.edu.

The First Resort (530) 752-2807, thefirstresort@ucdavis.edu, has drop-in peer advising resources for all students to assist with registration procedures, course selection, choosing a major or other general advising questions. The student advisers can either answer your questions or put you in contact with others who can. The staff can give you advice and assistance from the point of view of someone who has "been there." Peer advisors from The First Resort are also part of an extensive network of academic support services available to first-year students living in the campus residence halls referred to as the "Residence Hall Advising Team." The First Resort maintains a referral service, a listing of courses of 1 to 3 units and other valuable resources. These peer advisors also serve as a First Resort for transfer students and can assist with transfer student services. If you have a problem, remember, start with The First Resort.

New Student & Orientation Services (530) 752-4443, orientation@ucdavis.edu, http://orientation.ucdavis.edu, assists new students and their families with the transition to UC Davis. Orientation includes assistance with academic advising, course registration, information for campus resources and social integration. The staff will introduce you to the campus environment, procedures and opportunities, and offers programs relevant to your changing needs. Your contribution to orientation programs, through ideas and assistance, is always welcome.

Pre-Graduate School Advising (530) 752-3000, helps students with the application process for Masters, Ph.D. or teaching credential programs. Staff members meet with students to discuss strategies on how to become a competitive applicant including GPA, test preparation, writing the statement of purpose, and obtaining strong letters of recommendation. Graduate School Information Day is held on campus each October to give students an opportunity to speak with representatives from Universities across the country in preparation for entrance to graduate school. This unit also coordinates the Undergraduate Research, Scholarship & Creative Activities Conference, an annual event open to all UC Davis undergraduate student researchers.

Transfer & Reentry Student Services (530) 752-2200, transferstudents@ucdavis.edu, helps students who have transferred from other institutions of higher education, coordinating transfer student matters among existing student services units to aid in an easy and smooth transfer to the university. It also sponsors special receptions and workshops for new transfers as well as monthly workshops called Transfer Tuesdays. Feel free to drop-in to talk with a transfer student Peer Advisor or call to make and appointment.

Reentry Student Services (530) 752-2005, reentry@ucdavis.edu, helps students who have returned to the university after several years of life and work experience. The office provides information, orientation and peer support, and provides referral assistance through the Reentry Resource Network. The office sponsors an annual Reentry Day for prospective reentry students.
Student Regent, (530) 752-3000, The UC Davis Student Regent campus Coordinator assists students with the application process for this prestigious appointment. The Student Regent is a position on the Board of UC Regents, which governs the University and is responsible for the financial management of the University, its investments, and its property holdings. The Regents preside over the appointment of the President of the University, the ten campus Chancellors, and the Officers of The Regents, among others. The selected candidate is appointed to serve a two-year term; in the first year, s/he will serve as “Student Regent-designate” and will participate in all Board and committee meetings, but without voting privileges. In the second year, s/he will serve as Student Regent and will participate as a full voting member of the Board. To apply you must be an undergraduate, graduate, or professional student at one of the University's ten campuses and be in good academic standing. The Student Regent will be reimbursed for expenses incurred for attendance at Board and committee meetings, and all mandatory University fees and tuition will be waived during the student’s two-year term.

Veterans Affairs (530) 752-2020, assists veterans, dependents and reservists with a number of services, including certifying course attendance to the Department of Veterans Affairs, coordinating a tutorial assistance program, providing advice and support, and helping with educational fee waivers, work study and financial aid concerns. To initiate a benefit claim, write or drop by with your letter of admission.

South Silo
160 South Silo
(530) 752-4475; http://advisingservices.ucdavis.edu

Health Sciences Advising (530) 752-4475, offers individualized advice and information to students interested in admission to health profession schools (medical, dental, vet med, etc.) including prerequisite course planning, exam preparation, evaluation of competitiveness and assistance with all aspects of the application process such as writing the personal statement, getting good letters of recommendation, selecting schools/programs and strategies for becoming the most competitive applicant possible. In addition, Health Sciences Advising offers small group advising and informative workshops, and hosts visits from admissions officers from various health professions schools who do presentations at programs/panels and attend Graduate School Information Day. Informational handouts are available.http://advisingservices.ucdavis.edu and the Professional Letter Service (PLS) provides a way for applicants to store and send letters of recommendation to health professions schools.

Pre-Law/MBA Advising (530) 752-4475, offers help with preparation and program planning for students interested in the legal profession or business fields. The staff and law student advisors also work with students on strategies on how to be a competitive applicant, test preparation, writing the personal statement and business essays, obtaining letters of recommendation and selecting schools. In addition to providing the annual Law School Information Day event where students have an opportunity to speak with law school admissions representatives from over sixty law schools around the United States, the service also conducts several useful information programs each quarter.

Student Disability Center (530) 752-3184 (voice) or (530) 752-6833 (TTY); http://sdc.ucdavis.edu, provides services to students with disabilities in accordance with Section 504 of the Rehabilitation Act, the Americans with Disabilities Act and state law. The staff assists students with disabilities in identifying accommodations that will ensure the student has equal access to educational opportunities at UC Davis. Disability management counseling is also provided to address disability-related academic or personal concerns.

STUDENT CONDUCT AND GRIEVANCES

Student Judicial Affairs
3200 Dutton Hall
(530) 752-1128; http://sja.ucdavis.edu

The Office of Student Judicial Affairs (SJA) is charged with administering the student discipline system. SJA supports campus standards by resolving alleged violations of university policies or campus regulations. The office also assists in early resolution of student grievances and provides information and assistance about how to file formal complaints of alleged unfair policies or practices, arbitrary treatment, and prohibited discrimination or harassment (based on sex, race, religion, disability, etc.). The office can help with conflict resolution and provide interpretations of university policies and regulations.

Misconduct and Discipline

Students enrolling or seeking enrollment in the university have an obligation to act honestly, ethically and responsibly consistent with the university's function as an educational institution. As members of our academic community and of society at large, students have both rights and responsibilities and are expected to comply with the general law, University policies and campus regulations. Rules concerning student conduct, student organizations, use of university facilities and related matters are set forth in both university policies and campus regulations; they apply to on-campus and University-related conduct or activities, and also to certain off-campus behavior.

Standards for student conduct are included in the UC Davis Code of Academic Conduct, the Student Organization Sourcebook, the Guide to Residence Hall Life and the University of California Policies Applying to Campus Activities, Organizations and Students. The operation of the campus student disciplinary system is outlined in the publication, the Administration of Student Discipline. These policies and regulations are available on the Internet. For assistance, contact SJA.

Misconduct for which students are subject to discipline includes, but is not limited to, plagiarism, cheating, or other dishonest or unfair academic misconduct; furnishing false information to the university; sexual or other physical assault; threats of violence or conduct that threatens health and safety; misuse of university property or resources, including electronic communications; possession of weapons; harassment, including stalking and sexual harassment; forgery; theft; vandalism; possession, use, distribution or sale of drugs or alcohol that is illegal or against University policy; hazing; obstruction or disruption of university activities or functions; and alteration or misuse of university documents, records, keys or identification.

Disciplinary sanctions that may be imposed range from censure to dismissal from the university and may include restitution and/or assigned community service. Suspected violations of campus or university standards by individual students should be reported to the Office of Student Judicial Affairs. Suspected misconduct by registered student organizations should be reported to the Student Programs and Activities Center. If complaints cannot be resolved informally by agreement between Student Judicial Affairs, the accused student and the reporting party, the case may be referred
to a hearing before a panel of students and faculty or staff, or a
hearing officer. The president of the university, through the chan-
celloir, has ultimate authority for the administration of student dis-

cipline.

**Student Responsibilities**

Students are responsible for complying with the announcements
and regulations printed in this catalog, in the *Class Schedule and
Registration Guide*, on the SJA Web site and with all policies, rules
and regulations of the university and this campus. Students will
not be able to register or receive transcripts of record or diplomas
until they have met all university obligations.

**Discrimination/Harassment**

If students believe that they have been discriminated against or
harassed, they may contact the Office of Student Judicial Affairs at
(530) 752-1128 or Matilda Aidam, Director, Mediation Services
and Interim Title IX and Disability Compliance Officer, (530) 757-
4480, for information and assistance. It is important to seek assis-
tance as soon as possible, as time limits may apply to some griev-
ance processes. Advice is also available from the Sexual
Harassment Information Line at (530) 752-2255 and the campus
Sexual Harassment Officer at (530) 752-9255. Graduate students
may contact Graduate Studies at (530) 752-0650 and/or the Grad-
uate Student Association at (530) 752-6108.

**RESOLVING ACADEMIC PROBLEMS**

**Grade Changes**

Grades may not be changed once they have been submitted to the
Office of the University Registrar unless (1) a clerical error has
been made (e.g., a homework score is missing) or (2) a procedural
error has affected the student’s grade (e.g., misapplication of grad-
ing procedures, arbitrary treatment or prohibited discrimination).
Students who believe they received an incorrect grade due to a
clerical or procedural error should ask their instructor to file a
grade change form with the Office of the University Registrar. If
the instructor does not agree, the student may request a change of
grade by filing a grade change petition with the Office of the Uni-
versity Registrar. Requests must be made by the fifth week of the
following quarter; see the *Class Schedule and Registration Guide
(CSRG)*.

The Academic Senate Committee on Grade Changes reviews
requests for grade changes and has no authority to reevaluate stu-
dent work, but can change the grade if it finds a documented cler-
tical or procedural error. If the alleged procedural error involves
arbitrary treatment or prohibited discrimination, the Grade
Change Committee, may inform the student of his/her right to file a
complaint under campus grievance procedures (see nondiscrimi-
nation policy). For more information, students may contact the
Office of Student Judicial Affairs (530) 752-1128.

**Other Academic Problems**

If you need a requirement waived or any other type of variance,
contact your faculty adviser or the appropriate dean’s office for
information on your college’s procedures. If you cannot get satis-
faction through normal channels, contact the ASUCD Student
Advocacy Grievance Center or the Committee on Student-Faculty
Relationships; see ASUCD Student Advocacy Grievance Center,
below.

**ASUCD Student Advocacy Grievance Center**

349 Memorial Union
(530) 754-4131/6101/3339

The ASUCD Student Advocacy Grievance Center advocates stu-
dents’ academic and nonacademic concerns to the faculty and
administration. Grievance counselors assist students one-on-one,
directing them to appropriate channels through which to state
their academic grievances (e.g., student-faculty relations, sexual
harassment, grade change problems, pre-judicial treatment in the
classroom and problems with academic procedure and policy) and
nonacademic grievances (e.g., campus facilities, campus safety,
ASUCD and any other nonacademic concerns). All information
discussed between counselors and students is completely confi-
dential. Students can get counseling, referrals and support to aid in
the resolution of these matters.

**Committee on Student-Faculty Relationships**

Academic Senate Office
402 Mrak Hall
(530) 752-2231

If students with a grievance feel they cannot get satisfaction
through normal procedures, they may contact the Committee on
Student-Faculty Relationships for assistance. The committee is
advisory and can make recommendations to the office having
authority to resolve the problem. The chair and/or other designate
may also meet informally with the students involved with the
grievance.

**TUTORING AND LEARNING RESOURCES**

**EOP Services**

Learning Skills Center
2205 Dutton Hall
(530) 752-2013

The Learning Skills Center offers pre- and co-classes in mathemat-
ics and physics for EOP students. Pre-classes help prepare EOP
students for the regular university class they usually take the fol-
lowing quarter. Co-classes provide supplementary instruction for
EOP students enrolled in the regular class. The LSC offers pre-
classes for Mathematics 16A, 21A and Physics 9A. The LSC also
offers co-classes for the Mathematics 16 and 21 series and the
Physics 9 series. All pre-classes carry three workload units and co-
classes carry one workload unit. These units count toward mini-
mum progress and financial aid eligibility, but do not count toward
graduation.

Tutoring is a free service available to students. If you are having
difficulty with your course work or just want to improve your
grades, the Learning Skills Center offers tutoring in many course
areas. Tutoring is provided in pre-arranged groups and one-to-one
and on a drop-in basis. The tutoring program is staffed by students
carefully selected for both their knowledge of course content and
their sensitivity to the needs of students being tutored.
Learning Skills Center

2205 Dutton Hall  
(530) 752-2013

At the Learning Skills Center you can receive help with general study skills, math and science concepts, writing essays and term papers, reading efficiency, English as a second language, time-management and test-taking skills and test anxiety reduction.

Learning specialists can help you individually, in small groups, or you may participate in workshops covering specific areas of study. A Learning Resource room is available that provides subject tapes, instructional materials, reference books and preparation exams for a variety of tests such as the GRE, MCAT and LSAT. Most materials may be checked out.

Undergraduate tutors offer group and individual sessions on a pre-arranged and drop-in basis. Come in and ask about our services, which are free to all UC Davis students.

Special Transitional Enrichment Program

Learning Skills Center  
2205 Dutton Hall  
(530) 752-2013

Freshman EOP students are invited to participate in the Special Transitional Enrichment Program (STEP). The program begins in summer and continues through the first two academic years, offering preparatory course work, developing academic skills and providing advising. It helps students adjust academically and socially to the campus by strengthening their learning skills and study habits, and by providing an extensive orientation to campus life.

Student Housing Computer Centers

Student Housing  
(530) 754-6022

Computer Centers are located in the Segundo, Tercero and Cuarto residence hall areas. They provide residents with a variety of academic resources in close proximity to their living areas. Technical resources include PCs with direct Internet connections and contemporary software titles, printers, scanners, CD-ROM drives, and headsets which students can use to listen to online lessons for their foreign language courses. Other resources include dictionaries, thesauri, writing reference guides, digital encyclopedias and areas for group study. In addition to these resources the helpful site staff offer free tutoring on all computer software used in the centers.

INTERNSHIPS AND CAREER SERVICES

Internship Programs

The Internship and Career Center  
2nd and 3rd floors, South Hall, Buehler Alumni and Visitors Center  
(530) 752-2855; http://icc.ucdavis.edu

You can take advantage of one of the hundreds of organized internships through the Internship and Career Center or initiate your own.

An internship may be full time or part time, credit or non-credit, voluntary or involving a stipend, depending on your needs and interests and the availability of openings. Internship experiences must emphasize learning rather than routine activities, must include field supervision by a qualified professional and, where appropriate, the faculty member responsible for giving credit. Academic credit is awarded only for experiences planned and approved in advance by the sponsoring faculty member.

The Internship and Career Center (ICC)

2nd and 3rd floors, South Hall; Buehler Alumni and Visitors Center  
(530) 752-2855; http://icc.ucdavis.edu

If you are an undergraduate, graduate or alumnus, ICC can help you identify your abilities and interests and relate them to jobs; gain access to practical experience to increase your competitiveness in the job market; and find out how and where to look for the jobs you want. If you are considering dropping out of the university for a term or longer, an adviser can also give you information about internships and employment opportunities.

The Career and Graduate Study Resource Room (1st floor, South Hall) contains materials that can help you learn how your major field of study can be translated into job opportunities and data concerning types of employment graduates have obtained. Useful to job-seekers—and available free of charge—is ICC’s Career Resource Manual, which provides guidelines for preparing a resume, tips on being interviewed and information on employment in government, business and education.

The ICCs Career Recruiting Programs, located in the Buehler Alumni and Visitors Center, maintains job vacancy listings, arranges employment interviews and schedules on-campus recruiting by employers.

Graduate Student and Postdoctoral Career Services

The Internship and Career Center  
3rd floor, South Hall  
(530) 752-7841

Students enrolled in the teaching credential program or pursuing a master’s or doctoral degree in order to teach should visit the Graduate Student and Postdoctoral Career Services offices in South Hall.

Services include teaching job vacancy listings, information on establishing placement files (professional dossiers) through Interfolio, and special workshops on writing teaching resumes, curriculum vitae and preparing for interviews. Individual advising is available by appointment.

Advisers maintain contact with school district personnel and provide resources to students and graduates on career opportunities. The office sponsors the Graduate Career Options Program for advanced degree candidates originally planning a teaching career and now considering other career options, and hosts the Pathways Symposium, an annual day-long career services event for graduate students and postdoctoral scholars.
**Human Corps Program**

The Internship and Career Center
2nd floor, South Hall
(530) 752-3813

Human Corps is the student community services program at UC Davis. Public service work can be a rewarding and satisfying experience that may also improve your qualifications for the job market. Community service may or may not be compensated through wages, academic credit or transcript notation and can vary from a one-day activity to a long-term commitment. The Human Corps is a referral center for students who want to perform community service and as a resource for agencies and campus units with service opportunities. The office has a database and directories with information about nonprofit agencies in California, community service opportunities throughout the world and employment in the non-profit or public sectors after graduation. This office also coordinates the AmeriCorps Bonner Leaders Program at UC Davis.

**ACADEMIC RESOURCES**

**Education Abroad Center**
207 Third Street, Suite 120
(530) 297-4633; Fax (530) 297-4695
http://eac.ucdavis.edu

The opportunity to study abroad is one of the richest educational experiences a student can have. When students return from study abroad in places like Italy or Hong Kong, they describe their time abroad as an experience that changed their lives. Students study abroad to see the world, to study their academic interests in a global context, to learn a language, to prepare for a job in the global economy and to add distinction to an application for graduate or professional school.

The Education Abroad Center (EAC) can help students decide which program is best for them, whether to study abroad for a summer, quarter, semester or a full year and when to go abroad (freshman through senior years). The EAC Coordinators also participate in freshman seminars, offer financial aid workshops and can advise on programs that have internship opportunities. The EAC also administers the Global and International Studies (GIS) minor, which is sponsored by the Humanities Program in the College of Letters and Science.

The EAC is home to the University of California Education Abroad Program (EAP), to UC Davis Quarter Abroad and to UC Davis Summer Abroad. The EAC coordinates the Non-UC Study Abroad (NUCSA) leave program for students who are interested in participating on non-UC study abroad programs for transfer credit. Finally, the EAC advises and provides student services for international EAP Reciprocal Exchange students.

**Freshman Seminar Program**

17 Wellman
(530) 752-3249; http://trc.ucdavis.edu/trc

The UC Davis Freshman Seminar Program gives first-year students the opportunity to study with faculty members in small groups, meeting in settings more informal than the ordinary classroom. The seminars focus on a current intellectual interest of the faculty member. All freshman seminars emphasize student participation, providing intense intellectual exchange among students and between student and teacher.

**Mathematics and Science Teaching Program (MAST)**
1023 Sciences Laboratory Building
(530) 754-9621; mast@ucdavis.edu, http://mast.ucdavis.edu

The UC Davis Mathematics and Science Teaching Program (MAST) program helps students explore mathematics and science teaching careers while working on their math, science, or engineering degree. Part of the statewide University of California Science and Mathematics Initiative, MAST offers seminars on education, internships in K-12 classrooms, and academic advising to help students choose coursework compatible with multiple goals, including preparing for a teaching credential program.

**Student Farm**
(530) 752-7645; http://studentfarm.ucdavis.edu

The Student Farm offers students a wide range of educational and research opportunities in sustainable agriculture through numerous internship offerings, formal courses (e.g., in organic crop production, sustainable agriculture and environmental education) and research efforts. Opportunities include several staff-supervised hands-on projects such as organic vegetable production and marketing, on-farm composting, tractor operations and environmental education tours for school children. In addition, students may conduct field and greenhouse experiments in various aspects of sustainable agriculture or other individual projects. The Student Farm is a part of the Agricultural Sustainability Institute and is located on the west edge of the campus core, near the Rec Pool. The Student Farm is open to all students, regardless of major or background.

**STUDENT RESOURCE AND INFORMATION CENTERS**

**Campus Violence Prevention Program**

Police / TAPS Building
200 Dairy Road Bikeway
(530) 752-3299; jmbeeman@ucdavis.edu

The goals of the UC Davis Campus Violence Prevention Program (CVPP) are to reduce the incidence of sexual assault, intimate partner violence, stalking and bias related incidents in the campus community and at the UC Davis Medical Center by increasing the knowledge and awareness of students, staff and faculty about such offenses; to provide crisis intervention, advocacy, support, counseling and referrals to victims of such offenses, their families and friends; to service as a resource for information regarding sexual assault, intimate partner violence, stalking and bias related crime; and to collaborate with other campus units and community agencies to provide a safer campus community and a concerted integrated efforts.
The Program’s primary mission is to eliminate all forms of violence and in the interim, to ensure that comprehensive and appropriate support services are available for survivors. The Violence Prevention Program provides confidential and supportive responses to victims and offers one on one advocacy with initial medical evaluation, legal and police procedures, and academic and housing issues. Confidential crisis intervention, problem-solving and advocacy is also available to recent survivors and to those working to recover from past incidents, as well as short-term intervention and support being available for friends, family, housemates and co-workers. With the overall purpose of providing for a comprehensive model program of support, education, training and outreach.

**Center for Leadership Learning**

168 LaRue Road (at The College at LaRue apartment complex)  
(530) 752-6908; [http://cll.ucdavis.edu/](http://cll.ucdavis.edu/)

The Center for Leadership Learning (CLL) offers a variety of leadership programs for undergraduate students. The CLL hosts the following programs and services: Student Leadership Development Series (SLDS), Coaching for Leadership Success, academic advising for the Contemporary Leadership Minor, and the annual Leadership Conference. Each program aims to develop and cultivate a new generation of leaders who are civically and socially engaged, who demonstrate effective cultural and interpersonal communication skills, and who are prepared to successfully contribute to their professional field of choice. Leadership programs offered through the CLL are designed for any undergraduate student, despite their level of experience with leadership. By strengthening their leadership skills, students can increase their self-confidence, learn skills applicable to the world of work and enhance their resumes.

**Cross-Cultural Center**

Steven Baissa, Director  
Corner of East Quad and Shields Avenue  
(530) 752-4287, Fax (530) 752-5067;  
ccc@ucdavis.edu; [http://ccc.ucdavis.edu](http://ccc.ucdavis.edu)

The mission of the Cross-Cultural Center (CCC) is to foster a multi-cultural community through education and advocacy regarding systematic group oppressions, ethnic and cultural diversity, and establishing an environment of cross-cultural learning and exchange for the entire campus. Furthermore, the CCC strives to create a safe space for students of color, LGBTQ students, and students who identify with intersections of multiple identities on campus. To this end, the CCC advocates for a campus environment free of racism, classism, sexism, heterosexism, ableism, body image oppression, religious/spiritual oppression and any other forms of oppression.

**Lesbian, Gay, Bisexual and Transgender Resource Center**

Sheri Atkinson, Director  
University House Annex  
(530) 752-2452; [http://lgbtcenter.ucdavis.edu](http://lgbtcenter.ucdavis.edu)

The LGBT Resource Center provides a comprehensive range of education, information and advocacy services and works to create and maintain an open, safe and inclusive environment for lesbian, gay, bisexual and transgender students, staff, faculty, their family and friends and the entire campus community. The LGBT Resource Center offers a library of over 1,100 books, most of which can be borrowed for two weeks for personal use. The Center can also serve as a meeting space for local organizations or support groups. Our focus is respect, pride and unity with regard to all individuals. The LGBT Resource Center is open Monday–Friday, 9 a.m.–5 p.m.

**Services for International Students and Scholars (SISS)**

Services for International Students and Scholars  
(530) 752-0864; siss@ucdavis.edu

Services for International Students and Scholars assists international students, faculty and researchers in gaining and maintaining an appropriate immigration status while at UC Davis. SISS provides orientation and other information and assistance as part of its mission to build a campus community that is fully inclusive of international students and scholars.

All new and transfer international students must attend a special orientation program held just before each quarter begins. The orientation helps new students with immigration regulations and finding campus services and community resources, and is a vital addition to campus and departmental orientation programs. Orientation for new J-1 international scholars is held each week. Students and scholars should report to SISS as soon as possible after arriving in Davis.

**Estimated Costs for 2008-2009**

International students are responsible for all of their expenses while studying at UC Davis. The expenses include nonresident tuition, educational fees, room and board and a modest amount for personal expenses. For the 2008-2009 calendar year (12 months), we estimate the cost will be $44,200. Because the exact cost for tuition and fees is not determined until just before the beginning of the academic year, $44,200 is only a preliminary figure. This minimum allowance may be increased without advance notice.

**Women’s Resources and Research Center (WRRC)**

North Hall, First Floor  
(530) 752-3372; [http://wrrc.ucdavis.edu](http://wrrc.ucdavis.edu)

The Women’s Resources and Research Center (WRRC) educates the campus community about women’s issues and concerns, promotes an understanding of the role and impact of gender in our lives and in our society; helps women of diverse backgrounds achieve their intellectual, professional, and personal goals, and advocates for women’s full inclusion, equality and advancement. The WRRC meets the needs of students, staff and faculty.

The WRRC’s caring, knowledgeable staff can answer questions, locate resources and help you with a wide range of personal, academic or work-related concerns. The WRRC offers events, skill-building workshops and classes; a library focused on women and gender; advising, mentoring, advocacy and referral by WRRC staff; and informal, comfortable spaces to meet, study and socialize. Student internships and volunteer opportunities are available at the WRRC.
1930 Robert G. Sproul, the first native Californian to be named president of the university, succeeds William W. Campbell. Every University of California campus except UC San Francisco and UC Merced has a Sproul Hall.

1948 First commencement ceremony on the Davis campus is held; 300 students receive degrees.
REGISTRATION AT UC DAVIS

REGISTRATION

Office of the University Registrar
12 Mrak Hall
(530) 752-3639; http://registrar.ucdavis.edu

Registration is the way you become a student at the university. Every UC Davis student must register each quarter. Registration includes enrolling in classes, paying fees and other financial obligations, filing your current address with the Office of the University Registrar, and completing and filing other forms.

If you are a new or reentering student you must also:

- Have a student ID card produced; consult the appropriate quarter Class Schedule and Registration Guide (CSRG) for times and locations.
- Submit a Statement of Legal Residence; see the Appendix, on page 535.
- Return the completed Medical History form, evidence of rubella and hepatitis B immunity, results of a tuberculin skin test and the Insurance Information Request form. These forms are mailed to each new student by the Student Health Center.

New graduate students who have been registered previously at UC Davis as undergraduates are considered to be new students.

Change of Name. Petitions to change your name on official university records can be obtained from the Office of the University Registrar. (Students planning to graduate should file this petition no later than the fifth week of the quarter in which they intend to graduate.)

Change of Address. Be sure to inform the Office of the University Registrar of any change of address. Failure to file your current addresses can result in a hold on your registration. You can update your address using SISWeb; see http://sisweb.ucdavis.edu.

Late Registration

Late registration privileges extend through the 10th day of instruction, but you are assessed a late fee of $50.00 to defray the extra clerical costs. Registration after the deadline is allowed only if action or inaction on the part of the university delays registration. A recommendation from an appropriate administrative unit is required and the registration fee must be paid with cash, cashier's check, credit union check, university check or fee credit.

ENROLLING IN COURSES

SISWeb Web Registration. Students enroll in courses by using SISWeb on the Internet; see http://sisweb.ucdavis.edu.

The Class Schedule and Registration Guide (CSRG), available one week before the start of registration for the quarter, explains registration procedures, gives class meeting times and locations, and provides updated information on fees and registration. The CSRG is available at the bookstore and at http://registrar.ucdavis.edu one week before registration.

The Schedule of Classes, an open-courses list and other registration information, is available at http://registrar.ucdavis.edu.

Undergraduate Registration Priority. Access to registration is by priority groups. The groups are established according to student class level, as determined by the number of units completed. Undergraduate Class Level is determined as follows:

- Freshman Level 0–44.99 units
- Sophomore Level 45–89.99 units
- Junior Level 90–134.99 units
- Senior Level 135 units and above

You are officially registered in all courses listed on your individual study list. You are responsible for completing each of the courses. View your study list (class schedule) using SISWeb.

Adding and Dropping Courses

You can adjust your schedule by adding or dropping courses until the deadlines published in the CSRG.

The last day to add courses is the 12th day of instruction. The last day to drop courses without dean’s permission or fee is the 20th day of instruction, except for those courses designated by departments as 10-day-drop courses. You need to obtain the permission of your dean and pay a $3.00 fee to drop a designated 10-day-drop course after the 10th day of instruction or to drop any other courses after the 20th day of instruction.

The CSRG for each quarter lists the add and drop deadlines and explains how to use SISWeb to adjust your schedule and what add/drop procedures and fees apply after the published deadlines. The academic calendar in the front of this catalog also lists the course add and drop deadlines.

Late Drop

To drop a course after the deadline (but before the day of the scheduled final examination), you need approval of the dean of your college or school. Graduate students must have their adviser’s approval in order to drop courses. A $3.00 fee applies to late drops. Permission to drop courses after the deadline may be granted only in exceptional circumstances.

Late Add

To add a course after the deadline (but before the day of the scheduled final examination), you need approval of the department. A $3.00 fee applies to late adds.

Retroactive Drop

Occasionally, in exceptional circumstances, students are allowed to drop a course after the course is completed. Reasons for seeking a retroactive drop are very specific: medical problems, severe emotional difficulties, or recent death or severe illness in the immediate family. Petitions are subject to approval by the Grade Change Committee of the Davis Division Academic Senate. Petitions are available from the Office of the University Registrar and should include a detailed account of the problem, appropriate documentation and an adequate explanation of why an I grade or late drop was not taken during the quarter in which the problem occurred. The instructor’s signature is required on the petition. A $3.00 fee is applicable on all retroactive drops.
Degree, the campus has established minimum progress requirements for students to achieve expected progress towards the degree in 12 quarters (totaling 180 units). Because occasions arise which prevent students from achieving expected progress towards the degree, the campus has established minimum progress requirements, to which students must adhere.

Minimum Progress Requirements. To meet minimum progress, a full-time regular undergraduate is required to maintain an average of at least 13 units passed over all quarters of enrollment. Minimum progress is calculated at the end of every Spring Quarter for the preceding three quarters (Fall, Winter, Spring) comprising the academic year. Undergraduate students falling below this requirement are not in good academic standing and may be disqualified from further enrollment at the University. Quarters for which a student was officially approved for part-time status are omitted from the minimum progress calculation. For more information, see Probation and Dismissal, on page 77.

Certification of Full-Time Status. Undergraduate students must carry a study load of at least 12 units (including workload units) each quarter in order to be certified as full-time students for insurance and financial aid purposes or to compete in intercollegiate athletics. Graduate students must carry a study load of at least 12 units each quarter in order to be certified as full-time students.

Course Load Limits in the College of Letters and Science. Freshman students in their first year and transfer students in their first quarter of residence may not take more than 17 units each quarter. For all other Letters and Science students, the study list may not exceed 21 units each quarter. These unit limitations include non-credit remedial courses and repeated courses, but not make-up work to remove incomplete grades.

Course Loads in the College of Engineering. Because of the large number of required units in engineering programs, many students must take more than 15 units per quarter and/or attend summer sessions to finish in four years.

Part-Time Student Status

If, for reasons of occupation, family responsibility, health or, graduating-senior status (one term only), you are unable to attend the university on a full-time basis, you may qualify for enrollment in part-time status. Undergraduate students must file for part-time status each quarter. Graduate students with approved part-time status will remain part-time until the student enrolls full-time. To be considered eligible, undergraduate students must be registered in 10 units (including workload units) or fewer by the tenth day of instruction that quarter and graduate students must be registered in 6 units or fewer by the tenth day of instruction. Minimum progress requirements are waived for part-time students. Part-time petitions are available at the Office of the University Registrar and require approval by the University Registrar. Part-time students have use of the same facilities and are eligible for the same services, including Student Health Services, as full-time students.

The Major

You will find a complete list of the majors offered at UC Davis in Degrees Offered By UC Davis, on page 10.

Declaration of Major

College of Agricultural and Environmental Sciences. Students must declare a major by the time they have completed 90 units. Failure to declare a major at this point may result in a hold on further registration. In order to declare a major, you must meet with your faculty adviser and/or advising associate, fill out a Change of Major petition available at the Office of the University Registrar's web site or dean's office and file the petition with the dean's office. If you have completed 90 units, you must prepare a study plan with your adviser and/or advising associate at the same time. You are accepted into a major only after your major department and the dean's office have approved the Change of Major petition. With the approval of the College Executive Committee, additional requirements, such as completion of a particular set of required courses with a specified grade point average (usually well above a C average), may be introduced as conditions for acceptance into any major at any time.

College of Biological Sciences. Students must declare a major by the time they have completed 90 units. A hold will be placed on your registration if you are still undeclared after completing 90 units. Students can obtain a Change of Major petition from the Dean's office or the Office of the University Registrar's web site. They must meet with an academic adviser for the major, discuss a projected plan of studies, obtain the adviser's signature and return the signed petition to the Dean's Office. The minimum requirement for entry into a major is a C average in all courses used to satisfy major requirements. Students are accepted into the major when their adviser and the dean have approved the petition.

Students who fail to maintain a 2.000 GPA in courses required for their major over two consecutive quarters may be required to withdraw from the major.

Retroactive Add

In some rare circumstances, students are allowed to add a course after the course is completed. Petitions are subject to approval by the Grade Change Committee of the Davis Division Academic Senate.

Petitions for retroactive adds are available from the Office of the University Registrar. Each petition must include the reason for the student's failure to add the course during the quarter in which it was offered. The petition must be supported by the instructor's signed approval, together with a statement from the instructor indicating knowledge of the student's participation and performance during the presentation of the course in question and the instructor's understanding as to the reason for the student's failure to add the course before the end of the quarter. A course grade must be assigned by the instructor. A $3.00 fee is applicable on all retroactive adds.

Course Load

Expected Progress. Undergraduate students are expected to graduate in 12 quarters (four years). To do so, students should plan to complete an average of 15 units per quarter (15 units per quarter for 12 quarters totals 180 units). Because occasions arise which prevent students from achieving expected progress towards the degree, the campus has established minimum progress requirements, to which students must adhere.

Minimum Progress Requirements. To meet minimum progress, a full-time regular undergraduate is required to maintain an average of at least 13 units passed over all quarters of enrollment. Minimum progress is calculated at the end of every Spring Quarter for the preceding three quarters (Fall, Winter, Spring) comprising the academic year. Undergraduate students falling below this requirement are not in good academic standing and may be disqualified from further enrollment at the University. Quarters for which a student was officially approved for part-time status are omitted from the minimum progress calculation. For more information, see Probation and Dismissal, on page 77.

Certification of Full-Time Status. Undergraduate students must carry a study load of at least 12 units (including workload units) each quarter in order to be certified as full-time students for insurance and financial aid purposes or to compete in intercollegiate athletics. Graduate students must carry a study load of at least 12 units each quarter in order to be certified as full-time students.

Course Load Limits in the College of Letters and Science. Freshman students in their first year and transfer students in their first quarter of residence may not take more than 17 units each quarter. For all other Letters and Science students, the study list may not exceed 21 units each quarter. These unit limitations include non-credit remedial courses and repeated courses, but not make-up work to remove incomplete grades.

Course Loads in the College of Engineering. Because of the large number of required units in engineering programs, many students must take more than 15 units per quarter and/or attend summer sessions to finish in four years.

Part-Time Student Status

If, for reasons of occupation, family responsibility, health or, graduating-senior status (one term only), you are unable to attend the university on a full-time basis, you may qualify for enrollment in part-time status. Undergraduate students must file for part-time status each quarter. Graduate students with approved part-time status will remain part-time until the student enrolls full-time. To be considered eligible, undergraduate students must be registered in 10 units (including workload units) or fewer by the tenth day of instruction that quarter and graduate students must be registered in 6 units or fewer by the tenth day of instruction. Minimum progress requirements are waived for part-time students. Part-time petitions are available at the Office of the University Registrar and require approval by the University Registrar. Part-time students have use of the same facilities and are eligible for the same services, including Student Health Services, as full-time students.

The Major

You will find a complete list of the majors offered at UC Davis in Degrees Offered By UC Davis, on page 10.

Declaration of Major

College of Agricultural and Environmental Sciences. Students must declare a major by the time they have completed 90 units. Failure to declare a major at this point may result in a hold on further registration. In order to declare a major, you must meet with your faculty adviser and/or advising associate, fill out a Change of Major petition available at the Office of the University Registrar's web site or dean's office and file the petition with the dean's office. If you have completed 90 units, you must prepare a study plan with your adviser and/or advising associate at the same time. You are accepted into a major only after your major department and the dean's office have approved the Change of Major petition. With the approval of the College Executive Committee, additional requirements, such as completion of a particular set of required courses with a specified grade point average (usually well above a C average), may be introduced as conditions for acceptance into any major at any time.

College of Biological Sciences. Students must declare a major by the time they have completed 90 units. A hold will be placed on your registration if you are still undeclared after completing 90 units. Students can obtain a Change of Major petition from the Dean's office or the Office of the University Registrar's web site. They must meet with an academic adviser for the major, discuss a projected plan of studies, obtain the adviser's signature and return the signed petition to the Dean's Office. The minimum requirement for entry into a major is a C average in all courses used to satisfy major requirements. Students are accepted into the major when their adviser and the dean have approved the petition.

Students who fail to maintain a 2.000 GPA in courses required for their major over two consecutive quarters may be required to withdraw from the major.
College of Engineering. Students must declare a major when they apply to the College of Engineering. The ability to change majors thereafter may be limited. Requirements for changing to a College of Engineering major can be found at http://engineering.ucdavis.edu or by contacting the Undergraduate Advising Office (530) 752-1979.

College of Letters and Science. Students must declare a major by the time they have completed 90 units. If you have not declared a major by this point, a hold may be placed on your registration. Such a hold would be removed only when your Change of Major petition is filed in the deans' office. Petitions can be obtained from department offices or the Office of the University Registrar's Web site. As a part of the declaration procedure, you must, in consultation with a faculty adviser, prepare a projected plan of study. You are accepted into the major when your adviser and the dean have approved the petition.

To be accepted into a major, you must have a C average in all courses you have completed that are required for that major, as well as a C average in the upper division courses you have taken toward the major. With the approval of the College Executive Committee, additional requirements, such as completion of a particular set of required courses with a specified grade point average (usually well above a C average), may be introduced as conditions for acceptance into any major at any time.

If your performance is unsatisfactory after you have declared a major program, you may be required by the dean to withdraw from that major, upon written recommendation from the chair of the department or the curriculum committee that administers the major.

Change of Major Within a College

To change from one major to another within a college, you need the consent of the department or committee in charge of your proposed new major and the approval of the dean. Admission into a major program may be denied by the program or by the dean if your grade point average (GPA) in courses required for the selected major is less than 2.000.

Procedures for change of major within a college are the same as for declaration of major and the same conditions apply. If you wish to change to a major that has admission restrictions, you must comply with the special procedures and requirements for that major.

Except under unusual circumstances, no change of major will be permitted after you attain senior standing (135 units). Students wishing to petition for such an exception should consult in advance with the relevant dean's office regarding additional restrictions and requirements.

It is not possible to change or declare a major in the quarter in which you file to graduate.

College of Biological Sciences. Students who wish to change their major and college after completing 135 units should include a quarter-by-quarter graduation plan with the change of major petition. Changes of major will not be permitted by the Dean after the beginning of the quarter of the student's graduation.

College of Engineering. The above provisions may not apply to students in the College of Engineering, whose freedom to change majors is limited. Requirements for changing to a College of Engineering major can be found at http://engineering.ucdavis.edu or by contacting the Undergraduate Advising Office (530) 752-1979.

Change of Major Accompanied by Change of College

A change petition, available at dean's offices, the Office of the University Registrar, and online at the Office of the University Registrar's Web site, must be endorsed by a faculty adviser of the new major you are selecting and signed by a faculty adviser of the major you are leaving and the dean of the college from which you wish to transfer. In addition, admission to the new college will require that dean's approval. To obtain that approval, you must be in good academic standing (qualitatively and quantitatively, see the Probation and Dismissal, on page 77), meet all minimum GPA criteria, including those for the major, and satisfy any other admission requirements established by the new college.

Except under unusual circumstances, no change of major will be permitted after you attain senior standing (135 units). Students wishing to petition for such an exception should consult in advance with the relevant dean's office regarding additional restrictions and requirements.

It is not possible to change or declare a major in the quarter in which you file to graduate.

College of Biological Sciences. Students who wish to change their major and college after completing 135 units should include a quarter-by-quarter graduation plan with the change of major petition. Changes of major will not be permitted by the Dean after the beginning of the quarter of the student's graduation.

College of Engineering. Requirements for changing to a College of Engineering major can be found at http://engineering.ucdavis.edu or by contacting the Undergraduate Advising Office (530) 752-1979.

Multiple Majors

College of Agricultural and Environmental Sciences. A student choosing to major in multiple majors must petition the departments/programs/divisions responsible for the major(s) and the dean of the college. The dean's approval of declaration for multiple majors is subject to the following:

1. Eighty percent of the upper division units offered in satisfaction of course and unit requirements of each major must be unique; that is, they may not be offered in satisfaction toward the upper division unit requirements of any of the other selected majors. Courses with substantial overlap in content will not count as part of the 80 percent. Departmental advisers may approve only one course for substitution when considering the 80 percent in upper division courses and units required for each major.

2. When unit requirements of the majors included in a request differ, the major with the smaller number of upper division units required should be used to compute the minimal unit difference that must be met.
3. A student in good academic standing and with a minimum of a C average in the upper division courses taken toward the major may elect to declare simultaneously more than one major within the college or a combination of majors offered by the college and other undergraduate colleges on campus.

4. Combinations of majors offered by a single department/program/division are not allowed. Multiple majors will not be approved for the following majors: biochemistry and molecular biology; biological sciences; cell biology; evolution and ecology; genetics; microbiology; neurobiology; physiology, and behavior; plant biology.

**College of Biological Sciences.** Admission into multiple majors is subject to the approval of offices in charge of the majors involved and the dean of the college. Departments, curriculum committees and other teaching units, singly or collectively, as well as faculty advisers have the right to disapprove a student's request for a multiple major.

Approval of a request to declare more than one major is subject to the following:

1. Eighty percent of the upper division units used to satisfy requirements in each major must be unique; that is, they may not be offered in satisfaction of requirements of any of the other majors involved.

2. If the major programs differ in the number of upper division units required, the major program requiring the smaller number of upper division units will be used to compute the minimum number of units that must be unique.

3. In determining that the 80 percent requirements have been satisfied, advisers and the Dean must count both specific courses and courses with substantial overlap of content as common to the majors involved.

4. Students must complete all majors within the 225-unit limit.

5. Students may only petition for a multiple major after completing two Depth Subject Matter courses in each major.

A student who completes all requirements for approved multiple majors in which one major normally leads to an B.A. degree and another normally leads to a B.S. degree, will receive a B.A.S. degree. A single degree is granted to students who graduate with multiple majors.

**College of Engineering.** Engineering has two established combined majors. In addition to the combined majors, students may choose to complete multiple engineering majors. Enrollment in an engineering major and a non-engineering major may be possible. Double-major students must satisfy the requirements for both majors. Degree requirements for such double majors ordinarily cannot be completed within four academic years. A change of major petition is required for all requests and appropriate approvals from all applicable departments and dean's offices are necessary.

The Department of Computer Science does not allow double majors of Computer Science and Engineering and Computer Engineering, or Computer Science and Engineering and Electrical Engineering, or Computer Science and Engineering and Computer Science.

If you want to double major in any over-subscribed engineering major, you will be subject to the additional restrictions for changing into those majors and must satisfy the requirements of both majors.

**College of Letters and Science.** Students choosing to major in multiple subjects must notify the dean's office of their decision by submitting for approval a petition endorsed by faculty advisers in the majors. The dean's approval of the declaration of more than one major is subject to the following conditions:

1. At least 80 percent of the upper division units used to satisfy course and unit requirements in each major selected must be unique and may not be counted toward the upper division unit requirements of any other major undertaken. Courses with substantial overlap in content will not count as part of the 80 percent.

2. At the time of request, a substantial part of the preparatory subject matter and at least two upper division courses in each major must have been successfully completed.

3. All degree requirements must be completed within the 225-unit limit.

Combination proposals that cannot be approved are two or more majors offered by the same discipline, except art history and art studio.

A student who completes all requirements for approved multiple majors in which one major normally leads to an A.B. degree and another normally leads to a B.S. degree, will receive a B.A.S. degree. A single degree is granted to students who graduate with multiple majors.

**Cross-College Majors**

**College of Agricultural and Environmental Sciences.** The College does encourage multiple majors between colleges whenever your academic interests and abilities indicate this to be the best route. After endorsement of the Change of Major petition by the appropriate faculty in the colleges involved, each dean may approve the petition if there are sufficient differences between the requirements for the major programs you wish to study. At least 80 percent of the upper division units used to satisfy course and unit requirements in each major selected must be unique and not duplicate those of the other major. In planning for multiple majors, you should determine the total requirements needed for each major as well as for graduation from each college involved. All degree requirements must be completed within the 225-unit limit.

The same conditions apply for cross-college majors as for multiple majors. Cross-college programs will not be approved if the majors involved are available within a single college as well. For example, cross-college programs between the colleges of Letters and Science and Agricultural and Environmental Sciences will not be approved if one of the majors is biochemistry and molecular biology; biological sciences; cell biology; evolution and ecology; genetics; microbiology; neurobiology; physiology, and behavior; or plant biology.
College of Biological Sciences. The same conditions apply for cross-college multiple majors as for multiple majors within the college. In addition, approval of the deans of all involved colleges are required for cross-college multiple majors.

College of Engineering. Enrollment in a combination of an engineering major and a non-engineering major may be possible. A change of major petition is required for all requests and appropriate approvals from all applicable departments and dean's offices are necessary. Such double-major students must satisfy the requirements for both majors. Degree requirements for such double majors ordinarily cannot be completed within four academic years.

College of Letters and Science. The same conditions apply for cross-college majors as for multiple majors. Cross-college programs will not be approved if the majors involved are available within a single college as well.

Individual Major
Students with academic interests not covered by an established major have the opportunity to develop an individual major. Such a major requires the selection of interrelated courses totaling a minimum of 45 upper division units from two or more areas of study. If you choose this option you will work closely with faculty advisers to develop a coherent and rigorous academic program. This program is then submitted to a faculty committee for review and approval. Submit the proposed program to the committee prior to reaching 90 units, or by the fourth full week of the fifth quarter before graduation, whichever is earlier. If you wish to undertake an individual major, request the appropriate forms from your dean's office. Program requirements are outlined under Individual Major, on page 331. The College of Engineering does not offer an individual major.

The Minor
If you are interested in two or more areas of study, you should consider completing one or more minor programs. Minor program requirements are listed in the chapter of this catalog under the department that offers them. You will find a complete list of the minors offered at UC Davis under Minor Programs Offered by UC Davis, on page 12.

A minor consists of 18 to 24 units in upper division courses specified by the department or program offering the minor. Courses used to satisfy the requirements of a minor, including those completed elsewhere, must be approved by an adviser in the sponsoring department or program. For minors offered by the College of Agricultural and Environmental Sciences, at least half of these units and courses must be completed in residence on the UC Davis campus. You are also expected to complete all courses that are prerequisite to the upper division courses required for the minor. Minors offered by the College of Letters and Science do not require that a portion of the units be completed at UC Davis.

Students in the College of Biological Sciences may not complete a minor in the same field as the student's major. This includes any minor offered by the department or curriculum committee in charge of the student's major. All major and minor requirements must be completed within the 225 total unit limit.

With the exception of interdisciplinary minors approved by the College Executive Committee, students in the College of Letters and Science may not complete a minor offered by the department or program in charge of the student's major.

To request certification of a minor, you must have a grade point average of 2.000 in all courses required for the minor. At most, one course used in satisfaction of your major may be applied to your minor. If you elect more than one minor, the minors may not have any courses in common.

If you want to have completion of a minor certified on your transcript, you must obtain a minor petition from your dean's office and file it no later than the deadline for filing for graduation. You can elect only one minor in a subject area. Requirements for the minor must be met by the time of graduation.

College of Engineering. There are two minor programs in the College of Engineering. Information about the minor in Computational Applied Science can be obtained by contacting the Undergraduate Adviser in the Department of Applied Science (530) 754-8838. Information about the Construction Engineering and Management minor can be obtained by contacting the Undergraduate Adviser in the Department of Civil Engineering (530) 752-3425.

Students in Engineering may, with the approval of the Engineering dean's office and the adviser in the minor department, elect a minor in the College of Letters and Science, the College of Biological Sciences, the College of Agricultural and Environmental Sciences, or the Graduate School of Management. You must file a petition for your minor which is available on the College of Engineering Web site, http://engineering.ucdavis.edu. The completed petition must be approved by the minor adviser and then turned into the Undergraduate Advising Office of the College of Engineering for certification at least one quarter prior to graduation.

Academic Credit
Units of Credit
Academic work at the university is measured by “units of credit.” In conjunction with the letter grade you receive from the course instructor, units of credit give a fairly accurate evaluation of the amount of time you have devoted to a given subject. Units of credit also make it possible to anticipate the amount of work involved in a particular course and enable you to transfer from one campus or university to another without undue difficulty. To convert quarter units to semester units, multiply by 0.66; from semester to quarter units, multiply by 1.5.

Units of credit are assigned to courses based on 1 unit of credit for three hours of work by the student per week. Usually this means one hour of lecture or discussion led by the instructor and two hours of outside preparation by the student. In laboratory courses, two or three hours of work in the laboratory are normally assigned 1 unit of credit.

In most courses at UC Davis, the standard procedure prevails, so that a 3-unit course meets for three hours a week, a 4-unit course for four hours and so on. Courses that are an exception to this pattern may require additional class time or give more demanding assignments. If you have questions about the number of units assigned to a course, you should check the expanded course descriptions (available at your college, department, or on the Internet) or ask the instructor what is required in terms of outside
reading, term papers, problem sets or field trips. These are not always spelled out completely in the General Catalog. By knowing the amount of work that will be required, you can plan your course load more systematically and realistically.

**Credit by Examination**

Under certain prescribed conditions, currently registered students in good standing may receive course credit by taking an examination without formally enrolling in a course. You may obtain a petition and a copy of the prescribed conditions from the Office of the University Registrar. The petition is subject to the approval of the instructor giving the examination and the department involved. The completed petition, accompanied by a fee of $5.00, must be presented for final approval to the dean of your college or school, or if you are a graduate student, to the dean of Graduate Studies.

The credit received for the examination may not duplicate any credit you have already earned toward your degree. You may not use credit by examination to repeat any course you have taken previously, regardless of the grade you received in that course. The final results will be reported to the Office of the University Registrar, which will assign the appropriate grade and grade points to you. Since failure to pass the examination will be recorded as an F, you are encouraged to prepare fully for such an examination before attempting it.

You may also receive credit for learning in nonacademic settings through credit by examination.

To earn credit through the credit by examination process, the examination must be given by a UC Davis instructor and be for a course listed in the current General Catalog. Students are not eligible to take a credit by examination in a quarter in which they are not currently enrolled.

**Concurrent Credit from Another Institution**

A student may not obtain transfer credit for courses taken at a non-University of California campus in a term during which the student is registered as a full-time student at UC Davis. A variance can be obtained only by petitioning the dean of your college well in advance of the desired registration. When a variance is granted, units earned are counted toward minimum progress for the term in which the dual registration occurs. Summer Session courses are exempt from this regulation.

Students may gain credit for courses taken during the summer at other institutions, provided the courses parallel those given in the University of California. Assurance that such credit will be accepted, however, can be given only after the courses have been completed. You should arrange to have the transcripts of your Summer Session grades sent to Undergraduate Admissions for evaluation.

**Intercampus Visitor Program**

Qualified undergraduates may take advantage of educational opportunities on other University of California campuses as an Intercampus Visitor (ICV). This program enables students who have completed at least one year in residence on their home campus and have maintained a grade point average of at least 2.000 to take courses not available on their home campus, to participate in special programs, or to study with distinguished faculty members on other campuses of the university. Students who meet the above requirements should complete an application available in the Office of the University Registrar.

**Summer Sessions**

Every summer, many students earn units, complete their undergraduate degrees, expand their knowledge, do research, take special study courses, meet prerequisites or take courses that are often over-enrolled during the academic year by participating in Summer Sessions at UC Davis.

Summer Sessions offers more than 700 lower and upper division course sections in a wide range of subject areas that provide full university credit transferable to most campuses. Since admission is open to virtually all adults, Summer Sessions traditionally attracts students from universities and colleges, high school graduates and many other qualified applicants. Admission to a summer session, however, does not guarantee or imply admission to the university's regular academic quarters.

Summer offerings include Special Programs that either occur off-campus or take place outside the normal six-week terms.

Summer session dates are listed in the Academic Calendar, on page 1, at http://summer-sessions.ucdavis.edu and in the Class Schedule and Registration Guide (CSRG).

**UC/CSU/Community College Cross Enrollment**

If you are interested in taking a particular class at a nearby California State University or community college campus, you may now do so through the Intersegmental Cross Enrollment program. Enrollment is limited to one course per term and participating students need the approval of both the home and the host campus. Please note that the Los Rios Community College district is not participating in the program.

Senate Bill 361 requires that UC, CSU and the California Community Colleges permit students to enroll in one course per term at a campus of either of the other two systems on a space available basis at the discretion of the two campuses. This program aims to encourage community college students to enroll concurrently in courses offered at local universities, potentially increasing the number of community college transfers, including students from underrepresented groups.

Students must meet certain qualifications and be certified by their home campus as to eligibility, residence, fee, financial aid and health status. Generally, students will be allowed to add a class, if space is available, after the add/drop period on the host campus. To add a course, students must obtain the faculty member's approval and signature on a Cross-Enrollment form, available at their home campus Registrar's Office. The student takes the signed form to the Registrar's Office at the host campus for processing. If you are interested in participating, come to the service counter at the Office of the University Registrar in 12 Mrak Hall for more information.
Open Campus (Concurrent) Program

UC Davis Extension
1333 Research Park Drive
(800) 752-0881 or (530) 757-8777
http://www.extension.ucdavis.edu/opencampus

Most of the classes taught at UC Davis are available to members of the public through the Open Campus (Concurrent) Program on a space available basis. The enrollment limitations, deadlines and fee schedule are available in the Open Campus brochure-obtained online, by mail or from the UC Davis Extension office. Students registered at UC Davis may not enroll through Open Campus (Concurrent) until twelve months after withdrawing from UC Davis except with permission of the student’s College Dean’s Office. Upon admission or readmission to regular student status at UC Davis, the units and grade points earned when enrolled in Open Campus courses will count toward both the 180-unit undergraduate degree requirement and the UC GPA.

UC Davis Extension
1333 Research Park Drive
(800) 752-0881 or (530) 757-8777
http://www.extension.ucdavis.edu

As the outreach arm of UC Davis, UC Davis Extension provides adult continuing education in numerous professional and academic fields. Details on the courses available from Extension may be obtained by visiting the Extension Web site, calling or coming to the Extension office. Students enrolled at UC Davis who wish to use UC Davis Extension courses other than Open Campus (Concurrent) towards degree requirements must obtain written approval from the dean’s office of their college before enrolling in the Extension courses. Upon approval students may apply a limited number of credits towards the 180-unit undergraduate degree requirement.

EXAMINATIONS

Midterms

In undergraduate courses for which a midterm examination is required, each student has the right to take the midterm (or submit the take-home examination as opted by the instructor) during one of the regularly scheduled meetings of the class as published in the Class Schedule and Registration Guide (CSRG). The scheduling of a midterm examination at a time other than a regularly scheduled class meeting requires mutual written consent of the instructor and each student registered in the course. A student who does not consent in writing to the different time must be permitted to take the examination (or submit the take-home examination) at the officially scheduled time. A student who consents in writing to the change of examination time waives the right to take the midterm at the officially scheduled time.

Final Examinations

Scheduling. The Class Schedule and Registration Guide (CSRG) lists the regulations and times that final examinations are to be held. These are set up according to the day-and-start time of the classes offered during the quarter. This information is available in the CSRG each term so that you can avoid final examination conflicts.

A student who has multiple exams on the same day may discuss the situation with the instructors of the courses. Students are responsible for ensuring they do not have conflicting exams. There is no regulation mandating a change.

Requirements. Except under certain specified circumstances, Academic Senate Regulations require that final examinations be given in all undergraduate courses. Final examinations may be given in graduate courses. Exceptions to the regulation would be independent study courses, courses that consist of laboratory work only and courses in which the examination has been waived.

At the instructor’s option, the final examination in any course other than an on-line course may be wholly or in part of the take-home type. All examinations for on-line courses must be proctored to ensure that the person taking the examination is the student receiving credit. The writing time (in undergraduate courses) of a take-home and an in-class final examination together should not exceed three hours. In each course in which a final examination is required, the students have the right to take the final examination (and/or submit the take-home examination) at the time published in the Class Schedule and Registration Guide (CSRG).

An instructor may release each student’s original examination, or a copy, at any time. Otherwise, the instructor will keep the exams, or copies thereof, until the end of the next quarter and students may pick up their exams during this period.

For on-line courses, the instructor of each on-line class will be provided the option to have the final in the last time slot on the last day of finals or at a time on dead day. Students shall be notified of the time and place of the final on or before the first day of instruction.

Changing a Final Examination Date. An in-class final examination may not be rescheduled for a date earlier than the first day of finals week. The due date for a take-home final examination may not be rescheduled for a date earlier than the first day of finals week. The scheduling of an examination at a time other than the specified time requires the written mutual consent of the instructor and each student involved in the change. Any student who does not consent in writing to a different time will be permitted to take an examination (or submit the instructor-opted take-home examination) at the officially scheduled time. A student who consents in writing to a change in the final examination time waives the right to take the examination as originally scheduled. Departures from the published examination schedule should be carried out so as not to disadvantage students who are unable to accept the changed schedule.

A student who is improperly denied the right to take a required final examination on the published date (or submit the take-home examination as opted by the instructor) may file a petition with the Executive Council of the Davis Division of the Academic Senate by the end of the next regular term for appropriate action.

Disabilities. Students with documented disabilities may be entitled to in-class accommodations. The student shall provide the instructor with a letter from the Student Disability Center (SDC) recommending those academic accommodations that the instructor is responsible for providing. Students must request accommodation as soon as possible, to allow the university reasonable time to evaluate the request and offer necessary adjustments. No accommodations shall alter the nature of the academic demands made of the student nor decrease the standards and types of academic performance, nor require facilities or personnel that cannot reasonably be provided. SDC coordinates with the Office of the University Registrar to reserve a classroom for examinations for students with documented disabilities during finals week. The instructor should consult with the student and SDC on any questions or concerns.
Religious Observances. UC Davis seeks to accommodate any student who, in observance of a religious creed, encounters an unavoidable conflict with a test or examination schedule. The student is responsible for providing, in writing no later than the beginning of the quarter, notification of a potential conflict to the individual responsible for administering the examination and requesting accommodation. Instructors will consider such requests on a case-by-case basis and determine whether such conflicts can be resolved without imposing on the instructor or the other students in the class an undue hardship, which cannot be reasonably avoided. If so, the instructor will determine, in consultation with the student, a time during which the student can take the test or examination without incurring a penalty or violation to the student's religious creed.

GRADES

Every instructor is required to assign a grade for each student enrolled in a course. The following grades are used to report the quality of a student's work at UC Davis:

- **A**: excellent
- **B**: good
- **C**: fair
- **D**: barely passing
- **F**: not passing (work so poor that it must be repeated to receive recognition)

- **P**: passed (grade **C-** or better)
- **NP**: not passed
- **S**: satisfactory
- **U**: unsatisfactory
- **I**: incomplete (work is satisfactory but incomplete for a good cause)
- **IP**: in progress

The grades **A**, **B**, **C** and **D** may be modified by a plus (+) or minus (–).

Grade Points

Grade points are assigned each letter grade as follows:

- **A+**: 4.000
- **B-**: 2.700
- **D**: 1.000
- **A**: 4.000
- **C+**: 3.300
- **D-**: 0.700
- **A-**: 3.700
- **C**: 2.000
- **F**: 0.000
- **B+**: 3.300
- **C-**: 1.700
- **P/NP = n/a**
- **B**: 3.000
- **D+**: 1.300
- **S/U = n/a**

Grade Point Average (GPA)

The grade point average is computed on courses taken at the University of California. The value of grade points over units attempted determines your grade point average. The grade point average is computed on courses taken at the University of California. The maximum number of units graded **P** that will be accepted for degree credit is one third of the units completed in residence on the UC Davis campus. Consequently, at least two thirds of the units completed in residence at UC Davis and presented in satisfaction of degree requirements must be in courses taken for a letter grade.

In specific approved courses, instructors will assign only Passed or Not Passed grades. Such courses count toward the maximum number of units graded **P** allowable toward the degree. If you are planning to take courses on a P/NP basis, you should also familiarize yourself with the requirements of your particular school or college, which may have placed conditions or restrictions in addition to the university requirements. If you plan to attend graduate or professional school, you should consult with Advising Services regarding Passed/Not Passed grading.

If you elect the P/NP grading option for courses graded upon completion of a two- or three-quarter sequence (in-progress grading), a petition must be submitted before half of the time covered by the IP grading has elapsed. The P/NP grading will then be in effect for the entire course sequence.

If you receive a **D** or an **F** in a course, you may not repeat it using the P/NP option. If you receive an Incomplete in a course you took for a letter grade, you may not complete the course on a Passed/Not Passed basis.

Passed/Not Passed (P/NP) Grading

Subject to regulation by the faculties of the colleges and schools, an undergraduate student in good standing may request to take specific courses on a Passed/Not Passed basis. Such requests must be submitted and confirmed before the 25th day of instruction.

The grade **P** is assigned for a grade of **C-** or better. Units thus earned are counted in satisfaction of degree requirements but are not counted in determining your grade point average.

The intent of this option is to encourage exploration in areas in which you have little or no previous experience by alleviating grading pressures. The maximum number of units graded **P** that will be accepted for degree credit is one third of the units completed in residence on the UC Davis campus. Consequently, at least two thirds of the units completed in residence at UC Davis and presented in satisfaction of degree requirements must be in courses taken for a letter grade.

In specific approved courses, instructors will assign only Passed or Not Passed grades. Such courses count toward the maximum number of units graded **P** allowable toward the degree. If you are planning to take courses on a P/NP basis, you should also familiarize yourself with the requirements of your particular school or college, which may have placed conditions or restrictions in addition to the university requirements. If you plan to attend graduate or professional school, you should consult with Advising Services regarding Passed/Not Passed grading.

If you elect the P/NP grading option for courses graded upon completion of a two- or three-quarter sequence (in-progress grading), a petition must be submitted before half of the time covered by the IP grading has elapsed. The P/NP grading will then be in effect for the entire course sequence.

If you receive a **D** or an **F** in a course, you may not repeat it using the P/NP option. If you receive an Incomplete in a course you took for a letter grade, you may not complete the course on a Passed/Not Passed basis.

College of Agricultural and Environmental Sciences. The Passed/Not Passed option should be used only for elective courses, not for courses taken to fulfill major requirements. An **NP** grade in a course required by the major could prevent graduation. When in doubt, check with your faculty adviser before electing to take a course on a Passed/Not Passed grading basis.

College of Biological Sciences. All courses used to satisfy major requirements must be taken on a letter-graded basis, unless courses are only offered on a Passed/Not Passed basis. Courses taken before Fall 2006 on a Passed/Not Passed basis will be accepted in fulfillment of major requirements. Per university regulations, all courses used to fulfill General Education requirements must be taken for a letter grade.

College of Engineering. Students in the College of Engineering may not take any course used to satisfy a degree requirement, or any course offered by the College of Engineering on a P/NP basis. College of Engineering students are unable to select the P/NP option in SISWEB. Engineering students wishing to take a non-engineering course that is not needed to satisfy a degree requirement can obtain a P/NP petition in the Undergraduate Advising Office in 1050 Kemper Hall.

College of Letters and Science. Students enrolled in the College of Letters and Science are subject to an additional limitation on the number of units that may be completed employing the Passed/Not

A student at UC Davis is expected to maintain a **C** (2.000 GPA) or better in all work undertaken in the university. If you fall below a **C** average, you are considered "schoastically deficient;" see Probation and Dismissal, on page 77.
Passed grading option; see Bachelor's Degree Requirements for the college in the Undergraduate Education chapter. Graduating seniors and other students planning to undertake graduate or professional studies, should consult an adviser before electing for Passed/Not Passed grading in courses required for the major program.

**Satisfactory/Unsatisfactory (S/U)**

The grade of S is awarded to graduate students for work in graduate courses that otherwise would receive a grade of B− or better and for work in undergraduate courses that otherwise would receive a grade of C− or better.

Graduate students, under certain circumstances, may be assigned grades of S or U, but units earned in this way will not be counted in calculating the grade point average. Petitions to elect S/U grading are available from the Graduate Studies Office and must be signed by your graduate adviser. Graduate students may petition to take no more than one course per quarter on an S/U grading basis. A graduate course in which a C, D or F grade is received may not be repeated with the S/U option.

In specific approved courses, instructors will assign only Satisfactory or Unsatisfactory grades. Such courses count toward the maximum number of units graded S allowable toward the degree, as specified by each degree program.

**In-Progress (IP) Grading**

For a course extending over more than one quarter (designated “deferred grading only, pending completion of sequence” in course descriptions), evaluation of student performance is deferred until the end of the final quarter. Provisional grades of IP are assigned in the intervening quarters and are replaced with the final grade at the completion of the sequence. In order to gain credit toward graduation, a student must successfully complete the entire sequence. For electing P/NP grading for a course graded in-progress, see Passed/Not Passed (P/NP) Grading, on page 73.

**Incomplete Grades**

The grade of I may be assigned when a student's work is of passing quality and represents a significant portion of the requirements for a final grade, but is incomplete for a good cause as determined by the instructor; good cause may include current illness, serious personal problems, an accident, a recent death in the immediate family, a large and necessary increase in working hours or other situations of equal gravity.

You may replace an I grade with a passing grade and receive unit credit (and grade points if the instructor assigns a letter grade) provided you satisfactorily complete the course work as specified by the instructor. In order to change your records, you must obtain a petition from the Office of the University Registrar and present it to your instructor for completion and mailing.

An I grade must be replaced with a letter grade (or P or S grade) before the end of the third succeeding quarter (excluding summer sessions) of the student's academic residence, or the grade will revert to an F (or NP or U). If a student's degree is conferred before the expiration of the time limit for an I-grade conversion, the graduated student shall have until the end of the third quarter succeeding the quarter in which the I grade was assigned to replace the I grade. If the grade is not replaced by then, the I grade will remain on the student's record.

You may not re-enroll for credit in a course for which an I grade has been assigned. An undergraduate student whose record shows more than 16 units of I grades will be subject to disqualification. A graduate student who accumulates more than eight units of I grades will be subject to probation.

Incomplete grades will not be included in your grade point average at the end of a quarter. However, at the time of graduation, any remaining I grades are included when your grade point average is computed in order to determine whether you have achieved the 2.000 average required for the bachelor's degree. An Incomplete grade, in these computations, has the same effect as a grade F, NP, S or U, depending on which option you have exercised. Therefore, it is recommended that students not delay the clearance of incomplete grades so as not to jeopardize graduation.

**Retroactive Grade Changes**

All grades except I and IP are final when filed by an instructor at the end of the quarter. No final grade except I may be revised by examination or the submission of additional work after the close of the quarter.

If a clerical or procedural error in the reporting of a grade by the instructor can be documented, you may request a change of grade with a petition available from department offices. The request must be made by the fifth week of the following quarter.

Grade changes for “clerical” errors (such as incorrect addition of points), upon documentation, are automatically granted. Requests to interchange P, NP, S or U grades with normal letter grades based upon student need (such as to allow graduation or to meet entrance requirements for professional school) do not involve clerical or procedural errors and are automatically denied. Thus, students should exercise the Passed/Not Passed or Satisfactory/Unsatisfactory grading options with caution.

Students are reminded of their responsibility to be aware of the procedures and regulations contained in the General Catalog and the Class Schedule and Registration Guide (CSRG), to verify their class schedules, and to familiarize themselves with the expectations of their instructors. No changes, except completion of an I grade as noted above, can be made to the student's record once he or she has graduated.

**Repeating Courses**

Undergraduate students may only repeat courses in which they received a D, F or NP. Courses in which students received a grade of D or F may not be repeated on a P/NP grading basis. (Courses in which a grade of NP was received may be repeated on a P/NP grading basis.)

Degree credit for a repeated course will be given only once, but the grades assigned for both the first and second time a course is taken will appear on the student's transcript. In computing the GPA of undergraduates who have received a grade of D, F or NP, only the grade and corresponding grade points earned the second time a course is taken will be used, up to a maximum of 16 units for all repeated courses. After the 16-unit maximum is reached, the GPA shall be based on all grades assigned and total units attempted.

Repeating a course more than once requires approval by the appropriate college dean. Departments may restrict the repetition of a course if it is a prerequisite to a course the student has already completed with a grade of C− or better.
Academic Information

Graduate students, with the consent of the appropriate graduate adviser and the dean of Graduate Studies, may repeat any course in which they received a C, D, F or U, up to a maximum of 9 units for all courses repeated. Courses in which a grade of C, D or F has been earned may not be repeated on an S/U basis. Courses in which a grade of U as received may be repeated on an S/U basis.

Degree credit for a repeated course will be given only once, but the grades assigned for both the first and second time a course is taken will appear on the student's transcript. In computing the GPA of graduate students who have received a grade of C, D or F only the most recently earned grade for each course and corresponding grade points will be used, up to a maximum of 9 units for all courses repeated. After the 9-unit maximum is reached, the GPA shall be based on all grades assigned and total units attempted.

Mid-Term Grade Standing
Students wishing to know their grade at the mid-quarter should ask the instructor. Those who have deficient grades (D, F or NP) are urged to confer with their advisers.

Final Grades
Grades are generally available about three weeks after a quarter has ended. You can check your grades through SISWeb; see http://sisweb.ucdavis.edu.

Transcripts
A record of each student's academic work at UC Davis is retained permanently by the Office of the University Registrar. Copies of your official transcript may be obtained from that office for $10.00 a copy. Application for a transcript of record should be made at least two weeks in advance of the time needed. For more information, see the University Registrar Web page at http://registrar.ucdavis.edu.

Transcripts of all work done through UC Davis Extension or concurrent enrollment must be requested directly from the UC Davis Extension Office, 1333 Research Park Drive, Davis, CA 95616. Transcripts of work completed at another campus of the university or at another institution must be requested directly from the campus or institution concerned.

PROBATION AND DISMISSAL
The following provisions apply to all undergraduates. Graduate and professional students with scholarship deficiencies are subject to action at the discretion of their respective deans.

Scholastic Deficiencies
A student will be placed on probation or subject to disqualification for failure to meet qualitative or quantitative standards of scholarship.

Qualitative Standards. The qualitative standards of scholarship require that a student maintain a C average (2.000) or better for all work undertaken in the university and for the work undertaken in any one quarter.

A student will be placed on probation for qualitative reasons if, at the end of any quarter, the student's grade point average (GPA) is:

• Less than 2.000, but not less than 1.500, for the quarter or
• Less than 2.000 for all courses taken within the University of California

A student will be subject to disqualification for qualitative reasons if, at the end of any quarter,

• The student's grade point average is less than 1.500 for the quarter, or
• The student's grade point average is less than 1.500 for all courses taken within the University of California, or
• The student has attempted more than 16 units graded I (Incomplete), or
• The student has spent two consecutive quarters on academic probation.

Quantitative Standards. The quantitative standards, referred to as minimum progress requirements, define scholarship in terms of the number of units that you must satisfactorily complete. It is expected that a student will earn the 180-unit minimum degree requirements within 12 quarters (four years). This means students are expected to complete, on average, 15 units per quarter.

Because occasions arise which prevent students from achieving expected progress towards the degree, the campus has established minimum progress requirements, to which students must adhere. To meet minimum progress, a full-time regular undergraduate is required to maintain an average of at least 13 units passed over all quarters of enrollment. Minimum progress is calculated at the end of every Spring Quarter for the preceding three quarters (Fall, Winter, Spring) comprising the academic year. Quarters during that period for which a student was officially approved for part-time status are omitted from the minimum progress calculation.

The following courses may be counted toward unit minimum progress:

• Required non-credit courses, e.g., Mathematics B, will be evaluated according to the “Carnegie unit” rule and counted as units passed, although these courses shall not be applied toward the satisfaction of baccalaureate degree requirements.
• Repeated courses passed to improve D or F grades up to a maximum of 16 units.
• Courses passed in Summer Sessions at UC Davis or at another accredited school and transferred to UC Davis will be counted as units passed (applied to the next full-time quarter of enrollment immediately following the summer session).
• Courses passed by examination in accordance with policies established by the Divisional Committee on Courses (applied to quarter in which exam is taken).
• Courses that are IP (in progress) will be counted as units passed.
• Courses graded I will be counted as units passed when replaced by a passing grade (applied to the quarter in which the I grade is received).
A student will be placed on probation for quantitative reasons if, at the end of any Spring Quarter, the minimum progress calculation for the preceding academic year shows that the student passed an average of less than 13 units but greater than or equal to 12 units per quarter.

A student will be subject to disqualification for quantitative reasons if, at the end of any Spring Quarter, the minimum progress calculation for the preceding academic year shows that the student passed an average of less than 12 units per quarter.

For every student who fails to meet minimum progress at the end of Spring Quarter, a “degree progress average” will be calculated at the close of the next full-time quarter of enrollment at UC Davis. The degree progress average is defined as the quotient of the number of units passed during all full-time quarters from the initial quarter of matriculation at UC Davis divided by the number of full-time quarters completed at UC Davis.

A student whose degree progress average is less than 13 units shall be “subject to disqualification for quantitative reasons.” A student whose degree progress average is 13 or more units shall not be “subject to disqualification for quantitative reasons.”

If a student fails to make minimum progress at the end of Spring Quarter, the degree progress average shall be calculated each subsequent full-time quarter of enrollment as long as the student is “subject to disqualification for quantitative reasons.” A student who is “subject to disqualification for quantitative reasons” at the end of two consecutive full-time quarters of enrollment shall be disqualified from the university.

In the case of probation or subject to disqualification, for either qualitative or quantitative reasons, the official transcript will state “not in good standing.” Once a student has met qualitative and quantitative standards of scholarship, or has satisfied all requirements for graduation, the notation will be removed from the transcript.

**Dismissal**

Dismissal for either qualitative or quantitative reasons (defined above) is based on the decision of the dean of the college in which the student is enrolled. Such dismissal is from the University of California system and not simply the college or the UC Davis campus. Should a former UC Davis student later wish to be readmitted to the UC Davis campus, the authority to do so rests with the dean of the college from which the student was dismissed. If a student is dismissed from their college, they will automatically receive a full refund of registration fees paid for that term.

Students should go to the dean’s office of their college if they need academic advising about probation and dismissal.

A student will be placed on probation or subject to disqualification for failure to meet qualitative or quantitative standards of scholarship.

**HONORS AND PRIZES**

**Scholarships**

1100 Dutton Hall
(530) 752-2804; http://financialaid.ucdavis.edu/scholarships/

By mail:
Scholarship Office
University of California
One Shields Avenue
Davis, CA 95616-8696

Students with outstanding academic records who show promise of continued scholarly achievement are encouraged to apply for scholarship recognition and awards. Awards include a financial honorarium or stipend.

**Deans’ Honors Lists**

According to UC Davis campus regulations, the quarterly Dean’s Honors List includes names of students who have completed, for a letter grade, a minimum of 12 units in a specific quarter with a grade point average equal to or higher than the minimum grade point average attained by the upper 16 percent of those registered in the same class level and college during that quarter. Honors lists will be posted quarterly on deans’ office Web sites or made available by other means and a notation of these honors will be placed on each student’s permanent record by the Office of the University Registrar.

**Graduation Honors**

Honors at graduation are awarded to students who have a grade point average in the top percent of their college as shown in the table below. The College of Letters and Science requires that additional criteria be met for high and highest honors; see the sections below for more information.

<table>
<thead>
<tr>
<th>Total Quarter Units Completed at UC</th>
<th>Highest Honors</th>
<th>High Honors</th>
<th>Honors</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>45-89</td>
<td>2%</td>
<td>next 2%</td>
<td>next 4%</td>
<td>8%</td>
</tr>
<tr>
<td>90-134</td>
<td>3%</td>
<td>next 5%</td>
<td>next 6%</td>
<td>12%</td>
</tr>
<tr>
<td>135+</td>
<td>4%</td>
<td>next 8%</td>
<td></td>
<td>16%</td>
</tr>
</tbody>
</table>

Grade point averages from the winter quarter prior to graduation are used to determine the averages that will earn an honors designation. Following are the averages for winter quarter 2008. These averages will be used through winter quarter 2009.

**Grade Point Average by College**

<table>
<thead>
<tr>
<th>Percent Determining Cut-Off Point</th>
<th>Agricultural &amp; Environmental Sciences</th>
<th>Biological &amp; Environmental Sciences</th>
<th>Engineering</th>
<th>Letters and Sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>2%</td>
<td>3.004</td>
<td>3.962</td>
<td>3.942</td>
<td>3.909</td>
</tr>
<tr>
<td>3%</td>
<td>3.651</td>
<td>3.930</td>
<td>3.883</td>
<td>3.878</td>
</tr>
<tr>
<td>4%</td>
<td>3.815</td>
<td>3.895</td>
<td>3.839</td>
<td>3.840</td>
</tr>
<tr>
<td>6%</td>
<td>3.739</td>
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<td>3.507</td>
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<td>3.531</td>
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</table>

An honors notation is made on students’ diplomas and on their permanent records in the Office of the University Registrar.
College of Letters and Science. Graduation with “honors” requires that a student meet the appropriate grade point requirement described in the above table for all UC courses completed. Students who meet the grade point requirement for graduation with honors, and who complete the Honors Program of the College of Letters and Science, may be recommended by their departments for graduation with high honors or highest honors on the basis of an evaluation of their academic achievements in the major and in the honors project in particular. A notation shall appear on the student’s official transcript indicating that the 194H Honors Thesis was completed. Graduating students will not be awarded honors with the bachelor’s degree if more than eight units of grade I (Incomplete) appear on their transcripts. The College Committee on Honors may consider exceptions to this condition. Petitions for this purpose should be submitted to the deans’ office.

The Honors Program of the College of Letters and Science

The Honors Program in the College of Letters and Science permits students to pursue a program of study in their major at a level significantly beyond that defined by the normal curriculum. It represents an opportunity for the qualified student to experience aspects of the major that are representative of advanced study in the field. Successful completion of the College Honors Program is a necessary prerequisite to consideration for the awarding of high or highest honors at graduation.

Entrance into the honors program requires that a student have completed at least 135 units with a minimum grade point average of 3.500 in courses counted toward the major. Other prerequisites for entrance into the program are defined by the major. The program consists of a project whose specific nature is determined by consultation with the student’s major adviser. It may involve completion of a research project, a scholarly paper, a senior thesis, or some comparable assignment depending on the major. The project will have a minimum duration of two quarters and will be noted on the student’s record by a variable unit course number or special honors course designation. Successful completion of the honors program requires that a minimum of six units of credit be earned in course work for the project.

College of Engineering

The Department of Chemical Engineering and Materials Science has established honors programs for the following majors: Chemical Engineering, Biochemical Engineering, Materials Science and Engineering. Contact the undergraduate adviser in the department for specific information about these programs at (530) 752-2504.

Davis Honors Challenge

(530) 752-2335; http://dhc.ucdavis.edu

The Davis Honors Challenge (DHC) is a campuswide program for highly motivated students who are interested in enhancing their education through special courses, closer contact with faculty and dynamic interaction with academic peers.

DHC courses are limited in size so that participants receive substantial individual attention from faculty. In return, students are expected to participate actively in analyzing real world problems. Honors courses and small honors sections of regular courses also encourage individual student participation and self-challenge. Students satisfactorily completing the program will receive transcript notation for each academic year of participation.

First- and second-year students take two honors courses and one problem-oriented interdisciplinary seminar per academic year. Second year students have the option to substitute an honors contract for an honors course. Third-year students are required to complete two honors contracts and one upper division honors seminar, a team-based project in conjunction with an outside interested party. Fourth-year students participate in a year-long team project to identify real world problems, apply research, critical thinking, problem-solving and communication skills to develop viable solutions for their outside party. Transfer students complete the second or third-year program, depending on their class standing.

Other components of the DHC include honors living learning communities, a mentorship program and a service learning program. Each of these programs is designed to enhance students’ college experience.

Entering first-year and transfer students who file a “Statement of Intent to Register” at UC Davis will be mailed detailed information about the DHC application process. Continuing students may obtain information and an application from the DHC Office after the start of spring quarter.

Integrated Studies Honors Program

(530) 752-9760

The Integrated Studies Honors Program is a campuswide, invitational, first-year residential honors program, now in its fourth decade. Course offerings oriented toward research opportunities are also offered beyond the freshman year. During the freshman year, the Integrated Studies Honors Program offers specially designed, interdisciplinary honors courses that satisfy General Education requirements. Approximately 120 students live in an Academic Residential Community on campus and take three limited-enrollment honors courses (open only to Integrated Studies Honors Program students) and two seminars.

Holders of Regents Scholarships, the university’s most prestigious scholarship awards, are guaranteed places in the Integrated Studies Honors Program. Other highly qualified students are also invited to participate and are selected to create a balanced community of students from all four undergraduate colleges.

Prizes and Awards

The University Medal is the highest campus honor awarded to a graduating senior in recognition of superior scholarship and achievement. A College or School Medal is also given to the outstanding graduating student in each of the colleges and professional schools.

Departmental citations, special awards and prizes are also awarded to students for superior achievement and scholarship.

College of Agricultural and Environmental Sciences. Each year, the outstanding graduating senior in the College is awarded a silver medal, known as the “Agricultural and Environmental Sciences Medal.” Scholastic excellence (in a minimum of six quarters at UC Davis) is the primary basis for choosing the recipient. The Mary Regan Meyer Prize is awarded to an outstanding graduate who has demonstrated expertise and an interest in serving humanity. The Charles E. Hess Award is awarded to the graduate with the most noteworthy record of public/community service while at UC Davis. The Kinsella Memorial Prize, in honor of John E. Kinsella, is awarded annually to an outstanding individual who sub-
mits his or her Ph.D. dissertation during the spring, fall or winter quarter immediately preceding the due date for nomination.

**College of Biological Sciences.** Each year the College Medal is awarded to one outstanding graduating senior. Academic excellence is the primary basis for selecting medal nominees. For additional information regarding college awards, please contact the Dean's Office.

**College of Engineering.** Each year, outstanding senior students in engineering are selected by their grade point averages as nominees for the M.S. Ghausi Medal. Academic excellence is the primary basis for selecting the recipient of the award. The Zuhair Munir Award is given to the student who has submitted the year's best engineering doctoral dissertation. Established in 1999, the award honors former Dean of the College, Zuhair Munir, who led the UC Davis College of Engineering from 2000 to 2002 and acted as its Associate Dean for Graduate Studies for 20 years. More than 25 faculty, staff and friends of the College of Engineering contribute to this endowed fund.

**College of Letters and Science.** Graduating seniors with a distinguished academic record may be recommended by the faculty as nominees for the College's Herbert A. Young Medal. Each June, one medalist is selected from among the graduates of the current academic year. The Leon H. Mayhew Award is conferred upon the outstanding graduate majoring in the arts or humanities, preferably music, art, or literature. Academic excellence is the primary basis for selecting the recipients of these awards. The Lawrence J. Andrews prize is awarded to a student entering the senior year who not only has achieved academic excellence but who also has demonstrated interests outside of pure scholarship.

**Chancellor's Award for Excellence in Undergraduate Research**

This award recognizes students who have distinguished themselves through their excellence in and contribution to undergraduate research and encourages others to become involved in these types of efforts. Recipients of the award receive a certificate of commendation and inscribed plaque from the Chancellor of the university.

In conjunction with the Chancellor’s Award, Professor Dean Simonton of UC Davis’ Department of Psychology established an endowment for funding a cash prize for each year’s student recipient. A research award is also given to a faculty mentor along with a certificate of commendations. For more information, see [http://undergraduatestudies.ucdavis.edu/research.cfm](http://undergraduatestudies.ucdavis.edu/research.cfm).

**Honorary Societies**

Election to an honorary society is one of the most prestigious awards a student can receive. At UC Davis, the following honorary societies are represented:

- Alpha Kappa Delta (Sociology)
- Alpha Omega Alpha (Medicine)
- Alpha Zeta (College of Agricultural and Environmental Sciences)
- Delta Phi Alpha (German)
- Gamma Sigma Delta (College of Agricultural and Environmental Sciences; College of Biological Sciences)
- Golden Key (All colleges and schools)
- Kappa Omicron Nu (Family and Consumer Sciences)
- The National Society of Collegiate Scholars (All colleges and schools)
- Omicron Delta Epsilon (Economics)
- Order of Omega (Fraternities–Sororities)
- Order of the Cof (Law)
- Phi Alpha Theta (History)
- Phi Beta Kappa (College of Letters and Science)
- Phi Kappa Phi (All colleges and schools)
- Phi Sigma (Biological Sciences)
- Phi Zeta (Veterinary Medicine)
- Pi Delta Phi (French)
- Pi Mu Epsilon (Mathematics)
- Pi Sigma Alpha (Political Science)
- Prytanean Honor Society (All colleges—undergraduate women only)
- Psi Chi (Psychology)
- Sigma Pi Sigma (Physics)
- Sigma Xi (All colleges and schools—research)
- Tau Beta Pi (Engineering)

**LEAVING UC DAVIS**

**Graduation**

Each candidate for an undergraduate degree must file an Application for Graduation with the Office of the University Registrar for the quarter in which the candidate plans to receive the degree; see [http://registrar.ucdavis.edu/graduation](http://registrar.ucdavis.edu/graduation). The dates for campus filing are published in the Academic Calendar, on page 1, and the quarterly Class Schedule and Registration Guide (CSRG).

Students in the College of Agricultural and Environmental Sciences must have their Major Certification form evaluated by the dean’s office before their candidacy for a degree can be finalized; see Bachelor's Degree Requirements for the college in the Undergraduate Education chapter.

Students in the College of Engineering must register at the College of Engineering Web site ([http://engineering.ucdavis.edu](http://engineering.ucdavis.edu)) in addition to filing with the Office of the University Registrar ([http://registrar.ucdavis.edu](http://registrar.ucdavis.edu)). See the College of Engineering Web site or call the Undergraduate Advising Office at (530) 752-1979 for Engineering filing deadlines.

Graduating students who wish to participate in the Commencement Ceremony must register to do so with their college by the filing deadline for that term. For links to each college’s registration Web site, see [http://registrar.ucdavis.edu/graduation](http://registrar.ucdavis.edu/graduation). Commencement Ceremonies are held twice a year, in the Fall (December) and Spring (June).

Please note that to graduate, a student must file an Application for Graduation with the Office of the University Registrar by the stated deadline. To participate in the Commencement Ceremony, a student must register with their college by the stated deadline. These are separate actions.
Leaves of Absence: Planned Educational Leave Program (PELP)

The Planned Educational Leave Program allows any registered student-undergraduate or graduate-to temporarily suspend academic work at UC Davis. Undergraduates may take one such leave during their academic career at UC Davis and that leave is limited to one quarter in duration. For graduate students the maximum leave is up to one year. Undergraduates apply for PELP at the Office of the University Registrar. Graduate students apply through their departments and professional students apply through their Dean's office.

Applications for PELP may be filed as late as the tenth day of instruction during the quarter for which the student is requesting a leave. However, approved applications submitted after the first day of instruction will entitle you to only a partial refund of fees paid, in accordance with the Schedule of Refunds. The Schedule of Refunds refers to calendar days beginning with the first day of instruction. The effective date for determining a refund of fees is the date the completed and approved PELP form is returned to the Office of the University Registrar; see the Fees, Expenses and Financial Aid chapter.

An application fee of $60 is charged to your account when you enroll in the PELP program. This fee is identical to that paid by a student who withdraws and is required to pay a readmission fee upon return. After filing your PELP form, you must file an exit form with Student Accounting.

While students may receive academic credit at other institutions and transfer this credit to UC Davis (subject to rules concerning transfer credit), participants are reminded that the intent of the program is to “suspend academic work.” Therefore, students are urged to carefully evaluate the desirability of taking academic work while away from the campus during PELP. Students enrolled in PELP are not eligible to enroll in Open Campus (concurrent) courses at the UC Davis campus, or to otherwise earn academic credit at UC Davis during the PELP leave.

Readmission is guaranteed assuming you resume academic work by enrolling in courses, satisfying any holds that may have been placed on your registration and paying your registration fees by the established deadlines for the quarter specified for return on your approved PELP application. Students who do not return by the specified quarter will be automatically withdrawn from the university.

You will not be eligible to receive normal university services during the planned leave. Certain limited services, however, such as placement and student employment services, counseling, and faculty advising are available. Students on PELP may purchase a health care card from the Student Health Service and may retain library privileges by purchasing a library card. International students should consult Services for International Students and Scholars to find out how the PELP will affect their status. Grants and other financial aids will be discontinued for the period of the leave, but effort will be made, where legally possible, to allow you to renegotiate loan payment schedules and to ensure the availability of financial aid upon your return.

Withdrawal

Withdrawals may be granted by the university for emergency reasons or for good cause. Petitions for withdrawal (Notice of Cancellation/Withdrawal) are available at the Office of the University Registrar. A percentage of fees paid may be refunded, in accordance with the Schedule of Refunds; see the Fees, Expenses and Financial Aid chapter. The effective date for determining a refund of fees is the date the completed withdrawal form is filed with the Office of the University Registrar. After filing your withdrawal form, you must then file an exit form with Student Accounting to complete your withdrawal.

If you are receiving financial aid, you must report your change of status immediately, in person or by mail, to the Financial Aid and Student Accounting Offices. If you are receiving veterans benefits, you must also report your withdrawal to the Veterans Affairs Office.

Retroactive Withdrawals. Petitions for retroactive withdrawals may be obtained from the Office of the University Registrar. Reasons for seeking such are medical problems, severe emotional difficulties, or death or severe illness in the immediate family. Petitions should include a detailed account of the problem, appropriate documentation and an adequate explanation of why withdrawal was not taken during the quarter in which the problem occurred.
1920 2000

1922 Four-year degree program is initiated.

2005 The Division of Biological Sciences becomes the College of Biological Sciences.
Students may choose from over 150 major programs and more than 90 minor programs in a wide variety of disciplines offered by the four undergraduate colleges.

**COLLEGE OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES**

Office of the Dean
150 Mrak Hall
(530) 752-0108; [http://www.caes.ucdavis.edu](http://www.caes.ucdavis.edu)

Major programs in the College of Agricultural and Environmental Sciences highlight the multiple connections among agricultural sciences, environmental sciences and human sciences within the larger context of the quality of life in the global economy. The majors fall into three broad areas of study described below. The College of Agricultural and Environmental Sciences also offers two collegewide degree programs and two collegewide non-degree programs.

**The Undergraduate Programs**

**Agricultural Sciences**

These majors prepare students in animal biology and the management of environmental resources as needed to develop sustainable animal production technologies. Also considered is the impact of production and management processes on animal health and welfare, human diet and health, and the natural environment.

The majors that focus on plant science provide a strong background in the context of agricultural and environmental systems and societal needs; ecological understanding of food and fiber production systems; biological and economic principles that underlie management decisions in agribusiness; and a basic background in all areas of plant biology, including plant development, plant protection, biotechnology and post-harvest physiology.

**Majors:**
- Agricultural and Environmental Education, B.S
- Agricultural Management and Rangeland Resources, B.S.; see Ecological Management and Restoration
- Animal Biology, B.S.
- Animal Science, B.S.
- Animal Science and Management, B.S.
- Avian Sciences, B.S.
- Biotechnology, B.S.
- Crop Science and Management, B.S.; see Plant Sciences
- Entomology, B.S.
- Plant Sciences, B.S.
- Viticulture and Enology, B.S.

**Minors:**
- Agricultural Entomology and Bee Biology (Entomology)
- Applied Computing and Information Systems (Plant Sciences)
- Animal Biology (Animal Science)
- Animal Genetics (Animal Science)
- Apiiculture Entomology (Entomology)
- Aquaculture (Animal Science)
- Avian Sciences
- Dairy/Livestock (Animal Science)
- Entomology
- Environmental Horticulture (Plant Sciences)
- Fungal Biology and Ecology (Plant Pathology)
- Insect Biology (Entomology)
- Insect Ecology and Evolution (Entomology)
- Medical-Veterinary Entomology (Entomology)
- Nematology
- Precision Agriculture (Biological and Agricultural Engineering)

**Environmental Sciences**

These majors focus on the broad facets of the human and natural environments and their interactions. They draw on the social, physical and biological sciences as needed to prepare students for leadership and advanced studies in the areas of natural resource management, environmental quality and stewardship, community planning and design, and public policy decision making.

**Majors:**
- Agricultural and Environmental Education, B.S
- Atmospheric Science, B.S.
- Ecological Management and Restoration, B.S.
- Environmental and Resource Sciences, B.S.; see Environmental Science and Management
- Environmental Biology and Management, B.S.; see Environmental Science and Management
- Environmental Horticulture and Urban Forestry, B.S.
- Environmental Science and Management, B.S.
- Environmental Policy Analysis and Planning, B.S.
- Environmental Toxicology, B.S.
- Hydrology, B.S.
- Landscape Architecture, B.S.
- Soil and Water Science, B.S.; see Environmental Science and Management
- Wildlife, Fish, and Conservation Biology, B.S.

**Minors:**
- Atmospheric Science (Land, Air, and Water Resources)
- Environmental Policy Analysis (Environmental Science and Policy)
- Environmental Toxicology
- Geographic Information Systems (Biological and Agricultural Engineering)
- Geographic Studies (Environmental Design)
- Hydrology (Land, Air, and Water Resources)
- Landscape Restoration (Plant Sciences)
- Soil Science (Land, Air, and Water Resources)
- Wildlife, Fish, and Conservation Biology

**Human Sciences**

These majors foster a deeper understanding of the multiple connections between scientific and cultural issues in the context of human health and the quality of life. Basic physical and biological science, social science, design, and economic principles are taught in this context, linking food and fiber production to consumption, emerging knowledge to societal applications and policy, and human development to active, informed citizenship. Emphasis is on linking resources for humans with humans as resources. Physiological, social and aesthetic dimensions of the human experience are explored.

**Majors:**
- Agricultural and Environmental Education, B.S
- Clinical Nutrition, B.S.
- Community and Regional Development, B.S.
- Fiber and Polymer Science, B.S.
- Food Science, B.S.
• Human Development, B.S.
• Managerial Economics, B.S.
• Nutrition Science, B.S.
• Textiles and Clothing, B.S.

**Minors:**
• Aging and Adult Development (Human and Community Development)
• Community Development (Human and Community Development)
• Community Nutrition (Nutrition)
• Fiber and Polymer Science (Textiles and Clothing)
• Food Service Management (Nutrition)
• Human Development (Human and Community Development)
• Managerial Economics (Agricultural and Resource Economics)
• Nutrition and Food (Nutrition)
• Nutrition Science (Nutrition)
• Textiles and Clothing

**Collegewide Programs**

The collegewide programs cut across all of the above areas, providing students in a variety of majors with a background in such areas as public policy, economic principles in a global context and the intersections among environmental, agricultural and socio-economic issues. Collegewide programs also include non-degree, lower division curricula aimed at providing students with a foundational knowledge base and the potential for developing individualized programs.

**Majors:**
• Individual Major, B.S.
• International Agricultural Development, B.S.

**Minors:**
• Contemporary Leadership
• International Agricultural Development
• Science and Society

**Non-degree programs:**
• Undeclared/Exploratory
• Science and Society

**COLLEGE OF BIOLOGICAL SCIENCES**

Dean’s Office
202 Life Sciences
(530) 752-0410; http://biosci.ucdavis.edu/

The College of Biological Sciences administers undergraduate programs in fundamental aspects of biology. The college is organized into five departments that represent major themes of modern biology: Evolution and Ecology; Microbiology; Molecular and Cellular Biology; Neurobiology, Physiology, and Behavior; and Plant Biology. The individual departments offer a total of eight specialized majors, each focusing on one of the core disciplines of biology. The Biological Sciences major, the Individual major, the Undeclared-Life Sciences program and the Bodega Marine Laboratory Spring Quarter Program are offered by the entire college.

**The Undergraduate Programs**

**Biological Sciences**

The Biological Sciences major is broad in concept, designed to span the numerous core disciplines of biology. The major covers most dimensions of the study of life, ranging from molecules and cells to populations of organisms. While emphasizing breadth, the Bachelor of Science degree also requires the student to select an area of emphasis that provides concentrated study in one facet of biology at the upper division level. Areas of emphasis are Evolution, Ecology and Biodiversity; Marine Biology; Microbiology; Molecular and Cellular Biology; Neurobiology, Physiology, and Behavior; and Plant Biology.

**Major:**
• Biological Sciences, A.B., B.S.

**Minor:**
• Biological Sciences

**Evolution and Ecology**

The major in Evolution, Ecology and Biodiversity offers the student a broad background in the theoretical and empirical basis of our understanding of the evolution and ecology of living organisms. The program of study begins with a core of introductory courses in mathematics, physical sciences and biology. These are followed by survey courses in evolution and ecology and more specialized courses that focus the student on particular disciplines or organisms, with an emphasis on problem-solving and critical thinking.

**Major:**
• Evolution, Ecology and Biodiversity, A.B., B.S.

**Minor:**
• Evolution, Ecology and Biodiversity

**Microbiology**

Microbiology deals with bacteria, yeasts and other fungi, algae, protozoa and viruses. These microorganisms are ubiquitous in nature and play a crucial role in areas such as agriculture, biotechnology, ecology, medicine and veterinary science. The field of microbiology contributes to areas of fundamental inquiry such as biochemistry, cell biology, evolution, genetics, molecular biology, pathogenesis and physiology.

**Major:**
• Microbiology, A.B., B.S.

**Molecular and Cellular Biology**

The Department of Molecular and Cellular Biology offers three majors.

The Biochemistry and Molecular Biology major introduces students to the chemistry of living organisms and the experimental techniques that are used to probe the structures and functions of biologically important molecules. Students who enjoy both chemistry and biology and who are comfortable with quantitative approaches to problem-solving will find this major a rewarding field of study.

The Cell Biology major provides a comprehensive understanding of the cell, the basic structural and functional unit of all living organisms. The major emphasizes the principles that govern how biomolecules interact with one another to organize themselves into higher order structures that comprise cells and how cellular organization and function contribute to the development, maintenance and reproduction of adult organisms.

The Genetics major provides a broad background in the biological, mathematical and physical sciences basic to the study of heredity and evolution. The major provides a dual focus on the molecular
mechanisms that regulate utilization of information encoded within the genome as well as the mechanisms and analysis of inheritance of genetic information. The major is sufficiently flexible to accommodate students interested in the subject either as a basic discipline in the biological sciences or in terms of its applied aspects in medicine, biotechnology and agriculture.

**Majors:**
- Biochemistry and Molecular Biology, B.S.
- Cell Biology, B.S.
- Genetics, B.S.

**Neurobiology, Physiology, and Behavior**
The Department of Neurobiology, Physiology, and Behavior offers two majors.

The major in Exercise Biology is an integrative program of study, encompassing the physiological, biomechanical and behavioral aspects of exercise and physical activity. The focus is on both the acute and adaptive effects of physical activity (and inactivity). Exercise biology deals with the mechanisms and consequences of activity from the molecular to the organismal (human ecological) level. We examine these mechanisms and consequences during growth, development, aging, disease and in altered environmental conditions. The exercise biology major encompasses the critical aspects of an integrative program in applied human biology.

The Neurobiology, Physiology, and Behavior major emphasizes the understanding of vital functions common to all animals. All animals perform certain basic functions-they grow, reproduce, move, respond to stimuli and maintain homeostasis. The physiological mechanisms upon which these functions depend are precisely regulated and highly integrated. Actions of the nervous and endocrine systems determine behavior and the interaction between organisms and their physical and social environments. Students in this major will study functional mechanisms; the control, regulation and integration of these mechanisms; and the behavior which relates to those mechanisms at the level of the cell, the organ system and the organism.

**Major:**
- Exercise Biology, A.B., B.S.
- Neurobiology, Physiology, and Behavior, B.S.

**Minor:**
- Exercise Biology
- Human Physiology
- Neuroscience

**Plant Biology**
Plant Biology is the study of plants as organisms. It includes the newer disciplines of cellular and molecular plant biology and the traditional areas of botany, such as anatomy, morphology, systematics, physiology, mycology, phycology, ecology and evolution. The major provides breadth in diverse areas of plant biology and depth in one of several areas of specialization.

**Major:**
- Plant Biology, A.B., B.S.

**Minor:**
- Plant Biology

**Collegewide Programs**

**Quantitative Biology and Bioinformatics**
The interdisciplinary minor in Quantitative Biology and Bioinformatics is an integrative program that introduces students to the quantitative and computational approaches that are redefining all disciplines in the biological sciences, from molecular and cell biology, through genetics and physiology, to ecology and evolutionary biology. The minor in Quantitative Biology and Bioinformatics is open to all undergraduates regardless of major and is sponsored by the College of Biological Sciences.

**Minor:**
- Quantitative Biology and Bioinformatics

**Individual Major**
Students whose academic interests are not met by any established major, or combinations of majors and minors may develop an Individual major. Students work in conjunction with the Committee on Undergraduate Petitions and a faculty member in the college.

**Major:**
- Individual Major, A.B., B.S.

Students who wish to explore the array of life science majors offered at UC Davis before declaring a major may be admitted to the college through the Undeclared—Life Sciences program. These students use the College of Biological Sciences Dean's Office for their advising center. Students in this program must declare a major before completing 90 units.

**Bodega Marine Laboratory Program**

**Spring Quarter Program**
A full quarter of undergraduate course work in marine biology is available each spring quarter at the Bodega Marine Laboratory, located in Bodega Bay, California. Course offerings include lecture and laboratory instruction in the developmental biology and physiological adaptation of marine organisms, and population biology and ecology; a weekly colloquium; and an intensive individual research experience under the direction of laboratory faculty (Biological Sciences courses 120, 120P, 122, 122P, 123; Neurobiology, Physiology, and Behavior 141, 141P). This is a 15 unit program and course offerings and instructors may vary from year to year. Applications are due January 31. For more course detail, see Bodega Marine Laboratory Program, on page 173 or http://bml.ucdavis.edu/.

**Summer Special Session Courses**
This integrated program offers students a multidisciplinary understanding of coastal ecosystems through intensive, hands-on courses taught at BML. The program offers students three sequences of instruction with up to 10 units in each. Two sequences occur during the first Summer Session dates and one sequence in the second Summer Session dates. Applications are due May 1. For more course detail see full description under appropriate academic department listing or http://bml.ucdavis.edu/.

The programs are residential with students housed on the laboratory grounds. Participants are assessed a room and board fee in addition to standard campus registration fees. Additional informa-
The following programs are not accredited by a Commission of Accreditation Commission of ABET accredit the following programs:

- Aeronautical Science and Engineering
- Biochemical Engineering
- Biological Systems Engineering
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Electrical Engineering/Materials Science and Engineering
- Materials Science and Engineering
- Mechanical Engineering
- Optical Science and Engineering

The College of Engineering

Undergraduate Advising Office
1080 Kemper Hall
(530) 752-1979; http://engineering.ucdavis.edu

Engineering is the profession in which the physical and biological sciences are applied in a practical way for the benefit of society. As an engineering student, you will learn to observe and describe technological problems and to seek useful solutions to them. Your skills upon graduation will be useful to you not only as an engineer, but also as a professional in management, sales, operations, manufacturing and other fields.

Sixteen undergraduate majors, including two combined major programs are offered. Each of these is a four-year program leading to the degree of Bachelor of Science.

The Engineering Accreditation Commission of ABET (111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700) accredits the following programs:

- Aeronautical Science and Engineering
- Biochemical Engineering
- Biological Systems Engineering
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Electrical Engineering/Materials Science and Engineering
- Materials Science and Engineering
- Mechanical Engineering
- Optical Science and Engineering

The Engineering Accreditation Commission and the Computing Accreditation Commission of ABET accredit the following program:

- Computer Science and Engineering

The following programs are not accredited by a Commission of ABET:

- Biomedical Engineering
- Computational Applied Science
- Chemical Engineering/Materials Science and Engineering
- Mechanical Engineering/Materials Science and Engineering

Minor Programs. The College of Engineering currently offers two minor programs:

- Computational Applied Science (in the Department of Applied Science)
- Construction Management and Engineering (in the Department of Civil and Environmental Engineering)

The Undergraduate Programs

Applied Science

The Department of Applied Science offers two majors, one in Optical Science and Engineering and one in Computational Applied Science. The objective of the Optical Science and Engineering program is to provide a basic education in the fundamental principles of optics combined with key courses in physics, mathematics and the engineering applications of optics. There is a rapidly growing national demand for engineers educated in optical science and engineering. Much of the high-technology infrastructure is based upon optics and its applications, the most prominent being optical digital information transmission. In addition, engineers trained in optical science and engineering are in strong demand in health care and life science, optical sensing for environmental and weather applications, energy-use reduction, commercial camera and space-program optical applications, and national defense applications. Computational Applied Science deals with the interplay between the mathematics of models that arise from physical science and engineering and the numerical techniques for their computational implementation and subsequent solution. The major provides a comprehensive background in mathematics and physical science. The specific objective of the major is to enable students to construct practical numerical solutions to problems in science and engineering. Strong components of the program are the development, analysis and integration of numerical algorithms and an appreciation for the interaction among numerical simulations, theoretical models and experiments.

Majors:

- Computational Applied Science, B.S.
- Optical Science and Engineering, B.S.

Minors:

- Computational Applied Science

Biological and Agricultural Engineering

Biological Systems Engineering majors learn to combine the science and art of engineering with the science of biology to design systems that influence, control, or use biological materials and organisms for improving the quality of life. Specific objectives include designing systems to process biological materials into consumer products; designing machines to interact with biological systems in disciplines ranging from agriculture to medicine; managing, recycling and using wastes; developing systems to protect and preserve our natural resources and environment; developing and improving processing systems for food; designing equipment and systems that improve nutrition and diets; and minimizing waste discharge to the environment.

Majors:

- Biological Systems Engineering, B.S.

Biomedical Engineering

The Department of Biomedical Engineering advances fundamental medical concepts; creates knowledge from the molecular to the organ systems levels; and develops innovative biologics, materials, processes, implants, devices and informatics approaches. These approaches are applied to the prevention, diagnosis and treatment of disease. The objective is to prepare students for employment in companies that manufacture medical assist devices, human tissue products and therapeutics. The program also prepares students to enter a graduate program in biomedical engineering or pursue professional degrees in medicine and related health fields.

Majors:

- Biomedical Engineering, B.S.

Chemical Engineering and Materials Science

The Department of Chemical Engineering and Materials Science offers five majors, including two combined majors.

Chemical Engineering majors learn to apply chemical and engineering principles to create useful products ranging from antibiotics to zirconium, from petroleum to plutonium, from agricultural
Majors:

- Biochemical Engineering, B.S.
- Chemical Engineering, B.S.
- Chemical Engineering/Materials Science and Engineering, B.S.
- Materials Science and Engineering, B.S.
- Electrical Engineering/Materials Science and Engineering, B.S.

Civil and Environmental Engineering

Civil Engineering majors learn to apply the principles of the physical and biological sciences and engineering to plan and design systems to improve the quality of life. Specific objectives include providing potable water and freedom from disease-carrying wastes; protecting the natural environment; mitigating the effects of earthquakes and other natural disasters; designing land-, water- and air-transportation systems; and building roads and structures.

Majors:

- Civil Engineering, B.S.

Minors:

- Construction Engineering and Management

Computer Science and Engineering

The field of computer science and engineering encompasses the organization, design, analysis, theory, programming and application of digital computers and computing systems. The curriculum develops versatile engineers with backgrounds spanning a broad computer/software spectrum. The Computer Science and Engineering major provides a solid background in mathematics, physics, chemistry and electronic circuits and systems—all supporting the computer hardware and software courses that form the focus of the curriculum. A key theme is the hardware/software interaction in computer system design; this theme is reflected in the balance between hardware and software course requirements and in the orientation of the courses themselves. The major requires more humanities and social science electives than other college majors, in order to produce the verbal skills and intellectual breadth demanded by today’s employers.

Major:

- Computer Science and Engineering, B.S.

Electrical and Computer Engineering

Electrical Engineering majors learn to apply the principles of the physical sciences and engineering to the design, analysis, development, production and evaluation of electronic systems. Specific objectives include the provision of systems for communications, control, signal processing, integrated circuit fabrication, optoelectronics, consumer electronics and digital systems.

Computer Engineering majors study the design, development, analysis, organization, theory, programming and application of digital computers. Specific objectives include developing the student's ability to design both software and hardware. In comparison to the Computer Science and Engineering major, the Computer Engineering major provides greater emphasis on hardware in the key hardware/software interaction in computer system design.

Majors:

- Computer Engineering, B.S.
- Electrical Engineering, B.S.

Mechanical and Aeronautical Science Engineering

Aeronautical Science and Engineering majors learn to apply the principles of the physical sciences and engineering to vehicles whose motion is determined by aerodynamic forces. Specific objectives include the design, development and manufacture of aircraft and other transportation systems integrating the disciplines associated with aerodynamics, propulsion, structures and guidance/control.

Mechanical Engineering majors learn to apply physical and mechanical principles to the design and manufacture of machines and products, energy conversion systems and equipment for guidance and control. Specific objectives include the provision of products and processes for intelligent manufacturing systems, biomechanical and sports equipment, power generation systems, propulsion for transportation, integration of vehicles and automated highways, and applications of computer and automation technologies.

Majors:

- Aeronautical Science and Engineering, B.S.
- Mechanical Engineering, B.S.
- Mechanical Engineering/Materials Science and Engineering, B.S.

Colleges of Letters and Science

Office of Undergraduate Education and Advising
Room 200, Social Sciences and Humanities Building
(530) 752-0392; http://www.ls.ucdavis.edu

Major programs in the College of Letters and Science provide students systematic exposure to the key principles, methods, findings and representations of a selected area of study. In pursuing a major, students gain intellectual depth and competency in that subject matter, explore important linkages with collateral fields of inquiry and are encouraged to engage in independent study.

The academic programs offered through the school are grouped in three divisions: Humanities, Arts and Cultural Studies; Mathematical and Physical Sciences; and Social Sciences. One collegewide degree program, the individual major, also is available.
The Undergraduate Programs

Division of Humanities, Arts and Cultural Studies

These majors focus centrally on the artifacts, expressions and concerns of humankind in various cultures and times. They provide students the opportunity to explore the creation, performance and analysis of works of art, the language and customs of non-English speaking societies, the theory and criticism of literature, and the peoples and cultures of this nation and its hemisphere. Students interested in studying these types of issues may select from more than 20 different majors.

Majors:
- African American and African Studies, A.B.
- American Studies, A.B.
- Art History, A.B.
- Art Studio, A.B.
- Asian American Studies, A.B.
- Chicana/Chicano Studies, A.B.
- Chinese, A.B.
- Classical Civilization, A.B.
- Comparative Literature, A.B.
- Design, A.B.
- Dramatic Art, A.B.
- English, A.B.
- Film Studies, A.B.
- French, A.B.
- German, A.B.
- Italian, A.B.
- Japanese, A.B.
- Medieval and Early Modern Studies, A.B.
- Music, A.B.
- Native American Studies, A.B.
- Nature and Culture, A.B.
- Religious Studies, A.B.
- Russian, A.B.
- Spanish, A.B.
- Technocultural Studies, A.B.
- Women's Studies, A.B.

Minors:
- African American and African Studies
- American Studies
- Art History
- Art Studio
- Asian American Studies
- Chicana/Chicano Studies
- Chinese
- Classical Civilization
- Comparative Literature
- Dramatic Art
- English
- Film Studies
- French
- German
- Global and International Studies
- Greek
- Italian
- Japanese
- Latin
- Medieval and Early Modern Studies
- Music
- Native American Studies

- Nature and Culture
- Religious Studies
- Russian
- Sexuality Studies
- Social and Ethnic Relations
- Spanish
- Women's Studies

Division of Mathematical and Physical Sciences

These majors focus primarily on the description and interpretation of the structure, processes and events of the physical universe. They provide students the opportunity to explore in depth the structure, properties and reactions of substances; fundamental mathematical techniques and models and their application to the interpretation and explanation of phenomena; studies of matter and energy and their interconversions; the nature and development of computer languages; and earth and environmental processes. Students interested in studying these types of subjects may select from ten different majors. The division strongly encourages undergraduates to enroll in undergraduate research projects with one-on-one instruction by faculty scholar/researchers.

Majors:
- Applied Mathematics, B.S.
- Applied Physics, B.S.
- Chemistry, A.B., B.S.
- Computer Science, B.S.
- Geology, A.B., B.S.
- Mathematical and Scientific Computation, B.S.
- Mathematics, A.B., B.S.
- Natural Sciences, B.S.
- Physics, A.B., B.S.
- Statistics, A.B., B.S.

Minors:
- Chemistry
- Computer Science
- Environmental Geology
- Geology
- Geophysics
- Mathematics
- Oceanography
- Physics
- Statistics

Division of Social Sciences

These majors focus largely on issues and problems that characterize social, cultural, political and economic life across human societies. They provide students the opportunity to explore the relationships between people and the groups and organizations of which they are a part, the antecedents of individual behavior, the development of political and economic systems, the social forces that have shaped the contemporary world and the foundations of language, thought, knowledge and perception. Students interested in studying these types of issues may select from more than a dozen different majors.

Majors:
- Anthropology, A.B., B.S.
- Communication, A.B.
- East Asian Studies, A.B.
- Economics, A.B.
- History, A.B.
• International Relations, A.B.
• Linguistics, A.B.
• Middle East/South Asia Studies, A.B.
• Philosophy, A.B.
• Political Science, A.B.
• Political Science–Public Service, A.B.
• Psychology, A.B., B.S.
• Science and Technology Studies, A.B.
• Sociology, A.B.
• Sociology–Organizational Studies, A.B.

Minors:
• Anthropology
• Communication
• East Asian Studies
• Economics
• History
• History and Philosophy of Science
• Jewish Studies
• Latin American and Hemispheric Studies
• Linguistics
• Middle East/South Asia Studies
• Philosophy
• Political Science
• Psychology
• Sociology
• War-Peace Studies

Collegewide Program

Students whose academic interests cannot be satisfactorily met through the completion of an established major have the opportunity to develop an individual major. Individual majors may reflect the most recent trends in scholarship and research and are typically interdisciplinary in nature. The major proposal is developed in close and active consultation with two faculty advisers from the academic disciplines most closely related to the subject matter of the individual major. Careful faculty guidance and review assure that individual majors are comparable in academic rigor and intellectual coherence to those regularly available through the departments and programs of the college.

Major:
Individual Major, A.B., B.S.

Bachelor’s Degree Requirements

University Requirements
All students must fulfill the following University of California requirements:
Entry-Level Writing Requirement
American History and Institutions Requirement
Unit Requirement
Residence Requirement
Scholarship Requirement

General Education Requirement
Students must complete three courses in the two areas of topical breadth outside the assigned area of their major. Students also must complete three writing experience courses and one social-cultural diversity course.

College Requirements

College of Agricultural and Environmental Sciences
Unit
Residence
Scholarship
English Composition

College of Biological Sciences
Unit
Residence
Scholarship
English Composition
Foreign Language (only A.B. & B.A.S. degrees)
Breadth (only A.B. & B.A.S. degrees)

College of Engineering
Unit
Residence
Scholarship
English Composition
Design
Engineering General Education
Current Catalog Curriculum

College of Letters and Science
Unit
Residence
Scholarship
English Composition
Area (Breadth)
Foreign Language (A.B. & B.A.S. degrees)

Major Requirements
Course requirements for each major are listed in the Programs and Courses section of this catalog.
UNIVERSITY REQUIREMENTS

All students must fulfill the following University of California requirements.

Entry Level Writing Requirement

The university requires every undergraduate student to demonstrate college-level proficiency in English composition. Satisfactory completion of the Entry Level Writing Requirement is a prerequisite to all other undergraduate courses in English.

The requirement, as determined by Undergraduate Admissions, may be met in one of the following ways:

- By earning a score of 680 or higher on the Writing section of the new SAT Reasoning Examination, or on the old SAT-II Writing Test.
- By earning a score of 3, 4 or 5 on either College Board Advanced Placement Examination in English.
- By earning a score of 30 or higher on the Combined English/Writing section of the ACT Assessment.
- By earning a score of 5 or above on the International Baccalaureate’s Higher Level English A Examination.
- By earning a score of 6 or above on the International Baccalaureate’s Standard Level English A Examination.
- By entering the university with credentials showing the completion of an acceptable 3 semester-unit or 4 quarter-unit college-level course in English composition with a grade of C or higher.
- By writing a passing essay on the Analytical Writing Placement Examination. This examination may be taken only once prior to enrollment. It is offered in the spring at local sites throughout California; a student admitted for fall quarter who has not already satisfied the Entry Level Writing Requirement must take this examination. Out-of-state students or any California freshmen admitted after mid-April will take another form of the Analytical Writing Placement Examination, which will be offered on the UC Davis campus during the orientation period each quarter. For the time and location, consult the Class Schedule and Registration Guide (CSRG), published before the beginning of each quarter.

If you have not satisfied the requirement in one of the ways described above, you must enroll in Workload 57 during your first quarter of residence at the university, or as soon thereafter as space is available in the course. Workload 57, offered by Sacramento City College on the UC Davis campus, counts as 4.5 units on your study list and toward minimum progress but carries no units toward graduation. To satisfy the requirement, students must earn a course grade of C or higher. Students who receive a grade lower than C must repeat Workload 57. If the requirement has not been satisfied by the end of your third quarter, and you were not required to take courses for non-native speakers of English in the Linguistics program, you may be disenrolled from the University.

Students whose native or school language is not English, and some students whose schooling combines work in the United States and in another country, must demonstrate proficiency in English. The level of proficiency must meet the standards of both the Linguistics and the Entry Level Writing programs. The results of the Analytical Writing Placement Examination administered during the orientation period each quarter determine whether a student has met the Entry Level Writing Requirement or must take specific course work in the Linguistics program. Students held for Linguistics course work have three quarters to meet the Entry Level Writing Requirement plus the number of quarters required in Linguistics.

American History and Institutions

The American History and Institutions requirement ensures that every graduating student will have at least a minimum knowledge of the background of this country’s development and an understanding of the political, economic and social interrelationships of its way of life.

You may meet this requirement in any of these ways:

- Complete one high school unit in American history, or 1/2 high school unit in American history and 1/2 high school unit in civics or American government, with a grade of C or better in each course.
- Complete any one of the following courses:
  - African American and African Studies 10, 100, 120, 121
  - Asian American Studies 1, 2
  - Economics 111A, 111B
  - Political Science 1, 5, 100, 101, 102, 103, 104, 105, 106, 108, 109, 113, 130, 131, 160, 163

  Students electing to complete one of the above courses in order to meet this requirement are subject to the rules for prerequisites and majors.
- Present evidence that the requirement has been accepted as satisfied at another campus of the university.
- Present evidence that the requirement has been satisfied through courses in the area of American History and Institutions at another collegiate institution whose credits are acceptable for transfer to UC Davis.
- Successful completion of the Advanced Placement Examination in American History or American Government and Politics.

International students, regardless of the type of visa they hold, must meet the university’s American History and Institutions requirement for graduation.

Unit Requirements

A minimum of 180 quarter units is required for graduation. These must be distributed according to the minimum requirements set forth by the faculty of your college.

A maximum of 12 units of Internship Courses (92, 192, or a combination) may be counted toward the 180-unit bachelor’s degree requirement.

The acceptability of transfer courses for unit credit is determined by Undergraduate Admissions. The acceptability of such courses toward specific requirements is determined by the individual college or school.

Students should refer to the Advanced Placement Examination chart and their transcripts to eliminate the possibility of duplication of credit.
Residence Requirements

The minimum residence requirement for a bachelor's degree at the University of California is one academic year (three quarters). Thirty-five of the final 45 quarter units completed by each candidate must be earned while in residence on the UC Davis campus. Each summer session in which a student completes a course of at least 2 quarter units may be counted as half a quarter's residence. Not more than 18 of these 35 quarter units may be completed in summer session courses at UC Davis.

Regularly approved courses (laboratory, field, or other individual work) done outside of a regular session but under the direction of a department of instruction may be accepted upon the recommendation of the department in partial fulfillment of the residence requirement for the bachelor's degree. Registration is with the consent of the instructor only.

UC Davis Extension courses are not accepted as part of the university residence requirement.

There are additional residence requirements for students enrolled in the Colleges of Letters and Science and Engineering. If you are planning to study abroad during your senior year, you should consult your college dean's office.

With the approval of the dean of a student's college or school, a candidate for the bachelor's degree who was in active service in the armed forces of the United States in the year preceding the awarding of the degree may be recommended for the degree after only one quarter of university residence in which the candidate completes at least 16 units or passes a comprehensive examination in the major or field of concentration.

Scholarship Requirement

To receive a bachelor's degree, you must obtain twice as many grade points as units (a 2.000 GPA) for all courses you have attempted in the university. An exception to this rule is made for those students undertaking certain honors courses. For specific college requirements consult the college sections following.

GENERAL EDUCATION REQUIREMENT

The General Education (GE) requirement promotes the intellectual growth of all undergraduates by ensuring that they acquire a breadth of knowledge that will enlarge their perspectives beyond the focus of a major and serve them well as participants in a knowledge-based society. It seeks to stimulate continued intellectual growth by providing students with knowledge not only of the content but also of the methodologies of different academic disciplines. It involves students in the learning process by its expectation of considerable writing and class participation. It encourages students to consider the relationships between disciplines.

The GE requirement has three components: Topical Breadth, Social-Cultural Diversity and Writing Experience.

Topical Breadth

A GE course in topical breadth addresses broad subject areas that are important to the student's general knowledge. It takes a critical, analytical perspective on knowledge, considering how knowledge has been acquired and the assumptions, theories, or paradigms that guide its use.

Topical breadth courses are grouped into three broad subject areas of knowledge:

1. Arts and Humanities. Courses in this area provide students with knowledge of significant intellectual traditions, cultural achievements and historical processes.
2. Science and Engineering. Courses in this area provide students with knowledge of major scientific ideas and applications. They seek to communicate the scope, power, limitations and appeal of science.
3. Social Sciences. Courses in this area provide students with knowledge of the individual, social, political and economic activities of people.

Social-Cultural Diversity

Courses in social-cultural diversity teach students the significance of the many patterned differences that characterize human populations—particularly differences of gender, race, ethnicity, sexuality, religion or social class.

Writing Experience

Courses in writing experience improve student writing through instruction and practice. Writing assignments are designed to encourage students to think critically and communicate effectively. Courses require one extended writing assignment (five pages or more) or multiple short assignments. Writing is evaluated not only for content, but also for organization, style, use of language, and logical coherence.

Fulfilling the General Education Requirement

Topical Breadth Component: 6 courses

To fulfill the topical breadth component of the General Education requirement you must successfully complete three approved courses in each of the two subject areas of topical breadth other than the one that includes your major. To identify the area of topical breadth to which your major belongs, refer to the chart at the back of this catalog. Each academic major has been assigned to one of the three subject areas of GE topical breadth. If you have any questions concerning the subject area to which your major is assigned, consult your college dean's office.

- Double majors will satisfy the topical breadth subject areas to which they are assigned. You will still be responsible for completing any topical breadth subject area in which you do not have a major. If, for example, two majors are assigned to the same subject area, you will need to complete the topical breadth component in each of the other two other subject areas. If, on the other hand, you complete two majors that have been assigned to two different areas of topical breadth then you will be responsible for completing the topical breadth component in only the remaining subject area.

- Individual majors are assigned to an area of topical breadth at the time they are approved by your college.

- Each minor has also been assigned to one of the three subject areas of topical breadth. A minor assigned to a subject area other than the area of your major will satisfy the GE course requirement for topical breadth in that subject area.

- Courses in your major may count toward the topical breadth component when those courses are also assigned to subject areas other than the area of your major.
• A course approved in more than one topical breadth subject area may only be offered in satisfaction of one of those subject areas.

Fulfilling the General Education Requirement

Freshman student, or Transfer student* who has not completed TCC or IGETC†

6 GE courses in topical breadth—3 courses in each of the two subject areas other than your major's assigned area
1 GE course in social-cultural diversity
3 GE courses in writing experience

Bear in mind that some courses may count toward two or three components of GE. For example, a single course might provide GE credit for topical breadth, writing experience and social-cultural diversity. Depending on the GE courses you choose, you can satisfy the GE requirement with 6 courses.

* Transfer work comparable to approved UC Davis GE courses may be used to satisfy the GE requirement, as determined by the college dean's office.
† Transfer Core Curriculum (TCC) or Intersegmental General Education Transfer Curriculum (IGETC); completion must be certified by the community college. College of Engineering students still have General Education requirements to complete.

Transfer student who has successfully completed TCC or IGETC†

GE requirement satisfied; no further GE courses required
† Transfer Core Curriculum (TCC) or Intersegmental General Education Transfer Curriculum (IGETC); completion must be certified by the community college. College of Engineering students still have General Education requirements to complete.

Approved General Education Courses

Approved GE courses.
Courses approved for multiple GE components. Courses approved for more than one component of the GE requirement (topical breadth, writing experience and social-cultural diversity) will be accepted toward satisfaction of all components for which the course has been approved.

Approved GE courses. You cannot claim GE credit for any course you completed before it was an approved GE course.

College of Engineering. Students seeking a degree in a College of Engineering major must complete 24 units of general education coursework (33 units are required for Computer Science and Engineering majors) and two upper division courses from the campus approved list of approved courses in Arts and Humanities or Social Science. The list of approved courses appears at the back of this catalog.

GE Exemption

IGETC, TCC and UC Reciprocity. You are exempt from the UC Davis GE requirement if you come from a California community college and are certified as having successfully completed the “Intersegmental General Education Transfer Curriculum” (IGETC) or “Transfer Core Curriculum” (TCC), or if you come from another UC campus and are certified as having successfully completed the lower division breadth or General Education requirements of that UC campus (UC reciprocity).

If you are in the College of Engineering and have satisfied IGETC or TCC, you are still required to complete two upper-division General Education courses at UC Davis to satisfy College of Engineering requirements.

Approved General Education Courses

See General Education Courses/Options, on page 523, for a list of the courses that provide General Education credit for 2008-09. Please note that you cannot claim GE credit for a course you completed before it was an approved GE course. This list is subject to change. For the most current information, you should check the Class Schedule and Registration Guide (CSRG) each quarter.

General Education Theme Options

General Education theme options are sets of GE courses sharing a common intellectual theme. Faculty from the College of Agricultural and Environmental Sciences have worked collaboratively to develop sets of complementary courses in several areas of interest. These GE theme options are not a separate element of the GE requirement, but a way of selecting your GE courses so that you may benefit from a coherent focus of study while completing the GE requirement.

Completion of a theme satisfies the GE requirement for students with majors assigned to the GE topical breadth area of Arts and Humanities. Students with majors assigned to the topical breadth area of either Science and Engineering or Social Science will need to complete additional GE courses in Arts and Humanities to satisfy the campus GE requirement.

Social-Cultural Diversity Component: 1 course

To fulfill the social-cultural diversity component of the GE requirement, you must successfully complete one course from the approved list at the back of this catalog.

Writing Experience Component: 3 courses

To fulfill the writing experience component of the GE requirement, you must successfully complete three courses from the approved list at the back of this catalog.

• Entry Level Writing Requirement (formerly Subject A). You must satisfy the university Entry Level Writing Requirement before you take any writing experience course for GE credit. If you take an approved writing experience course, but have not yet satisfied the Entry Level Writing Requirement, you will not receive GE writing experience credit for that course.

Additional Conditions

• Letter grading. All courses taken to fulfill the GE requirement must be taken for a letter grade. No GE credit will be awarded for a course that you take on a Passed/Not Passed basis.

• College and university composition requirements. The following GE courses may not be used to satisfy university or college requirements in composition and GE writing experience simultaneously:
  • Communication 1
  • Comparative Literature 1, 2, 3, 4
  • English 3
  • Evolution and Ecology 12
  • Native American Studies 5

• University Writing Program 1, 18, 19, 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, 104E

Remember: You must satisfy the university Entry Level Writing Requirement before you take any writing experience course for GE credit.
Beginning a theme option does not prevent you from later choosing to take other approved GE courses to fulfill the GE requirement. If you choose to mix courses from a theme option and the broader GE course lists, you will need to make sure that the combination of courses you select will complete the campus GE requirement.

**GE Scholars**

GE Scholars is a certificate program related to the GE theme options. In addition to completing three approved courses in a GE theme option, students choose a capstone experience (either a seminar course or curriculum related internship) that integrates concepts introduced in the theme courses. Students are awarded a certificate upon completion of their capstone experience. The GE Scholars program allows you to participate in the application of knowledge gained in GE courses, focus your academic experience beyond your major and develop a secondary body of knowledge while working towards completing your GE requirement.

For more information, contact the GE Scholars Project Manager at (530) 752-9710, gamartinez@ucdavis.edu or see http://gescholars.ucdavis.edu.

**COLLEGE REQUIREMENTS FOR THE BACHELOR’S DEGREE**

**College of Agricultural and Environmental Sciences**

**Unit Requirements**

Of the required 180 units counted toward a degree, 54 units must be upper division work.

**Unit Credit Limitations**

In addition, the following unit limitations apply to all majors:

- Not more than 6 units can be Physical Education 1 and 6
- Not more than 20 units can be courses numbered 90X, 92, 97T, 97TC, 99, 190C, 190X, 192, 197T, 197TC, or 199
- Not more than 12 units can be courses numbered 92 and/or 192 (credit will not be given for 192s or 199s taken before the completion of 84 units)
- Not more than 5 units per quarter of Special Study courses (99, 194H, 199)
- Not more than 9 units of professional courses (numbers 300–499) may be used toward the 54 upper division units

**Limitation on Credit for Units Graded P**. The Academic Senate limits the total number of courses graded P, including units earned in courses graded “P/NP only,” to one third of the units completed on the UC Davis campus. The P/NP option is to be used only for elective courses and should not be used for major requirements.

**Credit for Open Campus (Concurrent) Courses**. Students may apply credit for courses taken in the Open Campus (Concurrent) Program through UC Davis Extension towards the 180-unit undergraduate degree requirement. The grade points earned when enrolled in Open Campus courses will count toward the calculation of a student’s UC GPA upon his/her admission or readmission to regular student status at UC Davis. Students registered at UC Davis may not enroll in Open Campus courses.

**Credit for UC Davis Extension Courses**. Registered UC Davis students who plan to use academic credit earned in a UC Davis Extension course other than Open Campus (Concurrent) towards their UC Davis degree must obtain prior written approval from their College before registering in the UC Davis Extension. Upon approval students may apply a limited number of credits towards the 180-unit undergraduate degree requirements. Courses completed in UC Davis Extension will not count toward the calculation of a student's UC GPA.

**Registration Beyond the 225-Unit Limit.** Students may not exceed 225 units; registration for enrollment when the limit has been reached may only be approved by the Dean. A petition to complete excess units may be picked up in the Dean's office or in your major department.

**Residence Requirement**

Thirty-five of the final 45 quarter units completed by each candidate must be earned while in residence on the UC Davis campus.

**Scholarship Requirement**

Students in the College are required to attain a minimum grade point average of 2.000 for all courses specified as depth subject matter in their major. Only grades earned in courses taken at UC Davis are included in the grade point calculation. Each candidate must complete a program of study either as prescribed in (a) a major approved by the Undergraduate Majors and Courses Standing committee and printed in this catalog, or (b) an individual major approved by the Individual Major Standing committee.

**English Composition Requirement**

The English Composition requirement can be met in one of two ways:

1. Either two courses emphasizing written expression or one course emphasizing written expression and one course emphasizing oral expression, with a grade of C- (or P) or better. The following UC Davis courses satisfy this requirement:

   (a) one course must be selected from English 3, University Writing Program 1, 18, 19, 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, 104E, 104F; or
   Nematology 150 (courses with primary emphasis in writing skills);

   (b) one course selected from the courses not selected above, or
   from Communication 1, Comparative Literature 1, 2, 3, 4, or
   Native American Studies 5 (courses emphasizing either writing or speaking skills);

   OR

2. By passing the English Composition Examination administered by the College of Letters and Science upon completion of 70 units of degree credit (the examination does not yield credit).

**English Composition Examination.** The no-fee examination is typically offered on Saturday mornings in mid-October, late January and late April; see the Class Schedule and Registration Guide for specific dates.
Sign-up for the English Composition Examination at http://writingprogram.ucdavis.edu/compexam/ from the Monday before the exam date until Friday at noon or until the sign-up sheets are filled. The English Composition Examination form, available at the UC Davis Bookstore, is required. It is recommended that students with disabilities contact the Student Disability Center at (530) 752-3184 and the Entry Level Writing/Subject A Office (530) 752-0450 at least two weeks prior to the exam date to arrange accommodations. There are no examinations given during the summer.

**General Education**

You should consult your Dean's Office or department adviser in advance to determine exactly how your General Education courses will apply toward your major.

You can choose one of four General Education theme options to help plan your GE courses. The themes, Global Population and Environmental Issues; Biodiversity and Cultural Diversity; Food and Fiber; and Changing Agriculture are described in more detail in General Education Theme Options, on page 534.

**Study Plan Approval**

A Study Plan provides for attainment of specific long-term goals and should allow for the acquisition of prerequisite knowledge for courses to be taken in subsequent quarters; the fulfillment of College and major requirements; a proper balance between the demands of the courses and your ability to master the subject matter; and meeting the minimum progress requirements; see Course Load, on page 69.

In conjunction with a faculty adviser and/or staff adviser, you must plan and prepare a program that specifies your goals and shows how the graduation requirements will be met. It is a regulation that a written “study plan” be filed with your faculty adviser or staff adviser by the end of the second quarter of the junior year (having completed not more than 120 units either in residence and/or by transfer).

You may be denied registration for future quarters if you do not comply with this regulation. However, filing this study plan does not preclude a change of major or program modifications.

**Major Degree Certification**

A Major Certification is completed during the quarter you plan to graduate. At that time, you and your faculty adviser and/or staff adviser check to see that all major requirements have been completed. The Dean's Office completes the degree certification by verifying that all college and university requirements have been satisfied and will notify you with a copy of the Major Certification form.

**Degree Requirement Changes**

On occasion, the faculty make changes in the requirements that students must satisfy to obtain the baccalaureate degree. So that you will not be penalized by changes that may work to your disadvantage and so that you will benefit by changes that assist you in completing your degree requirements, it is college policy that you may choose to fulfill the university, college and major requirements in effect at the time you were registered at UC Davis. If you have transferred to UC Davis from a community college, state college, or another university, you may follow the requirements as stated in any UC Davis General Catalog in effect either during the three years immediately preceding your transfer to UC Davis or at the time you first registered at that institution, whichever is most recent. Once you have chosen the year of the General Catalog under which you wish to be governed, you must satisfy all of the university, college and major requirements specified in that catalog.

**College of Biological Sciences**

All students in the College of Biological Sciences must satisfy the following college requirements in addition to satisfying the University Requirements, on page 90 and General Education Requirement, on page 91.

**Unit Requirements**

**Total Units.** Complete no less than 180 units incorporating the unit credit limitations listed below. No student may exceed 225 units in their academic career without approval of the Dean. Units earned in Advanced Placement and International Baccalaureate exams are not counted toward this 225-unit limit. Upon reaching 200 units, a student must submit a quarter-by-quarter graduation plan to the Dean's Office or a hold will be placed on his/her registration.

**Upper Division Units.** Complete 64 upper division units.

**Unit Credit Limitations**

- **Passed/Not Passed Units.** All courses used to satisfy major requirements must be taken on a letter-graded basis, unless courses are only offered on a Passed/Not Passed basis.
- **Physical Education.** Maximum of 6 units of Physical Education 1, 6 and similar physical activity courses including transfer work.
- **Transfer work.** Maximum of 105 units of credit earned at two-year institutions (community college).
- **Graduate Courses.** Courses numbered 200-299 may not be applied toward the 64-unit upper division requirement.
- **Professional and teaching courses.** Maximum of 9 units in courses numbered 300-399 and 400-499. These units may not be applied toward the 64-unit upper division requirement.
- **Upper division standing.** Must complete 84 units before enrolling in 192, 194H and 199 to receive degree and upper division credit.
- **Special Study.** Not more than 5 units per quarter of Special Study courses (99, 194H, 199).
- **Nonstandard Courses.** Maximum of 20 units of nonstandard courses including transfer work.a

Nonstandard courses are defined here as tutoring, internship, research, research conference, honors research and similar course activities. Some examples of these courses are, but are not limited to, courses numbered 90C, 92, 92C, 97T, 97TC, 99, 189, 190C, 191, 192, 192C, 193, 194H, 197T, 197TC, 199, etc. Courses numbered 98 or 198 are not included in this 20-unit limitation.

There are additional unit credit limitations on tutoring and internship units.

- **Tutoring.** Maximum of 3 tutoring units including but not limited to 97T, 197T, 97TC and 197TC.
- **Internship.** A maximum of 6 internship units including but not limited to 92, 192, 92C, 192C.
Repeating Courses.

Two consecutive quarters may be required to withdraw from the major. Students who fail to maintain a 2.000 GPA in courses required for their major over two consecutive quarters may be required to withdraw from the major.

- Repeating Courses. Students may once repeat courses in which they received a grade of D+ or less. To repeat a course more than once, students must petition the Dean for approval prior to enrolling in the course.
- Passed/Not Passed Grading Option. All courses used to satisfy major requirements must be taken on a letter-graded basis, unless courses are only offered on a Passed/Not Passed basis.

English Composition Requirement

The English Composition requirement may be satisfied in one of two ways:

1. Completing 8 units, to include 4 upper division units, in English composition courses with at least a C- or Passed grade from the following list: Comparative Literature 1, 2, 3, 4, English 3, Evolution and Ecology 12, Native American Studies 5, Nematology 150, University Writing Program 1, 18, 19, 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, 104E, 104F

OR

2. Passing the English Composition Examination, administered by the Entry-Level Writing program, upon completion of 70 units of degree credit. This examination does not yield credit. Students interested in entering the health science field should check with the Health Sciences Advising Office or the Dean’s Office before choosing this option.

Additional Bachelor of Arts Requirements

Bachelor of Arts degrees are available in Biological Sciences; Evolution, Ecology and Biodiversity; Exercise Biology; Microbiology; and Plant Biology. These degrees offer students an opportunity to broaden their education while pursuing a rigorous life science major.

Candidates for the Bachelor of Arts degrees must complete two additional requirements.

1. Foreign Language. The requirement can be met in one of three ways:
   - Complete with passing grades 15 quarter units of college level course work, or the equivalent thereof, in a single language.
   - Attain a minimal score prescribed by the Committee on Undergraduate Curriculum and Educational Policy, in the College Entrance Examination Board Achievement Test in Foreign Language, which may be taken at any time during the student’s high school career, or any other achievement test approved by the Committee on Undergraduate Curriculum and Educational Policy.
   - Placement beyond the 15-unit level on a placement/proficiency examination offered by one of the foreign language departments of the University.

2. Breadth Requirements. Complete one of the following options:
   - At least three upper division courses in the humanities or social sciences, which are not offered in satisfaction of major, college English composition or General Education requirements. Each course must be at least three units and may not include internship, research, tutoring, other non-standard courses or directed group study courses.
   - At least three lower or upper division courses in the fine arts, which are not offered in satisfaction of major, college English composition or General Education requirements. Each course must be at least three units and may not include internship, research, tutoring, other non-standard courses or directed group study courses.
   - A certified minor or an additional major in the humanities, social sciences, or fine arts from any UC Davis college or program. Minors and all majors must be completed before accumulating 225 total units.

Declaration of Major/Undeclared—Life Sciences

Students must declare a major by 90 units. A hold will be placed on a student’s registration if he/she is still undeclared after completing 90 units.

All changes of major and college must be completed before the beginning of the student’s quarter of graduation.

Students with Biological Sciences majors and students who are Undeclared—Life Sciences use the College of Biological Sciences Dean’s Office for advising on their program. All other students who are enrolled in a major administered by the College of Biological Sciences should see the master or staff adviser in the department office that houses their major, as listed in the catalog. All students, regardless of their college affiliation, working on a major administered by the College of Biological Sciences should obtain university, general education, college and other non-major academic advising from the College of Biological Sciences Dean’s Office.

Degree Check

Students are encouraged to meet with their academic adviser at least once a year to ensure timely graduation. Students are required to consult an academic adviser at two points in their academic careers:

- Before accumulating 90 units.
- Before accumulating 135 units.

- In addition, if a you are taking courses which, if passed, will cause your unit total to exceed 200 units and you intend to register for the next quarter, you must file a plan with your adviser that leads to graduation within 225 units. If the plan anticipates registering after you have accumulated 225 units, the plan must be submitted to the Dean for approval.

A hold may be placed on your registration if you do not meet any of these advising requirements.
Degree Requirement Changes or Catalog Rights

On occasion, the faculty makes changes in the requirements that students must satisfy to obtain the baccalaureate degree. So that you will not be penalized by changes that may work to your disadvantage and so that you will benefit by changes that assist you in completing your degree requirements, it is college policy that you may choose to fulfill the university and college requirements (see General Education Requirement, on page 91 for an exception) as stated in any UC Davis General Catalog in effect at the time you were registered at UC Davis. If you have transferred to UC Davis from a community college, state college, or another university, and were matriculated to a regular quarter prior to Fall 2006, you may follow the requirements as stated in any UC Davis General Catalog in effect either during the three years immediately preceding your transfer to Davis or at the time you first registered at that institution, whichever is most recent. Once you have chosen the year of the General Catalog under which you wish to be governed, you must satisfy all of the university and college requirements specified in that catalog.

With respect to the completion of your major requirements, most of the majors in the College of Biological Sciences require completion of the major degree requirements in effect at the time you officially declared your major. However, because departments differ in how they handle these matters, check with the department or major program office if you have any questions about which requirements apply to you.

College of Engineering

Unit Requirements

Each candidate for the degree of Bachelor of Science in Engineering must satisfactorily complete an approved curriculum in engineering. No unit of coursework you complete may be used to satisfy two different degree requirements (except where the catalog specifically indicates otherwise). Detailed requirements for the approved curricula are given in the Undergraduate Courses chapter of this catalog; to see the courses required in your major, follow the requirements as stated in any UC Davis General Catalog under which you wish to be governed, you must satisfy all of the university and college requirements specified in that catalog.

You may, for good cause, request a modification of particular degree requirements by submitting a student petition. These petitions, which are available in the Undergraduate Advising Office, can be a valuable aid in resolving individual program conflicts or other special problems. Such petitions are subject to approval by the Committee on Student Petitions, a body of eight faculty members and non-voting staff advisers and student representatives. A negative decision by the committee may be appealed to the College Executive Committee.

Transfer students. To be eligible for transfer into the College of Engineering you must have at least ninety transferable quarter units (sixty semester units) from another institution. To be a competitive applicant, you must have a minimum overall GPA of 3.100. Highest priority for transfer admission is given to California community college transfer applicants who have completed two transferable English composition courses and all of the required lower division engineering coursework offered at the community college they attended.

We give lower priority for admission to community college applicants who are missing one or two of the required lower division courses. Community college applicants will be denied admission if they are missing three or more of the required lower-division courses.

Priority is next given to junior-level transfers from other UC campuses and other four-year institutions in and out of state. These students must also have completed all of the required lower-division coursework.

Successful applicants are admitted to a specific major. You may be limited in your ability to change majors within the college after you are admitted.

Transfer advising and information. For more specific advice on lower-division requirements for community college students, meet with the transfer counselor at your institution or see the Assist Web site at http://www.assist.org. Transfer credit agreements are available on the College of Engineering Web site, http://engineering.ucdavis.edu. You may also contact the College of Engineering Undergraduate Advising Office (530) 752-1979. California Community college students should consider a Transfer Admission Guarantee (TAG), which is a formal written agreement specifying the courses you need to complete and the grade point average you need to earn to be admitted. A signed agreement guarantees that you will be admitted to UC Davis in the major you want and for the term you have chosen—provided that you complete the agreement and apply for admission during the open filing period. If you would like more information on the TAG program, see your community college counselor or see http://why.ucdavis.edu.

We also participate in the Transfer Opportunity Program, which encourages community college students to transfer to UC Davis and provides them with services to ease the transition. You can use the Transfer Opportunity Program to get information about admission and transfer requirements, academic programs, financial aid, housing, tutoring, campus life and other services.

Upon admission, transfer students are classified as having upper division status, but are obligated to complete all lower division course requirements for the major before your lower division requirements are considered complete. You may, however, start your upper division coursework while completing your lower division requirements provided you meet all prerequisites for the upper division courses.

The College of Engineering does NOT recommend completion of the Intersegmental General Education Transfer Curriculum (IGETC).

Credit for Open Campus (Concurrent) Courses. Students may apply a maximum of 16 units of credit for courses taken in the Open Campus (Concurrent) Program through UC Davis Extension towards the 180-unit undergraduate degree requirement. The grade points earned when enrolled in Open Campus courses will count toward the calculation of a student’s UC GPA upon his/her admission or readmission to regular student status at UC Davis. Students registered at UC Davis may not enroll in Open Campus courses. Open Campus is not available to students that have been enrolled at UC Davis within the last 12 months and have not graduated, unless an exception letter is provided to Extension by the dean of the student’s college.
Credit for UC Davis Extension Courses. Registered UC Davis students who plan to use academic credit earned in a UC Davis Extension courses other than Open Campus (Concurrent) towards their UC Davis degree must obtain prior written approval from their college before registering in the UC Davis Extension. Upon approval students may apply a limited number of credits towards the 180-unit undergraduate degree requirement.

Residence Requirement
In addition to fulfilling the university residence requirement, you must complete at least 33 of the final 45 units characteristic of your curriculum in engineering while registered in the College.

Scholarship Requirement
In addition to meeting the university scholarship requirement, you are required to maintain a 2.000 grade point average for all course work within Engineering.

English Composition Requirement; Upper Division
The upper division composition requirement can be satisfied by passing the Upper-Division English Composition exam or through an approved upper-division writing course with a grade of C- or better when a student has satisfied the lower-division writing requirement and has 70 or more units. Consult your program's degree requirements for the list of courses approved for your major.

The Upper-Division Composition Examination is administered through the College of Letters and Science. It is typically offered on Saturday mornings in mid-October, late January and late April. See the Class Schedule and Registration Guide for specific dates. Registration for the exam is done on-line, at http://writingprogram.ucdavis.edu, beginning the Monday before each exam date until Friday at noon or until the exam slots are filled. You must obtain the English Composition Examination form, available at the UC Davis Bookstore, to take the exam. (Units of credit are not given for passing this examination.)

This requirement is in addition to the expository writing course requirement; appropriate Advanced Placement or International Baccalaureate credit or completion of one of the following courses with a grade of C- or better: English 3; Comparative Literature 1, 2, 3 or 4; Native American Studies 5; or University Writing Program 1.

Engineering Design Requirement
Engineering design is the process of devising a system, component, or process to meet certain needs. Design involves a decision-making process (often iterative), in which the basic sciences, mathematics and engineering sciences are applied to convert resources optimally to meet a stated objective. Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, testing and evaluation. You must take an appropriate amount of design course work through a combination of required and restricted elective courses. Specific comments about design are included in individual curricula descriptions. You should also review the design content of your individual program with your adviser in the course of completing the upper division advising worksheet.

Electives
In general, there are three kinds of elective courses in the engineering curricula; General Education, Technical and Unrestricted. Some transfer students have an additional set of electives; Physical and Biological Sciences electives.

General Education Electives. Because, as an engineer, you will be a significant participant in the human setting, you will need to have a breadth of education that will allow you to deal with contemporary social issues and to understand the impact of engineering solutions in the global and societal context. To these ends, you will need to take a minimum of 24 units of credit in meeting the General Education requirement (or 33 units for majors in Computer Science and Engineering). In addition, to add a degree of depth and coherence to the general education requirement, the College of Engineering requires that students complete two upper division topical breadth courses.

Since all engineering programs are in the Science and Engineering GE topical breadth area, you will fulfill the campus GE requirements by taking courses in the Arts and Humanities and Social Sciences areas.

In satisfying the GE requirement note that (a) you must take GE courses for a letter grade, and (b) you must satisfy the Entry Level Writing requirement before you can receive writing experience credit for any course.

In consultation with your academic adviser, you should attempt to design a coherent approach to contemporary issues by using your GE electives.

In addition, to ensure that your GE program has a degree of depth and coherence, you must take at least two Arts and Humanities or Social Science topical breadth courses that are upper division courses (courses numbered 100 or above).

2008-2009 Technical Electives List
Technical electives permit you to tailor a program to your own academic and career objectives. For some, the technical electives offer the opportunity to prepare for a specific occupation. For others, they offer an opportunity to broaden a background in the sciences and engineering. You may receive technical elective credit up to a maximum of 6 units for any combination of engineering courses numbered 190C, 192, 198, and 199. (You should note that academic credit for 199 courses is limited to a maximum of five units for each substantially different project). Academic credit for engineering internship courses (192) is limited to a maximum of 5 units per quarter. (Individual departments may allow fewer units.) With the exception of the following courses, upper-division courses in chemistry, engineering, mathematics, physics, and statistics may be taken as technical electives.

The courses which may not be used are:

- Chemistry 195, 197
- Engineering Computer Science 188
- Engineering 191Engineering 198: Gearing Up for Grad School/ Undergraduate Research
- Engineering 160 (restricted to one unit of technical elective)
- Mathematics 197TC,
- Physics 137, 160 (both are restricted to one unit of technical elective), 195, 197T
- Statistics 100, 102, 103, 104, 106, 108
In addition to the upper-division chemistry, engineering, mathematics, physics, and statistics courses not excepted above, the following courses, when not used to satisfy other degree requirements, may be taken as technical electives.

- Animal Biology (ABI) 102, 103
- Animal Genetics (ANG) 101, 105, 107, 111, 120
- Animal Science (ANS) 103, 104, 105, 116, 118, 119, 120, 120L, 123, 124, 125, 126, 127, 128, 129 131, 136, 137, 140, 142, 143, 144, 145, 146, 147, 149, 149L
- Applied Biological Systems Technology (ABT) 101, 110L, 121, 142, 161, 163, 165, 175, 180, 182, 182L
- Atmospheric Science (ATM) 110, 111, 115, 116, 120, 121A, 121B, 124, 128, 133, 149, 150, 158, 160
- Avian Sciences (AVS) 100, 103, 115, 121, 123, 149, 150, 160, 170
- Biological Sciences (BIS) 1A, 1B, 1C, 2A, 2B, 2C, 101, 101D, 102, 103, 104, 109, 110, 116, 117, 119, 123, 135, 153, 156, 156L
- Environmental Horticulture (ENH) 100, 102, 105, 120, 125, 129, 130, 133, 144, 145, 150, 160
- Environmental and Resource Sciences (ERS) 100, 100L, 121, 131, 135, 136, 140, 141, 144, 183, 185, 186, 186L
- Environmental Toxicology (ETX) 101, 102A, 102B, 103A, 103B, 111, 120, 127, 131, 135, 138, 146
- Exercise Biology (EXB) 101, 102, 103, 110, 111, 112, 113, 115, 116, 117, 125, 126
- Fiber and Polymer Science (FPS) 100, 150, 161, 161L
- Hydrologic Science (HYD) 110, 115, 124, 134, 141, 142, 143, 144, 146, 151, 182
- Management (MGT) 11A, 11B, 100, 120, 140, 150, 160, 170, 180
- Microbiology (MIC) 102, 102L, 105, 120, 120L, 140, 150, 155L, 160, 162, 170
- Molecular and Cellular Biology (MCB) 120L, 121, 123, 126, 140L, 142, 143, 144, 145, 150, 150L, 160L, 161, 162, 163, 164
- Neurobiology, Physiology, and Behavior (NPB) 100 through 169
- Physics (PHY) 9D, 9HD, 9HE if not used to satisfy other degree requirements
- Plant Pathology (PLP) 120, 123, 130, 140, 148, 150, 151A, 151B, 155, 185
- Plant Sciences (PLS) any upper division course except 120 and 190 through 199
- Soil Science (SSC) 100, 102, 105, 107, 109, 111, 112, 118, 120
- Wildlife, Fish and Conservation Biology (WFC) 100, 101, 101L, 102L, 110, 110L, 111, 111L, 120, 120L, 121, 122, 130, 136, 141, 151, 152, 153, 154, 155, 156, 157, 158

You are urged to discuss the selection of technical elective courses with your academic adviser.

**Unrestricted electives.** If your curriculum allows for unrestricted electives, you may count any course for which university credit is allowed as an unrestricted elective in the engineering curricula.

**Degree Check**

Use a Degree Requirement Check sheet for your major to monitor your progress toward completing degree requirements. These check sheets are available in the Undergraduate Advising Office in 1050 Kemper Hall. The University holds students responsible for knowing and completing all degree requirements. Degree checks are performed as a courtesy to help students make accurate progress toward fulfilling all major, college, and university requirements. Students should request a preliminary degree check three quarters prior to graduation and a follow-up degree check prior to the beginning of a student's final quarter. Requests can be submitted to the Undergraduate Advising Office in 1050 Kemper Hall.

**Current Curriculum Requirement**

Since engineering is a rapidly developing profession, curricular changes are made by the faculty from year to year. To ensure that you benefit from these changes, the College of Engineering has established a policy that you must fulfill the degree requirements stated in the College of Engineering Bulletin for the year in which you complete degree work or in the Bulletin for the year immediately preceding. The Bulletin is available at the College of Engineering Web site, [http://engineering.ucdavis.edu/](http://engineering.ucdavis.edu/).

**College of Letters and Science**

**Unit Requirements**

A minimum of 180 units is required for the bachelor's degree. Of these units, 64 must be earned in upper division courses.

**Registration Beyond the 225-unit Limit.** You are expected to fulfill all degree requirements within the 180- to 225-unit range.
Once 225 units have been completed (excluding units awarded for College Board Advanced Placement Examinations), you may register only with the permission of the dean. Such permission is rarely granted and then typically only to allow completion of minimum degree requirements. You will be expected to adhere to a program of courses agreed upon and to meet other conditions that may have been set. Approval must be obtained before you will be permitted to register for courses for the quarter following completion of 225 or more units.

If you are in good standing, you will be able to complete 12 quarters or the equivalent (e.g., four years) of college work even if you have earned more than 225 units before you finish your fourth year. You must petition for continuation, however, and file the quarter-by-quarter course program you have planned.

**Unit Credit Limitations**

For certain courses, limits have been established on the number of units that can be counted towards the 180-unit minimum required for the degree. To avoid discovering just before graduation that you are short units, keep track of the number of units you have taken in each of the following categories.

**Limitation on Credit for Graduate and Professional Courses.** Undergraduates may enroll in graduate and professional courses in the 200, 300, and 400 series subject to the restrictions described in the Academic Information, on page 67, in this catalog. Graduate and professional courses that have been completed will be listed on the student's transcript in the usual manner. However, the units earned may be counted toward degree requirements only under the conditions listed below:

Within the limitations A, B and C given below, undergraduate students in the College may count an unlimited number of units in graduate 200 series courses and up to a combined total of 9 units in 300 and 400 series professional courses toward degree requirements. These units, however, are not counted as upper division units unless this is granted by petition to the dean.

A. The recommendations of the instructor in the course and the department chairperson—in addition to approval from the dean—must be obtained by petition in order to receive credit toward the degree for the following kinds of courses:

- All graduate courses 200–298, whether offered by a department or program outside of or within the College of Letters and Science
- All professional courses 300–398 for teachers offered outside of the College of Letters and Science
- All postgraduate professional courses 400–498 offered outside of the College of Letters and Science
- All variable unit courses 300–398 and 400–498 offered within the College of Letters and Science

B. The minimum eligibility conditions for an undergraduate student in the College to petition for degree credit for a 200, 300, or 400 series course are a UC grade point average of 3.300 and completion of 18 upper division units basic to the subject matter of the course. These eligibility conditions may be waived, however, upon the recommendation of the course instructor and concurrence of the department chairperson if the student's preparation warrants exception.

C. Undergraduates in the College cannot receive degree credit for special study courses 299, 399, or 499.

**Limitation on Credit for Units Graded P.** Excluding courses that are graded on a Passed/Not Passed (P/NP) basis only, the number of units graded P that may be accepted towards a degree in the College of Letters and Science is limited to not more than one fourth of the units completed in residence on the UC Davis campus.

The Academic Senate limits the total number of courses graded P, including units earned in courses graded “P/NP only,” to one third of the units completed on the UC Davis campus. This limitation applies to all UC Davis undergraduates, including Letters and Science students.

**Limitation on Credit for University Extension Courses.** Students may apply credit earned through UC Davis Extension courses towards the 180-unit requirement only with written approval from the dean prior to registration. The degree credit allowed by the dean for UC Davis Extension courses with designators other than “XD” or “XDC” is usually less than the unit value listed in the course description. Additional limitations on UC Davis Extension courses include: a maximum of 9 units may be offered for elective credit only and may not be applied toward fulfillment of the Area, Foreign Language, Upper Division, or Residence requirements of the College. Beginning in Fall 2003, grade points earned when enrolled in Open Campus (concurrent) courses through UC Davis Extension will count toward the calculation of a student's UC GPA upon his/her admission or readmission to regular student status at UC Davis.

**Other Unit Credit Limitations.** The following are additional courses that have limits on the number of units that can be counted toward your degree.

- **Internship courses (numbers 92, 192):** 12 units maximum including internship units taken at other institutions; see Nonstandard courses
- **Music 130, 131, 140, 141, 142, 143, 144, 145, 146, 147, 154 (combined):** 19 units maximum
- **Nonstandard courses (92, 97T, 97C, 99, 192, 194H, 197T, 197C, 199 and similar courses):** 30 units maximum or one-sixth of the units taken at UC Davis, whichever is the smaller; note the separate unit limits on internship, special study and tutoring courses; and major limitations
- **Physical Education 1 and 6 (combined):** 6 units maximum
- **Special Study courses (99, 194H, 199):** 5 units maximum in any one quarter; see Nonstandard courses
- **Tutoring courses (97T, 97C, 197T, 197TC):** 10 units maximum; see Nonstandard courses, above

**Residence Requirement**

While registered in the College of Letters and Science, a minimum of 27 upper division units, including 18 upper division units in the major, must be completed on the UC Davis campus; work completed while registered in the UC Education Abroad Program or the UC Davis Extension Open Campus Program does not satisfy campus or College Residence requirements.

**Scholarship Requirement**

The minimum grade point average to satisfy the scholarship requirement is 2.000 for all courses counted toward the major and for all upper division courses used to satisfy major requirements. Only grades earned in courses taken at UC Davis will be included in the grade point computations. To obtain these minimum averages in the major, you may repeat courses that are graded D or F if
you have to repeat a course more than once, you need the dean's prior approval.

**English Composition Requirement**
The English Composition requirement can be met in one of two ways:

1. By passing the English Composition Examination upon completion of 70 units of degree credit (the examination does not yield credit);

OR

2. By completing with a grade of C– (or P) or better
   - One course from English 3, Comparative Literature 1, 2, 3, 4, Native American Studies 5, or University Writing Program 1, 18, 19;
   and
   - University Writing Program 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, 104E, 104F, or 104G, which must be taken after 84 units have been completed.

**Transfer Courses in English Composition.** Transfer courses considered by the Dean to be equivalent or comparable to English 3, Comparative Literature 1, 2, 3, 4, Native American Studies 5, or University Writing Program 1, 18, 19, 101, 104A, 104B, 104C, 104D, 104E, 104F; will be accepted toward satisfaction of the English Composition requirement. Note that University Writing Program 101 and 104A, 104B, 104C, 104D, 104E and 104F or the equivalent must be taken after you have completed 84 units of transferable degree credit.

If your transfer work does not include an acceptable English composition course taken after you had completed or accumulated 84 units, you may fulfill the requirement by examination (see below) or take University Writing Program 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, 104E, or 104F at UC Davis.

**English Composition Examination.** The no-fee examination is typically offered on a Saturday morning in October, January and April; see the Class Schedule and Registration Guide for specific dates.

Students are strongly advised to complete this requirement in their junior year. Sign-up for the English Composition Examination at http://writingprogram.ucdavis.edu/compexam/ from the Monday before the exam date until Friday at noon or until the sign-up sheets are filled. The English Composition Examination form, available at the UC Davis Bookstore, is required. It is recommended that students with disabilities contact the Student Disability Center at (530) 752-3184 and the Entry Level Writing/Subject A Office (530) 752-0450 at least two weeks prior to the exam date to arrange accommodations. No examinations are given during the summer.

**Area (Breadth) Requirement**
The College Breadth Requirement promotes the intellectual growth of students by asking them to acquire a broader background of knowledge than is provided by the usual major. The Breadth requirement also guides students in exploring the interdependence of knowledge and, in the case of the A.B. degree, provides students the opportunity to become acquainted with performance in the fine arts.

**A.B. Degree.** Satisfaction of the campus General Education requirement plus completion of one of the following options:

a. A “Mini Minor” consisting of a minimum of three approved upper division courses in a single Letters and Science department or program other than the major (and which are not offered in satisfaction of major requirements);

OR

b. A minimum of three approved lower or upper division courses in Art, Music, or Dramatic Art from outside the student’s major;

OR

c. A certified minor from any UC Davis college or program.

The Letters and Science faculty believes that the completion of a certified minor is often the best way for a student to obtain structure and coherence in pursuit of intellectual breadth.

For the purposes of options a and b above, all courses are considered as approved except: courses bearing less than 3 units of credit, internship courses, non-standard courses, directed group study courses and courses used to satisfy the College English Composition Requirement.

**B.S. Degree.** A total of 90 units in natural sciences/mathematics; and satisfaction of the General Education requirement.

Courses numbered 92, 97T, 97TC, 98, 192, 197T, 197TC, 198 and from 200 through 499 cannot be counted toward satisfaction of the natural sciences/mathematics Area requirement. A maximum of 10 units in special study courses (99, 194H, 199) may be used to satisfy the English Composition and Foreign Language requirements. Courses used to satisfy the English Composition and Foreign Language requirements may not be counted toward the Area requirement. Subject to the restrictions just listed, courses acceptable for fulfilling the 90-unit natural sciences/mathematics Area requirement are:

**Natural Sciences and Mathematics**
- Anatomy, Physiology and Cell Biology 100
- Anthropology 1, 5, 15, 15V, 151, 152, 153, 154A, 154B, 155, 156, 157, 158
- Astronomy
- Avian Sciences 13
- Biological Sciences
- Cell Biology and Human Anatomy 101, 101L
- Chemistry
- Engineering 6, 10, 35, 102
- Engineering: Computer Science 10, 30, 40, 50, 60, 120,
  122A, 122B, 140A, 140B, 142, 150, 152A, 152B, 153, 154A,
  154B, 158, 160, 163, 165A, 165B, 170, 175, 177, 178
- Engineering: Electrical and Computer 70, 170
- Entomology 10, 100, 153
- Environmental and Resource Sciences 131
- Environmental Science and Policy 30, 100, 121, 126
- Environmental Toxicology 101
- Evolution, Ecology, and Biodiversity
- Fiber and Polymer Science 110
- Food Science and Technology 100A, 100B, 101A, 101B
- Geology
- Integrated Studies 8A
- Mathematics
- Microbiology
Foreign Language Requirement; A.B. and B.A.S. Degrees

The College of Letters and Science encourages its students to acquire functional proficiency in at least one language other than English before graduating. Generally speaking, the language programs at UC Davis promote proficiency in each of the “four skills”: listening, speaking, reading, and writing. Language learning is a key component of a liberal education. It enables students to communicate effectively in an increasingly internationalized world, enhances their ability to understand ways of thinking different from their own, gives them direct access to cultural production from another time and place, awakens in them an awareness of the conditioned nature of their assumptions about the world, and trains them to cope more effectively with intellectual and practical problems they may face in their future careers. At a minimum, the College requires A.B. candidates to complete three sequenced quarters (15 units) of courses in one foreign language or its equivalent. B.S. candidates, only as required in the major program.

The Foreign Language requirement may be satisfied in any language offered at UC Davis (including ancient languages), or for which transfer credit is allowed from another academic institution (including American Sign Language).

You may also satisfy this requirement by examination in a language not offered on the UC Davis campus. In this case, the Dean’s Office will assist you in making arrangements to take an examination on another University of California campus, with a faculty member who teaches the language in question.

Satisfaction of the Requirement. If you plan to apply for a study abroad program with a language prerequisite, you should plan on completing the Foreign Language requirement by the end of your second or third year, depending on the program. The requirement may also be completed through course work in certain study abroad programs that do not have a language prerequisite. The Foreign Language requirement may be satisfied by examination or completion of language courses as follows:

1. Foreign Language Placement Test. This test does not yield unit credit—it only determines whether the Foreign Language requirement has been met, or at which point in the language sequence you should enroll. Students must follow the language program’s placement policy if they decide to study the language at UC Davis.

You may validate your knowledge of a language acquired by any means before matriculating at UC Davis by taking this test (or another form of evaluation, if available in the relevant language department). A test may not be taken, however, in a language for which you have already received degree credit. If you are a transfer student, consult your Graduation Requirement Degree Check, which is issued by the Dean’s Office within a quarter after enrollment. If you want to continue to study the language at UC Davis, you must consult the relevant language coordinator.

2. College Board Subject Test. Earning a qualifying score of at least 550 on a College Board Foreign Language Subject Test satisfies the requirement. This test may be taken at any time during your high school career. Once your score is on file at Undergraduate Admissions, notify the Letters and Science Dean’s Office so that satisfaction of the College requirement can be noted on your record.

3. College Board Advanced Placement Examination. A score of 5, 4, or 3 on any foreign language College Board Advanced Placement Examination, with the exception of Latin, taken in high school will satisfy the Foreign Language requirement.

4. International Baccalaureate Higher Level Examination. A score of 7, 6, or 5 on the French A1, A2 or B Examination, or the Latin A1 Examination taken in high school will satisfy the Foreign Language requirement.

5. Intersegmental General Education Transfer Curriculum (IGETC). IGETC is a series of courses prospective transfer students attending California community colleges may complete to satisfy the lower division breadth/general education requirements at the University of California. Students may satisfy the Foreign Language requirement by attaining certification of IGETC completion.

6. Course Completion in College; or the equivalent. A.B. and B.A.S. degrees—equivalent of 15-unit level of proficiency in one language at UC Davis (e.g., Spanish 3 or Japanese 3). B.S. degree—none, but as is required in the major program.

If you have successfully completed the second or third year of a language in the tenth or higher grade in high school you may receive unit credit for course 1 of that language when taken at UC Davis, but the grading mode will be P/NP only. Although a Passed or Not Passed grade will be charged to your P/NP option, no petition is required; see Passed/Not Passed (P/NP) Grading in the Academic Information chapter.

7. Proficiency Examination. If you have not completed the required level language course, but assume you have attained equivalent knowledge, you may satisfy the language requirement by passing a proficiency examination. For more information, consult the appropriate foreign language department.

Major Degree Certification

Requirements for major programs are described in the Undergraduate Courses chapter of this catalog. These requirements are fulfilled by completing a major program offered by a teaching department or program committee in the College of Letters and Science (see the list of majors) or an individual major program approved by the College’s Committee on Individual Majors.

No more than six units in internship courses (numbered 92, 192, or similar internship courses) may be accepted in satisfaction of the requirements of major programs. Courses numbered 97T, 97TC, 197T and 197TC do not satisfy unit or course requirements in the major.
Before the beginning of your senior year, take some time to consider your goals and to plan the academic program for your final year as an undergraduate. To plan properly and to ensure that you get the most out of your remaining education and complete all graduation requirements as well, you should know what requirements remain unsatisfied. To help you in these efforts, the Undergraduate Education and Advising Office provides on its Web site informational materials and instructions on how to evaluate your progress on college and university requirements; see http://www.ls.ucdavis.edu/students. Many departments provide similar information regarding your major requirements.

Once you have completed 135 units of degree credit, you should contact your faculty adviser for a check of your major requirements. At approximately this point, you also should request an official degree check summarizing your progress in fulfilling college and university requirements from the Undergraduate Education and Advising Office; see http://www.ls.ucdavis.edu/students for additional information.

**Degree Requirement Changes**

On occasion, the faculty makes changes in the requirements that students must satisfy to obtain the baccalaureate degree. So that you will not be penalized by changes that may work to your disadvantage and so that you will benefit by changes that assist you in completing your degree requirements, it is College policy that you may choose to fulfill the university and College requirements (see General Education requirement for an exception) as stated in any UC Davis General Catalog in effect at any time you were registered in a postsecondary institution of higher education; e.g., community college, college or university.

Once you have chosen the year of the General Catalog under which you wish to be governed, you must satisfy all of the university and college requirements specified in that catalog. With respect to the completion of your major requirements, most of the majors in the College of Letters and Science require completion of the major degree requirements in effect at the time you officially declared your major. However, because departments differ in how they handle these matters, check with the department or major program office if you have any questions about which requirements apply to you.
1925 Graduate instruction and research begin at Davis when 12 graduate students associated with various Berkeley departments enroll to work in the College of Agriculture here. Until after the war, all graduate records are kept by the dean of the Graduate Division at Berkeley.

1951 Graduate groups become a great strength of the university. In these associations, scholars and researchers, sharing similar scientific disciplines but stationed in different departments or at different campuses, work together to develop cross-linked graduate programs. This format, developed at Davis, has influenced several other universities.
GRADUATE STUDIES
250 Myrak Hall
(530) 752-0650; http://www.gradstudies.ucdavis.edu
UC Davis offers advanced degrees in nearly 90 graduate programs. Students’ graduate study is guided by either departments or graduate groups. Graduate groups are composed of individual faculty members from multiple departments with similar academic interests. The group structure, used extensively at UC Davis, permits faculty to be affiliated with graduate programs in more than one discipline and offers students an interdisciplinary graduate experience that crosses the administrative boundaries of the various departments, colleges, schools, and sometimes campuses. In keeping with UC Davis’ progressive spirit, the group structure also allows for evolution of established degree programs and facilitates the development of new ones. More than half of the graduate programs at UC Davis are organized as graduate groups. You will find a complete list of graduate degrees under Degrees Offered By UC Davis, on page 10.

Graduate study is administered by the Graduate Council, a standing committee of the Davis Division of the Academic Senate and by the dean of Graduate Studies. A universitywide Coordinating Committee on Graduate Affairs determines general policies and establishes common procedures.

PREPARING FOR AN ADVANCED DEGREE
Admission to a graduate program at the University of California requires a bachelor’s degree that is comparable in quality to a degree from the University of California both in distribution of academic subject matter and in scholarly achievement.

The primary requirement for admission to any program is evidence of intellectual achievement and promise. Your application will be evaluated first on the basis of your transcript to assure that your qualifications meet minimum standards as set by universitywide and UC Davis Graduate Councils. Generally, you must have a minimum B average in undergraduate course work from an institution of acceptable standing to be considered for admission. UC Davis also requires a Personal Statement and a Personal History Statement from each applicant. International applicants must demonstrate the ability to understand and use English by submitting TOEFL or IELTS scores. Graduate programs frequently require submission of additional materials such as Graduate Record Examination (GRE) scores, letters of recommendation, and portfolios or examples of written work to assist in selecting from among qualified applicants. Admission to graduate study is limited by the number of spaces available in major programs. Not all eligible applicants can be admitted.

UC Davis is committed to maintaining excellence, preserving fairness and promoting diversity in its student population. In addition to an applicant’s past scholastic achievement, admissions criteria include an applicant’s potential for service in the field, keeping in mind the needs of our society and of underrepresented and disadvantaged communities. Criteria also attempt to take into account any prior disadvantages applicants have overcome that may bear on future achievements and services.

APPLYING FOR ADMISSION
To apply for admission, see https://apply.embark.com/grad/UCDavis/30.

May 31*. Deadline to file applications for admission to graduate standing, with complete credentials, with the program or department, or as required by program. *Many programs have earlier deadlines. Please check the Web site of the program to which you are applying for that program’s deadline.

To apply for fellowship, see https://apply.embark.com/grad/UCDavis/30.

January 15. Deadline for all students applying for fellowships. The application for admission must be received at the same time as the fellowship application. If the program to which you are applying has an earlier application deadline, the earlier deadline applies.

March 1. Deadline for international students to file applications for admission to graduate standing, with complete credentials, with the program or department, or as required by program.

April 1. Deadline for United States residents to file applications for admission to graduate standing, with complete credentials, with the program or department, or as required by program.

About Admissions
Applications are accepted for fall quarter only. You may apply for admission to graduate study at https://apply.embark.com/grad/UCDavis/30. Transcripts of all your undergraduate and previous graduate study, along with other supporting documents (if required), must be sent via mail to your graduate major program office.

You should begin the application process as early as possible in the academic year since many programs have early deadlines. In addition, your chances for appointment as a teaching assistant or graduate student researcher, or of receiving financial support, are greatly enhanced by applying early. The application deadlines are as noted above, unless otherwise indicated by the program, or until your proposed graduate program is full, whichever occurs first. Many programs have earlier deadlines.

The Graduate Admissions Advisory Committee for the program will submit its recommendation and evaluation to Graduate Studies; final admission decisions rest with the dean of Graduate Studies. This approval procedure applies to all applicants, including those seeking a transfer to UC Davis from another UC campus.

Applications for the degrees of Juris Doctor, Doctor of Medicine, Doctor of Veterinary Medicine, Master of Business Administration and Master of Preventive Veterinary Medicine must be filed directly with the appropriate professional school.
Readmission

May 31. Deadline to file applications for readmission to graduate status with Graduate Studies.

If you were formerly registered at UC Davis as a graduate student and wish to return to pursue the same degree objective in the same major, you must apply for readmission and pay the readmission application fee of $60. The readmission application must be filed with Graduate Studies by May 31 (or earlier if the program specifies an earlier date). Readmission to quarters other than fall is granted on an exception basis by special petition to the dean of Graduate Studies. If you are seeking to return to a new degree program and/or new major, you must apply for admission along with other new applicants. Apply at https://apply.embark.com/grad/UCDavis/30. Transcripts of all work undertaken since you were last registered in graduate status at UC Davis must be presented with the application. There is no assurance of reentry, as applicants for readmission will be considered in competition with other applicants for the program.

International Students

Assessment of a foreign degree is based on the characteristics of the national system of education, the type of institution attended and the level of study completed.

If you are an international student with credentials from universities outside the U.S., you should begin the application process as early as a year in advance. Official copies or certified copies of all transcripts in English and in the original language are required before your application can be processed. Do not attempt to convert your grade point average or ranking to a U.S. equivalent. Graduate Studies will determine your eligibility using U.S. guidelines for credential evaluation. Completed online applications from international students along with the nonrefundable $80 application fee must be received by the program to which you are applying by May 31, unless your proposed program has an earlier deadline.

International students must apply at https://apply.embark.com/grad/UCDavis/30.

English Requirement. Applicants whose native language or language of instruction is not English must take the TOEFL or IELTS. The minimum score required for admission to UC Davis is 550 on the paper test, 213 on the computer-based test, and a minimum total score of 68 based on the reading, listening and writing categories on the Internet-based test for TOEFL, or at least 7 on a 9-point scale for IELTS. TOEFL scores are valid for two years only. Some programs require higher scores; for more information, see http://www.gradstudies.ucdavis.edu/programs/. There is no conditional admission. TOEFL scores must be reported electronically by ETS. The score report is required before application processing begins. You may send a photocopy of your paper report; however, official scores are required before registration if you are admitted.

TOEFL Scores. The Test of English as a Foreign Language (TOEFL) is given by Educational Testing Service (ETS). TOEFL Services, PO Box 6131, Princeton NJ 08541-6131, (609) 771-7100. Request information from toefl@ets.org or see http://www.ets.org/toefl.

IELTS Scores. The Academic Modules of the International English Language Testing System (IELTS) are designed by the University of Cambridge Local Examinations Syndicate and administered by the British Council worldwide. You are responsible for providing us with an official Test Report Form (TRF) of your IELTS. Remember to order the TRF when you register to take the test. To register for the IELTS, see the IELTS Web site at http://www.ielts.org or contact the IELTS Subject Officer, University of Cambridge, Local Examinations Syndicate, 1 Hills Road, Cambridge, CB1 2EU, United Kingdom.

Visas. If you need a certificate of eligibility for a student visa issued by UC Davis, you will be required to complete a certification of finances form showing the availability of sufficient funding for your graduate program. For complete details, see Services for International Students and Scholars (SISS), on page 66, in the Academic Advising chapter.

PROGRAM OF STUDY

New students are assigned an adviser within the appropriate department or graduate group who assists them in planning a program of study. The program will depend to some degree on the student’s undergraduate training and may include undergraduate courses to remove deficiencies. Each student must satisfy the degree requirements as stated by the program and found at http://www.gradstudies.ucdavis.edu/programs/.

Additional requirements for study may be established by the department or group and approved by the Graduate Council. These requirements often include a core of required courses, but considerable flexibility is permitted to suit individual needs. Undergraduates at UC Davis who plan to pursue graduate study should consult with their major adviser early in their senior year to guarantee adequate preparation.

A graduate degree is awarded to recognize a student’s command of a wide range of knowledge in an academic field. It is not awarded merely for fulfillment of technical requirements, such as residence or the completion of specific courses.

Master’s Degree

Students working toward a master’s degree must be registered in residence for at least three quarters. Two regular six-week Summer Sessions may count as the equivalent of one quarter. Usually, all work for the master’s degree is done in residence on the UC Davis campus. With the consent of the graduate adviser and the dean of Graduate Studies, however, some work taken elsewhere may be credited toward your degree. The normal limit for such transfer credit is 6 units from another institution, or 12 concurrent units, or up to one half of the unit requirement if the courses were taken at another UC campus—providing the units were not used to satisfy requirements for another degree.

A master’s degree may be awarded upon completion of one of two basic plans in which either a thesis or a comprehensive examination is required.

Ph.D. Degree

The Doctor of Philosophy degree, as granted at the University of California, means that the recipient possesses knowledge of a broad field of learning and has given evidence of distinguished attainment in that field; it is a warrant of critical ability and powers of imagination and synthesis. It means, too, that the candidate has presented a dissertation containing an original contribution to the knowledge of the chosen field of study.

Students working toward a doctorate must be registered and in university residence for a minimum of six regular quarters. Experi-
ence indicates that it takes considerably longer than this to complete a degree program. Two consecutive regular Summer Sessions may count as the equivalent of one regular quarter.

There is no university unit requirement for the doctoral degree. However, individual programs have course requirements that must be completed before admission to the qualifying examination.

The Qualifying Examination is administered by a committee appointed by the dean of Graduate Studies. The examination is intended to demonstrate critical thinking ability, powers of imagination and synthesis and broad knowledge of the field of study. Upon recommendation of the Qualifying Examination Committee, and with the approval of the Graduate Council, the examination may be repeated one time.

After successful completion of the Qualifying Examination, the student must file for Advancement to Candidacy for the degree. At this time, a committee is appointed to direct the research problem and guide in the preparation of the dissertation.

Graduate students in certain Ph.D. programs may participate in a Designated Emphasis, a specialization that might include a new method of inquiry or an important field of application which is related to two or more existing Ph.D. programs. The Designated Emphasis is awarded in conjunction with the Ph.D. degree and is signified by a transcript designation; for example, "Ph.D. in History with a Designated Emphasis in Critical Theory." Programs approved as Designated Emphases include African American and African Studies, Biology of Vector Borne Diseases, Biophotonics, Biotechnology, Classics and the Classical Tradition, Computational Science, Critical Theory, Economy, Justice and Society, Feminist Theory and Research, International and Community Nutrition, Native American Studies, Performance and Practice, Reproductive Biology, Second Language Acquisition, and Social Theory and Comparative History.

**INTERCAMPUS EXCHANGE PROGRAM**

A graduate student registered on any campus of the university may become an intercampus exchange student with the approval of the graduate adviser, the chairperson of the department or group on the host campus and the dean of Graduate Studies on both the home and the host campuses.

An intercampus exchange student has library, health service and other student privileges on the host campus, but is considered a graduate student in residence on the home campus. The grades obtained in courses on the host campus are transferred to the home campus and entered on the student's official graduate transcript.

Application forms may be obtained in Graduate Studies and must be submitted five weeks before the beginning of the quarter in which you wish to participate in the program. Petitions received after the first day of the quarter will not be processed.

**FELLOWSHIPS, ASSISTANTSHIPS AND LOANS**


Financial support for graduate study at UC Davis is available in several forms: teaching and research assistantships, financial aid and fellowships/scholarships.

Financial aid is awarded on the basis of demonstrated financial need and is administered by the Financial Aid Office. Federal financial aid includes student loans, grants and work-study funding. You may apply for financial aid before you have been admitted. To be considered for financial aid, or for any awards based on financial need, you must file a “Free Application for Federal Student Aid” (FAFSA), at [http://www.fafsa.ed.gov](http://www.fafsa.ed.gov), no later than March 2, prior to the fall quarter enrollment. This form, submitted directly to the Federal Student Aid Program Office, Iowa City, IA, is used to determine financial need only. Contact the Graduate Financial Aid Office for information regarding loans, grants and work-study at [http://financialaid.ucdavis.edu/graduate/](http://financialaid.ucdavis.edu/graduate/).

Fellowships and graduate scholarships are awarded primarily on the basis of scholarship and promise of outstanding academic and professional achievement. Fellowship awards can include a stipend, fees and/or nonresident tuition. Considered in evaluations are the Graduate Record Examination (GRE) scores, undergraduate and graduate grade point averages, academic transcripts, statement of purpose, letters of recommendation and other documentation such as publications or awards. The minimum cumulative undergraduate or graduate grade point average required for a stipend, nonresident tuition fellowships or in-state...
fee award is 3,000 (A=4,000). U.S. citizens and permanent residents are only eligible for nonresident tuition fellowships for their first three quarters at UC Davis. New international students may be awarded nonresident tuition fellowships, in addition to some stipend fellowships, in their first three quarters.

Applications for fellowships and graduate scholarships are due by January 15 for awards beginning fall quarter. If the program to which you are applying has an earlier application deadline, the earlier deadline applies. Information for both new and continuing students and application materials for fellowships and graduate scholarships are available at [http://www.gradstudies.ucdavis.edu/support/](http://www.gradstudies.ucdavis.edu/support/). Apply for fellowships at [https://apply.embark.com/grad/UCDavis/30](https://apply.embark.com/grad/UCDavis/30).

**GRADUATE CERTIFICATE PROGRAM FOR ENGINEERS**

For engineers who already have a degree, the College of Engineering offers Graduate Certificate Programs in various fields of Engineering. The certificate programs consist of course work in selected engineering subjects and require fewer units than the degree programs. The purpose of the Graduate Certificate Program is to provide practicing engineers with an opportunity to develop additional expertise in specific areas and to explore new fields of technical interest.

General requirements for the programs are:

- 15 or 16 units of specified graduate course work, or a combination of specified graduate and undergraduate course work.
- Admission to Graduate Studies.

Further information on the Graduate Certificate Programs may be found within the graduate programs of the College of Engineering; see [http://engineering.ucdavis.edu/pages/future_students/graduates/](http://engineering.ucdavis.edu/pages/future_students/graduates/).

**SEMINAR ON COLLEGE TEACHING**

Teaching Resources Center
17 Wellman Hall
(530) 752-6050; [http://trc.ucdavis.edu/trc/ta/courses.html](http://trc.ucdavis.edu/trc/ta/courses.html)

The Seminar on College Teaching introduces graduate students to the principles and methods of designing and delivering college-level instruction. The seminar deals with a broad range of skills and issues involved in helping college students learn, including classroom presentations, planning discussions, facilitating active learning, evaluating student learning and employing effective class management strategies.

Depending on the seminar format, participants meet either for weekly two-hour sessions or for a three-day retreat on- or off-campus. Participants also select and complete several assignments, such as developing a syllabus, preparing a lesson plan, investigating an ethical issue related to teaching, creating a teaching blog, or writing a teaching philosophy statement. Readings from various sources complete the seminar experience.

Participants who attend every session and fulfill the required brief assignments in a satisfactory and timely manner receive a certificate of completion that is appropriate to note in a curriculum vitae.
2000

The Division of Education becomes the School of Education.

2001

2004 Dawn Imamoto (’95) is one of the school’s most distinguished alumni. In 2004, she was recognized as a California Teacher of the Year, and in 2005, she was named UC Davis Young Alumna of the Year.
SCHOOL OF EDUCATION

The School of Education offers a wide range of academic and professional development programs that prepare teaching and administrative leaders for the world of public education (P-16), as well as researchers and university faculty. Hallmarks of our work include research that is integrated with practice and policy; deep, sustained engagement with schools and communities; and authentic, collaborative partnerships with those who share our goals.

Through our Ph.D., Ed.D. and M.A. programs, we prepare students to take leadership roles in strengthening schools, community colleges, and universities, advancing research and scholarship, and improving education policy and practice. In our credential program (Teaching Credential/M.A.), we prepare students to become teacher leaders and educational advocates for all children.

PROGRAMS OF STUDY

The Minor in Education is considered a foundation for undergraduates who wish to obtain a teaching credential, obtain a master’s degree in education or a related field, pursue a doctoral degree in education, enter a profession that focuses on work with people, or develop a better understanding of issues confronting education today.

The Master of Arts in Education provides a course of study for examining research and theory about learners, teachers, schools, and related social institutions. The program prepares professionals to conduct research about the education of children, youth, and adults in a multicultural society. Graduates may assume leadership positions in school districts, state education agencies, and private organizations concerned with instructional research, policy and practice.

The M.A. Program in Education offers (1) a general track that serves a broad range of student research interests and career plans, (2) a Practicing Teachers track that offers research training and experience focused on classroom-based inquiry and instructional intervention, and (3) an M.A./Credential track that integrates the M.A. with the Teaching Credential and focuses particularly on classroom-based research.

Students in the M.A. General and M.A. for Practicing Teachers programs are offered three areas of emphasis: Instructional Studies, Learning and Mind Sciences, and Socio-cultural Studies.

In conjunction with the M.A. Program’s M.A./Credential track, our program offers an opportunity for qualified students to obtain both a Master of Arts in Education degree and a Multiple Subject or Single Subject Credential (optional BCLAD emphasis) in a combined five-quarter program. We offer Teaching Credential programs in elementary education as well as secondary English, mathematics, social studies, science (biology, chemistry, geoscience, physics), agricultural education, and foreign language (Spanish).

The Integrated Teaching Credential with Master’s Degree Program offers an opportunity for qualified students to complete the requirements for both a Masters of Arts in Education degree and a Multiple Subject OR Single Subject Credential (with optional BCLAD emphasis) in a 15-month, 5 quarter program. The Credential Program prepares students for the teaching profession by immersing them in the total environment of a public school classroom while enrolled in required coursework. The coursework incorporates a theoretical-practical approach to the teaching-learning process, encouraging close interactions among teacher candidates and teacher education faculty. Students complete requirements for the M.A. degree during two part-time quarters following the credential year. This course work introduces the integration of research into teaching practice, making teachers more informed and pro-active practitioners.

Math and Science Teaching

Undergraduates who are interested in exploring teaching mathematics or science in public schools should contact the MAST Program (http://mast.ucdavis.edu) at their first opportunity. The MAST program offers seminars that give participants experience in elementary, middle school, and high school classrooms. MAST advisors can help students to combine the prerequisites for a credential program with General Education requirements. The Natural Sciences major is sound preparation for teaching the science disciplines offered in middle and high schools. A major in Mathematics will provide you with the broad understanding needed to teach in the public schools.

The Capital Area North Doctorate in Educational Leadership (Candel) is a collaborative program of UC Davis and Sonoma State University. The program, leading to a Doctor of Education (Ed.D) degree, is intended primarily for working professionals in P-12 or Community College related leadership positions and can be completed within three years. Graduates of this program will be prepared to lead in educational environments that promote learning, equity and achievement for all students. Armed with real-world, problem-based learning, program graduates will be ready to manage the complexities of educational organizations, effect school change processes and shape the educational policies that bear on the practice of education in the public setting.

The Ph.D. in Education is a multidisciplinary program offered by the Graduate Group in Education, with faculty drawn from education, mathematics, science, social science and humanities units throughout the UC Davis campus. The program provides a challenging course of study for examining research and theory about learners, teachers, schools and related social institutions. Through course work, apprenticeships and mentoring, Ph.D. students are prepared to conduct research and teach about the education of children, youth and adults in a multicultural and multilingual society. Graduates of the program have assumed faculty positions in universities, as well as other leadership positions in universities, school districts, state education agencies and in private organizations that support teaching and learning in schools and communities. The program offers five areas of emphasis: Mathematics Education; Science Education; Learning and Mind Sciences; Language, Literacy and Culture; and School Organization and Educational Policy.

PREPARING FOR THE STUDY OF EDUCATION

Teaching Credential/M.A. Degree Program

Academic preparation for the Teacher Credential Program includes a completed Bachelor’s Degree and a GPA of at least 3.000. For the Multiple Subject credential, many undergraduate majors are appropriate preparation for the program. For single-subject candidates we recommend an undergraduate major in the intended area
of secondary teaching. Use undergraduate internship opportunities to gain classroom experience in the grade levels at which you wish to teach. In addition to these general requirements, learn about current state and UC Davis credential prerequisites at the School of Education Web site or call our Student Services Office.

- Classroom experience in the appropriate grade levels
- U.S. Constitution course
- Specific preparatory course work; see adviser for details
- California Basic Educational Skills Test (CBEST)
- For the elementary credential program, the California Subject Examination for Teachers (CSET)
- For secondary credential programs, approved subject matter course work or the California Subject Examination for Teachers (CSET) for the appropriate subject

Applicants are encouraged to have program requirements and testing requirements completed at the time of application. Credential requirements are revised by the State of California. To obtain the most current information, students considering a career in teaching are encouraged to consult with the School of Education advisers throughout their undergraduate career.

**M.A. in Education Degree Programs.** Applicants to the General Track M.A. and M.A. for Practicing Teachers must have completed an undergraduate degree with a major in a field that supports their intended area of emphasis. A minimum undergraduate GPA of 3.000 is necessary for graduate admission at the University of California, Davis. Please consult with advisers in the School of Education regarding additional testing or supplemental information that may be required for application to a specific program.

**Ed.D. Degree (CANDEL).** Applicants to the CANDEL program must meet general admission requirements for graduate study at the University of California. Requirements include a bachelor’s and master’s degree (or equivalent) from an accredited institution, a GPA of at least 3.000. In addition, applicants will have demonstrated prior experience in administrative or leadership roles in an educational institution or related areas.

**Ph.D. Degree.** Applicants to the Ph.D. program in Education normally will have completed a Master’s Degree (or equivalent) in a field that supports their intended area of emphasis. A minimum GPA of 3.000 in previous graduate course work is required for graduate admission at the University of California, Davis. Applicants must demonstrate a high potential for scholarly achievement and research. Individuals possessing graduate degrees in fields other than education are encouraged to apply. Experience in teaching, research, or related areas of education are desirable.

**APPLYING FOR ADMISSION**

School of Education students are admitted for fall term ONLY. Online applications will be available through the Office of Graduate Studies Web site at [http://gradstudies.ucdavis.edu/](http://gradstudies.ucdavis.edu/).

Application deadlines and requirements vary by program. Please consult with a School of Education adviser regarding your program interests. Applicants with underrepresented and nontraditional backgrounds are encouraged to apply.

**Minor in Education**

No Application Deadline.

For more information, please see our Web site at [http://education.ucdavis.edu](http://education.ucdavis.edu) or contact the School of Education Student Services Office at (530) 752-0757 or eduadvising@ucdavis.edu.

Steps in declaring a minor in education:

- Consult with the education undergraduate advisor in 2060 Academic Surge
- Declare minor by completing a “Declaration of Minor” form available from the Dean's office in the college of your major

**Teaching Credential/M.A. Degree Program**

**Application Deadline.** Please see the School of Education Web site for Program application information and deadlines at [http://education.ucdavis.edu](http://education.ucdavis.edu).

For more information or instructions please see our Web site or contact the School of Education Student Services office at (530) 752-0752 or eduadvising@ucdavis.edu.

Steps in the Admissions Process:

- Complete Office of Graduate Studies online application
- Send nonrefundable application fee payable to UC Davis Regents
- Submit two (2) official transcripts for all college and university work completed
- Submit to the School of Education any supporting documentation: verification of classroom field experience, copies of test scores, etc.

Applicants will be:

- Screened and scheduled for an admissions interview
- Evaluated and reviewed by an admissions committee
- Recommended to Graduate Studies Office for admission or denial
- Notified of admission or non-admission by the Graduate Studies Office
M.A. Degree

Masters of Arts in Education General Track and Masters of Arts in Education for Practicing Teachers

Application Deadline. Please see the School of Education Web site for Program application information and deadlines at http://education.ucdavis.edu.

For more information or instructions please see our Web site or contact the School of Education Student Services office at (530) 752-0752 or eduadvising@ucdavis.edu.

Steps in the Application Process:

• Complete Office of Graduate Studies online application, which includes three (3) uploaded letters of recommendation
• Send nonrefundable application fee payable to UC Davis Regents
• Submit an official transcripts for all college and university work completed
• Submit to UC Davis official scores (taken within the last 5 years) for the Graduate Record Exam (GRE) General Test
• Submit, to the School of Education, any supporting documentation required by program

Capital Area North Doctorate in Educational Leadership (CANDEL)


For more information, see the program Web site at http://education.ucdavis.edu/programs/candel.html or contact the School of Education at (530) 754-6664 or eduadvising@ucdavis.edu.

Steps in the application process:

• Complete the online application for the Capital Area North Doctorate in Educational Leadership
• Submit application fee of $60 (nonrefundable) made payable to UC Regents
• Submit two (2) official transcripts in sealed envelopes as received from the registrar(s) of each college or university attended
• Submit Official Score(s) for the Graduate Record Examination (GRE) General Test or the Miller Analogies Test (MAT)
• Submit three (3) letters of recommendation written by three employers, professors or others in a position to assess the applicant’s potential for graduate work (must be uploaded online)
• Include a statement of support from employer; a separate document from the applicant's current employer verifying a commitment to provide periodic leave for intensive program activities

Finalists will be interviewed by the CANDEL Admissions Committee.

Ph.D. Degree


For more information or an application package, see the program Web site at http://education.ucdavis.edu/programs/PhDoverview.html or contact the School of Education Student Services Office at (530) 752-3887 or phdeduadvising@ucdavis.edu.

Steps in the application process:

• Complete UC Davis Office of Graduate Studies Application
• Application fee
• Official score(s) for the Graduate Record Examination (GRE) General Test
• Three (3) letters of recommendation
• One (1) official transcript from all institutions attended
• Writing sample (typically a seminar paper, thesis, or published article)
1966 The School of Law begins operating in temporary buildings with an initial entering class of 78 and a faculty of four.

1968 The School of Law’s permanent building is completed and named after Martin Luther King Jr.
SCHOOL OF LAW

School of Law, Admission Office
(530) 752-6477, admissions@law.ucdavis.edu, http://www.law.ucdavis.edu

The University of California Davis School of Law offers a three-year professional curriculum leading to the degree of Juris Doctor. Within a uniquely supportive atmosphere, law students are provided a comprehensive modern law school curriculum taught by a nationally and internationally distinguished faculty. The School offers a full range of traditional law courses, opportunities for practical experience through clinical programs and for in-depth study of an area of law in an individualized program of classroom work, research, writing, or experience in the community. It further provides professional skills training in interviewing and counseling, negotiation and dispute resolution and trial practice. The School seeks to promote critical evaluation of law and legal institutions in a broad perspective, integrating non-legal disciplines with professional legal education.

UC Davis Law School is fully accredited by the American Bar Association, is a member of the Association of American Law Schools and has a chapter of the Order of the Coif.

PREPARING FOR THE STUDY OF LAW

No specific college major is required for admission to the School of Law and there is no prescribed pre-legal program. Your college record and Law School Admission Test (LSAT) score must, of course, demonstrate that you are highly qualified for the study of law.

As a pre-law student, you should plan a course of study that will give you a broad cultural background and include intensive work for a substantial period of time in a selected field of study. Pre-law students should develop the ability to think critically. They should gain an understanding of people and institutions and know how to gather and weigh facts, to solve problems and think creatively. They should be able to read rapidly with comprehension and express themselves clearly, completely and concisely, both orally and in writing.

You can get help with program planning from the Pre-Law Advising Office in 160 South Silo, (530) 752-6477.

For additional information, see the Official Guide to ABA-Approved Law Schools, a publication of the Law School Admission Council and the American Bar Association. This book includes information on the law and lawyers, pre-law preparation, applying to law school and the study of law, together with individualized information on all ABA approved law schools. It can be found at college and major bookstores or ordered at http://www.LSAC.org.

APPLYING FOR ADMISSION

Deadline for filing electronic applications for admission to the School of Law:

February 1

1. Request the law school catalog to learn more about the School and the admission process. The electronic application can be accessed at the School’s Web site, http://www.law.ucdavis.edu or at the Law School Admission Council (LSAC) Web site at http://www.LSAC.org. After completing and submitting the electronic application form, print the certification form and mail it along with the $75 nonrefundable application fee or the UC Davis application fee waiver form to the Office of Admission, School of Law, University of California, 400 Mrak Hall Drive, Davis, CA 95616-5201. The application fee should be submitted in the form of a check or money order made payable to The Regents of the University of California.

The last date for filing completed application forms, together with all supporting documents, including Law School Admission Test (LSAT) scores, Law School Data Assembly Service (LSDAS) reports and letters of recommendation, is February 1 of the year in which admission is sought. Early filing of all application materials is strongly recommended.

2. You must take the Law School Admission Test and register with the Law School Data Assembly Service so that the score will be reported to the school. You are urged to take the test as early as possible and no later than December preceding the year in which admission is sought; the February test date is too late for Fall admission.

Testing centers are located in all parts of the United States and in many foreign countries. Tests are given four times a year: February, June, September or October and December.

To obtain information about the test, specific test dates and the location of testing centers, you can contact the Law School Admission Council (LSAC) at lsacinfo@lsac.org. Both the LSDAS and LSAT registration process are electronic. See the LSAC Web site to find information about the test, test dates, test centers and to familiarize yourself with the online services. The LSAT and LSDAS Information book is also available on campus in the Law School Admission Office and at the Pre-Law Advising Office.

3. Register with the Law School Data Assembly Service (LSDAS) no later than December 1 at the LSAC Web site. Arrange to have a transcript from each college or university you have attended sent directly to LSAC. Complete instructions for the online services are available at the LSAC Web site.
4. Submit an official transcript of college work completed during the first semester or quarter of your senior year directly to the School of Law as soon as it is available. Failure to do so may delay consideration of your application materials. Successful applicants must submit directly to the School of Law a final transcript showing the award of a bachelor's degree.

5. Provide two letters of recommendation from objective and responsible persons to whom you are well known. At least one of these letters should come from a faculty member under whom you studied while in college. UC Davis Law School requires all applicants to submit recommendations to the LSDAS Letter of Recommendation Service for inclusion with your LSDAS report. Your application cannot be considered until two letters have been received.

Your application will be reviewed by the School of Law Admissions Committee, which seeks students of demonstrated academic ability, as evidenced by a variety of factors including information provided in the required two-page personal statement and letters of recommendation, in combination with the LSAT scores and the undergraduate grade point average (GPA). The committee seeks students of diverse backgrounds and considers economic factors, obstacles overcome, advanced degrees or other advanced studies, significant work experience and extracurricular and community activities during and after the college years. An applicant's growth, maturity and commitment to the study of law are also major considerations. Students are admitted only on a full-time basis and only in August.

6. When accepted by the School of Law, you are simultaneously admitted to Graduate Studies on the UC Davis campus of the university for the program leading to the degree of Juris Doctor. If you intend to pursue studies leading to other graduate degrees, or wish to become a candidate for a Combined Degree Program, you must make separate application to Graduate Studies or the Graduate School of Management before commencing such studies.

Admission to Advanced Standing

If you have completed at least one year of full-time law course work in another approved law school, you may be considered for admission to advanced standing with credit for not more than one year of such work. The application filing period is June 1–30. No application for advanced standing will be considered until the Office of Admissions has received transcripts for all prior law school work.

Application procedures for advanced standing are the same as described above with the addition of (1) a letter of good standing including class rank from the dean of any law school previously attended; (2) at least one letter of recommendation from a law professor; (3) transcripts of all law school work; (4) LSAT score provided as part of an updated LSDAS report from LSAC; and (5) an official transcript from the school where you earned your undergraduate degree, stating the date the degree was conferred. The deadline for transfer applications is June 30 of the year for which transfer is sought. Committee decisions on advanced standing are normally made in July or early August of the year in which admission is sought.

Students who have been disqualified at another law school will not be admitted to UC Davis Law School.

Recruitment of Underrepresented Groups

The students and faculty of the School of Law recognize the great need for lawyers from under-represented groups. The School, therefore, actively solicits applications from those groups that reflect the many diverse populations of California but, traditionally, have been underrepresented in the law school population.

The School of Law, in cooperation with the Association of American Law Schools (AALS) and the Council on Legal Education Opportunity (CLEO), participates in programs designed to increase the number of law students from underrepresented groups. CLEO applications may be obtained by writing to Council on Legal Education Opportunity, 740 15th Street, N.W., 9th floor, Washington, D.C. 20005; (202) 216-4343 or toll free (866) 886-4343; http://www.cleoscholars.com.

Program of Study

The professional curriculum requires six semesters for completion and extends over a period of three years. It is for full-time students only; no part-time or evening program is offered. New students are admitted only at the beginning of the fall semester.

After satisfactorily completing the professional curriculum of 88 semester units and the required period of resident study, you will receive the degree of Juris Doctor (J.D.). Students who fail to attain satisfactory grades may be required to withdraw from the School at the end of any academic year.

The first year's work is prescribed and provides the essential foundation for subsequent legal study. Satisfactory completion of the first-year courses is, in all cases, prerequisite to second- and third-year courses. The work of the second and third years is elective.

The courses of the professional curriculum are listed in the Undergraduate Courses chapter. Courses taken in summer sessions at other accredited law schools may, with prior permission, be credited toward the units required for the professional degree.

Combined Degree Programs

Students may find a combined degree involving law and another discipline such as economics, business, sociology, or science advantageous. To encourage this kind of study, the School, in conjunction with other schools and university departments, has established Combined Degree Programs. Under these programs, a student may work toward a J.D. degree and a master's degree in another discipline at the same time. In some instances it may be possible to work on a Ph.D. degree as well. Students working toward a combined degree are required to spend their first year at the law school.

Normally, a Combined Degree Program will take at least four years. You will usually be able to earn up to 10 semester-hours of law school credit for work in the related discipline and normally can complete the combined degrees in less time than it would take to earn the two degrees separately. The first year of the Combined Degree Program must be taken entirely in the School of Law. During the remaining years, course work may be divided between the law school and the related discipline. You must satisfy the admission requirements for both programs and file applications with both units.

Students have pursued degree programs in combination with UC Davis departments for the M.A. degree in economics, philosophy, computer science and sociology, and with the School of Management for the M.B.A. degree. The law school will attempt to
work out an additional program if you are interested in other disciplines. You may enroll in the Combined Degree Program any time before the beginning of your third year in law school. If you are interested in pursuing a Combined Degree Program, and have made a separate application to another school or department, you should notify the School of Law if that application is accepted.

The LL.M. Program

(530) 757-8569; Fax (530) 757-8596; llm@unexmail.ucdavis.edu
http://www.law.ucdavis.edu/internprogram/graduate.shtml

The Law School LL.M. (Master of Laws) program integrates American and foreign law students at all levels of study. For foreign law graduates, the program provides an opportunity to gain a basic knowledge of the United States legal system. United States law school graduates and selected foreign LL.M. candidates may also seek admission on a thesis rather than a course basis. Other opportunities available to all graduate law students include developing special expertise in a particular area and doing special projects and original research under the direction of a faculty member.

Each LL.M. candidate must successfully complete a minimum of 20 semester units of work, usually 10 units each semester. Foreign LL.M. students must enroll in the 1-unit course Introduction to Legal Research and the 2-unit course Introduction to the Law of the United States. They earn the remainder of their required course credit in regular elective J.D. courses. Each foreign student must also complete an intellectually rigorous legal research and writing project, constituting at least 2 units of credit.

All LL.M. candidates begin their year of study with a complete orientation in the academic and social life of the law school, the UC Davis campus and the city of Davis. LL.M. students are encouraged to enroll in the School of Law’s Orientation in U.S.A. Law Program, given in the month before the LL.M. Program begins.

SCHOOL OF LAW ACADEMIC CALENDAR 2008-2009

The School of Law operates on a semester system rather than the quarter system used on the remainder of the UC Davis campus.

<table>
<thead>
<tr>
<th>Event</th>
<th>Fall 2008</th>
<th>Spring 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction Week</td>
<td>Mon.–Fri.,</td>
<td></td>
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<tr>
<td></td>
<td>Aug 14-18</td>
<td></td>
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<tr>
<td>Law School instruction begins</td>
<td>Mon., Aug 21</td>
<td>Mon. Jan 8</td>
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<tr>
<td>Labor Day holiday</td>
<td>Mon., Sep 4</td>
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<tr>
<td>Veteran's Day holiday</td>
<td>Thurs., Nov 10</td>
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<tr>
<td>Thanksgiving holiday</td>
<td>Thurs.–Fri.,</td>
<td>Nov 23-24</td>
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<tr>
<td></td>
<td>Nov 28–Dec 2</td>
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<tr>
<td>Martin Luther King, Jr. holiday</td>
<td>Mon., Jan 15</td>
<td></td>
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<tr>
<td>President’s Day holiday</td>
<td>Mon., Feb 19</td>
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<tr>
<td>Spring recess</td>
<td>Mon.–Fri.,</td>
<td>Mar 19–23</td>
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<tr>
<td></td>
<td>Mar 19-23</td>
<td></td>
</tr>
<tr>
<td>Law School instruction ends</td>
<td>Fri., Dec 1</td>
<td>Fri., Apr 27</td>
</tr>
<tr>
<td>Reading period</td>
<td>Sat.–Tues.,</td>
<td>Sat.–Wed.,</td>
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<tr>
<td></td>
<td>Dec 2–6</td>
<td>Apr 28–May 2</td>
</tr>
<tr>
<td>Law School examination period</td>
<td>Wed.–Thurs.,</td>
<td>Thurs.–Fri.,</td>
</tr>
<tr>
<td></td>
<td>Dec 7–22</td>
<td>May 3–18</td>
</tr>
<tr>
<td>Law School Commencement</td>
<td>Sat. May 19</td>
<td></td>
</tr>
</tbody>
</table>

Thursday, February 22 is treated as a Monday for class schedule purposes.
2007 The Graduate School of Management breaks ground on its new, 40,000-square-foot building, to be named Maurice J. Gallagher Jr. Hall in honor of the airline executive who has given $10 million to support the project and establish an endowment for the school. The doors will open in fall 2009.

1996 Every year since 1996, U.S. News & World Report has ranked Graduate School of Management as one of the nation’s top MBA programs.
GRADUATE SCHOOL OF MANAGEMENT

Graduate School of Management
106 AOB IV
(330) 752-7658; http://www.gsm.ucdavis.edu

The Graduate School of Management offers a full-time, two-year program leading to the Master of Business Administration degree. The program provides both entry-level and mid-career students with understanding of management approaches to problem solving and an awareness of the environment within which public and private management decisions are made. Successful completion requires not only a sophisticated understanding of a variety of functional skills in finance, marketing, production, program evaluation and accounting, but also an understanding of computers, information systems and the application of scientific methods to the identification and solution of management problems.

Preparing for the Study of Management

A bachelor's degree and a strong interest in professional management are prerequisites for admission to the Graduate School of Management. The school seeks students from diverse professional and academic backgrounds and does not limit its consideration to applicants from any particular category of majors. Entry-level and mid-career applicants are considered and women and minorities are encouraged to apply.

Although the program has no specific subject prerequisites, it is strongly recommended that students complete the following course work before enrolling:

- Accounting—an introductory course in financial accounting
- Economics—an introductory course in microeconomics
- Mathematics—an introductory course in calculus
- Statistics—a course in elementary statistics

Applying for Admission

Application Deadlines

November 1
January 1
March 1
May 1

Admission is for the fall quarter only. Application materials can be obtained in the following ways:

- Print the application materials http://www.gsm.ucdavis.edu or contact the Graduate School of Management at admissions@gsm.ucdavis.edu.
- Call (330) 752-7658.

Complete and return your application, with all supporting documents, by the deadlines given above. The application fee is $100.00.

In addition to your application, you need to submit:

- Transcripts from all colleges or universities previously attended
- Graduate Management Admission Test (GMAT) taken within the last five years of the admission date. For further information and registration forms contact: Graduate Management Admission Council; (952) 681-3680; http://www.mba.com
- Two letters of recommendation
- Three essays on specific topics

For more information, call (330) 752-7658, or contact admissions@gsm.ucdavis.edu.

International Students

International applicants for whom English is a second language must take the Test of English as a Foreign Language (TOEFL) within the last two years and receive a minimum score of 600/paper-based or 250/computer-based test. To receive registration forms, contact TOEFL, Educational Testing Service at (877) 863-3546 or see http://www.toefl.org.

International students must show proof of financial support for two academic years including fees and living expenses.

Criteria for Admission

Admission to the UC Davis MBA Program is highly selective. The aim of the Admissions Committee is to select those applicants whose academic background, intellectual capability, work experience, demonstrated leadership and communication skills meet the challenging demands of the MBA program and a managerial career. Consideration of an applicant's undergraduate performance includes a review of trends in scholastic performance and areas of academic strength as well as an assessment of overall grade point averages. Admissions standards and grading policies of the schools attended are also considered. Verbal, quantitative and analytical scores on the GMAT are used to evaluate general aptitude for management study. Background and maturity as indicated by employment history, service and activity records, recommendations and the applicant's essays are factors in the committee's evaluation. Professional management experience is not required for admission but is favorably considered.

PROGRAM OF STUDY

The hallmark of the two-year UC Davis MBA program is its flexibility. Students are required to take six core courses and then choose three breadth courses to prepare them for in-depth study in their concentration. The series of core courses in the first year focuses on all basic disciplines of business—accounting, economics, finance, marketing, organizational behavior and statistics.

As early as the first year of study, students are able to integrate elective courses into their personal curriculum. Elective courses place an emphasis on real-world application of management principles. Students can focus on one or more of the “standing” concentrations, or may design their own concentration. The concentrations include accounting, agricultural management, entrepreneurship, finance, management of information systems, marketing, not-for-profit management, operations strategy, strategic management and technology management.
MBA Program for Working Professionals

In addition to the full-time program, the Graduate School of Management offers two Working Professional part-time MBA programs in Sacramento and in the Bay Area. Students enrolled in the MBA Program for Working Professionals pay a flat rate per course.


Application Deadline

February 1
April 1
June 1

Interviews may be scheduled once your application is submitted.

If you would like more information about this program, please contact the Graduate School of Management Admissions at (530) 752-7658 or see http://www.gsm.ucdavis.edu.
1968 First students enroll and official instruction begins in the UC Davis School of Medicine. Medical students originally attend school in their interim “surge” buildings.

1977 Negotiations to convert the former Sacramento County Hospital into the UC Davis Medical Center are completed.
School of Medicine

The Doctor of Medicine degree requires the satisfactory completion of a four-year course of study composed of 135 consecutive quarters. Course work is conducted on the Sacramento campus, at the UC Davis Medical Center and in nearby affiliated hospitals.

PREPARING FOR THE STUDY OF MEDICINE

When you apply to the School of Medicine, you must submit the results from the Medical College Admission Test (MCAT), so it is recommended that you take the MCAT by the spring before application. Information can be obtained at your undergraduate institution or directly from MCAT Program, Box 4056, Iowa City, IA 52243; (319) 337-1357. To be acceptable for the fall entering class, the MCAT must be taken no later than the previous fall. No scores before August 2005 will be accepted.

Applicants must also meet the following academic requirements:

A. Completed at least three years of study in an accredited college or university in the United States or Canada. A minimum of 90 semester hours or 135 quarter units of college-level work is required. Courses in highly specialized fields are acceptable only at the discretion of the medical school.

B. Completed satisfactorily before matriculation each of the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Quarter Units</th>
<th>Semester Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>English, 1 year or its equivalent</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Biological science, 1½ years* including laboratory, or its equivalent</td>
<td>15</td>
<td>11</td>
</tr>
<tr>
<td>General chemistry, 1 year including laboratory, or its equivalent</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Organic chemistry, 1 year or its equivalent. If two or more undergraduate organic chemistry courses are offered, it is recommended that you elect the more rigorous option</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Physics, 1 year including laboratory or its equivalent</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Mathematics, College level math, including statistics. Note: AP credit does not satisfy math requirement</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

* Upper Division Science Requirements for Admission. One semester or two quarters of upper division biology. This can be satisfied by courses in Biochemistry, Molecular Biology, Cell Biology or Genetics. Admission to medical school requires that the applicant will have an understanding of fundamental concepts of biomedical science. Although a biochemistry course is not absolutely required for admission, it is strongly recommended.

C. Demonstrate the potential to perform academically at least as well as the average of the current first year class. This reflects the School of Medicine's generally higher standards and our emphasis on potential as judged from the application as a whole, including but not limited to MCAT and GPA scores.

For additional information, contact the School of Medicine Admissions Office.

APPLYING FOR ADMISSION

Deadline for filing applications for admission to the School of Medicine

October 1

The School of Medicine participates in the centralized American Medical College Application Service (AMCAS). For information on admission to medical school, see the Association of American Medical Colleges (AAMC) at http://www.tomorrowsdoctors.org. You need to submit only one application and one set of official transcripts to AMCAS, regardless of the number of member schools to which you are applying.

Submit the completed application and other required credentials directly to AMCAS for verification, reproduction and immediate distribution to the medical schools you have indicated.

After your AMCAS application has been received by the School of Medicine, the Admissions Office will notify you and may request a secondary application and two letters of recommendation along with a nonrefundable application fee of $60. Send these items directly to the Associate Dean, Office of Admissions and Outreach, School of Medicine, and not to AMCAS. Recommendations can be in the form of a report by a premedical advisory committee at the college or university where you are enrolled or letters from two faculty members who are familiar enough with you and your abilities to make a meaningful evaluation. We recommend that one letter be from a science instructor and the other from a non-science instructor—three to five letters of recommendation suggested.

Applications are accepted by AMCAS between June 1 and October 1. We strongly recommend that you make an early request for application materials from AMCAS and see that the necessary supporting items reach the Committee as soon as possible after the School of Medicine requests them. The Committee reviews only complete application files and schedules interviews for highly qualified applicants throughout the application period and beyond.

A personal interview is usually required before a place in the first-year class can be offered. However, because of the large number of applicants, it is not possible to interview each one and for this reason interviews are held only at the invitation of the Admissions Committee. Interviews take place at the medical school in order to provide you with first-hand knowledge of programs and facilities and give you the opportunity to meet some of the students.

As decisions are made, letters of acceptance are sent; this can be as early as mid-October and as late as September of the following year.

Applicant Selection. The class entering in the fall will be limited to 93 students selected on the basis of academic achievement, academic promise and personal characteristics. The Admissions Committee uses these criteria to determine if a candidate will be able to complete satisfactorily the requirements of the medical curriculum and become excellent medical practitioners. Factors taken into consideration include scholastic records, Medical College Admission Test performance and reports of teachers, advisers and interviewers with regard to intellectual capacity, motivation, emotional stability and personal dedication.

The majority of openings in the entering class will be awarded to students who are California residents. However, the School of Medicine participates in the program of the Western Interstate Commission for Higher Education (WICHE) and residents of participating states will be considered as residents for purposes of
admission. For more information, write the WICHE at Post Office Drawer P, Boulder, CO 80302.

The School of Medicine selects students for admission with a view to meeting the needs of society, of the medical profession and of the School. Because we live in a pluralistic society, and the educational experience is enhanced by the interaction of students from various backgrounds, the School desires diversity in its student body. This is reflected in the School’s commitment to expand opportunities in medical education for individuals from groups underserved in medicine as the result of socioeconomic disadvantage and to increase the number of physicians practicing in underserved areas. Therefore, the Admissions Committee, composed of individuals from a variety of backgrounds and representative of a broad spectrum of medical sciences, evaluates applicants in terms of all relevant factors. These include academic credentials, with due regard to how they may have been affected by disadvantages experienced by the applicant, such personal traits as character and motivation, experience in the health sciences and/or the community, career objectives, and the ability of the individual to make a positive contribution to society, the profession and the School.

**Transfer with Advanced Standing**

Currently enrolled students (U.S. citizens or permanent residents) in good standing at an accredited ALLOPATHIC medical school in the United States or Canada may apply for admission to the third year of study. In order to provide the best facilities and clinical resources, however, we must limit the number of students in our clinical clerkships. Therefore, applications for transfer to the third year are considered on a space-available basis.

Deadline for application is April 1 of the year of transfer. Applicants must provide medical school transcripts along with other materials and if accepted, must pass Part I of the United States Medical Licensing Examination (USMLE) at their current institution. Available spaces may be filled by the Admissions Committee based upon the entire content of an application, or they may request additional information including letters of recommendation and a personal interview. All applicants for transfer must meet the usual requirements for admission, as well as satisfactorily completing the equivalent of two years of study at the medical school. Applicants will be notified of the Admissions Committee’s decision starting April 30.

**PROGRAM OF STUDY**

**Doctor of Medicine.** The curriculum for the M.D. degree is normally a four-year program that provides comprehensive training for the practice of medicine and provides a blend of basic sciences training and clinical experience. The emphasis during the first two years is on the basic-science foundations of medicine. Medical students are introduced to patient care during their very first quarter of study, reflecting the School’s commitment to the training of highly skilled clinicians. Several volunteer clinics, largely staffed by UC Davis medical students, provide an ideal setting for hands-on clinical experience.

**Combined Degree Program.** In addition to the Doctor of Medicine degree, the School of Medicine at UC Davis offers a variety of dual-degree programs through coordination with other graduate groups and divisions. These advanced degrees can couple the M.D. degree with the M.P.H., Ph.D. and M.B.A. that train physicians to meet, respond to and solve the broad diversity of problems and dilemmas facing current and future health care.

Meeting this challenge requires those capable of advancing our biological sciences knowledge base and others who can recognize and solve the ethical, political and humanitarian issues that confront the broad delivery of health care to all. Hence, the field for the Ph.D. in the joint degree program at UC Davis can be any graduate program offered on the UC Davis campus, extending beyond the traditional biological sciences boundaries, and strongly encouraging candidates to seek degrees in social sciences and humanities. All requirements for both degrees are met in a course of study that usually lasts seven years. To be admitted, and be concurrently enrolled in both degree programs, students must apply for separate admission to both the M.D. and Ph.D. programs and obtain permission of the School of Medicine M.D./Ph.D. Advisory Committee. Funding for two competitive fellowships is awarded annually to students enrolled in the M.D./Ph.D. program.

**Advisory Committee.** Inquiries about admission to graduate education should be directed to the Dean of Graduate Studies, University of California, One Shields Avenue, Davis, CA 95616. For more information concerning the combined-degree programs, contact Edward D. Dagang, Office of Admissions, School of Medicine, University of California, One Shields Avenue, Davis, CA 95616-8661.

**Family Nurse Practitioner/Physician Assistant Program.** The Family Nurse Practitioner/Physician Assistant (FNP/PA) credential program educates health care professionals to act as members of a health care team and improves the availability of culturally relevant primary health care in underserved populations throughout central and northern California. Enrollment in these courses is limited to students who are enrolled in the FNP/PA program; see Medicine, School of, Department of Family and Community Medicine.

**ACADEMIC CALENDAR**

The School of Medicine operates on a different schedule from the rest of the campus. A detailed academic calendar may be seen at [http://www.ucdmc.ucdavis.edu/medschool/education/students.html](http://www.ucdmc.ucdavis.edu/medschool/education/students.html).

The program is a continuous four-year academic experience. The first year curriculum commences in mid-summer and extends through mid-spring of the following year. There is a six week break between the first and second year for electives, research, and remediation. The second year curriculum begins in early summer and extends through mid-spring of the following year. This is followed by a six-week academic period for preparation for USMLE Step 1. The third year clinical clerkships start in the spring and extend for 48 weeks. The fourth year curriculum begins immediately thereafter and extends through spring of the following year, with graduation in June.
1946 The school of veterinary medicine opens. William Randolph Hearst's backing for the school is credited to a veterinarian who treated Hearst's pet.

1948 Ground is broken for the School of Veterinary Medicine's first major building (later named Haring Hall), and in 1950 it is occupied. The first class of 42 Doctors of Veterinary Medicine (DVM), all men and mostly from farm and ranch backgrounds, graduates in 1952.
SCHOOL OF VETERINARY MEDICINE

School of Veterinary Medicine
Office of the Dean
Surge IV
(530) 752-1383; http://www.vetmed.ucdavis.edu

The mission of the School of Veterinary Medicine is to provide the best possible health care for animals through teaching, research and public service. Students are offered a rigorous four-year program of study that prepares them for diverse career opportunities in veterinary medicine.

PREPARING FOR THE STUDY OF VETERINARY MEDICINE

To be considered for admission to the School, you must have completed 108 quarter units (72 semester units) in an accredited college or university and have completed the following courses:

<table>
<thead>
<tr>
<th>Lower Division Required Sciences</th>
<th>Quarter Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Chemistry</td>
<td>15</td>
</tr>
<tr>
<td>Organic Chemistry</td>
<td>6</td>
</tr>
<tr>
<td>Physics</td>
<td>6</td>
</tr>
<tr>
<td>Biological Sciences</td>
<td>14</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Upper Division Required Sciences</th>
<th>Quarter Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetic</td>
<td>4</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>4</td>
</tr>
<tr>
<td>Physiology</td>
<td>5</td>
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</table>

<table>
<thead>
<tr>
<th>Additional Courses</th>
<th>Quarter Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required English</td>
<td>12</td>
</tr>
<tr>
<td>Required Humanities and Social Sciences</td>
<td>12</td>
</tr>
<tr>
<td>Required Statistics</td>
<td>4</td>
</tr>
</tbody>
</table>

To convert semester units to quarter units, multiply by 3/2. For example, a four-unit semester course is equivalent to a six-unit course in the quarter system.

You should plan your pre-veterinary medical education carefully. An undergraduate major should be selected on the basis of individual interest and aptitude; there is no advantage gained toward admission by selecting one major over another. If you have definite areas of interest within the general field of veterinary medicine, you are encouraged to take courses (for example, computer science, agricultural economics, molecular and biochemical genetics) that will broaden your background in these areas. Some specialized areas include laboratory animal medicine, exotic animal medicine, public health, food animal practice and biomedical research.

Examinations. You must take the General Aptitude Test of the Graduate Record Examination (GRE) no later than October 1st of the year you apply for admission. Applications for the exams and additional information may be obtained from the Educational Testing Service at http://www.GRE.org.

Grade Point Average. To be considered for admission, you must have a minimum grade point average of 2.500 for both the required sciences and the cumulative grade point average. Applicants who do not meet the minimum grade point average can qualify for admission by receiving GRE scores in the upper 30th percentile for the combined General Aptitude Test scores. Applicants who do not have transcripts with letter grading can qualify for consideration with these same scores or by receiving a bachelor’s degree with honors.

Practical Experience. Admission to the School requires extensive experience with animals. This experience may entail more than having family pets and should include experience with several animal species if that experience includes activities that give you an appreciation and understanding of the veterinary profession. The minimum requirement for animal, veterinary and biomedical science experience is 180 hours (4.5 weeks). This experience must also include working with veterinarians, to give you an understanding of the duties and responsibilities of a practitioner and the breadth of veterinary medicine.

APPLYING FOR ADMISSION

October 1 is the deadline for filing applications for admission to enter the School of Veterinary Medicine the following fall quarter.

Students are admitted to the School of Veterinary Medicine in the fall only. All applicants must apply through the online Veterinary Medical College Application Service-VMCAS at https://www.vmcas.org.

Students interested in admission to the School of Veterinary Medicine should see the School’s Guide for Prospective Students at http://www.vetmed.ucdavis.edu/StudentPrograms/StudentGuide_Post.cfm for detailed information on admissions requirements.

Applicants with disadvantaged backgrounds (cultural, economic, social, educational, disabled and other factors) are encouraged to apply to the Veterinary Medical Opportunity Program (VMOP). For further information, see http://www.vetmed.ucdavis.edu/StudentPrograms/subpages/vmop_application.pdf.

Letters of Evaluation. Three letters of evaluation are required. Letters should be requested from those who know you well, who understand academic and professional demands and have had the opportunity to evaluate your personal qualities and potential as a professional person. The evaluator should be willing to write a thorough, comprehensive letter on your behalf.

Interviews. Interviews may be requested, as deemed necessary, by the Dean and Admissions Committee to obtain additional information. The Dean and Admissions Committee may require additional evaluation procedures for selecting candidates for admission.

Out-of-State and Foreign Applicants. California residents are given priority for admission to the school. A small number of uniquely qualified applicants who are not California residents may be admitted as nonresidents. The criteria for determining residency are explained in Residence for Tuition Information in the Appendix of this catalog. Specific questions should be addressed to the Residence Deputy, Office of the University Registrar, One Shields Avenue, University of California, Davis, CA 95616. No other persons are qualified to give rulings on residency.

If you are from a country other than the United States, you must include a certified English version of your college transcript and, if English is your second language, the official scores from the Test of English as a Foreign Language (TOEFL) taken within five years of the date when your application is submitted.
CRITERIA FOR SELECTION

I. Academic Factors (50-60%)
   A. College course work:
      • Overall GPA in undergraduate/graduate course work
      • GPA of required pre-veterinary medical science courses
      • GPA of last two years of undergraduate/graduate work; minimum of 72 quarters or 45 semester units
   B. Graduate Record Examination (GRE):
      • General Aptitude Test (Verbal, Quantitative and Analytical Writing)

II. Non-Academic Factors (40-50%)
   A. Personal Statement
   B. Letters of Evaluation
   C. Veterinary and Animal Experience
   D. Interview

Non-academic factors will be evaluated based on the following criteria: understanding of the veterinary profession and the responsibilities of being a veterinarian; a demonstrated interest in serving the public through the profession of veterinary medicine; and the possession of maturity, motivation and other qualities needed for successful academic and professional work.

PROGRAM OF STUDY

Doctor of Veterinary Medicine. To receive a Doctor of Veterinary Medicine degree, students must study veterinary medicine for the equivalent of 13 quarters. A minimum grade point average of 2.000 (C), computed on all courses taken while in the School, is required and students must satisfactorily complete all required work as determined by the faculty of the School.

Master of Preventive Veterinary Medicine. Applicants for candidacy to the Master of Preventive Veterinary Medicine (M.P.V.M.) degree program must have completed the Doctorate in Veterinary Medicine or the equivalent; final admission decisions rest with the M.P.V.M. Admissions Committee. Application deadline for August admission is March 31. International applicants are encouraged to apply as early as possible.

The M.P.V.M. degree normally takes one year to complete; however, some students may require as much as two years to finish the program. Students who intend to complete the program in one calendar year must begin the program in August. Candidates for the M.P.V.M. degree must satisfactorily complete a total of 40 units of course work while in residence. This includes 28 units of required courses in epidemiology, biostatistics, and research methodology and a minimum of 12 units of approved elective courses in areas such as epidemiology, biostatistics, herd health management, animal health economics, simulation modeling, veterinary medical data management, zoonoses and veterinary public health. Students must also complete a research study which culminates in a written report and oral presentation. A committee consisting of three faculty members reviews each paper for acceptability and assigns an appropriate grade.

Application forms and information about the program are available from the Director, M.P.V.M. Program, Office of the Dean, School of Veterinary Medicine, University of California, One Shields Avenue, Davis CA 95616; or see http://www.vetmed.ucdavis.edu/mpvm/mpvm.htm.

A combined D.V.M./Ph.D. program is offered. Information regarding the Veterinary Scientist Training Program (VSTP) is available at http://www.vetmed.ucdavis.edu/VSTP. Information on additional combined degree programs can be found on the Graduate Studies Web site at http://www.gradstudies.ucdavis.edu/programs/.

Combined Degree Programs. Students may enroll in combined degree programs. General information regarding these degrees can be found in the Announcement of Graduate Studies, available from Graduate Studies, University of California, One Shields Avenue, Davis CA 95616. For more detailed information, write to the chairperson of the department in which you want to study and the School of Veterinary Medicine.

ACADEMIC CALENDAR 2008–2009*

Summer Quarter 2008
4th Year Orientation Session Monday, Jun 16
4th Year Senior/Summer Clinics begin Monday, Jun 16

Fall Quarter 2008
Orientation for 1st-year students Aug 29 and Sep 2-6
Labor Day Holiday Monday, Sep 1
Instruction begins for 1st-, 2nd- and 3rd-year students Monday, Sep 8
Rosh Hashanah Wednesday, Oct 1
Yom Kippur Holiday Friday, Oct 10
Veteran's Day Holiday Tuesday, Nov 11
Thanksgiving Holiday Thursday-Friday, Nov 27-28
Instruction ends Friday, Dec 5
Finals end Friday, Dec 12
4th Year Clinics end Friday, Dec 19

Winter Quarter 2009
Instruction begins for 1st-, 2nd- and 3rd-year students Monday, Jan 5
4th Year Clinics begin Monday, Jan 5
M. L. King Holiday Monday, Jan 19
President's Day Holiday Monday, Feb 16
Instruction ends Friday, Mar 13
Finals end Friday, Mar 20

Spring Quarter 2009
Instruction begins Monday, Mar 30
Awards Ceremony Wednesday, May 13
Memorial Day Holiday Monday, May 25
Instruction ends Friday, Jun 5
4th Year Clinics ends Wednesday, Jun 10
Finals end Thursday, Jun 12
Commencement Friday, Jun 12

*All dates are subject to change without notice.
Between 1950 and 1962 Richard L. Nelson brings together a legendary faculty including Roland Petersen, Ralph Johnson, Wayne Thiebaud, Manuel Neri, William T. Wiley, Robert Arneson and Roy DeForest to build UC Davis’ world-famous art program. Robert Arneson (left) was hired in 1962.

1960

1962

1966

Switch is made from semesters to quarters.
UNDERGRADUATE COURSES

Lower Division Courses

These courses, numbered 1–99, are open to all students for lower division credit, but are designed primarily for freshmen and sophomores.

Upper Division Courses

These courses, numbered 100–199, are open to all students who have met the necessary prerequisites as indicated in the General Catalog course description. Preparation should generally include completion of one lower division course in the given subject or completion of two years of college work.

VARIABLE-UNIT COURSES

Subject to approval by the department chair, an instructor may arrange to give a special study course (numbers 90X, 92, 97T, 97TC, 98, 99, 190X, 192, 194H, 197T, 197TC, 198, 199) to interested students. Theses courses may be offered any fall, winter, or spring quarter as determined by the department.

- 90X/190X (Seminar) are seminar courses for in-depth examination of a special topic within the subject area.
- 92/192 (Internship) courses enable individual students to obtain practical experience to complement their educational goals or to explore potential career interests and opportunities. Students must have completed 84 units before enrolling in course 192.
- 97T/197T (Tutoring) and 97TC/197TC (Tutoring in the Community) are courses for students who want to tutor in a subject in which they are proficient—generally in their major field—while enrolled as an undergraduate.
- 98/198 (Directed Group Study) courses are set up on a one-time basis for a group of students in a subject for which no regular courses have been established.
- 99 (Special Study for Undergraduates) is a course arranged for an individual student who shares, with an instructor, an academic interest that cannot be accommodated within the formal course structure.
- 194H (Special Study for Honors Students) courses are for individual students with honor status, as determined by the department offering the course and who have completed 84 units.
- 199 (Special Study for Advanced Undergraduates) courses are the upper division counterparts of course 99 and involve supervised independent study and research requiring adequate background in the subject proposed for study as well as prior completion of 84 units.

Credit in courses 99, 194H and 199 is limited to a total of 5 units per term.

Autotutorial Courses are courses in which students instruct themselves at their own pace. These courses can be identified by the letters AT at the end of their course numbers, e.g., 13AT, 141AT.

Virtual Courses are courses in which instruction is delivered on the Internet. These courses can be identified by the letter V at the end of their course numbers, e.g., 10V, 162V.

Research Conference Courses are courses in which advanced undergraduate students may participate in critical discussions of staff research activities. These one-unit courses are numbered 190C and are graded on a Passed/Not Passed basis.

GRADUATE COURSES

Courses numbered 200–299 are open to graduate students and to undergraduates who have completed 18 units of upper division work basic to the subject matter of the course. However, admission is subject to the approval of the instructor in charge of the course. Grading in 290C courses and most variable-unit 299 or 299D courses is Satisfactory/Unsatisfactory. Check the course description for grading information.

PROFESSIONAL COURSES FOR TEACHERS AND NURSE PRACTITIONERS

Courses numbered 300–399 are teacher-training courses in the School of Education and in other departments and are especially intended for teachers or prospective teachers. Courses designed to provide instruction to teaching assistants are included. Courses for certification of family nurse practitioners and physician assistants are also included. These courses are open only to students enrolled in those programs.

OTHER PROFESSIONAL COURSES

Courses numbered 400–499 are professional training courses. Graduate students should consult their faculty adviser or contact the Graduate Studies Office before registering in 400 series courses to determine if graduate credit may be awarded for the course in question.

PREREQUISITES

Prerequisites for courses should be noted carefully; the responsibility for meeting these requirements rests on the student. If you can demonstrate that your preparation is equivalent to that specified by the prerequisites, the instructor may waive these requirements for you. However, the prerequisite that requires that you complete 84 units before registering in the course may not be waived. The instructor in charge of a course may request that the Registrar drop from the course any student who has enrolled without completing the published prerequisites if, in the judgment of the instructor, failure to have completed that work seriously reduces the probability that the student will successfully complete the course. An instructor who intends to exclude a student for this reason must notify the student before taking action.
COURSE DESCRIPTIONS

Below is a sample of how a course is listed in this catalog.

190. Proseminar in Nutrition (1)
Seminar—1 hour. Prerequisite: senior standing; course 111. Discussion of human nutrition problems. Each term will involve a different emphasis among experimental, clinical, and dietetic problems of community, national and international scope. May be repeated twice for credit with consent of instructor.—I, II, III. (I, II, III.) Zidenberg-Cherr

Top line is course number; title; units.

Paragraph following is course instructional format; prerequisite; course description; grading if other than letter grading; quarter offered 2008–09; quarter offered 2009–10 (in parentheses); instructor (if specified).

Quarters offered is the quarter in which a course is intended to be given is shown as follows:
• I. Fall Quarter (September to December) or Fall Semester (August to December), School of Law
• II. Winter Quarter (January to March) or Spring Semester (January to May), School of Law
• III. Spring Quarter (April to June)
• IV. Summer Quarter (July to September) for students in the School of Medicine only

The quarter a course is offered is subject to change. For more information, consult the Class Schedule and Registration Guide (CSRG) or contact the department.

Alternate Year Designation

Some course descriptions will include the phrase “Offered in alternate years.” If the course will be offered in the 2008–09 academic year, the quarter designation immediately follows the description.

If the course will be offered in the 2009–10 academic year, the quarter designation is inside parentheses.

Multi-Quarter Courses

A series of course numbers followed by two or three letters (for example, Physics 110A-110B-110C) is continued through three successive quarters, ordinarily from September to June. The first quarter course listed this way is a prerequisite to the second and the second is prerequisite to the third. On the other hand, where A and B portions of a course are listed separately (for example, Economics 160A and 160B), the A course is not a prerequisite to B, unless it is specifically mentioned in the list of prerequisites.

Expanded Course Descriptions

Because of space limitations, you may find that the descriptions in the General Catalog do not include all the information you would like about a course. The faculty has responded to this need by writing the “Expanded Course Descriptions,” giving more detailed explanations about each course offering. These descriptions are available each quarter to assist students in selecting their courses. They contain such information as texts used, preparation required of students, basis for grading, course format, special assignments (papers, field trips, etc.) and a topical outline of the material to be covered.

Copies of the “Expanded Course Descriptions” are available for on-campus use at the College dean’s offices, advisers’ offices, advising centers, departmental offices and at The First Resort. A limited number of expanded course descriptions are also available in the archive at http://registrar.ucdavis.edu/cafinfo.

The course offerings and instructors listed in this catalog are subject to change without notice. For more current quarter offerings and instructors, refer to the General Catalog Supplement at http://registrar.ucdavis.edu/UCDWebCatalog.
African American and African Studies

African American and African Studies is a field of study in the humanities, arts, and social sciences that provides students with a multi-disciplinary learning experience. In addition to courses offered within African American and African Studies, majors and minors are also encouraged to take advantage of internship opportunities.

The Program. The purpose of this program is to give students a sense of the individual characteristics and contributions of Black communities in Africa, the United States, and in the wider Diaspora. The African American emphasis includes courses on history, culture, and the impact of developments in politics and the economy on the social organization of Black people in the United States. The African Diaspora emphasis allows students to focus on Africa's recent history, social issues, and contemporary culture.

Career Alternatives. Students completing the African American and African Studies major are well prepared for graduate study in psychology, education, sociology, human development, history, etc. Majors in African American and African Studies can also pursue professional fields such as pharmacy, medicine, or law. Graduates of this major have also pursued employment opportunities in the federal and state government, in international development agencies, in human service units, in county social service programs, and counseling services. African American and African Studies is also an appropriate background for work in community organizations like the Urban League, NAACP, Urban Affairs, and the Office of Economic Opportunity, and for teaching at all levels.

A.B. Major Requirements: The major program must be developed in consultation with an African American and African Studies faculty member, and approved by the program's Major Adviser.

One course from African American and African Studies 12, 50, 51, 52, 80 ........... 4
One course from Anthropology 2; Economics 1A, 1B; Geography 2; Sociology 1; Political Science 1, 2; Psychology 1 ........... 4
One course from Chicana/o Studies 10; Native American Studies 1, 10; American Studies 10; Asian American Studies 1, 2, 3 ........... 4
Two units from African American and African Studies 16, 51, 54, 134, 155A, Dramatic Art 41A, 41B, Music 28, 105, 106 ........... 4

One course from African American and African Studies 150A, 150B, 151, 152, 155A, 156, 157, 160, 170, 171, 175A, 175B, 181, 185 ........... 4
One course from African American and African Studies 111, 123, 130, 133, 141, 145A, 156, 162, 163, 165, 172 ........... 4
One coordinated program of upper division courses, selected and approved in consultation with the major adviser and chosen to reflect the student's major emphasis. ........... 24

Possible areas of emphasis, in consultation with the major adviser and chosen to reflect the student's major emphasis:

Creative arts in the black community worldwide, social and political trends in the global black community, African American society and culture, Africa, African Diasporas. These areas of emphasis are offered as guidelines for students in the major. They are the not the only areas of emphasis that students may choose for the major.

Related Upper Division Courses: The following courses are offered by faculty members in other disciplines and focus on African American studies, African diaspora studies, or African Studies.


Total Units for the Major: ........... 64

Major Adviser: C. Acham

Minor Program Requirements: Units

African American and African Studies: Select one course from African American and African Studies 10, 12, 15, 17, or 80 ....... 4
Select a second course offered in African American and African Studies, but not including African American and African Studies 154.

Note: Although a course may be listed more than once, such a course may satisfy only one requirement.

American History and Institutions: This University requirement can be satisfied by completion of African American Studies 100; see also under University Requirements, on page 90.

Courses in African American and African Studies (AAS)

Lower Division Courses

10. African-American Culture and Society (4) Lecture—3 hours; discussion—1 hour. Critical examination of the historical, political, social, and economic factors that have affected the development and status of African-American people in contemporary society. GE credit: Div—II. Harrison

12. Introduction to African Studies (4) Lecture/discussion—4 hours. Introduction to African Studies which will focus on the various disciplinary perspectives through which African society and culture are generally studied. A survey of methods, resources and conceptual tools for the study of Africa. GE credit: ArtHum, Div. Wrt.—II. (II.) Adejunmobi

15. Introduction to African American Humanities (4) Lecture—3 hours; discussion—1 hour. Introduction to the humanist tradition developed by writers, philosophers, and artists of African descent in the West. Attention given to African sources, as well as European, Caribbean, Latin-American, and North American variations on this tradition. GE credit: ArtHum, Div. Wrt.—II. (II.) Adejunmobi


17. Women in African Societies (4) Lecture/discussion—4 hours. Gender relations in traditional and contemporary African society. Involvement of African women in politics, religion, the economy, the arts. African responses to feminist theory. Images of women in African literature. GE credit: Div. Wrt.—II. (II.) Adejunmobi

50. Black Images in Popular Culture (4) Lecture—2 hours; discussion—2 hours. A survey of the depictions of Blacks in popular culture (popular press, stage, radio, film, television, advertising) from the middle of the sixteenth century to the present. GE credit: ArtHum, Div. Wrt.—III. (III.) Turner, Acham

51. History of Afro-American Dance (4) Lecture—2 hours; discussion—2 hours. Evolution of Afro-American dance, tracing its history and development from West Africa through the Caribbean and to the United States. Investigates the social relevance of Afro-American dance and the artistic merits and contributions of Afro-American choreographers and performers. GE credit: Div. Wrt.—II. (II.) Acham

52. African Traditional Religion (4) Lecture—2 hours; discussion—2 hours. Introduction to the traditional religions of the sub-Saharan African peoples: emphasis on myths, rituals and symbols in West, East, Central and South African indigenous religions. Examines themes such as sacred kingship, divination system, women, prophecy, conversion and adaptation to Islam and Christianity. GE credit: ArtHum, Div. Wrt.—II. (II.) Acham

54. University Gospel Choir (2) Rehearsal—4 hours. Prerequisite: consent of instructor; open to any student in the university. Rehearsal, study, and performance of Gospel music. May be repeated for credit. (Same course as Music 34.) PE credit: 3–4 NF grading only.)—I., II., III. (II., III.) Lymo


Quarter Offered: Fall, Winter, Spring, and Summer
99. Special Study for Undergraduates (1-5)  
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Survey of Ethnicity in the U.S. (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing or consent of instructor. Sociological and historical analysis of the experience, culture, and relations of and between groups considered racial and/or ethnic minorities in the United States. GE credit: ArtHum, Div.—II. Harrison

101. Introduction to Research in the Afro-American Community (4)  
Lecture—4 hours. Prerequisite: course 10 or consent of instructor. Survey of Afro-American Studies methods and techniques; problems and methodology in Afro-American Studies. —III. (III.) Harrison

107A. African Descent Communities and Culture in the Caribbean and Latin America (4)  
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: upper division standing. Origin and development of African descent communities and culture in the Caribbean and Latin America: a) the evidence for pre-Columbian arrivals; (b) the African trade and its aftermath; (c) the emergence of the African creole. Offered in alternate years. GE credit: ArtHum, Div.—Wrt.—(II.) Ng’weno

107B. African Descent Communities and Culture in North America (4)  
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: upper division standing. Origin and development of African descent communities and culture in the U.S.A., Canada, and Mexico from the African slave trade to contemporary urban society. Offered in alternate years. GE credit: ArtHum, Div. Wrt.—(II.)

107C. African Descent Communities and Culture in Europe and Asia (4)  
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: upper division standing. Origin and development of African descent communities and culture in Europe and Asia from the pre-Columbian to the post-colonial era. Offered in alternate years. GE credit: ArtHum, Div. Wrt.—(II.)

110. West African Social Organization (4)  
Lecture—4 hours. Prerequisite: course 101 or consent of instructor. Social organization, population, social organization, and survival culture of West Africa in the pre-colonial, colonial, and post-colonial periods. GE credit: SocSci, Div.—II. (II.) Adejunmobi

111. Cultural Politics in Contemporary Africa (4)  
Lecture/discussion—4 hours. Prerequisite: upper division standing or course 12. Themes and style of new cultural forms in Africa as displayed in art, music, film and writing, especially in regard to blending of indigenous and foreign influences. Social and political forces shaping contemporary cultural expression. Offered in alternate years. GE credit: ArtHum, Div. Wrt.—(II.) Adejunmobi

123. Black Female Experience in Contemporary Society (4)  
Lecture—4 hours. Prerequisite: upper division standing or consent of instructor. Black female social, intellectual, and psychological development. Black women’s contributions in history, literature, and social science; life experiences of Black women and philosophical underpinnings of the feminist movement. GE credit: ArtHum, Div.—II. (III.) Adejunmobi

130. Education in the African American Community (4)  
Lecture—2 hours; discussion—1 hour; fieldwork—3 hours. Prerequisite: course 10 or 100, and completion of the Subject A requirement. Examination of the historical experience of African Americans in the United States. Examination and critique of contemporary theories concerning the schooling of African Americans. (Former course 140).—I. (I.) Turner

133. The Black Family in America (4)  
Lecture—4 hours. Prerequisite: upper division standing or consent of social science research to examine relationship between Black family structures, patterns of functioning, and political, economic, and social conditions. Examination of role differentiation within families by race and social class. GE credit: SocSci, Div.—III. (III.) Harrison

141. Psychology of the African American Experience (3)  
Lecture—2 hours; discussion—1 hour. Prerequisite: course 10 or consent of instructor. Introduction to the psychological issues faced by African Americans. Analysis of issues from European/Western and Afro-centric frame of reference. Emphasis on Optimal Theory, a psychological theory based on an Afro-centric world view. —III. (III.) Haggins

145A. Black Social and Political Thought (4)  
Lecture—4 hours. Prerequisite: course 10 or 80, or consent of instructor. Exploration and analysis of Black social and political thought in the Americas. GE credit: SocSci, Div.—III. (III.) Harrison, Osumare

145B. Black Intellectuals (4)  
Lecture—4 hours. Prerequisite: course 10, 80, 145A, or consent of instructor. Examination and critical analysis of selected theoretical writings of Black intellectuals, and especially political and social thinkers, in the Americas. GE credit: SocSci, Div.—III. (III.) Harrison, Osumare

150A. Afro-American Visual Arts Tradition: A Historical and Cultural Study (4)  
Lecture—4 hours. Prerequisite: upper division standing. Afro-American visual arts tradition, folk and formal, in historical and cultural context, from 1600 through Reconstruction. GE credit: ArtHum, Div.—I. (I.)

150B. Afro-American Visual Arts Tradition: A Historical and Cultural Study (4)  
Lecture—4 hours. Prerequisite: upper division standing. Afro-American visual arts tradition, folk and formal, in historical and cultural context, from Reconstruction to the present. GE credit: ArtHum, Div.—II. (II.)

151. Afro-American Vernacular Music and Visual Arts (4)  
Lecture—2 hours; discussion—2 hours. Sociopolitical dimensions of African-American musical forms such as spiritual, work song, minstrelsy blues, rhythm and blues, and related verbal arts like preaching, tabernacle singing, pop, and related verbal arts like preaching, tabbing, rap. —III. (III.) Turner

152. Major Voices in Black World Literature (4)  
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: upper division standing, completion of course 15 or comparable course in literature or the humanities. The recurrence of cultural traps in the works of major black world authors and formation of an African-oriented canon. Principal activities include critical reading and discovery of literature as a cultural resource. GE credit: ArtHum, Div.—Wrt.—(II.) Adejunmobi

154. University Gospel Choir (2)  
Rehearsal—4 hours. Prerequisite: consent of instructor; open to any student in the University. Rehearsal, study, and performance of Gospel music. May be repeated for credit. (Same course as Music 154.) (P/NP grading only.)—II, III, (II, II, III, III) Lymos

155A. African-American Dance and Culture in the United States, Brazil and the Caribbean (4)  
Lecture/discussion—4 hours. A comparative study of the African American dance forms in the U.S.A., Brazil, Haiti, Cuba, Jamaica, Barbados, and Trinidad. Examination of historical and popular dance forms and the socio/historical factors that have influenced these forms. (Same course as Dramatic Art 155A.)—I. (II.) Osumare

156. Language and Identity in Africa and the African Diaspora (4)  
Lecture/discussion—4 hours. Prerequisite: upper division standing or course 12. Relationship between language and identity in literature from Africa and the African Diaspora. Use of pidgins, Creoles, translation from one language to another, and impact of language policies. GE credit: Div.—III. (III.) Adejunmobi

157. Literature and Society in South Africa (4)  
Lecture/discussion—4 hours. Prerequisite: upper division standing or course 12. Political and social developments in 20th-century South Africa as illustrated by a range of South African writing. Response of different writers to the rapidly changing government policies on race and language. Offered in alternate years. GE credit: Div.—Wrt.—(II.) Adejunmobi

160. African-American Folklore (4)  
Lecture—2 hours; discussion—1 hour; fieldwork—3 hours. Prerequisite: course 10. Theory and history of African-American folklore and folk life, including music, material culture, oral narrative, proverbs, and humor. African and Caribbean folk tales of New World folk genres will be probed. GE credit: ArtHum, Div.—III. (III.) Turner

162. Islam in Africa and the Americas (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: course in African American or African Studies. A perspective on the beliefs and practices of Muslims, from medieval origins, to the current period. Preferably course 12 or 110 or Religious Studies 60. A comparative and historical survey of Islam in the regional and cultural settings of Sub-Saharan Africa and the Americas. GE credit: ArtHum, Div. Wrt.—(II.)

163. African Religions in the Americas (4)  
Lecture—2 hours; discussion—2 hours. Prerequisite: course 10; course 15 or consent of instructor. Comparative study of African religious heritage in the Americas: Jamaica, Trinidad, Cuba, U.S.A., Haiti, and Brazil. Emphasis on the origins and development of Candamole, Santeria, Shango, Vodou, and Rastafariism in the New World. (Former course 153.) GE credit: ArtHum, Div. Wrt.—(III.)

165. Afro-Christianity and the Black Church (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10, 15 or consent of instructor; upper division standing. Examination of the historical role of Christian belief and practice as well as the institution of the Black Church in the experience of African Americans from slavery to the present. Offered in alternate years. GE credit—SocSci, Div.—II. (III.) Harrison

168. Black Documentary: Theory and Practice (4)  
Lecture—3 hours; laboratory—3 hours. Prerequisite: Humanities 10, course 170 and consent of instructor; course 50 recommended. Preference given to African American and African Studies majors and minors. A study of black documentary history and understanding of the use of the documentary form for political purposes. A discussion of documentary theory. Each student, singly or in a team, will create and carefully edit a documentary project. Offered in alternate years. GE credit: ArtHum, Div. Wrt.—(II.) Acham

169. History of African-American Television (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: course 50 recommended. History of the representa- tion of African Americans in television; how the representations reflect social and political forces in American society. Role of African Americans in actively shaping their representation. GE credit: ArtHum, Div.—II. (III.) Acham

170. African-American Film and Video (4)  
Lecture/discussion—2 hours, term paper; film viewing—2 hours. Prerequisite: one of courses 15, 50, or English 160, or 162. A comparative study in the study of fictional film and video production and directed by African Americans, drawing on the social sciences and black feminist theory to examine and discuss selected works. GE credit: ArtHum, Div. Wrt.—(II.) Acham
171. Black African and Black European Film and Video (4)
Lecture—4 hours; term paper; film viewing—2 hours. Prerequisite: one of courses 15, 50, or English 160 or 162. A comparative approach in the study of dramatic films and videos that treat black life in Africa and Europe. Critical attention will focus on the imaginative construction of ethnicity, race, nationality, gender, and sexuality in each particular work. GE credit: ArtHum, Div. —III. (III.)

172. Diaspora and New Black Identities (4)
Lecture/discussion—3 hours; term paper. Critical analysis about what it means to be Black/African American in the United States today. Topics include old and new diasporas, national origin, language, religion, class, education, politics, identity and cultural heritage. GE credit: Div. Wrt. —II. (II.) Ng’weno

175A. Black Documentary: History and Theory (4)
Lecture/discussion—4 hours. Prerequisite: Film Studies 1, 170, or 172 recommended. Black documentary history and documentary theory. Use of black documentary for political purposes. GE Credit: ArtHum, Div. Wrt. —II. III. Acham

175B. Black Documentary Practicum (4)
Lecture—5 hours; laboratory—6 hours. Prerequisite: course 175A and consent of instructor. Creation of documentary projects, with students working in production crews. Offered in alternate years. —II. III. Acham

180. Race and Ethnicity in Latin America (4)
Lecture—4 hours. The social and political effects of racial and ethnic categorization in Latin America, including issues of economic production, citizenship, national identity, and access to resources. Emphasis is on peoples of African, Indigenous, and Asian descent. GE credit: ArtHum, SocSci, Div. —II. (II.) Ng’weno

181. Hip Hop in Urban America (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: junior or senior-level standing or consent of instructor. History, aesthetics, urban context, and economies of hip-hop in the US, and its globalization. Hip-hop’s four artistic elements, deejaying, breakdancing, and aerosol art is the examination of issues of race, ethnicity, and gender in youth culture and American society. GE Credit: ArtHum, Div. —III. (III.) Osawaru

185. Topics in African-American Film (4)
Lecture/discussion—4 hours. Prerequisite: course 170; course 50 recommended. Intensive study of special topics in African American film. May be repeated once for credit. Offered in alternate years. GE credit: ArtHum, Div. Wrt. —II. (II.) Acham

190. Topics in African and African-Diaspora Studies (4)
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing in African American and African Studies or consent of instructor. Intensive treatment of a special topic or problem in African or African Diaspora Studies. May be repeated once for credit when topic differs. —III. (III.)

192. Internship in African-American and African Studies (1-8)
Internship—3-24 hours. Prerequisite: upper division standing, completion of 12 units of upper division study in African American and African Studies courses and consent of instructor. Enrollment limited to African American and African Studies majors and minors. Supervised internship in community, government, or private institutions, in all subject areas offered by the African American and African Studies Program. May be repeated for credit for a total of 12 units. (P/NP grading only.)

197T. Tutoring in Afro-American Studies (1-5)
Tutoring—1.5 hours. Prerequisite: consent of major committee; upper division standing with major in Afro-American Studies. Leading of small voluntary discussion groups affiliated with one of the department’s regular courses. May be repeated for credit for a total of six units. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses
201. Critical Foundations in African American Studies (4)
Seminar—3 hours. Prerequisite: graduate standing. Introduction to history of African American Studies. Topics include: research agendas, policy implications, debates, crises, and institutional frameworks. Offered in alternate years. —(I.) Acham, Garrison

Seminar—3 hours; term paper. Prerequisite: graduate standing. Introduces students to the history and current organization of African Studies as area of intellectual investigation. Offers students an opportunity to review research agenda and policy implications, debates, crises, and institutional frameworks surrounding the production of knowledge about Africa. Offered in alternate years. —III. Adjemumobi

203. Critical Foundations in African Diaspora Studies (4)
Seminar—3 hours; term paper. Integrative conceptual framework includes History, Geography, Political Economy, Culture, Aesthetics as tools to investigate the African Diaspora. Students engage African Diaspora theories within their research projects understanding issues developing from the movement of Africans to the rest of the world. —III. (III.) Ng’weno, Osawaru

204. Methodologies in African American and African Studies (4)
Seminar—3 hours; term paper. The relationship between theory and methodology, with emphasis on identifying relevant methodological approaches and constructing theoretically informed research projects for studying the experience of people of African descent whether on the African continent or in the rest of the world. —I. Harrison, Ng’weno

298A. Directed Group Study in African American and African Diaspora Studies (1-5)
Prerequisite: graduate standing. May be repeated for credit up to three times. (S/U grading only)

298B. Directed Group Study in African Studies (1-5)
May be repeated for credit up to three times. (S/U grading only)

299. Directed group study in African Studies (1-5)
(S/U grading only)

Agricultural and Environmental Chemistry (A Graduate Group)

Susan E. Ebeler, Ph.D., Chairperson of the Group

Group Office. 4117 Meyer Hall (530) 752-1415; http://agschem.ucdavis.edu/

Faculty

Douglas O. Adams, Ph.D., Associate Professor (Viticulture and Enology)

Cort Anastasio, Ph.D., Associate Professor (Land, Air, and Water Resources)

Charles W. Bamforth, Ph.D., Professor (Food Science and Technology)

Deborah Bennett, Ph.D., Assistant Adjunct Professor (Public Health Sciences, School of Medicine)

Linda F. Bisson, Ph.D., Professor (Viticulture and Enology)

Roger B. Boulton, Ph.D., Professor (Viticulture and Enology)

William H. Casey, Ph.D., Professor (Land, Air, and Water Resources)

Victor P. Claassen, Ph.D., Assistant Researcher (Land, Air, and Water Resources)

Andrew J. Clifford, Ph.D., Professor (Nutrition)

Carroll E. Cross, M.D., Professor (Internal Medicine)

Randy A. Dalgren, Ph.D., Professor (Land, Air, and Water Resources)

Susan E. Ebeler, Ph.D., Professor (Viticulture and Enology)

Ian C. Faloona, Ph.D., Assistant Professor (Land, Air, and Water Resources)

Oliver Fein, Ph.D., Associate Professor (Molecular and Cell Biology)

Edwin N. Frankel, Ph.D., Adjunct Professor (Food Science and Technology)

J. Bruce German, Ph.D., Professor (Food Science and Technology)

Peter G. Green, Ph.D., Lecturer (Civil and Environmental Engineering)

Bruce D. Hammock, Ph.D., Professor (Entomology)

Dirk M. Holsteghe, Ph.D., Assistant Adjunct Professor (Environmental Toxicology)

Krassimira R. Hristova, Ph.D., Research Professor (Environmental Toxicology)

You-Loo Hsieh, Ph.D., Professor (Textiles and Clothing)

Norman Y. Kado, Ph.D., Associate Adjunct Professor (Environmental Toxicology)

Peter B. Kelly, Ph.D., Professor (Chemistry)

Anna J. King, Ph.D., Professor (Animal Science)

Michael J. Kleeman, Ph.D., Associate Professor (Civil and Environmental Engineering)

Mark J. Kurth, Ph.D., Professor (Chemistry)

Fumio Matsunuma, Ph.D., Professor (Environmental Toxicology)

Michael J. McCarthy, Ph.D., Professor (Food Science and Technology)

Alyson E. Mitchell, Ph.D., Associate Professor (Food Science and Technology)

Krishnan P. Nambiar, Associate Professor (Chemistry) Distinguished Graduate Mentoring Award

David S. Reid, Ph.D., Professor (Food Science and Technology)

James R. Sanborn, Ph.D., Researcher (Entomology/Pesticide Regulation)

Neil E. Schore, Ph.D., Professor (Chemistry)

Takayuki Shibamoto, Ph.D., Professor (Environmental Toxicology)

Charles F. Shoemaker, Ph.D., Professor (Food Science and Technology)

Gary M. Smith, Ph.D., Professor (Food Science and Technology)

Randall J. Southard, Ph.D., Professor (Land, Air, and Water Resources)

Gang Sun, Ph.D., Professor (Textiles and Clothing)

Ronald S. Tjerdema, Ph.D., Professor (Environmental Toxicology)

Dean J. Tantillo, Ph.D., Assistant Professor (Chemistry)

Andrew L. Waterhouse, Ph.D., Professor (Viticulture and Enology)

Matthew J. Wood, Ph.D., Assistant Professor (Environmental Toxicology)

Thomas M. Young, Ph.D., Professor (Civil and Environmental Engineering)

Robert J. Zasoski, Ph.D., Professor (Land, Air, and Water Resources)

Emeriti Faculty

Donald G. Crosby, Ph.D., Professor Emeritus

John R. Whitaker, Ph.D., Professor

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer, 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum = Arts and Humanities, SciEng = Science and Engineering, SocSci = Social Sciences, Div = Social-Cultural Diversity, Wrt = Writing Experience
Affiliated Faculty
Lowell L. Ashbaugh, Ph.D., Associate Researcher (Crocker Nuclear Lab)
Diane M. Barrett, Ph.D., Specialist (Food Science and Technology)
Warren H. White, Ph.D., Researcher (Crocker Nuclear Lab)

Graduate Study. The Graduate Group in Agricultural and Environmental Chemistry offers programs of study and research leading to the M.S. and Ph.D. degrees. Study relates to the chemical and biochemical aspects of foods, wine, fibers/polymers, pesticides, and environmental pollution. Detailed information regarding graduate study may be obtained at http://agchem.ucdavis.edu/.

Graduate Advisers. D.O. Adams (Viticulture and Enology), D. S. Reid (Food Science and Technology), Y. L. Hsu (Textiles and Clothing), T. Shibamoto (Environmental Toxicology), T. Young (Civil and Environmental Engineering)

Courses in Agricultural and Environmental Chemistry (AGC)

Graduate Courses
290. Seminar (1) Seminar—1 hour. Selected topics in agricultural and environmental chemistry, presented by students. (S/U grading only)—I, II, III. (I, II, III.)

298. Group Study (1-5) Prerequisite: consent of instructor. The chemistry and biochemistry of foods, nutritional chemicals, pesticides, and other special topics as they apply to agricultural and environmental chemistry.

299. Research (1-12) Arrangements should be made well in advance with a faculty member of the Group in Agricultural and Environmental Chemistry. (S/U grading only.)

Agricultural Computing and Information Systems

See Applied Computing and Information Systems, on page 153.

Agricultural and Environmental Education

(College of Agricultural and Environmental Sciences and School of Education)

The Major Program
The major serves those interested in teaching agricultural and environmental sciences in schools or in non-formal settings such as nature preserve, environmental camps, or other venues. This major prepares graduates to enter programs in the agricultural and environmental sciences as well as provides them with a skill set necessary to work within social science careers related to these fields. This program of study meets state and federal requirements for teacher preparation in agriculture and science, as well as requirements in career technical education (CTE).

The Program
This program is designed to provide students with a broad background in various agricultural and environmental science disciplines, e.g., animal science, environmental science, plant and soil science, agricultural engineering, business management, agro-ecology, and horticulture. The program also focuses on the social sciences related to human resource development. The program provides students with practical experiences through fieldwork, school and non-formal learning sites placements, or placements related to a student’s focus of study. Through this major students will have the opportunity to explore and incorporate the diversity of agricultural and environmental issues facing today’s society.

Career Alternatives
The need for scientists, technicians and creative educators to assist in domestic and international agricultural and environmental programs has created a continuing demand for qualified instructors and supervisory personnel. This major also provides general preparation which is appropriate for work in banking, sales and service, rural recreation and related agricultural and environmental sectors. Students interested in obtaining breadth in both agricultural and environmental sciences will appreciate the scope and flexibility the major provides.

Advising For the major is located in 1202 Meyer Hall (530) 754-7915. For credential information, see School of Education in 2060 Academic Surge (530) 752-0757

Major Adviser. C. J. Trexler

Courses in Agricultural Education (AED)

Questions pertaining to the following courses should be directed to the instructor or Lynn Martindale (530) 754-6655.

Lower Division Courses
98. Directed Group Study (1-5) Prerequisite: consent of instructor. (P/NP grading only)

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only)

Upper Division Courses
100. Concepts in Agricultural and Environmental Education (3) Lecture—2 hours; laboratory—3 hours. Prerequisite: upper division standing. Philosophy and nature of formal and non-formal agricultural and environmental education programs. Emphasis on understanding the role of the teacher and observing a variety of programs. GE credit: SocSci, Wrt.—II. (II.) Martindale

160. Vocational Education (3) Lecture—3 hours. Philosophy and organization of vocational education, with particular reference to educational principles for agriculture commerce, home economics, and industry. GE credit: SocSci, Wrt.—II. (II.)

171. Audiovisual Communications (2) Lecture—1 hour; laboratory—3 hours. Prerequisite: upper division standing. Theory and principles of audiovisual communications. Comparison of audiovisual materials such as transparencies, slides, computer-generated graphics, and videos. Operation and use of audiovisual equipment is stressed. (II. (II.)

172. Multimedia Productions (3) Lecture—2 hours; laboratory—3 hours. Prerequisite: course 171 recommended. Design and production of educational, technical, and professional multimedia presentations. Instructional or professional presentations using a variety of media, including slides, video, transparencies, and computer-generated graphics. Offered in alternate years. GE credit: SocSci, Wrt.—III. (III.)

190. Seminar in Agricultural Education (2) Seminar—2 hours. Discussion of selected critical issues in agricultural education. May be repeated for credit with consent of instructor. (P/NP grading only)—II. (II.)

192. Internship (1-12) Internship—3-36 hours. Prerequisite: upper division standing; consent of instructor. Supervised internship off and on campus in areas of agricultural education. (P/NP grading only)

198. Directed Group Study (1-5) (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5) (P/NP grading only)

Professional Courses
300. Directed Field Experience in Teaching (2) Discussion—1 hour; field experience—3 hours. Pre- requisite: course 100. Experience as teaching assistant in agriculture or home economics programs in public schools. May be repeated once for credit. (P/NP grading only)—I, II, III. (I, II, III.)

301. Planning for Instructional Programs (3) Lecture—3 hours. Prerequisite: course 100; course 300 (may be taken concurrently). Major paradigms in program planning and development. Emphasis on key steps in curriculum development, including selection and organization of educational objectives, learning experiences and teaching materials and resources. —III. (III.) Trexler

302. Teaching Methods in Agricultural Education (3) Lecture—2 hours; laboratory—2 hours. Prerequisite: course 100, course 300 (may be taken concurrently). Development of teaching strategies with special emphasis on the designing of learning experiences, instructional execution, and use of teaching aids in agricultural education. —I. (I.) Martindale

306A. Field Experience with Future Farmers of America and Supervised Experience Programs (4) Lecture/discussion—3 hours; field work—6 hours. Prerequisite: acceptance into a teacher education program; course 306B (concurrently). Develop an understanding of the Future Farmers of America and supervised occupational experience programs through planning, conducting, and evaluating actual programs. —I, II, III. (I, II, III.)

306B. Field Experience in Teaching Agriculture (5-18) Student teaching (corresponds with public school session). Prerequisite: acceptance into a teacher education program; course 306A (concurrently); courses 100, 300, 301, 302: Directed teaching including supervision of occupational experience programs and youth activities in secondary schools or community colleges. May be repeated for credit up to a maximum of 18 units. —I, II, III. (I, II, III.)


Master Adviser. C. J. Trexler, Ph.D., Assistant Professor

Advising Center for the major, including peer advising, is located in 1202 Meyer Hall (530) 754-7915.
Agricultural Management and Rangeland Resources

The Major Program

This major is designed for students who are interested in understanding agricultural systems, their management, and their relationship to the environment. Courses are selected to provide an interdisciplinary background that encompasses both natural science and social science. Students will acquire a core understanding of agricultural production systems as managed ecosystems, how they function, how they interact with the natural environment and how they are intimately connected with human society and social changes. In addition, students will develop an area of specialization. Within the two areas of specialization, students choose between a broad-based education and one focused in selected areas.

The Program. The Sustainable Production Systems specialization covers food and agriculture production, agroecology, pest ecology and management, crop improvement and propagation. Students may also develop an emphasis in particular production areas such as agroecology, environmental horticulture, pomology, vegetable crops or viticulture. The Range and Natural Resources specialization emphasizes the theory and practice of natural resource management in grazed ecosystems.

All students gain practical experience through a combination of internships and practica. Students may also pursue an Honors thesis in their senior year.

Career Alternatives. Graduates from this program are prepared to pursue a wide range of careers, including various technical and management positions in agricultural and business enterprises; farming; consulting; private, state and federal agencies concerned with rangeland and natural resource management; Cooperative Extension; international development; teaching; agricultural and environmental journalism, information and communication services. Graduates are qualified to pursue graduate studies in the natural and social sciences, such as agroecology, environmental studies, pest management, education, business management.

B.S. Major Requirements:

**UNITS**

**Written/Oral Expression**........ 8-12
See college English requirement ........ 8
One of University Writing Program 102A, 102B, 102C, 102D, 102E, 102F, 102G, or 104A, 104C, 104D, 104F, or 104F 4

**Perspectives on Agriculture and the Environment**........... 13

- Plant Sciences 1 ....................... 3
- Plant Sciences 2 ....................... 4
- Applied Biological Systems Technology 49 .......................... 4
- Animal Science 1 or 2 ............... 4

**Preparatory Subject Matter** ....... 41-43

- Biological Sciences 1A-1B ............ 3-5
- Chemistry 2A-2B .......................... 10
- Physics 1A or 1B or Physics 2A or 7A-7B 6-8
- Mathematics 16A .......................... 3
- Plant Sciences 21 .......................... 3
- Plant Sciences 90 or Statistics 13 or 102 3
- Economics 1A ............................ 5

**Breadth/General Education** .......... 24
See General Education requirement.

**Depth Subject Matter** ............. 17-18

- Plant Sciences 150 or Environmental Science and Policy 100 or Plant Biology 117 or 142 ........................................ 4
- Agricultural and Resource Economics 112 or 113 or 140 ............. 4-5
- Plant Sciences 101 .......................... 3
- Plant Sciences 92, 99, or 137, or Applied Biological Systems Technology 145, or International Agricultural Development 195A, 195B . 3
- Plant Sciences 192, 199 .......................... 3

**Area of Specialization (choose one): Sustainable Production Systems** ....... 54-58

Includes food and agricultural production, agroecology, crop improvement, propagation, and pest management. Students may choose between a broad education in sustainable agriculture or focus on one or two areas of agriculture (e.g., agricultural management, agronomy, crop improvement, environmental horticulture, pest management, pomology, vegetable crops, viticulture).

Crop biology and ecology depth requirement must be met with Plant Biology 142.

- Plant Biology 152 or Biological Sciences 101 .......................... 4
- Chemistry 8A, 8B .......................... 6
- Plant Sciences 2 ......................................... 3
- Soil Science 100 .............................. 5
- Restricted elective courses chosen from the following groups with approval of the academic adviser ........................................ (minimum 24 units)
- Plant improvement and propagation:
  - Plant Sciences 118; Biotechnology 171;
  - Plant Biology 143, 152, 153, 154, 160, 171
- Plant physiology or plant nutrition:
  - Environmental Horticulture 102;
  - Plant Biology 111, 146, 157, 158, 172;
  - Viticulture and Enology 110
- Atmospheric, soil or water science:
  - Atmospheric Science 133;
  - Environmental and Resource Sciences 100;
  - Hydrologic Science 110, 124;
  - Soil Science 107, 109, 111
- Pest ecology and management:
  - Plant Biology 176;
  - Entomology 110, 135;
  - Nematology 100;
  - Plant Pathology 120;
  - Viticulture and Enology 118
- Agricultural economics:
  - Agricultural and Economic Resources 100A, 120, 130, 147;
  - International Agricultural Development 110
- Agricultural management:
  - Agricultural and Economic Resources 1008, 140, 145, 150, 157;
  - Applied Biological Systems Technology 142, 147;
  - Plant Sciences 121
  - Animal production:
    - Animal Science 41, 41L, 104
  - Policy, social science and ethics:
    - Agricultural and Economic Resources 147, 176;
    - Plant Sciences 121;
    - Environmental Science and Policy 161, 175;
    - International Agricultural Development 103, 104;
    - Plant Pathology 140;
    - Political Science 107
  - Unrestricted Electives ................................ 12-23

**Range and Natural Resources** ....... 49-54

This specialization brings together courses that provide a unified understanding of the interaction between livestock production and environmental quality in rangelands.

- Plant Sciences 112, 121, 130, 131, 134, 135, Plant Biology 102 or 145 21-23
- Soil Science 100 .......................... 5
- Environmental and Resource Sciences 100 or 121 or Hydrologic Science 141 or 143 4
- Wildlife, Fish, and Conservation Biology 110, 111, 120, 151 6-7
- Animal Science 41, Nutrition 115 ........ 6
- Plant Sciences 180, Applied Biological Systems Technology 180, 182, Environmental and Resource Sciences 186, or Hydrologic Science 182 3-5
- Environmental Science and Policy 172 4
- Unrestricted Electives .......................... 17-29

**Total Units for the Major** ........ 180

**Major Adviser.** K.J. Rice (Plant Sciences)

**Advising Center** located in 1220A Plant and Environmental Sciences (530) 752-1715.

**Minor Program Requirements:**

**Agricultural Systems and Environment** .................. 18-19
Preparatory material: Statistics 13, 32, Plant Sciences 1 120 or Sociology 428, or the equivalent.

Select one of the following tracks:

**Sustainable Agriculture**

- Plant Sciences 105, 150, Plant Biology 142, Soil Science 100 16
- Minimum of three units from the following:
  - Plant Sciences 107, 110A, 110B, 110C, 112, 170A, 170B 3-8
- Range and Natural Resources track

- Plant Sciences 121, 130 7
- Minimum of 11 units from the following:
  - Plant Sciences 131, 134, 135, 150, Environmental Science and Policy 123, 172 11

**Minor Advisers.** C.T. Foin (Plant Sciences), K.J. Rice (Plant Sciences)

**Advising Center** is located in 1220A Plant and Environmental Sciences (530) 752-1715.

**Honors.** The Senior Honors Thesis (Plant Sciences 194H) includes two or three successive quarters of guided, scientific and/or scholarly research on an agricultural and/or environmental subject of special interest to the student. With adviser approval, the Senior Thesis can satisfy up to 12 units of restricted electives in the major.

**Courses.** See Plant Sciences, on page 448.

**Agricultural and Managerial Economics**

See Managerial Economics, on page 360.

**Agricultural and Resource Economics**

(College of Agricultural and Environmental Sciences)
Richard E. Howitt, Ph.D., Chairperson of the Department

**Department Office.** 2116 Social Sciences and Humanities Building (530) 752-1517

Undergraduate Student Information, 1176 Social Sciences and Humanities Building (530) 754-9536, http://www.agecon.ucdavis.edu
Graduate Student Information, 1171 Social Sciences and Humanities Building (530) 752-6185, http://www.agecon.ucdavis.edu
Faculty
Marilyn D. Whitney, Ph.D., Lecturer
Gerald T. Lund
Richard Klee
George A. Jouganatos, Ph.D., Lecturer
Eric L. Johnson, M.S., Lecturer

104. for graduate study, see Graduate Studies, on

John H. Constantine, Ph.D., Lecturer
Bayford D. Butler, M.S., Lecturer
Chester O. McCorkle, Jr., Ph.D., Professor Emeritus
Elmer W. Learn, Ph.D., Professor Emeritus
Warren E. Johnston, Ph.D., Professor Emeritus
Benjamin C. French, Ph.D., Professor Emeritus
Douglas M. Larson, Ph.D., Professor
Richard E. Howitt, Ph.D., Professor
Arthur Havenner, Ph.D., Professor
Richard D. Green, Ph.D., Professor
Julian M. Alston, Ph.D., Professor
Faculty

105. cultural industry in U.S. and world economies; p

J. Edward Taylor, Ph.D., Professor
Quirino Paris, Ph.D., Professor

Emeriti Faculty
Oscar R. Burt, Ph.D., Professor Emeritus
Hay F. Carman, Ph.D., Professor Emeritus
Harold O. Carter, Ph.D., Professor Emeritus
Benjamin C. French, Ph.D., Professor Emeritus
Delworth Gardner, Ph.D., Professor Emeritus
Dale M. Heien, Ph.D., Professor Emeritus
Warren E. Johnston, Ph.D., Professor Emeritus
Gordon A. King, Ph.D., Professor Emeritus
Sylvia Lane, Ph.D., Professor Emeritus
Elmer W. Learn, Ph.D., Professor Emeritus
Samuel H. Logan, Ph.D., Professor Emeritus
Alexander F. McCalla, Ph.D., Professor Emeritus
Chester O. McCormick, Jr., Ph.D., Professor Emeritus
Refugio I. Rochin, Ph.D., Professor Emeritus
Lawrence E. Shepard, Ph.D., Senior Lecturer SOE Emeritus
Stephan H. Sosnick, Ph.D., Professor Emeritus

Affiliated Faculty
Steven C. Blank, Ph.D., Lecturer
Bayford D. Butler, M.S., Lecturer
Leslie J. Butler, Ph.D., Lecturer
John H. Constantine, Ph.D., Lecturer
Roberta L. Cook, Ph.D., Lecturer
Shermain D. Harding, Ph.D., Lecturer
Eric L. Johnson, M.S., Lecturer
George A. Jouganatos, Ph.D., Lecturer
Karen Klosny, Ph.D., Lecturer
Richard Kleberg, J.D., Lecturer
Hyunok Lee, Ph.D., Lecturer
Gerald T. Lundblad, M.B.A., Lecturer
Ralph Pavey, B.S., Lecturer
Scott D. Rozelle, Ph.D., Adjunct Professor
Stephen A. Vosti, Ph.D., Associate Adjunct Professor
Marilyn D. Whitney, Ph.D., Lecturer

Major Program and Graduate Study, See the major in Managerial Economics, on page 360; and for dissertation study, see Graduate Studies, on page 104.

Major Advisers, Contact Student Advising in 1176 Social Sciences and Humanities Building for a complete listing.


Courses in Agricultural and Resource Economics (ARE)

Lower Division Courses
1. Economic Basis of the Agricultural Industry (4)

Lecture—4 hours. Agriculture and man; the agricultural industry in U.S. and world economies; production and supply, marketing and demand; agricultural land, capital and labor markets; economic and social problems of agriculture in an urban and industrialized economy emphasizing California. GE credit: SocSci.

15. Economic Basis of the Agricultural Industry (4)
Lecture—4 hours. Agriculture and man; the agricultural industry in Australia and world economies; production and supply, marketing and demand; agricultural land, capital and labor markets; economic and social problems of agriculture in an urban and industrialized economy emphasizing Australia. Taught under the supervision of a UC Davis faculty member. Not open for credit to students who have completed course 1. Not offered even years.

15. Population, Environment and World Agriculture (4)
Lecture—3 hours; discussion—1 hour. Economic analysis of interactions among population, environment, natural resources and development of world agriculture. Introduces students to economic thinking about population growth, its causes and consequences for world food demand, and environmental and technological limits to increasing food supplies. GE credit: SocSci, Div. Writ.—III. (III.)

18. Business Law (4)
Lecture—4 hours. Prerequisite: sophomore standing. General principles of business law in the areas of contracts, business organization, real property, uniform commercial code, commercial paper, employment relations, and creditor-debtor against a background of the history and functioning of our present legal system. I, II, III, (I, II, III.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses
100A. Intermediate Microeconomics: Theory of Production and Consumption (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A, 1B, Mathematics 168. Theory of individual consumer and market demand; theory of production and supply of agricultural products, with particular reference to the individual firm; pricing, output determination, and employment of resources under pure competition. [Not open for credit to students who have completed Economics 100 or the equivalent; however, Economics 100 will not serve as prerequisite to course 100B.]—I, II, III, (I, II, III.)

100B. Intermediate Microeconomics: Imperfect Competition, Markets and Welfare Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A. Pricing, output determination, and employment of resources under conditions of monopolopoly, oligopoly, and monopolistic competition.—I, II, III, (I, II, III.)

106. Quantitative Methods in Agricultural Economics (4)

112. Fundamentals of Business Organization (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: upper division standing or consent of instructor. The role of organizational design and behavior in business and public agencies. Principles of planning, decision making, individual behavior, motivation, leadership, informal groups, conflict and change in the organization.—I, II, III, (I, II, III.)

113. Fundamentals of Marketing Management (4)
Lecture—4 hours. Prerequisite: Economics 1A. For non-majors only. Nature of product marketing by the business firm. Customer-product relationships, pricing and demand; new product development and marketing strategy; promotion and advertising, product life cycles; the distribution system; manufacturing, wholesaling, retailing. Government regulation and restraints. [Not open for credit to students who have completed course 1.]—II (II.)

115A. Economic Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A and 1B. Major issues encountered in emerging from international poverty, problems of growth and structural change, human welfare, population growth and health, and international migration. Important issues of policy concerning international trade and industrialization. (Same course as Economics 115A.) GE credit: SocSci. Div. Writ.—I, II, III, (I, II, III.)

115B. Economic Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A and 1B. Macroeconomic issues of developing countries. Issues include problems in generating capital, controlling monetary and fiscal policies, foreign aid and investment. Important issues of policy concerning international borrowing and external debt of developing countries. (Same course as Economics 115B.) GE credit: SocSci.—II, III, (I, II, III.)

118. Tax Accounting (4)
Lecture—4 hours. Prerequisite: Management 11A, 11B; course 18 recommended. Development and application of a framework for understanding tax effects of typical management decisions on both entities and their owners. Impacts that different methods of taxation have on business entities with emphasis on tax planning, using income and deduction strategies, retirement plans, and choice of business entity for tax minimization.—I, II, III.

120. Agricultural Policy (4)
Lecture—4 hours. Prerequisite: course 100A or consent of instructor. Analytical treatment of historical and current economic problems and governmental policies influencing American agriculture. Uses of economic theory to develop historical and conceptual understanding of the economics of agriculture; how public policy influences the nature and performance of American agriculture. GE credit: SocSci.—III, (I, II, III.)

1205. Agricultural Policy (4)
Lecture—4 hours. Prerequisite: course 100A or consent of instructor. Analytical treatment of historical and current economic problems and governmental policies influencing agriculture. Uses of economic theory to develop an understanding of the standing of the economics of agriculture; how public policy influences the nature and performance of agriculture. Taught in Australia under the supervision of a UC Davis faculty member. Not open for credit to students who have completed course 120. Not offered every year.—Alston

130. Agricultural Markets (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A. The nature, function, organizational structure, and operation of agricultural markets; prices, costs, and margins; market information, regulation, and controls, cooperative marketing.—II, (II.)

132. Cooperative Business Enterprises (3)
Lecture—3 hours. Prerequisite: Economics 1A. Study of cooperative business enterprise in the United States and elsewhere; economic theories of behavior, principles of operation, finance, decision-making, and taxation.—I, II, III.

135. Agribusiness Marketing Plan Development (2)
Lecture/discussion—2 hours. Prerequisite: upper division standing. Fundamental components required to develop a marketing plan for your product in the concept of a marketing plan, appropriate research required, including the use of library and Internet, survey and interview instruments, government documents, market analysis, business proposition, action planning, financial evaluation and monitoring. (P/ NP grading only.)
134. Agribusiness

136. Managerial Marketing (4)
Lecture—4 hours. Prerequisite: course 100A, Statisti- cics 102, or a combination of microeconomics theory and statistics in the study of marketing. Marketing measurement and forecasting, market planning, market segmenta- tion, determination of optimal market product mix and cost analysis, conduct of mar- keting research, marketing models and systems.—II, III, (II, III).

138. International Commodity and Resource Markets (3)
Lecture—3 hours. Prerequisite: course 100A, Eco- nomics 100 or 104. Basic nature and scope of inter- national trade in agricultural commodities, agricul- tural inputs, and natural resources. Market dimensions and institutional arrangements. Case studies to- illustrate import and export problems associated with different regions and commodities.—II. (III)

139. Futures and Options Markets (3)
Lecture—3 hours. Prerequisite: course 100A, Statis- tics 102, or a combination of microeconomic analysis, futures and options, and financial market pric- ing.—II, III, (II, III).

140. Farm Management (5)
Lecture—5 hours. Prerequisite: Economics 1A, Farm organization and resources; economic and techno- logical principles in decision making; analytical techniques and computer programs in organizing and managing the farm business.

142. Personal Finance (3)
Lecture—3 hours. Prerequisite: Economics 1B. Man- agement of income and expenditures by the house- hold. Use of consumer credit, saving, and insurance by households. Principles of tax, retirement, and estate planning.—II, III, (II, III).

143. Investments (3)
Lecture—3 hours. Prerequisite: course 142 or con- sent of instructor. Sources of investment institutions, sources of investment information, and portfolio the- ory. Analysis of the stock, bond and real estate mar- kets from the perspective of the investor.—II, (II, III).

144. Real Estate Economics (3)
Lecture—3 hours. Prerequisite: course 100A. The economic theory, analysis, and institutions of real estate markets and related financial markets. Case studies drawn from the real world, single family, multi- family, industrial and office real estate markets.—II, (II, III).

145. Farm and Rural Resources Appraisal (4)
Lecture/discussion—4 hours. Principles, proce- dures, and problems in the evaluation process with specific emphasis placed on farm real estate. Con- cepts of value, description of land, identification of the major physical and economic determinants of value, the three primary appraisal approaches to valuation, discussion of appraisal activity and prac- tice.—II. (II)

146. Government Regulation of Business (3)
Lecture—3 hours. Prerequisite: course 100A or the equivalent. Variety, nature and impact of govern- ment regulation: anti-trust laws and economic and social regulation. Nature of the legislative process, promulgation of regulations, and the impact, espe- cially as analyzed by economists. GE credit: SocSci. —I. (I)

147. Resource and Environmental Policy Analysis (3)
Lecture—3 hours. Prerequisite: Economics 1A; enroll- ment open to non-majors only. Natural resource use problems with emphasis on past and current policies and institutions affecting resource use; determinants, principles, and public policies of national resource use; property rights; conservation; private and public resource use problems; and public issues. (Students who have had or are taking course 100A, Eco- nomics 100 or 104 may receive credit for only 2 units of credit, so must enroll in course 147M instead.) GE credit: SocSci.—II. (II)

147M. Resource and Environmental Policy Analysis (2)
Lecture—2 hours. Prerequisite: Economics 1A; enroll- ment open to non-majors only. Natural resource use problems with emphasis on past and current policies and institutions affecting resource use; determinants, principles, and public policies of national resource use; property rights; conservation; private and public resource use problems; and public issues. (Students who have had or are taking course 100A, Eco- nomics 100 or 104 may receive only 2 units of credit, so must enroll in course 147M instead.) GE credit: SocSci.—II. (II)

147N. Resource and Environmental Policy Analysis (3)
Lecture—3 hours. Prerequisite: course 100A, Eco- nomics 100 or 104. Application of microeconomic and quantitative research: decision analysis for management, mathe- matical programming, competitive analysis, and other- ers.—I, II, III, (II, III).

150. Quantitative Analysis for Business Decision (4)
Lecture—3 hours. Discussion—1 hour. Prerequisite: course 100A, Statistics 103. Introduction to selected topics in management science and operations research: decision making; methods of management, mathemat- ical programming, competitive analysis, and other- ers.—I, II, III, (II, III).

151. Analysis for Production Management (4)
Lecture—4 hours. Prerequisite: course 100A and 155S; Mathematics 16C or 21C recommended (stu- dents should note that the formal mathematical con- tent of this course is higher than other courses in the curriculum). Linear algebra for economists; neces- sary and sufficient conditions in static optimization problems; implicit function theorem; economic meth- odology and mathematics; comparative statics; envelope theorem; Le Chatelier principle; applica- tions to production and consumer models.—I. (I)

152. Analysis for Production Management (4)
Lecture—2 hours. Prerequisite: Economics 100A and 155S; Mathematics 16C or 21C recommended (stu- dents should note that the formal mathematical con- tent of this course is higher than other courses in the curriculum). Linear algebra for economists; neces- sary and sufficient conditions in static optimization problems; implicit function theorem; economic meth- odology and mathematics; comparative statics; envelope theorem; Le Chatelier principle; applica- tions to production and consumer models.—II, (II)

157. Analysis for Production Management (4)
Lecture—4 hours. Prerequisite: course 100A, Eco- nomics 103. Application of economic theory and quan- titative methods in analyzing production management problems including inventory control, production scheduling, quality control, simulation, systems approach, and work measurement.—I, II, III, (II, III).

171A. Financial Management of the Firm (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 106; Management 1A or 11B. Financial analy- sis at the firm level: methods of depreciation; influ- ence of the tax structure; inventory, cash, and accounts receivable management; sources of short- term and long-term financing; financial problems solving using a computer spreadsheet program. Not open for credit to students who have completed Eco- nomics 134.—I, II, (II)

171B. Financial Management of the Firm (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 171A. Financial analysis at the firm level: methods of capital budgeting; calculating the cost of capital; dividend policies; mergers and acquisitions; and special current topics in finance.—II, III, (II, III).

175. Natural Resource Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100B or Economics 100 or the equivalent. Economic concepts and policy issues associated with natural resources, renewable resources, (ground water, forests, fisheries, and wildlife popula- tions) and non-renewable resources (minerals and energy resources, soil). Same course as Environmental Science and Policy 175J. GE Credit: SocSci.—III, (II, III).

176. Environmental Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100B or Economics 100. Role of the environ- ment in economic activity and methods for protecting and enhancing environmental quality; implications of market failures for public policy; design of envi- ronmental policy; theory of welfare measurement; measuring the benefits of environmental improve- ments.—GE credit: SocSci.—II. (II)

190. Topics in Agricultural and Resource Economics (3)
Lecture—3 hours. Prerequisite: passing grades in course 100A and Statistics 103, consent of instruc- tor. Selected topics in agricultural and resource eco- nomics, focusing on current research. May be repeated four times for credit when topic differs. Not offered every year.

192. Internship (1-6)
Internship—3-18 hours. Internship experience offered and on campus in all subject areas offered in the Department of Agricultural and Resource Economics. Internships are supervised by a member of the staff. (P/NP grading only.)

194HA-194HB. Special Study for Honors Students (4-4)
Independent Study—3 hours; seminar—1 hour. Prerequisite: Minimum GPA of 3.500; course 100B; courses 106 and 155 (may be taken concurrently); major in Agricultural and Managerial Economics or Managerial Economics; senior standing. A program of research culminating in the writing of a senior honors thesis under the direction of a faculty adviser. (Deferred grading only, pending completion of sequence.—I, II, (II, II).

197T. Tutoring in Agricultural Economics (1-3)
Hours and duties will vary depending upon the course being tutored. Prerequisite: senior standing in Agricultural and Resource Economics and consent of Department Chairperson. Tutor will lead small dis- cussion groups affiliated with one of the depart- ment's regular courses, under the supervision of, and at the option of the instructor in charge of the course. (P/NP grading only)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

Graduate Courses

200A. Microeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: graduate standing. Linear and non-linear optimiza- tion theory applied to develop the theory of the profit maximizing firm and the utility maximizing con- sumer. (Same course as Economics 200A.)—I, (II)

200B. Microeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 200A. Characteristics of market equilibrium under perfect competition, simple monopoly and monopsony. Emphasis on general equilibrium and welfare economics; the sources of market success and market failures. (Same course as Economics 200B.)—II, (II)

200C. Microeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 200B. Uncertainty and information econom- ics. Individual decision making under uncertainty. Introduction to game theory, with emphasis on appli- cations to markets with firms that are imperfect com- petitors or consumers that are imperfectly informed. (Same course as Economics 200C.)—III, (III)

202A. Introduction to Applied Research Methods (3)
Lecture/discussion—3 hours. Prerequisite: courses 204A and 256, or the equivalent; course 200A concurrently. Study of philosophy and methodology of applied research in agricultural economics. Methods of conceptualization of research problems. Analysis of communication and constructive criticism.—I, (II)

202B. Applied Microeconomics: Consumer and Producer Behavior (3)
Lecture/discussion—3 hours. Prerequisite: courses 200A and 204A; course 200B concurrently. Analysis of consumer and producer theory in models
of individual behavior and market-level phenomena. Implications of consumer and producer theory for specification of empirical models of supply and demand for inputs and outputs and market equilibrium displacement models.—II. (II.)

202C. Applied Microeconomics II: Welfare Analysis and Market Competition (3) Lecture/discussion—3 hours. Prerequisite: course 202B; course 200C concurrently. Methods of applied welfare economics with emphasis on problems arising in agriculture and the environment. Models of imperfectly competitive markets and their application to industries and institutions in the agricultural sector.—III. (III.)

204A. Microeconomic Analysis I (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 100B or Economics 160A; advanced undergraduates with consent of instructor. Behavior of consumers and producers and their interactions; tools and methods needed to analyze economic behavior in the marketplace. Application of these methods to real-world problems.—I. (I.) Morrison Paul

204B. Microeconomic Analysis II (4) Lecture—4 hours. Prerequisite: course 204A or consent of instructor. Behavior in imperfectly competitive markets; monopsony, monopoly, price discrimination; oligopoly. Introduction to noncooperative game theory. Analysis of decisions made under risk and uncertainty and imperfect information. The economics of externalities and public goods.—II. (II.) Sexton

214. Development Economics (4) Lecture—4 hours. Prerequisite: course 100A, 100B, Economics 101; course 204A and Economics 160A; 160B recommended. Review of the principal theoretical and empirical issues whose analysis has formed development economics. Analysis of economic development theories and development strategies and their application to specific policy issues in developing country contexts. (Same course as Economics 214.)—II. (II.) Boucher

215A. Microdevelopment Theory and Methods I (4) Lecture—4 hours; discussion—1 hour. Prerequisite: course 200A or 204A, course 240A recommended. Agricultural development theory, with a focus on microeconomics. Agricultural household behavior with and without imperfections and uncertainty. Analysis of rural land, labor, credit and insurance markets, institutions, and contracts. (Same course as Economics 215A.)—I. (I.) Taylor

215B. Open Microeconomics of Development (4) Lecture—4 hours; discussion—1 hour. Prerequisite: courses 200A or 204A, 200D or 205S, and 214 or 215A. Models and policy approaches regarding trade, monetary and fiscal issues, capital flows and debt, financial instruments, macroeconomic frameworks of an open developing country. The basic analytical focus is real exchange rate and its impact on sectoral allocation of resources. (Same course as Economics 215B.)—II. (II.) Boucher

215C. Microdevelopment Theory and Methods II (4) Lecture—4 hours; discussion—1 hour. Prerequisite: course 215A. Extension of development theory and microeconomic analysis. Agricultural growth and technological change, poverty and income inequality; multisectoral, including village and regional models. Computable general equilibrium methods and applications. (Same course as Economics 215C.)—III. (III.)

215D. Environment and Economic Development (4) Lecture—4 hours; discussion—1 hour. Prerequisite: courses 200A, 204A or 275. Interdisciplinary course drawing on theoretical and empirical research on interactions between environmental resource use and economic development processes. Analysis of issues emerging at the interface of environmental and economic development. (Same course as Economics 215D.)

222. International Agricultural Trade and Policy (3) Lecture—3 hours. Prerequisite: course 100B or 204A; Economics 160A or the equivalent. Analysis of country interdependence through world agricultural markets. Partial equilibrium analysis is used to study the impact of national intervention on world markets, national policy choice in an open economy and multinational policy issues.—I. (I.) Carter

231. Supply and Demand for Agricultural Products (4) Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200A, 202A, and 240A or consent of instructor. Analysis of supply and demand for agricultural commodities emphasizing the effective use of microeconomic methods and other empirical procedures, in conducting applied analysis of supply and demand at the firm and industry level.—I. (I.) Alan

232. Agricultural Commodity Markets (4) Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200A, 202A, and 240A or consent of instructor. Economic analysis of industries that produce, market, transport, store, and process basic commodities. Analysis of equilibrium under perfect and imperfect competition, with and without government involvement.—II. (II.) Goodhue, Sexton

233. Agricultural Policy (4) Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200A, 202A, and 240A or consent of instructor. Nature, formation, evolution, and institutions of economic policy applied to food, agricultural, and rural issues. Examples for detailed consideration include food security, commodity issues, and trade policy. Analytical approaches include static and dynamic welfare analysis, policy design, and political-economic analysis.—III. (III.) Sumner

239. Econometric Foundations (4) Lecture—3 hours; discussion—1 hour. Prerequisite: one course in undergraduate-level econometrics. The course will prepare students for econometric theory and empirical work by examining the statistical foundation of econometrics. Special attention is paid to problems specific to non-experimental data common to social sciences. Topics from matrix algebra are also covered. (Same course as Economics 239.)—I. (I.) Chalfant, Green

240A. Econometric Methods (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 113 and a course in linear algebra or the equivalent. Least squares, instrumental variables, and maximum likelihood estimation and inference for single equation linear regression model; linear restrictions; heteroskedasticity, autocorrelation; lagged dependence. (Same course as Economics 240A.)—II. (II.) Das

240B. Econometric Methods (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 240A. Topics include asymptotic theory and instrumental variable estimation, pooled time-series cross-section estimation, seemingly unrelated regression, classical hypothesis tests, identification and estimation of simultaneous equation models, cointegration, error-correction models, and limited dependent variable models. (Same course as Economics 240B.)—III. (III.) Smith

240C. Time Series Econometrics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 240B; R programming, inference and forecasting of time series models; trends and nonstandard asymptotic theory; vector time series methods and cointegration; time series models for higher order autoregressive and moving average data; state space modeling, the Kalman filter. (Same course as Economics 240C.)—II. (II.) Kuesteiner

240D. Cross Section Econometrics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 240B. Analysis and inference for nonlinear regression models for cross-section data; models for discrete data and for limited dependent variables; models for panel data; additional topics such as bootstrap and semiparametric regression. (Same course as Economics 240D.)—III. (III.) Carter

240E. Topics in Time Series Econometrics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: courses 240A, 240B and 240C. Modern econometric techniques for time series data. Expand on topics covered in Economics 240A, 240B and 240C. Contents may vary from year to year. (Same course as Economics 240E.)—I. (I.) Cameron

240F. Topics in Cross Section Econometrics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: courses 240A, 240B and 240D. Modern econometric techniques for cross-section data. Expand on topics covered in Economics 240A, 240B and 240D. Contents may vary from year to year. (Same course as Economics 240F.)—II. (II.) Jorda

252. Applied Linear Programming (4) Lecture—3 hours; discussion—1 hour. Applied linear programming methods emphasizing uses for business decisions: production, diet, blending, network and related problems.—II. (II.) Paris

253. Optimization Techniques with Economic Applications (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 200C. Optimization techniques and methods including linear and nonlinear programming. Empirical applications to household, firm, general equilibrium and economic growth problems.

254. Dynamic Optimization Techniques with Economic Applications (4) Lecture—4 hours. Prerequisite: course 253 and elementary knowledge of ordinary differential equations. Necessary and sufficient conditions in the calculus of variations and optimal control, economic interpretations, the dynamic envelope theorem and transversality conditions, infinite horizon problems and phase diagrams, local stability and comparative statics of the steady state, comparative dynamics. (II. (II.) Howitt, Wilen

255. Advanced Topics in Economic Dynamics (3) Lecture—3 hours. Prerequisite: course 254. Local stability analysis, steady state comparative statics and comparative dynamics, dynamic duality theory and the principle of optimality, differential games, numerical solution of deterministic and stochastic dynamic programs using ODE and IAS, stochastic optimal control, plus other advanced topics in economic dynamics. Offered in alternate years.

256. Applied Econometrics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 106, Economics 240A, 240B, or consent of instructor. Application of statistical tools to economic and business analysis. Emphasis on regression analysis, problems of specification, and model development. (Same course as Economics 256.)—I. (I.) Havener

258. Demand and Market Analysis (3) Lecture—3 hours. Prerequisite: courses 204A and 256 or consent of instructor. Quantitative and theoretical analysis of the factors affecting supply, demand and price determination for agricultural products. Emphasis on analytical tools for assessing the impacts of changes in government policies and macroeconomic variables.

275. Economic Analysis of Resource and Environmental Policies (4) Lecture/discussion—4 hours. Prerequisite: course 264. Development of externality theory; market failure concepts, welfare economics, theory of renewable and non-renewable resource use, and political economics. Applications to policy issues regarding the agricultural/environment interface and managing resources in the public domain. (Same course as Environmental Science and Policy 275.)—III. (III.) Farzin

276. Environmental Economics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 204A or consent of instructor. Application of externality theory to the design of efficient environmental policies. Evaluation of pollution control policy
Agricultural Systems and Environment

instruments in light of information limitations and market imperfections. Methods for nonmarket valuation of the benefits of environmental improvement.—I. [II] Lin

277. Natural Resource Economics (4)
Lecture—4 hours. Prerequisite: course 254 or consent of instructor. Application of capital theory and dynamic methods to issues of optimal use of renewable and nonrenewable resources. Examination of policy issues associated with forests, fisheries, groundwater, energy resources, watersheds, soil, global climate, and wildlife.—III. [III] Wilen

290. Topics in Agricultural and Resource Economics (3)
Lecture—3 hours. Selected topics in agricultural and resource economics, focusing on current research. May be repeated 4 times for credit. Not offered every year.—I., II, III. [I., II, III.]

293. Analysis of California Agriculture and Resources (3)
Lecture—1.5 hours; fieldwork—45 hours total, including one 5-day summer field trip. Review and analysis of production, marketing, and resource issues facing agricultural firms in California. Application of economic theory and measurement to individual firm and industry decisions in an applied setting. (S/U grading only)—II. [II.] Goodhue

298. Directed Group Study (1-5)

299. Individual Study (1-12)

299D. Special Study for Doctoral Dissertation (1-12)
(S/U grading only.)

Professional Course

296. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I., II, III. [I., II, III.]

American Studies

[College of Letters and Science]
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Julie Sze, Ph.D. [American Studies]
Patricia Turner, Ph.D. [American and African Studies, American Studies]
Grace Wang, Ph.D. [American Studies]

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Grace Wang, Ph.D., Assistant Professor

Emeriti Faculty
David Scafield Wilson, Ph.D., Senior Lecturer
Emeritus

Affiliated Faculty
Eric Schroeder, Ph.D., Lecturer, Academic Federation Excellence in Teaching Award

The Major Program
American Studies offers an alternative approach to the study of American experience for students who feel too limited by departmental approaches. Lower division, introductory classes explore the ways in which cultural systems shape and reflect life in the United States. These classes pay close attention to the ways in which differences of class, race, gender, generation, ethnicity, religion, and sexual orientation unevenly affect American lives.

The Program
American Studies majors take five upper division, in-depth classes and seminars devoted to close study of major thinkers and of issues crucial to the practice of American Studies. Advanced work in at least two other departments or programs allows each student to emphasize a period, a problem, or a subject tailored to his or her own individual education goals. Students have the option of writing a senior thesis within this emphasis.

Career Alternatives
As an interdisciplinary program, American Studies provides a broad liberal arts and sciences undergraduate education. American Studies maximizes a student’s contact with a variety of subject matter and approaches. Graduates have moved into a broad range of career settings, including journalism, law, medicine, nursing, law enforcement, teaching, environmental planning, library science, museum curatorship, and business. Some students discover new career possibilities through their internships in American institutions.

A.B. Major Requirements:

- Preparatory Subject Matter ....................... 24
  Preparatory Subject Matter ....................... 24
- American Studies 10 .............................. 4
- One additional lower division American Studies course ....................... 4
- One course from African American and African Studies 10, Asian American Studies 1, Chicano/a Studies 10, Native American Studies 1, or an equivalent course in racial and ethnic diversity .................... 4
- One course from Anthropology 2, Sociology 2, Women’s Studies 50, or an equivalent course in social science approaches to culture .............................. 4
- One course from History 17A, 17B, 72A, 72B ...................... 4
- One course from English 30A, 30B, Film Studies 1, or an equivalent course introducing critical approaches to literary and visual texts in the humanities .......................... 4

Depth Subject Matter .............................. 40
American Studies 100 and 160 ...................... 8
American Studies Electives: Three additional upper-division American Studies courses ...................... 12

Emphasis ............................................ 20
In consultation with the American Studies Undergraduate Adviser, the student designs a program of 20 units (typically five courses) of upper division course work around a unifying theme, period, or subject matter in American cultures. The courses should come from two or more departments or programs and can include up to 8 units of American Studies courses. Only 4 units of course 192 (internship) can be included in the emphasis. The student may choose the senior thesis option (190A-190B) for 8 units of the emphasis and take the remaining 12 units outside the program.

Total Units for the Major ......................... 64

Recommended
Completion of the college requirement in English composition before enrollment in American Studies 190A.

Minor Program Requirements:

American Studies .................................. 20
American Studies, upper division courses ...................... 20
No more than 8 units of course 192 may be counted toward this total.

Faculty Advisers

Teaching Credential Subject Representative
J. Mechling, see the Teaching Credential/M.A. Program on page 109.

Courses in American Studies (AMS) Lower Division Course

1. Science and American Culture (4)
Lecture—3 hours, discussion—1 hour. American science as a cultural system. Mutual influence and interaction of that system with other cultural systems including religion, social thought, art, architecture, literature, music, and common sense. GE credit: ArtHum, Div, Wrt—I. [I.] Mechling

18. Religion in American Lives (4)
Lecture—3 hours; discussion—1 hour. Religions and spiritual practices in the United States, and their interrelationships with other aspects of U.S. history, society and culture; indigenous and imported faiths, and the impact of immigration, colonization and culture contact on religious systems. GE credit: ArtHum or SocSci, Div, Wrt—I. [I.] Kelman

1C. American Lives Through Autobiography (4)
Lecture—3 hours; discussion—1 hour. American culture as understood through the individual life stories told by Americans, with attention to the roles of gender, race, ethnicity, social class, and sexual orientation in the individual’s life course. GE credit: ArtHum or SocSci, Div, Wrt—I. [I.] Mechling

Quarter Offered: I—Fall, II—Winter, III—Spring, IV—Summer; 2009-2010 offering in parentheses

11. Nature and Culture in America (4)
Lecture—3 hours; fieldwork—3 hours. Uses and abuses of nature in America; patterns of inhabitation, exploitation, appreciation, and neglect; attention to California; emphasis on metaphor as a key to understanding ourselves and the natural world; attention to mechanisms of healing; stewardship, ecology, the "rights" movement. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—II. (III.) Smith, Szé.

4. Freshman Seminar (2)
Seminar—2 hours. Prerequisite: open only to students who have completed fewer than 40 quarter units. Investigation of a special topic in American Studies through shared readings, discussions, written assignments, and other activities (such as fieldwork, site visits). Emphasis on student participation in learning. Limited enrollment. —II. (III., II.)

5. Technology in American Lives (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: completion of Subject A requirement. Technology as both a material cultural force and a symbol in American culture; the lives of engineers at work and play; images of the engineer and technology in popul culture; the lives of engineers at work and play; images of the engineer and technology in American culture; the lives of engineers at work and play. GE credit: ArtHum or SocSci, Div, Wrt.—I. (I) Smith

10. Introduction to American Studies (4)
Lecture—3 hours; discussion—1 hour. United States history and culture. Examination of cultural objects and social practices. Topics include popular culture (film, TV, Internet), cultural diversity, social activism, play, and communication. GE credit: ArtHum or SocSci, Div, Wrt.—II. (III.) Stillf., Wang

21. Objects and Everyday Life (4)
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: completion of Subject A requirement. Material objects (artifacts and objects ranging from everyday to ceremonial) and furnishings in buildings and constructed landscapes as evidence for understanding the everyday (vernacular) lives (gender, social class, ethnicity, region, age, and other factors); collecting and displaying material culture; commodity capitalism of individuals and communities in colonial North America and the United States. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—I. de la Peña, Mechling

30. Images of America and Americans in Popular Culture (4)
Lecture—3 hours; discussion—1 hour. Investigation of verbal and visual discourses about American identity in various popular culture products, including film, television, radio, music, fiction, art, advertising, and consumer experience; discussions about the United States in the popular culture of other societies. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—II. (III.) Kimelman, Smoodin

55. Food in American Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: complete Subject A requirement. Food as a cultural system in the United States; food in the performance of individual and group identity, including gender and ethnicity, food and culture, food industry and business. GE Credit: ArtHum, Div, SocSci, Wrt.—II. (III.) Bilikoff

40. Music and American Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: completed Subject A requirement. An examination of music and American culture. Studies will explore music in its cultural contexts, which may include examinations of recording and broadcasting, of race, class, and gender, the role of technology, and relationships between musical production, consumption, and listeners. GE credit: ArtHum, Div, SocSci, Wrt.—II. (III.) Kimelman, Wang

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

99. Individual Study for Undergraduates (1-5)
(P/NP grading only)

100. Interdisciplinary Skills (4)
Lecture/discussion—3 hours; term paper. Design and implementation of interdisciplinary research, analysis and writing for American Studies and other cultural studies fields. Library and Internet research skills, project/problem definition, methods of study of texts, individuals, communities. Hands-on, skill-building, focused reading, discussion. —I. (II.) Bilkoff

101A-H. Special Topics (4)
Seminar—3 hours, intensive reading, writing, and special projects. Interdisciplinary group study of special topics in American Studies. GE credit: ArtHum or SocSci, Div, Wrt.—I. (I)

10. A Decade in American Civilization (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: one of courses 1A, 1B, 1C, 1D, 1E or 1F. Close examination of a single decade in American civilization: the connections between the history, literature, arts, customs, and ideas of Americans living in the decade. Issues and representations of race, class, gender, age, and sexuality in the decade. May be repeated for credit if decades studied are different. GE credit: ArtHum or SocSci, Div, Wrt.—I. (I)

11. Theories and Practices of Everyday Life in the United States (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division status; preparatory courses for the American Studies major or the equivalent interdisciplinary experience. Examination of human bodies as sites for cultural constructions of identities and "selves" in the United States; attention to bodily norms, crises and conflicts; the relation between disciplining the body and controlling social categories, including race, gender, and sexualities. —II. (I)

120. American Folklore and Folklife (4)
Lecture—3 hours; fieldwork—1 hour. Theory and method of the study of American folk traditions, including oral lore, customs, music, and material folk culture; the uses and meanings of those traditions in various folk communities, including families, institutions, voluntary organizations, and occupa- tional groups. GE credit: ArtHum or SocSci, Div, Wrt.—II. (III.) Meckling

125. Corporate Cultures (4)
Lecture—2 hours; discussion—1 hour; fieldwork—1 hour. Prerequisite: one course chosen from course 120, Anthropology 2, Psychology 16, or Sociology 1; or consent of instructor. Exploration of the small group cultures of American corporate workplaces, including the role of environment, stories, jokes, rituals, ceremonies, personal style, and play. The effects of cultural diversity upon corporate cultures, both from within and in contact with foreign corporations. —III. (II.) de la Peña

130. American Popular Culture (4)
Lecture/discussion—2 hours; fieldwork—2 hours. Prerequisite: course 1 or upper division standing. American popular expression and experience as a cultural system, and the relationship between this system and elite and folk cultures. Exploration of the theories and methods for discovering and interpreting patterns of meaning in American popular culture. GE credit: ArtHum or SocSci, Div, Wrt.—II. (II.) Kimelman, Smoodin

132. Critical Approaches to Media Culture (4)
Lecture/discussion—4 hours, film viewing—2 hours. Critical approaches to the study of contemporary media culture, focusing specifically on film, television, computer, and print media and their products and on the various interrelationships between media and U.S. culture. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—II. (II.)

133. Rhetoric of Media on Social Issues (4)
Lecture/discussion—4 hours. An introduction to the rhetorical analysis of social issues as depicted within media culture, with specific emphasis on the way media frame messages about new social problems. Not open to students who have taken Rhetoric and Communication 124. Offered in alternate years. GE credit: SocSci, Div, Wrt.—II. (III.)

139. Feminist Cultural Studies (4)
Lecture/discussion—2 hours. Prerequisite: one course in Women's Studies. The histories, theories, and practices of feminist traditions within cultural studies. [Same course as Women's Studies 139.] GE credit: SocSci, Div, Wrt.—III. (II.)

151. American Landscapes and Places (4)
Lecture—2 hours; discussion—1 hour; fieldwork—3 hours. Prerequisite: course 1, upper division standing. Comparative study of several American cultural populations inhabiting a region, including their relationships to a shared biological, physical and social environment, their intercultural relations, and their relationships to the dominant American popular and elite culture and folk traditions. GE credit: ArtHum or SocSci, Div, Wrt.—II. (I)

152. The Lives of Children in America (4)
Lecture—2 hours; discussion—2 hours. Experience of childhood and adolescence in American culture, as understood through historical, literary, artistic, and social scientific approaches. GE credit: ArtHum or SocSci, Div, Wrt.—II. (I)

153. The Individual and Community in America (4)
Lecture—2 hours; discussion—2 hours. Interdisciplinary examination of past and present tensions between the individual and the community in American experience, as those tensions are expressed in such cultural systems as folklore, public ritual, popular entertainment, literature, fine arts, architecture, and social thought. GE credit: ArtHum or SocSci, Div, Wrt.—III. (III.) Smith

155. Symbols and Rituals in American Life (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: course 1. Interdisciplinary examination of selected, richly expressive events (parades, festivals, holidays) and symbols (flags, memorial temples) which encode nationwide values and understandings (Thanksgiving, New Year's, etc.) or which realize more limited, special meanings [Mardi Gras, rodeo,
Anatomy

156. Race, Culture and Society in the United States (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: course 1. Interdisciplinary examination of the significance of race, class, gender, and nation in U.S. society. GE credit: ArtHum or SocSci, Div. Wrt.—Ill. Bilkofski, de la Pena

158. Technology and the Modern American Body (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Technocultural Studies 1 and either course 1A or 2. The history and analysis of the relationship between human bodies and technologies in modern society. Dominant and eccentric examples of how human bodies and technologies influence one another and reveal underlying cultural assumptions. [Same course as Technocultural Studies 158.] GE credit: ArtHum.—I., II, III. de la Pena

160. Undergraduate Seminar in American Studies (4)
Seminar—3 hours; term paper. Prerequisite: open to junior and senior American Studies majors only. Intensive reading, discussion, research, and writing by small groups in selected topics of American Studies scholarship; emphasis on theory and its application to American material. Limited enrollment. May be repeated once for credit when content differs.—II, III. (III.) Sze

190A. Senior Thesis Research Seminar (4)
Seminar—2 hours; extensive writing. Prerequisite: senior standing in American Studies major. Research and prospects writing for senior thesis.—I. (I.) Sze

190B. Senior Thesis (4)
Independent study—12 hours. Prerequisite: senior standing in American Studies major and course 190A. In consultation with advisor, student writes an extended research paper on a topic proposed in course 190A.—I., II, III. (II, III.)

192. Internship in American Institutions (1-12)
Internship—1-12 hours. Prerequisite: enrollment dependent on availability of intern positions, with priority to American Studies majors. Supervised internship and study within and about key organizations in American civilization at archives, museums, schools, historical societies, governmental and social agencies, etc., with attention to the techniques of participant observation and the collection of ethnographic data. May be repeated for credit for a total of 12 units. IP/ NP grading only.

197T. Tutoring in American Studies (1-5)
Tutorial—1-5 hours. Prerequisite: consent of Chairperson of American Studies Program. Tutoring in lower division American Studies courses, usually in small discussion groups. Periodic meetings with the instructor in charge, reports and readings. May be repeated for credit when the tutoring is for a different course. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor and chairperson of American Studies Program. (P/NP grading only.)

Graduate Courses

220. American Folklore and Folk Life (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Theory and methods for the study of the folklore and the folk customary behavior of Americans; contributions of folklore studies to scholarship in humanities and social science disciplines.—III. (III.) Mechling, Turner

250. Cultural Study of Masculinities (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Interdisciplinary approaches to understanding the social and cultural construction of masculinities; attention to the effects of biology, gender, race, class, sexual and national identities; criticism of oral, printed, visual, and mass mediated texts, and of social relations and structures. [Same course as Women’s Studies 250.—II. Newton, Mechling]

255. Food in American Culture (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or advanced undergraduate with consent of instructor. Interdisciplinary theories and methods for the study of food in American culture; food studies in relation to issues of identity (age, gender, ethnicity, religion, region, etc.), social relations, systems of production, and cultures of consumption. Not offered every year. Bilkofski, de la Pena

298. Group Study in Animal Biology (1-5)
Prerequisite: graduate standing.

299. Individual Study (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—I, II, III. (II, III.)

Anatomy

See Anatomy, Physiology and Cell Biology, on page 138; and Courses in Cell Biology and Human Anatomy (CHA), on page 379.

Anatomy, Physiology and Cell Biology

See Veterinary Medicine, School of, on page 302.

Anesthesiology and Pain Medicine

See Medicine, School of, on page 367.

Animal Behavior (Graduate Group)

Jay Mench, Ph.D., Chairperson of the Group
Group Office, 310 Life Sciences
(530) 752-2981; Fax (530) 752-8822;
animalbehavior@biosci.ucdavis.edu;
http://biosci2.ucdavis.edu/ggp/anb/

Faculty. The Group includes faculty from 12 departments in five schools and colleges.

Graduate Study. The Ph.D. program in Animal Behavior is an interdepartmental program focusing on the adaptive and evolutionary bases of animal behavior. The program trains students for teaching and research in a variety of areas, including anthropo- podology, animal science, ecology, entomology, neurobiology, psychology, physiology, veterinary sciences, wildlife biology, and zoology. Areas of emphasis include ethology and evolutionary bases of animal behavior; physiological basis of animal behavior; behavior and conservation of wild animals; and behavior and management of domestic and captive animals. Resources available to students, in addition to various departmental facilities, include those of the California Regional Primate Research Center, Bodega Marine Laboratory, and the Agricultural Field Stations.

There is an application deadline of Dec 15 for fall quarter.

Preparation. Appropriate preparation is a bachelor’s or master’s degree in a discipline relevant to the biology of behavior. In addition, at least one course from each of the following areas must be taken before admission into the program or before the end of the first year in the program.

Ecology: e.g., Evolution and Ecology 101, Environmental Science and Policy 100
Genetics: e.g., Biological Sciences 101
Statistics: e.g., Statistics 102 or Psychology 103
Evolution: e.g., Evolution and Ecology 100
Animal behavior: Neurobiology, Physiology, and Behavior 102
Psychology: e.g., Neurobiology, Physiology, and Behavior 100

Core Requirements. Students take two “breadth” courses, at least one course in statistics, a methodology and grant writing course, and a graduate seminar. Required courses:

Comparative psychology: Psychology 250
Methodology and grant writing: Animal Behavior 201
Advanced statistics: Psychology 204A, 204B, 204C, or 204D
Agronomy 204, 206
Graduate seminars: Animal Behavior 290
Strongly recommended: a course on teaching science: Biological Sciences 310, Psychology 390A, 390B
Electives: Students also take two additional courses (at least 3 units each) in the student’s area of specialization, chosen in consultation with and approved by the Course Guidance Committee.

Strongly recommended at least one additional course in statistics or modeling. In addition to the above listed courses, modeling courses include Population Biology 231 and Psychology 128.

Courses in Animal Behavior (ANB) Graduate Courses

201. Scientific Approaches to Animal Behavior Research (3)
Lecture—3 hours. Prerequisite: consent of instructor. Philosophical issues, goals, strategies and tools in field and laboratory research. May be repeated for credit when topics differ.—III.

210. History of Animal Behavior (1)
Discussion—1 hour. Prerequisite: consent of instructor. Classic, seminal papers in animal behavior. Discussion of readings and broader historical context in which papers were written. (S/U grading only)—I. Camazine

218A. Fundamentals of Animal Behavior (5)
Lecture/discussion—4 hours; discussion—1 hour. Prerequisite: consent of instructor; upper-division undergraduate introduction to the biology of behav-
Animal Biology

(College of Agricultural and Environmental Sciences)

Faculty
Faculty includes members of the Departments of Animal Science, on page 141; Entomology, on page 272; Nematology, on page 419; and Wildlife, Fish, and Conservation Biology, on page 516.

The Major Program

The Animal Biology major offers students training in the biological and natural sciences as they apply to animals. The major covers the basic biological sciences that explain animal evolution, systems ecology, physiology, and molecular biology. Students in the Animal Biology major are encouraged to think beyond particular groups of animals in which they are interested and to consider science as a process and a way of understanding society. Emphasis is placed on logical principles that can be used in research or in solving societal problems associated with animals in agriculture, urban areas, or natural environments.

The Program

The Animal Biology major consists of core courses in the biological sciences that build an understanding of animal biology from the molecular to the ecological and evolutionary levels of organization. After completing these core courses, students have the opportunity to specialize in various interdisciplinary aspects of animal biology, and plan their chosen emphasis as part of a required discussion course and in consultation with their adviser. The Animal Biology major emphasizes courses on biological principles as opposed to courses on animal care and husbandry. This program includes a senior thesis, which each student designs to bridge the disciplines of the major.

Internships and Career Alternatives

The program and interests of each student in solving societal problems guides him or her to long-term internships or career choices. On- and off-campus internship opportunities are available in research laboratories, in field situations, with governmental agencies, with private industry, and in international programs. A degree in Animal Biology prepares students for careers in research, teaching, governmental regulation, health or agriculture as each relates to the integrative biology or ecology of animals. Careers in veterinary medicine, animal husbandry and animal management are open to Animal Biology majors, however, other preparation may be required. Students in the major gain research experience and may choose to continue their training at the graduate or professional level in a variety of biological disciplines.

B. S. Major Requirements:
UNITS

English Composition Requirement............. 8

Preparatory Subject Matter.................67-94

Biological Sciences 1C1A and 1B
1 and C, or 2A and 2B and 2C............. 14
Chemistry 2A-2B-2C, 8A-8B or 118A-118B
1-23
Mathematics 1A-1B-1C or 17A-17B-17C or 2A-2B-2C or 21A-21B-21C............. 9-12
Physics 7A-7B-7C............. 12
Statistics 13-22
Agricultural Management and Rangeland Resources 120............. 4

Animal Biology 50A, 50B, 50C............. 8
Broadsheet/General Education............. 24
Preparatory Subject Matter.................67-94

Biology Sciences 101............. 3-6
Animal Biology 102 and 103 or Biological Sciences 102 and 103............. 6-10
One from Neurobiology, Physiology, and Behavior 101, 117, Evolution 102, Wildlife, Fish, and Conservation Biology 121............. 3-5
One from Anatomy, Physiology and Cell Biology 100; Entomology 101; Neurobiology, Physiology, and Behavior 123............. 3-4
Evolution and Ecology 100............. 4
One from Environmental Science 103 Policy 100, 121; Evolution and Ecology 101, 102............. 4
Animal Biology 187............. 2
Animal Science 188 and 1890

Restricted Electives.........................25

Advising Center for the major, including peer advising, is located in 1202 Meyer Hall (530) 754-7915.

Courses in Animal Biology (ABI)

Lower Division Courses

50A. Animal Biology Laboratory (2)
Lecture/laboratory—4 hours. Scientific methods for answering questions in animal biology by doing exercises to demonstrate hypothesis testing and reporting. Short laboratory, population and field experiments. Maintain notebooks, analyze data, interpret results and write reports.—I. (I.) Kimsey, Kuehn

50B. Animal Biology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, Biological Sciences 1B (may be taken concurrently). Basic biological disciplines important to an understanding of practical animal biology issues including the evolution of animal behavior and mechanisms, animal physiology as it relates to maintenance and production, and aspects of comparative anatomy, behavior and ecology.—II. (II) Caswell-Chen

50C. Animal Biology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1B, 1C, courses 50A, 50B. Animal management and conservation. Societal concerns arising from management and conservation issues, including economics, aesthetics, regulations, safety, public perspectives and advocacy.—III. (III) Woodruff, Ferris, Lanzaro

92. Internship in Animal Biology (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Office, laboratory or fieldwork off or on campus in research, governmental regulation, policy making, and private enterprise dealing with animal related issues of production, welfare, pest management, biodiversity and the environment. All requirements of Internship Approval Request form must be met. (P/NP grading only)

98. Directed Group Study (1-5)
(P/NP grading only)

99. Special Study for Undergraduates (1-5)
(P/NP grading only)
Upper Division Courses

102. Animal Biochemistry and Metabolism (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: Chemistry 2A-2B, 8A-8B. Water and biological buffers; thermodynamics of metabolism; structure and function of biopolymers; enzyme kinetics and function; membrane biology; digestion and absorption; carbohydrate metabolism. Not open for credit to students who have completed Biological Sciences 102.—(I) Calvert

103. Animal Biochemistry and Metabolism (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 102. Physiological function and metabolism of lipids and amino acids; integrative metabolism; biochemical basis for nutrient requirements; structure and function of vitamins; mineral metabolism and requirements. Not open for credit to students who have completed Biological Sciences 103.—(II) Calvert

187. Animal Biology Seminar (2)
Seminar—1 hour; discussion—1 hour. Prerequisite: junior standing, courses 50A, 50B, 50C, and 187; course 189 concurrently the first time course 189 is taken. The practicum may be an experimental research project, a library/practicum project or something else that is a creative activity that will serve as a capstone experience for the Animal Biology major. May be repeated once for credit. (P/NP grading only)—I, II, III.—(I.) Calvert

189. Senior Practicum (3)
Independent study—6 hours. Prerequisite: junior standing, courses 50A, 50B, 50C, and 187; course 189 required concurrently. Course helps prevent or solve problems during the students’ senior practicum activity. (P/NP grading only)—I, II, III.—(I, II, III.)

189D. Senior Practicum Discussion (1)
Discussion—1 hour. Prerequisite: junior standing, courses 50A, 50B, 50C, and 187; course 189 required concurrently. Course helps prevent or solve problems during the students’ senior practicum activity. (P/NP grading only)—I, II, III.—(II, III.)

192. Internship in Animal Biology (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Office, laboratory or fieldwork off or on campus in research, governmental regulation, policy making, and private enterprise dealing with animal related issues of production, welfare, pest management, biodiversity and the environment. Requirements of Internship Approval Request form must be met. (P/NP grading only)

198. Directed Group Study (1-5)
(P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)

Animal Biology (A Graduate Group)

Trish Berger, Ph.D., Chairperson of the Group
Group Office, 1102 B Meyer Hall
(530) 752-2382, Fax: (530) 754-4359
http://animalbiology.ucdavis.edu

Faculty

Ernie Chang, Ph.D., Professor
(Animal Sciences, located at Bodega Marine Lab)
Alan J. Conley, Ph.D., Professor
(Population Health and Reproduction; School of Veterinary Medicine)
Mary E. Delany, Ph.D., Professor and Chair (Animal Science)
Edward J. DePeters, Ph.D., Professor
(Animal Science)
Sergei D. Dzhioev, Ph.D., Professor (Animal Science)
Holly B. Ernest, D.V.M., Ph.D., Assistant Professor
(Population, Health and Reproduction; School of Veterinary Medicine)
James G. Fadel, Ph.D., Professor (Animal Science)
Thomas R. Famula, Ph.D., Professor
(Animal Science)
Silas S.O. Hung, Ph.D., Professor (Animal Science)
Russell C. Hovey, Ph.D., Associate Professor
(Animal Science)
Michael L. Johnson, Ph.D., Associate Research Scientist (Director, Aquatic Ecosystems Analysis Laboratory); Adjunct Research Professor (Department of Medicine and Epidemiology; School of Veterinary Medicine)
Kirk C. Klasing, Ph.D., Professor (Animal Science)
Joy A. Mench, Ph.D., Professor (Animal Science)
Y.B. Lee, Ph.D., Professor (Animal Science)
Leslie A. Lyons, Ph.D., Associate Professor (Population Health and Reproduction; School of Veterinary Medicine)
Elizabeth Maga, Ph.D., Associate Researcher and Lecturer (Animal Science)
Bernie Mary, Ph.D., Adjunct Professor (Animal Science)
Juan F. Medrano, Ph.D., Professor (Animal Science)
Joy A. Mench, Ph.D., Professor (Animal Science)
Stuart Meyers, Ph.D., Associate Professor (Anatomy, Physiology and Cell Biology; School of Veterinary Medicine)
Deanne Meyer, Ph.D., Associate in Cooperative Extension and Director (Animal Science)
Brenda J. McCoyan, Ph.D., Associate Professional Researcher and Research Behavioral (Veterinary Medicine Teaching and Research Center and California National Primate Research Center)
James R. Milliam, Ph.D., Professor (Animal Science)
Frank M. Miltoehner, Ph.D., Professor and Associate Specialist in Cooperative Extension (Animal Science)
James D. Murray, Ph.D., Professor (Animal Science)
Anita M. Oberbauer, Ph.D., Professor
James W. Olijen, Ph.D., Specialist in Cooperative Extension and Lecturer (Animal Science)
M. Cecilia Torres-Penedo, Ph.D., Associate Research Geneticist (Veterinary Genetics Laboratory)
Kathryn Radke, Ph.D., Professor (Animal Science)
Peter H. Robinson, Ph.D., Specialist in Cooperative Extension and Lecturer (Animal Science)
Jan F. Roser, Ph.D., Professor (Animal Science)
Roberto D. Sainz, Ph.D., Associate Professor (Animal Science)
Cassandra B. Tucker, Ph.D., Assistant Professor (Animal Science)
Alison I. Van Eenennaam, Ph.D., Associate Specialist in Cooperative Extension and Lecturer (Animal Science)
Catherine A. VandeVoort, Ph.D., Adjunct Professor (California National Primate Research Center; and Reproductive Biology, Obstetrics and Gynecology; School of Medicine)
Barry W. Wilson, Ph.D., Professor (Animal Science)
Richard A. Zinn, Ph.D., Professor (Animal Science; located at Desert Research and Extension Center)

Graduate Study. The Graduate Group in Animal Biology offers programs of study and research leading to the M.S. and the Ph.D. degrees. The Animal Biology Graduate Group is an integrated animal biology. Each student individually tailors his/her program of study to meet individual needs. The Animal Biology Graduate Group is unique in encouraging a multidisciplinary approach to animal science, involving physiology, nutrition, genetics, ecology, and/or behavior within the context of organismal animal biology.

Graduate Advisers. E.J. DePeters, S.S.O. Hung, and E.A. Maga

Courses in Animal Biology (AGB)

Graduate Courses

200A. Integrated Animal Biology I (3)
Lecture/discussion—3 hours. Prerequisite: graduate standing; Biological Sciences 101 or the equivalent or the consent of the instructor. Natural history, management, historical and current uses, and specialized disciplinary features of model and novel animal systems used in research. Development of conceptual approaches in organismal biology to improve experimental design and interpretation of interdisciplinary research studies. Limited enrollment; first pass restricted to Animal Biology Graduate Group students.—(I.) Delany

200B. Integrated Animal Biology II (3)
Lecture/discussion—3 hours. Prerequisite: course 200A. Natural history, management, historical and current uses, and specialized disciplinary features of model and novel animal systems used in research. Development of conceptual approaches in organismal biology to improve experimental design and interpretation of interdisciplinary research studies. Limited enrollment; first pass restricted to Animal Biology Graduate Group students.—(II.) Delany

202. Grant Procurement and Administration (2)
Lecture—1 hour; discussion/ laboratory—1 hour. Prerequisite: course 200A. Topics include structure of grants, attention to specifications, concise persuasive writing, and grant budgeting. Students will learn how to identify grant opportunities, write a persuasive research grant proposal, and administer grants. Limited enrollment: Pass 1 restricted to Animal Biology Graduate Group students.—III. (III.) Midloehner

255. Physiology of the Stress Response (2)
Lecture/discussion—2 hours. Prerequisite: graduate student status. Definition of Stress; Physiological mechanisms of adaptation to stress; Hormonal control of the systemic stress response; Mechanisms of the cellular stress response; Discussion of current trends in stress physiology and current methods for studying the stress response. (Same course as Molecular, Cellular, and Integrative Physiology 255.—III.) Kueltz

290. Seminar in Animal Biology (1)
Seminar—1 hour. Prerequisite: graduate standing. Seminar on advanced topics in animal biology. Presentations by members of the Animal Biology Graduate Group and guest speakers. May be repeated for credit. (S/U grading only)—I, II, III.

290C. Research Conference (1)
Discussion—1 hour. Prerequisite: grant writing, course consent of instructor. Student presentations of research in Animal Biology and discussions among participating students and Animal Biology faculty. May be repeated for credit. (S/U grading only)—I, II, III, IV

298. Group Study in Animal Biology (1-5)
Prerequisite: graduate standing.

299. Research (1-11)
Prerequisite: graduate standing and consent of instructor. Research with a faculty in Animal Biology Graduate Group. May be repeated for credit. (S/U grading only)—I, II, III, IV

300. Methods in Teaching Animal Biology (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing and consent of instructor. Practical experience in the methods and problems of teaching animal biology. Includes analysis of laboratory exercises, discussion of teaching techniques, grading scientific essays, preparing for and conducting discussion or laboratory sections, giving presentations, and exam questions under supervision of instructor. May be repeated up to three times for credit. (S/U grading only)—I, II, (I, II) Famula, Oberbauer
Animal Genetics

Animal Science

Quarter Offered: I=Fall, II=Winter, III=Spring, IV=Summer; 2009-2010 offering in parentheses
General Education (GE) credit: ArtHum=Arts and Humanities; ScRing=Science and Engineering; SocSci=Social Sciences; Div=Social-Cultural Diversity; Wrt=Writing Experience

Varia (1-4)
Variable—3-12 hours. Prerequisite: graduate standing and consent of instructor. May be repeated for credit. (S/U grading only)—I, II, III. (I, II, III)

401. Ethics and Professionalism in Animal Biology (2)
Discussion—2 hours. Prerequisite: graduate standing; first pass Animal Biology graduate group students. Case studies and discussion of ethical and professional issues for animal biologists, including the use of animals in research and teaching, patenting and intellectual property, consulting and conflict of interest, scientific integrity, dealing with the media, and mentoring relationships.—III. (III) Mench

101. Anim Advising Center in 1202 Meyer Hall (530) 754-396. Technical Writing—II. (II.) Kueltz, Murray, Williamson
Questions pertaining to the following courses should be directed to the instructor or to the Animal Science Advising Center in 1202 Meyer Hall (530) 754-7915.

Upper Division Courses

101. Animal Cytogenetics (3)
Laboratory/discussion—1 hour; laboratory—6 hours. Prerequisite: Biological Sciences 101, 102 or the equivalent. Principles and techniques of cytogenetics applied to animal systems; chromosome harvest techniques, analysis of mitosis and meiosis, karyotyping, chromosome banding, cytogenetic mapping, chromosome structure and function, comparative cytogenetics.—III. Delany

105. Horse Genetics (2)
Lecture—2 hours. Prerequisite: course 1S and Biological Sciences 101. Coat color, parentage testing, medical genetics, pedigrees, breeds, the gene map and genre Equus. Emphasis on understanding horse genetics based on the unity of mammalian genetics and making breeding decisions based on fundamental genetic concepts.—III. (III) Murray, Torres-Fenodo

107. Genetics and Animal Breeding (5)
Lecture—4 hours; laboratory—3 hours. Prerequisite: Biological Sciences 101. Principles of quantitative genetics applied to improvement of livestock and poultry. Effects of mating systems and selection methods are emphasized with illustration from current breeding practices.—I. (I) Medrano

111. Molecular Biology Laboratory Techniques (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1C, 101, 102, 103. Introduction to the concepts and techniques used in molecular biology; the role of this technology in both basic and applied animal research, and participation in laboratories using some of the most common techniques in molecular biology.—II. (II) Kueltz, Murray, Williamson

120. Introduction to Statistical Genomics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101, Agricultural Management and Rangeland Resources 120 or Statistics 100 or 102. Statistical concepts associated with genomics. Linkage analysis and grouping, theory and methods for identifying quantitative loci, and algorithms useful in genomics.—III. (III) Famula

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. Selected topics relating to animal genetics. (P/NP grading only)

Graduate Courses

204. Theory of Quantitative Genetics (3)
Lecture—3 hours. Prerequisite: course 107 or the equivalent. Theoretical basis of quantitative genetics and the consequences of Mendelian inheritance. Concepts used to estimate quantitative genetic differences and basis for partitioning the phenotypic variance. Offered in alternate years.—III. (III) Medrano

208. Estimation of Genetic Parameters (3)
Lecture—1 hour; lecture/discussion—1 hour. Review of techniques for the genetic engineering of animals and their limitations and applications. Student-led discussions of recent papers in the field and possible future applications of genetically engineered animals in basic research and applied agricultural and medical research. Offered in alternate years. (S/U grading only)—III. (III) Famula

212. Sequence Analysis in Molecular Genetics (2)
Lecture/laboratory—2 hours. Prerequisite: Biological Sciences 101 or the equivalent, graduate standing, or consent of instructor. Use of computer algorithms and online databases to analyze nucleic acid and protein sequences in molecular genetics research. Offered in alternate years.—II. (II) Medrano

298. Group Study (1-5)
Prerequisite: consent of instructor. Lectures and discussions of advanced topics in animal genetics. (S/U grading only)

299. Research in Animal Genetics (1-12)
(S/U grading only)

Animal Physiology

See Animal Biology, on page 139; Animal Science, on page 141; Neurobiology, Physiology, and Behavior, on page 420; Philosophy, on page 432; and Molecular, Cellular, and Integrative Physiology (A Graduate Group), on page 409.
Animal Physiology

Fred S. Conte, Ph.D., Lecturer and Specialist in Cooperative Extension and Lecturer
Elizabeth Abel, Ph.D., Associate Researcher and Lecturer
Bernard P. May, Ph.D., Adjunct Professor
Deanne Heyer, Ph.D., Specialist in Cooperative Extension and Lecturer
Kenji Murata, Ph.D., Assistant Researcher
Deanne Meyer, Ph.D., Specialist in Cooperative Extension and Lecturer
James W. Oltjen, Ph.D., Specialist in Cooperative Extension and Lecturer
Peter H. Robinson, Ph.D., Specialist in Cooperative Extension and Lecturer
Alison L. Van Eenennaam, Ph.D., Associate Specialist in Cooperative Extension and Lecturer
Dana B. Van Liew, M.Ed., Lecturer, Academic Center.

B.S. Major Requirements:

Depth Subject Matter ........................... 38-42

- **Biology**: Biological Sciences 101; Animal Genetics 107, Animal Biology 102, 103, Neurobiology, Physiology, and Behavior 101, 102, 103, and 104.
- **Integrative Animal Biology**: Animal Science 123, 124, and 127.
- **Behavior** and **Sociology** courses, or other courses approved by your faculty advisor.

Laboratory: Select one from the following:

- Animal Genetics 111; Animal Science 106 or 126 and 132; Microbiology 102L; Molecular and Cellular Biology 120L or 160L; Neurobiology, Physiology, and Behavior 101L or 104L; Pathology, Microbiology, and Immunology 121L.
- **Area of Specialization** ........................... 20-23

Choose one area of specialization below, the program of study must be approved in advance by your faculty advisor.

**Animal Science with a Disciplinary Focus** ........................... 20

Select 20 upper division units, with approval from your faculty advisor, to form a coherent series of courses in one of the following disciplines: animal behavior, biochemistry, genetics, nutrition, or physiology.

**Aquatic Animals** ........................... 20

Select 20 upper division units, with approval from your faculty advisor, to form a coherent series of courses in the aquatic sciences.

**Avian Sciences** ........................... 20

Select 20 upper division units from any Animal Genetics or Animal Science course, or other courses approved by your faculty advisor.

- Select additional units from any Animal Genetics or Animal Science course, or other courses approved by your faculty advisor.
- Students in this specialization must take Animal Science 136 and 137 to meet their Laboratory Depth Subject Matter requirement.
- Students in this specialization may elect to substitute any of Biological Sciences 104, Evolution and Ecology 112, or Wildlife, Fish, and Conservation Biology 120 and 121 for the 12-unit requirement under Integrative Animal Biology, with approval of your faculty adviser.

**Avian Sciences** ........................... 20

Select 20 upper division units from any Animal Genetics, Animal Science, or Aquatic Sciences courses or other courses approved by your faculty advisor.

- Select additional units from any Animal Genetics, Animal Science, or Aquatic Sciences courses or other courses approved by your faculty advisor.
- Students in this specialization must substitute Animal Sciences 103, 121, and Neurobiology, Physiology, and Behavior 117 for the Animal Science 118 requirement.
- Neurobiology, Physiology, and Behavior 121 and 121L requirement under Integrative Animal Biology.

**Companion and Captive Animals** ........................... 20

Select 20 upper division units from any Animal Genetics, Animal Science, or Aquatic Sciences courses, or any Animal Genetics, Animal Science, or Aquatic Sciences courses.

- Select additional units from any Animal Genetics, Animal Science, or Aquatic Sciences courses, or any Animal Genetics, Animal Science, or Aquatic Sciences courses.
- Students in this specialization must substitute Animal Sciences 103, 121, and Neurobiology, Physiology, and Behavior 117 for the Animal Science 118 requirement.
- Neurobiology, Physiology, and Behavior 121 and 121L requirement under Integrative Animal Biology.

**Equine Science** ........................... 20

Select 20 upper division units from any Animal Genetics, Animal Science, or Aquatic Sciences course, or from Nutrition 115, 122, 123, 123L or other courses approved by your faculty adviser.

**Laboratory Animals** ........................... 23

- Animal Science 20, 103, 140, Nutrition 123, 123L, 123T, 124, or 125.
- Neurobiology, Physiology, and Behavior 102 and 104.
- Select additional units from any Animal Genetics, Animal Science, or Aquatic Sciences course, or from Nutrition 115, 122, 123, 123L or other courses approved by your faculty adviser.

**Livestock and Dairy** ........................... 20

- Select one of Animal Science 143, 144, 146; Animal Science 145 or 147; and Nutrition 115.
- Select additional upper division units from any Animal Genetics, Animal Science or Animal Science course, or Nutrition 122, 123, 123L or other courses approved by your faculty adviser.

**Poultry** ........................... 20

- Avian Sciences 11, 100, 150; Animal Sciences 143, Avian Sciences 149 or Food and Technology 121; Nutrition 123, 123L.
- Select additional upper division units from any Animal Genetics, Animal Science, Avian Sciences, or other courses approved by your faculty adviser.

- Students in this specialization must substitute Avian Sciences 103, 121, and Neurobiology, Physiology, and Behavior 117 for the Animal Science 124 and Neurobiology, Physiology, and Behavior 121 and 121L requirement under Integrative Animal Biology.

**Unrestricted Electives** ........................... 23-42

**Total Units for Degree** ........................... 180

**Minor Program Requirements:**

The Department of Animal Science offers five minor programs open to students majoring in other disciplines who wish to complement their study programs with a minor in Animal Science. Some courses have required prerequisites not included as part of the minor, and students should plan accordingly.

**UNITS**

**Animal Science—Animal Biology** ........................... 20

- Animal Science 15, 42, 41 and 41L, and 41L and 21

- Additional upper division courses ........................... 2-8

Select additional units to complete the 20-unit total from upper division Animal Science courses, Animal Genetics courses, Neurobiology, Physiology, and Behavior 121; 121L, Nutrition 115, 122, 123, 123L.

- Variable unit courses (92, 99, 192, 197, 198, 199) are not allowed for the completion of this requirement.

**Animal Science—Animal Genetics** ........................... 20

- Animal Science 15, 42, 41 and 41L, and 41L and 21

- Additional upper division courses ........................... 2-8

Select additional units to complete the 20-unit total from upper division Animal Science courses, Animal Genetics courses, Neurobiology, Physiology, and Behavior 121; 121L, Nutrition 115, 122, 123, 123L.

- Variable unit courses (92, 99, 192, 197, 198, 199) are not allowed for the completion of this requirement.

**Animal Science—Aquaculture** ........................... 20

- Animal Science 18

- Additional upper division courses ........................... 2-8

Select additional units to complete the 20-unit total from upper division Animal Science courses, Animal Genetics courses, Applied Biological Systems Technology 161, Nutrition 124, Wildlife, Fish, and Conservation Biology 121. Variable unit courses (92, 99, 192, 197, 198, 199) are not allowed for the completion of this requirement.

**Animal Science—Dairy/Livestock** ........................... 20

- Animal Science 41 and 41L or 21

- Additional upper division courses ........................... 2-8

Select additional units to complete the 20-unit total from upper division Animal Science courses, Animal Genetics courses, Neurobiology, Physiology, and Behavior 121; 121L, Nutrition 115, 122, 123, 123L.

- Variable unit courses (92, 99, 192, 197, 198, 199) are not allowed for the completion of this requirement.

**Quarter Offered:** I-Fall, II-Winter, III-Spring, IV-Summer; 2009-2010 offering in parentheses

**General Education (GE) credit:** ArtHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Social-Cultural Diversity; Wrt=Writing Experience
Courses in Animal Science (ANS)

Lower Division Courses

1. Domestic Animals and People (4)
   Lecture—3 hours; laboratory—3 hours. Animal domestication and factors affecting their characteristics and distribution. Animal use for food, fiber, work, drugs, research and recreation; present and future aspects of the human-animal relationship, the initiation of lactation, the composition of milk and milk products. GE credit: SciEng. Wrt.—I. (I.) Kurlitz

2. Livestock and Dairy Cattle Judging (2)
   Laboratory—6 hours. Prerequisite: course 1 or 2 recommended. Evaluation of type as presently applied to light horses, meat animals and dairy cattle. Relations between form and function, form and conformation, and form and milk production. GE credit: SciEng. Wrt.—I. (I.) Van Liew

22A. Animal Evaluation (2)
   Laboratory—3 hours; fieldwork—30 hours (total). Prerequisite: course 21 or the equivalent. Attendance at 3 one-day weekend field trips required. Domestic livestock species with emphasis on visual appraisal, carcass evaluation, and application of performance information. Emphasis on accurate written and oral evaluations. Prerequisite to intercollegiate judging competition. Offered in alternate years. (P/NP grading only)—I. (I.) Van Liew

22B. Animal Evaluation (2)
   Laboratory—3 hours; fieldwork—30 hours (total). Prerequisite: consent of instructor or the equivalent. Attendance at 3 one-day weekend field trips required.

Continuation of course 22A with emphasis on specific species: swine, beef cattle and sheep. Application of animal science principles to evaluation and management problem-solving scenarios. Prerequisite to intercollegiate judging competition. Offered in alternate years. (P/NP grading only)—I. (I.) Van Liew

41. Domestic Animal Production (2)

41L. Domestic Animal Production Laboratory (3)
   Discussion—1 hour; laboratory—3 hours. Prerequisite: course 41 may be taken concurrently. Animal production principles and practices, including field trips to dairy cattle, beef cattle, sheep, and swine operations and campus labs. (P/NP grading only)—I, II, III. (II, III.) Mitloehner, Van Liew

42. Introductory Companion Animal Biology (4)

49A.1 Animal Management Practices (2)
   Discussion—1 hour; laboratory—3 hours. The application of the principles of elementary biology to the management of a specific animal species. Among the topics may be: (A) Beef, (B) Dairy, (C) Poultry, (D) Swine. (P/NP grading only)—I, II, III. (I, II, III.) Van Liew

90C. Research Group Conference (1)
   Discussion—1 hour. Prerequisite: lower division standing, consent of instructor. Weekly conference on research problems, progress and techniques in the animal sciences. May be repeated for credit. (P/NP grading only)—I, II, III, IV, V, VI, VII, VIII. (I, II, III, IV, V, VI, VII, VIII.) Sainz

92. Internship in Animal Science (1-12)
   Internship—3-18 hours. Prerequisite: consent of instructor. Internship off and on campus in dairy, livestock, and aquaculture production and research and management, or in a business, industry, or agency associated with these or other animal enterprises. All requirements of Internship Approval form must be met. (P/NP grading only)—I, II, III. (I, II, III.) Lee

98. Directed Group Study (1-5)
   Prerequisite: consent of instructor. (P/NP grading only)

99. Special Study for Undergraduates (1-5)
   Prerequisite: consent of instructor. (P/NP grading only)

Upper Division Courses

103. Animal Welfare (4)
   Lecture—2 hours; discussion—2 hours. Prerequisite: course 104 or Neurobiology, Physiology, and Behavior 102 or the equivalent or consent of instructor. The application of principles of animal behavior and physiology to assessment and improvement of the welfare of wild, captive, and domestic animals. Topics include animal pain, stress, cognition, motivation, emotions, and preferences, as well as environmental enrichments. GE credit: SciEng. Wrt.—I. (I.) Tucker

104. Principles of Domestic Animal Behavior (3)
   Lecture—3 hours. Prerequisite: Biological Sciences 1A or 1B or the equivalent. Basic principles of animal behavior, experimental and applied species. Emphasis will be placed on behavioral development and social behavior. External (exogenous) and physiological mechanisms influencing behavior will be discussed. GE credit: SciEng. Wrt.—III. (III.) Tucker

105. Domestic Animal Behavior (2)
   Lecture—2 hours. Prerequisite: an introductory animal behavior course. Prerequisites: 150, Neurobiology, Physiology, and Behavior 102 or consent of instructor. Application of the principles of animal behavior in the management of domestic animals. Includes reproduction, feeding behavior, agonistic behavior, animal handling and human-animal interactions. GE credit: SciEng. Wrt.—I. (I.) Tucker

106. Domestic Animal Behavior Laboratory (2)
   Laboratory—6 hours. Prerequisite: course 104 or the equivalent. Research experience with the behavior of large domestic animals. Experimental design, methods of data collection, the reporting of experimental results. GE credit: SciEng. Wrt.—II. (II.) Tucker

115. Advanced Horse Production (4)
   Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 110, 111; Biological Sciences 115; Neurobiology, Physiology, and Behavior 101; or consent of instructor. Feeding, breeding, and management of horses; application of the basic principles of animal science to production of all types of horses. Designed for students who wish to become professionally involved in the horse industry. GE credit: SciEng.—I. (I.) Tucker

118. Fish Production (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: Wildlife, Fish, and Conservation Biology 120 and 121. Current practices in fish production; relationship between the biological aspects of a species and the production systems, husbandry, management, and marketing practices utilized. Emphasis on species currently reared in California. GE credit: SciEng.—II. (II.) Doroshov

119. Invertebrate Aquaculture (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 115. Management, breeding and feeding of aquatic invertebrates; application of basic principles of physiology, reproduction, and nutrition to production of mollusks and crustaceans for human food; emphasis on interaction of species biology and managerial techniques on production efficiencies. GE credit: SciEng.—II. (II.) Tucker

120. Principles of Meat Science (3)
   Lecture—3 hours. Prerequisite: Biological Sciences 1A. Anatomical, physiological, developmental, and biochemical aspects of muscle underlying the conversion of muscle to meat. Includes meat processing, preservation, microbiology, and public health issues associated with meat products. (Same course as Food Science and Technology 120.) GE credit: SciEng. Wrt.—III. (III.) Lee

120L. Meat Science Laboratory (2)
   Discussion—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 1A; course 120 may be taken concurrently. Laboratory exercises and student participation in transformation of live animal to carcass and meat, structural and biochemical changes related to meat quality, chemical and sensory evaluation of meat, and field trips to packing plant and processing plant. (Same course as Food Science and Technology 120L.) GE credit: SciEng. Wrt.—III. (III.) Lee

123. Animal Growth and Development (4)
   Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: Animal Biology 103 or Biological Sciences 103. Growth and development of animals from conception to maturity, viewed from practical and biological perspectives; including endocrine, nutritional control of cell and organism function. GE credit: SciEng. Wrt.—III. (III.) Sainz

124. Lactation (4)
   Lecture—3 hours; laboratory—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101. Animal Biology 103 (may be taken concurrently) or the equivalent background knowledge. Consideration of the biochemical, genetic, physiological, nutritional, and structural factors relating to mammary gland development, the initiation of lactation, the composition of milk and lactational performance. GE credit: SciEng. Wrt.—II. (II.) Hovey
125. Equine Exercise Physiology (3)
Lecture—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101 and an advanced learning class broadcast from Cal Poly, Pomona, on basic and applied physiology of the exercising horse. Includes physiological systems, gait analysis, lameness, pharmacology, and sport horse performance evaluation and conditioning. Students and instructor have two-way communication capabilities. —II. (III.) Roder

126. Equine Nutrition (3)
Lecture—3 hours. Prerequisite: course 15, Nutrition 115. Distance learning class broadcast from Cal Poly, Pomona and CSU Fresno on equine nutrition. Includes equine digestion, digestive physiology, diet development, and the relationship of the topics to recommended feeding practices and nutritional portions. —I. (II.) Roder

127. Advanced Equine Reproduction (3)
Lecture—3 hours. Prerequisite: an upper division physiological course (e.g., Neurobiology, Physiology, and Behavior 101) and an advanced horse production and management course (e.g., course 115). Distance learning course that provides in-depth knowledge of the reproductive physiology, anatomy and endocrinology of the mare and stallion. Emphasis on structure/function relationships as they are applied to improving equine reproductive management and efficiency. —II. (III.) Roder

128. Agricultural Applications of Linear Programming (4)
Lecture—2 hours; laboratory—2 hours; discussion—1 hour. Prerequisite: upper division standing and Agricultural Systems and Environment 211 or the equivalent. Applications of linear programming in agriculture, emphasizing resource allocation problems and decision making. Problems include crop production, ration formulation, and farm management. Hands-on experience in developing linear programs and interpreting the results. —II. (III.) Fadel

129. Environmental Stewardship in Animal Production Systems (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Biological Sciences 10 or 1A and 1B, Chemistry 2A, 2B, 8A, 8B. Management principles of environmental stewardship for grazing lands, animal feeding, operations, and aquaculture operations; existing regulations, sample analyses, interpretation and utilization of data, evaluation of alternative practices, and policy development. —II. (III.) Meyer

130. Reproduction and Early Development in Animal Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Molecular and Cellular Biology 150; Wildlife, Fish, and Conservation Biology 120, 121; or consent of instructor. Principles and developmental fundaments related to reproduction, breeding efficiency and fertility of animals commonly used in aquaculture. —III. (III.) Dorashov

136. Techniques and Practices of Fish Culture (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 1A and Chemistry 8B or the equivalent. Daily care and maintenance of fish in the personal aquarium, research, and commercial facilities. Biological and environmental factors important to sound fish management. Laboratories focus on fish culture and include growth trials. GE credit: SciEng, Wrt.—I. (II.) Hung

137. Animal Biochemistry Laboratory (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: Animal Biology 102 or Biological Sciences 102 or the equivalent. Chemical and biochemical methods, and interpretation of results obtained in animal science. Wet chemical methods, UV/visible and atomic absorption spectrophotometry, thin-layer and gas-liquid chromatography, commercial chemical kits. Attention to safety. —II. (III.) Hung

138. Advanced Animal Biochemical Techniques (3)
Laboratory—6 hours; lecture—1 hour. Prerequisite: Biological Sciences 102 and 103 or Animal Biology 102 and 103. Theory and advanced practices of biochemistry techniques used in animal research. Topics include laboratory and radiation safety, experimental design, data collection, data analysis, response growth trial, record keeping, statistical analysis, biological sampling and instrumentation in radio-immuno-assay, ELISA, and immuno-sorbent-assay, spectroscopy, chromatography, electrophoresis, and reporting. —III. (III.) Hung

140. Management of Laboratory Animals (4)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101. Laboratory animal management procedures in view of animal physiology, health and welfare, government regulations, and experimental needs. Clinical techniques and aspects of housing models. —I. (II.) Roder

141. Equine Enterprise Management (4)
Lecture/discussion—4 hours. Prerequisite: course 115; Economics 1A, 1B recommended. Examination of the concepts and principles involved in the operation of an equine enterprise. Existential aspects of equine enterprise management, including equine law, marketing, cash flow analysis, and impact of state and federal regulations. GE credit: SocSci, Wrt.—I. (II.) Hung

142. Companion Animal Care and Management (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 42, Biological Sciences 101, Neurobiology, Physiology, and Behavior 101. In-home care and management of companion animals. Examination of the structure/function relationships of the hoof for a companion animal. —I. (II.) Oberbauer

143. Pig and Poultry Care and Management (4)
Lecture—3 hours; laboratory—3 hours; Saturday field trips. Prerequisite: Nutrition 115, Neurobiology, Physiology, and Behavior 101. Care and management of swine, broilers and turkeys as related to environmental physiology, nutrition and metabolism, disease management and reproduction. Offered in alternate years. —I. (II.) King

144. Beef Cattle and Sheep Production (4)
Lecture—3 hours; laboratory—3 hours; one or two Saturday field trips. Prerequisite: course 41, Animal Genetics 107, Nutrition 115, or consent of instructor; a course in Range Science and a course in micromarketing are recommended. Genetics, physiology, nutrition, economics and business in beef cattle and sheep production. Resources used, species differences, range and feedlot operations. Emphasis on integration and information needed in methods for management of livestock enterprises. —III. (III.) Sait

145. Meat Processing and Marketing (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 143 or 144 or consent of instructor. Distribution, processing and marketing of meat and meat products. Techniques involved in grading and pricing. Government regulations and social/consumer concerns. Future trends and impact on production management practices. Includes porciny. —II. (II.) Lee

146. Dairy Cattle Production (4)
Lecture—2 hours; laboratory—3 hours; one mandatory Saturday field trip. Prerequisite: course 124, Animal Genetics 107, and Nutrition 115, or consent of instructor. Scientific principles from genetics, nutrition, physiology, and marketing as related to commercial animal production. GE credit: SciEng, Wrt.—III. (III.) DePeters

147. Dairy Processing and Marketing (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 146 or consent of instructor. Examination of distribution systems, processing practices, product quality, impact of government policy (domestic and foreign), marketing alternatives, and product development. —II. (II.)

148. Enterprise Analysis in Animal Industries (4)
Lecture/discussion—4 hours. Prerequisite: course 141 or 145 or consent of instructor. Examination and application of decision making and problem solving in the production enterprise. The areas of enterprise analysis, problem solving, risk analysis and cost/benefit analysis will be examined in terms of the total enterprise. GE credit: SocSci, Wrt.—III. (III.)

149. Forestry Science Laboratory (1)
Laboratory—3 hours. Prerequisite: course 146. Distance learning class broadcast from California Polytechnic State University San Luis Obispo, California Polytechnic State University Pomona, and California State University Fresno. Integration of the structure/function relationship of the equine hoof and how it relates to conformation, injury, and performance. —III. (III.)

149L. Forester Science Laboratory (1)
Laboratory—3 hours. Prerequisite: course 146 (may be taken concurrently) or consent of instructor. The art and science of horseshoeing in equine related fields. Proper use of the tools, materials and techniques in the fabrication of shoes and shoe preparation of the hoof for application of shoes. (P/NP grading only) —III. (III.)

170. Ethics of Animal Use (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: any basic science course in comparative anatomy or bioethics issues relating to animal use in contemporary society. Integration of philosophical theories with scientific evidence relating to animal behavior, mentality, and welfare. Uses of animals in art and consent of research, and as companions. Ethical responsibilities regarding wildlife and the environment. (Same course as Veterinary Medicine 170.) GE credit: SocSci, Wrt.—II. (III.) Munch

190C. Research Group Conference (1)
Discussion—1 hour. Prerequisite: advanced standing; consent of instructor. Weekly conference on research problems, progress and techniques in the animal sciences. May be repeated for credit. (P/NP grading only) —I, II, III, (II, III)

192. Internship in Animal Science (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Internship off and on campus in dairy, livestock and aquaculture production, research and management, or in a business, industry, or agency associated with these or other animal enterprises. All requirements of Internship Proposal Form must be met. (P/NP grading only)—I, II, III, (II, III)

194. Research in Animal Science (3)
Laboratory—6 hours; discussion—1 hour. Prerequisite: upper division standing, course 193, one laboratory course in animal biology or another course as approved by instructor. Research with a faculty mentor. Weekly discussion and laboratory on specific research topic. May include a seminar to research group. Choose from sections 1. Animal Behavior; 2. Animal Genetics; 3. Animal Nutrition; 4. Animal Physiology. May be repeated for credit for a total of four times. —I, II, III, (II, III)

194HA-194HB-194HC. Undergraduate Honors Thesis in Animal Science (4-4-4)
Lecture—1 hour; laboratory—9 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101, Animal Biology 103; minimum cumulative GPA of 3.0 and approval selection by committee. Students will carry out a research project (chosen from faculty-suggested or approved proposals) during the academic year under the guidance of a faculty mentor. Upon completion, sultent will write a thesis and present a public seminar describing his/her research. (Deferred grading only, pending completion of sequence.)

197T. Tutoring in Animal Science (1-2)
Tutorial—1-2 hours. Prerequisite: Animal Science or related major, advanced standing, consent of instructor. Tutoring of students in lower division animal science courses; weekly conference with instructors in

Quarter Offered: F(-Fall), W(-Winter), S(-Spring), V(-Summer), 2009-2010 offering in parentheses

charge of courses; written critiques of teaching procedures. May be repeated once for credit. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200. Strategies in Animal Production (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Examines the forces and issues in animal agriculture through the strategic management process. (I, II, III.)

206. Models in Agriculture and Nutrition (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Mathematics 16B, Statistics 108. Basic model building principles and techniques for statistical and systems simulation models. Optimization techniques for non-linear experimental designs and management models are presented. Quantitative analysis and evaluation of linear and non-linear equations used in agriculture and nutrition.—Fadel

259. Literature in Animal Science (1)
Seminar—1 hour. Prerequisite: graduate standing. Critical presentation and analysis of recent journal articles in animal science. May be repeated for credit up to nine times. (S/U grading only.)—I, II, III, (I, II, III.)

290C. Research Group Conference (1)
Discussion—1 hour. Prerequisite: graduate standing. Weekly conference on research problems, progress and techniques in the animal sciences. May be repeated for credit. (S/U grading only.)—I, II, III, (I, II, III.)

293. Current Research in Animal Science (1)
Seminar—1 hour. Prerequisite: graduate standing. Current research in animal science explored at weekly seminars presented by guest lecturers. Discussion of research presented. May be repeated for credit. (S/U grading only.)—I, II, III, (I, II, III.)

297. Supervised Teaching in Animal Science (2)
Supervised teaching—6 hours. Prerequisite: consent of instructor. Practical experience in teaching Animal Science at the University level; curriculum design and evaluation, preparation and presentation of material. Assistance in laboratories, discussion sections, and evaluation of student work. An evaluation letter sent to the Graduate Adviser with a copy to the student. (S/U grading only.)—I, II, III, (I, II, III.)

298. Group Study (1-5)
Prerequisite: consent of instructor. (Sect. 1, 2, 3—letter grading; from Sect. 4 on—S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Animal Science and Management

[College of Agricultural and Environmental Sciences]

Master Adviser. J. G. Fadel

Advising Center for the major (including peer advising) is located in 1202 Meyer Hall (530) 754-7915. Each student will be assigned a faculty adviser from this office upon entering the major.

The Major Program

The Animal Science and Management major combines a thorough education in the basic biology of domestic animal species grown with a strong background in agricultural economics. Graduates of this interdisciplinary major will be well positioned to adjust to our rapidly changing world and job market.

The Program. The interdisciplinary program in Animal Science and Management combines a fundamental background in the natural sciences (chemistry, biology, physiology, nutrition, genetics, mathematics, and behavior), with an understanding of economics and humanities. After completing preparatory courses, students focus on both the animal species that interest them (horses, cattle, sheep, companion animals, goats, fish, crustaceans or mollusks, among others) and principles of managerial economics (marketing, finance, business organization or systems analysis). Students preparing for medical or veterinary school can meet professional entrance requirements with those of this major if they plan ahead.

Career Alternatives. Job opportunities for successful graduates are plentiful and include positions with banking and financial institutions, agribusiness, Peace Corps, and international development. Most Animal Science and Management graduates are well prepared for professional study (medical, law, veterinary, and graduate business schools) as well as graduate research programs leading to the M.S. or Ph.D. degrees. Advanced degree opens doors to work as extension specialists, farm advisors, and teachers, and prepare students for international service.

B.S. Major Requirements:

UNITS

Written and Oral Expression.................8-16

See College requirement.................0-8

Select two courses (if not selected for English college requirement) from Communication 130, 134, 135, 136, 140; Nematology 150; University Writing Program 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, 104E. 104F..........................8

Preparatory Subject Matter...............69-72

Animal Science 1 and 2......................8

Biological Sciences 2A, 2B, and 2C, or Biological Sciences 1A, 1B, and one of Biological Sciences 1C, Plant Sciences 2, 110A, 112, or Environmental Horticulture 13-15

Chemistry 2A, 2B, 8A, 8B..................16

Plant Sciences 21 or Computer Science Engineering 15.................................3-4

Economics 1A, 1B, Management 11A, 11B....................................................16

Mathematics 16A, 16B, and 16C or the more advanced mathematics courses........9

Plant Sciences 120, Statistics 100 or 103, or other courses in quantitative skills with prior approval of the Master Adviser...............4

Breadth/General Education Subject Matter.............................................12-24

Depth Subject Matter.......................27-30

Biological Sciences 101........................................4

Nutrition 112...........................................4

Neurobiology, Physiology, and Behavior 101...........................................5

Business Management........................................14-17

Agricultural and Resource Economics 100A;
One course from Agricultural and Resource Economics 120, 130, 136, 138;
One course from Agricultural and Resource Economics 120, 130, 145, 157; Plus one course from Animal Science 128 or Agricultural and Resource Economics 155.

Area of Specializations.......................14-16

Choose one area of specialization below.

Aquatic Animals........................................16

Animal Science 18, 118 or 119, 131, and 148

Companion Animals.............................16

Animal Science 42, 140, 142, and 148.

Dairy....................................................15

Animal Science 41, 411, 146, 147, and 148.

Equine..................................................15

Animal Science 15, 115, 141, and 148

Livestock...............................................16

Animal Science 41, 411, 143 or 144, 145, and 148.

Poultry..................................................15

Avian Sciences 11, Animal Science 143, 145, and 148.

Individualized........................................14-16

Students may, with prior approval of their adviser and the Master Adviser, design their own individualized specialization within the major. The specialization will consist of 4 to 6 courses with one of the courses being Animal Science 148. The other courses will include an introduction, care and management, and processing and/or marketing aspects of the animal of interest.

Restricted Electives.................................8-10

At least two additional courses (minimum 8 units; duplicate from Depth courses not counted) selected with approval of adviser from: Agricultural and Resource Economics 18, 112, 113, 118, 120, 130, 132, 136, 138, 140, 142, 143, 144, 145, 150, 155, 157, 171A, 171B, 176; Animal Science 103, 104, 105, 106, 115, 118, 119, 120, 120S, 123, 124, 125, 126, 127, 128, 129, 131, 136, 137, 140, 141, 142, 143, 144, 145, 146, 147, 149, 170, 192, 194, 194H; Avian Sciences 100, 103, 115, 121, 123, 149, 130; Animal Genetics 101, 107, 111, Nutrition 122, 123, 128, 124; Animal Biology 102 (strongly recommended), 103; Computer Science Engineering 124; Management 100, Neurobiology, Physiology, and Behavior 117, 121, 130; Wildlife, Fish, and Conservation Biology 120, 120L, 130.

Unrestricted Electives............................12-42

Total Units for the Degree..........................180

Anthropology

[College of Letters and Science]

Bruce Winterhalder, Ph.D., Chairperson of the Department

Department Office. 330 Young Hall (530) 752-0475, 0746, 752-0745/0746; http://www.anthro.ucdavis.edu

Faculty

Robert L. Bettinger, Ph.D., Professor
Monique Borgerhoff Mulder, Ph.D., Professor
Christynn Darwent, Ph.D., Associate Professor
Martial de la Cadena, Ph.D., Associate Professor
Timothy K. Choy, Ph.D., Assistant Professor
Bruce Winterhalder, Ph.D., Chair

Other L. Bettinger, Ph.D., Professor

H Dumit, Ph.D., Associate Professor

Joseph Dumit, Ph.D., Associate Professor

Suad Joseph, Ph.D., Professor

(eating Science and Technology Studies)

Jolmer W. Eerkens, Ph.D., Associate Professor

Alexander H. Harcourt, Ph.D., Professor

Lynne A. Isbel, Ph.D., Professor

Alan Klima, Ph.D., Associate Professor

Andrew J. Marshall, Ph.D., Assistant Professor

Richard McEathern, Ph.D., Associate Professor

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer. 2009-2010 offering in parentheses.

Anthropology

Henry M. McHenry, Ph.D., Professor
(JUC Davis Prize for Undergraduate Teaching and Scholarship; Academic Adviser)
Suzanna M. Sawyer, Ph.D., Associate Professor
Janet S. Shibamoto Smith, Ph.D., Professor
David Glenn Smith, Ph.D., Assistant Professor
James Smith, Ph.D., Assistant Professor
Smitri Srinivas, Ph.D., Professor
Teresa E. Steele, Ph.D., Assistant Professor
Timothy G. Watters, Ph.D., Assistant Professor
Bruce P. Winterhalder, Ph.D., Professor
Aram A. Yengoyan, Ph.D., Professor
Timothy D. Weaver, Ph.D., Assistant Professor

Emeriti Faculty

David J. Boyd, Ph.D., Professor Emeritus
Richard T. Curley, Ph.D., Senior Lecturer Emeritus
William G. Dauster, Ph.D., Professor Emeritus
Jack D. Forbes, Ph.D., Professor Emeritus
Sarah B. Hrdy, Ph.D., Professor Emerita
David L. Olmsted, Ph.D., Professor Emeritus
Peter S. Rodman, Ph.D., Professor Emeritus
G. William Skinner, Ph.D., Professor Emeritus
Carol A. Smith, Ph.D., Professor Emerita
Carolyn F. Wall, Senior Lecturer Emerita

The Major Program

Anthropology is the systematic study of human beings. The student of anthropology learns about human biology, ecology, and social life—past and present—and the broad understanding of humans and societies. It is a diverse field, and the courses, faculty, and degree programs at UC Davis are subdivided into two wings—Evolutionary and Sociocultural.

Evolutionary. Evolutionary anthropologists are united by their common application of science to understand the behavior, ecology, history, and evolution of humans and non-human primates, as individuals and as societies. The many useful approaches to these topics bring together archaeology, human behavioral ecology, molecular anthropology, paleoanthropology, biogeography, conservation biology, and primatology. Archaeology is the study of the history or prehistory by analysis of a people's artifacts, or their material culture, with the goal of constructing a history and reconstituting human behavior. Human behavioral ecology is the study of how variation in ecology and social organization can help us understand variation in human behavior. Molecular anthropology uses DNA to study the genetics among different populations and the adaptive significance of specific genetic traits. Paleoanthropology uses comparisons among fossils to understand what morphological changes occurred during the course of human evolution. Biogeography investigates the biology behind the geographic distribution of species, and also the interaction between species. Conservation biology explores the causes of loss of biological diversity—in this department, it focuses on threatened non-human primates and the conservation of natural resources by a rapidly growing population. Primatology is the study of behavior, ecology and morphology of primates to address questions about the evolution and function of behavioral and morphological patterns in nonhuman primates and to test models of the origins of human morphology and behavior.

Sociocultural. Sociocultural anthropologists study the varied ways in which people around the world organize their lives and interpret the circumstances in which they live. The principal method is extended field research, which combines attention to global issues with the close study of human relations and culture. Among the themes addressed in the department's courses are globalization and transnationalism, human ecology and environmental change, the global spread of media and technology, migration, multiculturalism and urban life, capitalism and development; race, class and gender; rebellion, resistance and the cultural politics of everyday life; language use and discourse; and self, identity and family. The track in sociocultural anthropology thus offers an unusually rich set of resources for understanding and engaging pressing issues in a globalizing world characterized by new forms of international culture and community as well as by increasing material inequality and political volatility.

The Program. The Bachelor of Arts program is divided into two tracks, Sociocultural and Evolutionary, which parallel the two wings described above. Students interested in the study of recent and contemporary human languages and societies should follow the Sociocultural Track. To obtain a B.A. degree in sociocultural anthropology, each student is required to complete courses that provide (1) foundational skills, (2) language and cultural skills, (3) comprehensive skills, and (4) specialization skills. Students interested in the study of archaeology; primates; or, human biology, ecology or origins should follow the Evolutionary Track. The B.A. degree offered by the Evolutionary Track provides general training in anthropology from an evolutionary perspective. The Evolutionary Track also offers a B.S. degree that requires more rigorous lower division coursework in math and science than the B.A. degree and upper division coursework in biological anthropology and closely related disciplines.

Students in both tracks are encouraged to gain practical experience through courses taken while studying abroad (under the direction of the Education Abroad Center) and through internships performed for credit (under the administration of the Internship and Career Center). Students showing exceptional ability are welcome to seek permission from instructors to pursue graduate seminars and internships offered by the department and to have these courses count towards the fulfillment of upper division requirements for graduation.

Career Alternatives. A Bachelor of Arts degree in Anthropology is suited for students seeking a solid liberal arts education. With its broad facility to facilitate understanding across lines of cultural difference, sociocultural anthropology prepares students for lives that are influenced by increasingly pervasive cultural exchange, as well as cultural conflict, around the world. The program serves as excellent preparation for careers in intercultural skills are increasingly needed, including social and environmental activism, business, diplomacy and social administration, journalism, law, education and intercultural relations. Students that focus on evolutionary processes will be well prepared to enter fields such as medical or health anthropology, museum studies, cultural resource management and wildlife conservation. A B.A. or B.S. degree in Anthropology provides suitable pre-medical, pre-dental, and pre-veterinary training, and the educational background for further training in the health professions, biological sciences and forensic investigation. The A.B. or B.S. degree in anthropology with appropriate courses in education is good preparation for high school teaching in social, biological and natural sciences. An anthropology degree also provides the foundation for advanced study leading to careers in college-level teaching and research.

A.B. Major Requirements:

<table>
<thead>
<tr>
<th>Evolutionary Track</th>
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</thead>
<tbody>
<tr>
<td>Preparatory Subject Matter</td>
<td>19-21</td>
</tr>
<tr>
<td>Anthropology 1, 2, 3</td>
<td>12</td>
</tr>
<tr>
<td>Anthropology 15 or 23</td>
<td>4-5</td>
</tr>
<tr>
<td>Anthropology 13, Statistics 13, 32, 92, 100 or 102</td>
<td>3-4</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Depth Subject Matter</th>
<th>42-47</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two courses from Anthropology 101, 102, 103, 105, 122A, 128A, 154A, 154B, 158, 176</td>
<td>178</td>
</tr>
<tr>
<td>Anthropology 153 or 157</td>
<td>3-5</td>
</tr>
<tr>
<td>Anthropology 151 or 152</td>
<td>4-5</td>
</tr>
<tr>
<td>One course from Anthropology 170, 171, 172, 173, 176, 180 or 184</td>
<td>184</td>
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<tr>
<th>B.S. Major Requirements</th>
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<tr>
<td>Preparatory Subject Matter</td>
<td>19-21</td>
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<tr>
<td>Anthropology 1, 2, 3</td>
<td>12</td>
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<tr>
<td>Anthropology 15 or 23</td>
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<td>Anthropology 13, Statistics 13, 32, 92, 100 or 102</td>
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<tr>
<th>Depth Subject Matter</th>
<th>47-52</th>
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<tbody>
<tr>
<td>Two courses from Anthropology 101, 102, 103, 105, 122A, 128A, 154A, 154B, 158, 176</td>
<td>178</td>
</tr>
<tr>
<td>Anthropology 153 or 157</td>
<td>3-5</td>
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<tr>
<td>Anthropology 151 or 152</td>
<td>4-5</td>
</tr>
<tr>
<td>One course from Anthropology 170, 171, 172, 173, 176, 180 or 184</td>
<td>184</td>
</tr>
</tbody>
</table>

One course from sociocultural track in consultation with evolutionary track undergraduate adviser

Select 20 additional units from any upper division evolutionary track anthropology courses (see list below) chosen in consultation with an evolutionary track undergraduate adviser

Total Units for the Major | 61-68 |

Note: Evolutionary track courses at the upper division level are courses 101, 102, 103, 122A, 128A, and 151 to 184.

Sociocultural Track:

Preparatory Subject Matter | 16-22 |
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Anthropology 1, 2, 3</td>
<td>12</td>
</tr>
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</table>

Select one of the following three options:

1) Two upper division areas-of-focus sociocultural track courses | 8 |
2) Two additional quarters of the foreign language used to meet the L & S language requirement | 8-10 |
3) Pass exam in a language at fifth-quarter level of competence and complete one additional upper division areas-of-focus sociocultural track course | 4 |

Depth Subject Matter | 38-41 |
<table>
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<tbody>
<tr>
<td>Anthropology 100, 110</td>
<td>8</td>
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</table>

Two upper division areas-of-focus sociocultural track courses | 8 |

Select one of the following two options in consultation with, and only after prior written approval of, sociocultural track undergraduate adviser (see list below identifying upper division sociocultural; see list above identifying evolutionary track courses):

1) Six additional upper division anthropology courses (two courses may be in the evolutionary track; and up to six units can be internships) | 22-25 |
2) Six additional upper division courses that combine two to four sociocultural track courses with two to four courses in a single related academic discipline (including but not limited to: African American and African Studies, American Studies, Art Studio, Art History, Asian American Studies, Chicano/a Studies) | 30 |

Total Units for the Major | 54-63 |

Note: Sociocultural track courses at the upper division level are those with numbers from 100 to 1498, with the exception of 101, 103, 105, 128A, and 1418. Area-focus sociocultural track courses are those that refer in their titles to one or more peoples or regions of the world.

B.S. Major Requirements:

<table>
<thead>
<tr>
<th>Preparatory Subject Matter</th>
<th>59-59</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthropology 1, 2, 3</td>
<td>12</td>
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<tr>
<td>Biological Sciences 1A, 1B, 1C</td>
<td>5</td>
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<tr>
<td>Chemistry 2A, 2B, 8A, 8B</td>
<td>16</td>
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<tr>
<td>Mathematics 1A-16A-16C or 21A-21B-21C</td>
<td>9-12</td>
</tr>
<tr>
<td>Anthropology 13, Statistics 13, 32, 92, 100 or 102</td>
<td>3-4</td>
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<tr>
<th>Depth Subject Matter</th>
<th>45</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthropology 152, 153, 154A</td>
<td>15</td>
</tr>
</tbody>
</table>

Three additional courses in anthropology chosen in consultation with evolutionary track undergraduate adviser | 21-24 |
| Biological Sciences 101 | 4 |
| Evolution and Ecology 100 | 4 |

Quarter Offered: F=Fall, W=Winter, S=Spring, V=Summer; 2009-2010 offering in parentheses

General Education (GE) credit
<table>
<thead>
<tr>
<th>AntHum</th>
<th>Arts and Humanities</th>
<th>SciEng</th>
<th>Science and Engineering</th>
<th>SocSci</th>
<th>Social Sciences</th>
<th>Div</th>
<th>Social-Cultural Diversity</th>
<th>Wrt</th>
<th>Writing Experience</th>
</tr>
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<tr>
<td>146</td>
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</table>
Courses in Anthropology (ANT)

Lower Division Courses

1. Human Evolutionary Biology (4)

2. Cultural Anthropology (4)
   Lecture—3 hours; discussion—1 hour. Introduction to cultural diversity and the methods used by anthropologists to account for it. Family relations, economic activities, politics, gender, and religion in a wide range of societies. Current problems in tribal and peasant societies. GE credit: Sci, Div. Wrt.—II, II, III. (I, II, III) Yorkston, Bettinger, Darwent Steele

3. Introduction to Archaeology (4)

4. Introduction to Anthropological Linguistics (4)
   Seminar—3 hours; term paper. Prerequisite: course I and consent of instructor. Course primarily for majors. Integration of related disciplines in the study of biological anthropology through discussion and research project. Basic statistical emphasis in sociolinguistic issues. GE credit: Sci, Div. Wrt.—II, II. (I) Isbell

5. Proseminal in Biological Anthropology (4)
   Lecture/discussion—1 hour; fieldwork—1 hour. Skills for scientific thinking; designing, implementing, analyzing, interpreting, presenting, and criticizing research. Collection and analysis of original data. Basic statistical methods. GE credit: Sci, Div. Wrt.—II. (II) McElreath

13. Scientific Method in Physical Anthropology (4)
   Lecture—3 hours; laboratory/discussion—1 hour; fieldwork—1 hour. GE credit: Sci, Div. Wrt.—II. (II) Isbell

15. Behavioral and Evolutionary Biology of the Human Life Cycle (5)
   Lecture—3 hours; discussion—1 hour. Prerequisite: introductory biology. GE credit: Sci, Div. Wrt.—II. (I) Harcourt

15V. Behavioral and Evolutionary Biology of the Human Life Cycle–Web Taught (5)
   Live virtual lecture—3 hours, web electronic discussion—1 hour; term paper. Introduction to the biology of birth, childhood, marriage, the family, old age, and death. Examines comparative characteristics of nonhuman primates and other animals as well as cross-cultural variation in humans by study of selected cases. GE credit: Sci, Div. Wrt.—II. (I) Isbell

20. Comparative Cultures (4)
   Lecture—3 hours; discussion—1 hour. Introduction to the anthropological study of cultural diversity. Case studies of eight societies will be presented to illustrate and compare the distinctive features of major cultural regions of the world. GE credit: Sci, Div.—II, III. (I) Sawyer

23. Introduction to World Prehistory (4)
   Lecture—3 hours; discussion—1 hour. Broadly surveys patterns and changes in the human species. Physical and cultural evolution from earliest evidence for “humanness” to recent development of large-scale complex societies or “civilizations.” Lectures emphasize use of archaeology in reconstructing the past. GE credit: Sci, Div. Wrt.—II. (I) Eerkens

24. Ancient Crops and People (4)
   Lecture—3 hours; discussion—1 hour. The archaeological evidence for domestication of plants and animals in the agricultural societies of the Old World. GE credit: Sci, Div. Wrt.

30. Sexuality (4)
   Lecture/discussion—4 hours. Introduction to the study of sexuality, particularly to the meanings and social organization of same-sex behavior across cultures and through time. Biological and cultural approaches will be compared, and current North American issues placed in a wider comparative context. GE credit: Sci, Div. Wrt.

32. Science of Consumer Culture (4)
   Lecture—3 hours; discussion—1 hour. Drugs, politics, science, society in a cultural perspective: emphasis on roles of science, government and the media in shifting attitudes toward alcohol, marijuana, and other drugs. GE credit: Sci, Div. Wrt.

50. Evolution and Human Nature (4)
   Lecture—3 hours; discussion—1 hour. Evolutionary analysis of human nature, beginning with Lamarck, Darwin, Spencer and contemporaries, and extending through social Darwinism controversies to contemporary evolutionary anthropology research on human diversity in economic, mating, life-history, and social behavior. GE credit: Sci, Div. Wrt.—II, III. (III) Winterhalder

54. Introduction to Primatology (4)
   Lecture/discussion—3 hours; term paper. Basic survey of the primates as a separate order of mammals; natural history and evolution of primates; consideration of hypotheses for their origin. GE credit: Sci, Div. Wrt.—II, III

Upper Division Courses

100. Theory in Social-Cultural Anthropology (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Discussion of the theoretical and philosophical developments in cultural anthropology from the 19th century to the present. Not open for credit to students who have completed course 137. (Former course 137) GE credit: Sci, Div. Wrt.—II, III

   Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 2 or Environmental Science and Policy 20 or Evolution and Ecology 100 or Biological Sciences 101. Interdisciplinary study of diversity and change in human societies, using frameworks from anthropology, evolutionary ecology, history, archaeology, philosophy, and other fields. Topics include population dynamics, subsistence transitions, family organization, disease, economics, warfare, politics, and resource conservation. (Same course as Environmental Science and Policy 101) GE credit: Sci, Div. Wrt.—II, III

102. Cultural Ecology (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: one lower division course in the social sciences, upper division standing. Comparative survey of the interaction between diverse human cultural systems and the environment. Primary emphasis given to people in rural and relatively undeveloped environments as a basis for interpreting complex environ
148 Anthropology

103. Indigenous Peoples and Natural Resource Conservation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or Geology 1 or Environmental Science and Policy 30. Involves the interests of resident and indigenous peoples with the conservation of natural resources and ecosystems, using case study examples from both the developing and the developed world. Not open for credit to students who have completed course 121N. (Former course 121N.)

104N. Cultural Politics of the Environment (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Political economy of environmental struggles. Relationship between social inequality (based on race, class, and/or gender) and ecological degradation. Articulation of local peoples, national policy, and the international political economy in the contestation over the use of environmental resources. Not open for credit to students who have completed course 134N. (Former course 134N.) GE credit: SocSci, Div.—I. (I.) Sawyerr.

105. Evolution of Societies and Cultures (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or Geoscience and Policy 30 or Evolution and Ecology 100 or Biological Sciences 101. Interdisciplinary study of social and cultural evolution in humans. Culture as a system of inheritance, psychology of cultural learning, culture as an adaptive system, evolution of maladaptations, evolution of technology and institutions, evolutionary transition in primate socio-cultural systems of gender and cultural variation. Only two units of credit to students who have completed Environmental Science and Policy 101 or course 101 prior to fall 2004. (Same course as Environmental Science and Policy 105.) GE credit: SocSci, Div.—II. (II.) McElreath.

109. Visualization in Science: A Critical Introduction (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 2 or Science & Technology Studies 1 or Science & Technology Studies 20. Anthropological approaches to scientific visualization techniques, informatics, simulations. Examination of different visualization techniques toward understanding the work involved in producing them, critical assessment of their power and limits, especially when visualizations are used socially to make claims. Offered in alternate years. (Same course as Science and Technology Studies 109.) GE credit: SocSci, Div.—II. (II.) Dumbit.

110. Language and Sociocultural Anthropology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. The role of language analysis and linguistic theory in the development of sociocultural anthropology. Language, culture, and thought; the linguistic accomplishment of social action; language ideology; language and social power. Language as cultural mediator of politicoeconomic process. GE credit: SocSci, Div.; Wrt.—II. (II.) Shibamoto Smith.

117. Language and Society (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 4, or Linguistics 1 and course 2. Consideration of language in its social context. Methods of data collection and analysis; identification of socially significant linguistic variables. Contributions of the study of contextualized speech to linguistic theory. GE credit: SocSci, Div.; Wrt.—II. (II.) Shibamoto Smith.

119. World Writing Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 4 or Linguistics 1. Survey of major world writing systems, including pictographic, syllabic, and alphabetic scripts used in both the Old and New Worlds in ancient and modern times, examined from linguistic and socio-political aspects. GE credit: SocSci.

120. Language and Culture (4)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 4 or Linguistics 1. Culture, cognition, meaning, and interpretation; language and the classification of experience; communication and learning in crosscultural perspective. GE credit: SocSci, Div.; Wrt.—II. (II.) Smith.

122A. Economic Anthropology (4)
Lecture—3 hours; discussion—1 hour. Varieties of production, exchange, and consumption behavior in precapitalist economies, their interaction with cultural and social-political organization, and the theories that account for these phenomena. The effects of capitalism on precapitalist sectors. Not open for credit to students who have completed course 122. (Former course 122.) GE credit: SocSci, Div., Wrt.—I. (I.) McElreath.

122B. Anthropology and Political Economy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or the equivalent. Analysis of populist political protest in Third World and indigenous societies ranging from covert resistance to national revolutions. Comparative case studies and theories of peasant rebellions, millennial movements, social bands, Indian “wars,” ethnic and regional conflicts, gender and class conflicts. Not open for credit to students who have completed course 123A. (Former course 123A.) GE credit: SocSci, Div., Wrt.—I. (I.)

123AN. Resistance, Rebellion, and Popular Movements (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or equivalent. Analysis of social protest in Third World and indigenous societies ranging from covert resistance to national revolutions. Comparative case studies and theories of peasant rebellions, millennial movements, social bands, Indian “wars,” ethnic and regional conflicts, gender and class conflicts. Not open for credit to students who have completed course 123B. (Former course 123B.) GE credit: SocSci, Div., Wrt.—I. (I.) Srinivas.

123BN. Multiculturalism and Minority Identity (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Recent developments in conceptions of minority identity, from the point of view of minority populations in the Third World, Europe, and the United States. Challenges to existing categories of gender, race and class, as well as nationalism and imperialism. Not open for credit to students who have completed course 123C. (Former course 123C.)

124. Religion in Society and Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Discussion of anthropological theories of religion with emphasis on non-literate societies. Survey of shamanism, magic and witchcraft, ritual and symbols, and religious movements. Extensive discussion of ethnographic examples and analysis of social functions of religious institutions. GE credit: SocSci., Div.—II. (II.) Srinivas.

125A. Structuralism and Symbolism (4)
Lecture—3 hours; journal of instruction—1 hour. Prerequisite: course 2. Survey of anthropological approaches to understanding the logic of structuralism and symbolism in cultural analysis. Focus on how structural and symbolic interpretations relate to cultural and linguistic universals and to the philosophical basis of relativism in the social sciences. (Former course 125.) GE credit: SocSci, Div.—II. (II.) Yengoyan.

125B. Postmodernisms and Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. The U.S.-European postmodern condition. “Modernity” as an incomplete project for subordinated groups. The economic, social, technological and political consequences of postmodernist aesthetics, in comparison with postcolonialism, feminism and minority discourse. GE credit: SocSci, Div.; Wrt.—II. (II.)

126A. Anthropology of Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Theories of development and current critiques. Colonial legacies and post-colonial realities. Roles of the state and NGOs, population migrations, changing gender identities, cash-earning strategies, and sustainability issues. Stresses importance of cultural understandings in development initiatives. Cannot be repeated for credit to non-industrial societies. Not open for credit to students who have completed course 126. (Former course 126.) GE credit: SocSci, Div., Wrt.—II. (II.) J. Smith.

126B. Women and Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Current Third World and Western development issues concerning women in agriculture, industry, international division of labor, political movements, revolutions, politics of health, education, family and reproduction. Impact of secularism, capitalism, the welfare state, and international feminism on women and development. Not open for credit to students who have completed course 131. (Former course 131.) GE credit: SocSci, Div., Wrt.—I. (I.)

127. Urban Anthropology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Survey of approaches to urban living: political structures, organization of labor, class relations, world views. The evolution of urban life and its contemporary dilemmas. Cross-cultural comparisons discussed through case studies. GE credit: SocSci, Div., Wrt.—II. (II.) Zhang.

128A. Kinship and Social Organization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Comparative examination of personal kinship, descent, marriage, household and family organizations; the theories that account for variation, and recent advances in the treatment of these data. Not open for credit to students who have completed course 128. (Former course 128.) GE credit: SocSci, Div.—II. (II.)

128B. Self, Identity, and Family (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Exploration of self, identity, and family systems cross-culturally. Impact of class, gender, race, ethnicity, ruralization, urbanization, and globalization on nations of settlement in different social/cultural systems. Not open for credit to students who have completed course 129. (Former course 129.) GE credit: SocSci, Div. Wrt.—II.

130A. Cultural Dimensions of Globalization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. The cultural dimensions of recent economic and political developments frequently termed “globalization.” GE credit: SocSci, Div.—II. (II.) J. Smith.

130BN. Migration and the Politics of Place and Identity (4)
Lecture/discussion—4 hours. Prerequisite: course 2 or consent of instructor. Internal and international migration from an anthropological perspective, including causes, processes, and political, economic, and cultural effects of spatial mobility and displacement. Emphasizes the interplay of identity, place, and power in diverse cultural and historical contexts. Not open for credit to students who have completed course 123D. (Former course 123D.) GE credit: SocSci, Wrt.—II.

130C. Latino Migration to the United States (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. The experiences of people involved in migration between Latin America and the United States; most significant factors shaping those experiences. GE credit: SocSci, Wrt.—II.

131. Ecology and Politics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Analysis of the complex interactions between ecological, economic, and political processes employing the emerging approach of ecological policy. Case studies of environmental degradation (e.g., desertification, logging, mineral extraction, petroleum, wastewater) and their various cultural and geographic regions. GE credit: SocSci, Div.—II. (II.) Sawyer.
134. Buddhism in Global Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one credit in Anthropology, Sociology, History, or Religious Studies. Buddhist meditation and ritual as a cultural system that adapts to global and local forces of change. Anthropological theories and methods to understand global culture transmission, including Buddhist reform movements in Asia and Buddhist practice in the West. Limited enrollment. GE credit: SocSci, Div., Wrt.

135. Peasant Society and Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Comparative study of peasant communities, utilizing historical and ethnographic sources; analysis of urban-rural relations; problems of economic development and culture change. GE credit: SocSci, Div., Wrt.—III. (Ill.) J. Smith

136. Ethnographic Film (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Overview of the use of film in anthropology, film production in anthropological research and problems encountered in producing films in the field. GE credit: SocSci, Wrt.

137. Meditation and Culture (4)
Lecture/discussion—3 hours; discussion—1 hour. Prerequisite: one lower division course in Anthropology, Sociology, Philosophy, Psychology, or Religious Studies. Study and practice of the relation between meditation and cultural conditioning; comparison of Buddhist practice with other cultural constructions of mind, body, brain, thought, emotion, and self. Limited enrollment. Not offered every year.—III. (Ill.) Klima

138. Ethnographic Research Methods in Anthropology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 2 and 137. Basic concepts in and approaches to ethnographic field research. Problem formulation, research design, qualitative and quantitative data collection procedures, and techniques for organizing, retrieving, and analyzing information. Ethnographic description and constructed inference. Students will organize and conduct individual research projects. GE credit: SocSci.—III. (Ill.) de la Cadena

139AN. Race, Class, Gender Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Comparative analysis of class/race/gender inequality, focusing on the ways in which beliefs about descent, "blood," and biological differences interact with property and marital systems to affect the distribution of power in society. Not open for credit to students who have completed course 139. (Former course 139) GE credit: SocSci, Div., Wrt.—II. (II) de la Cadena

139BN. Gender and Sexuality (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Kinship, gender and sexuality in foraging bands, pastoral and agricultural tribes, and industrial societies. Debates on cultural evolution and distribution of gender hierarchies. Impact of politics, economics, religion, social practices, women’s movements on gender and sexuality. Culture, nature, and sexuality. Not open for credit to students who have completed course 130. (Former course 130) GE credit: SocSci, Div., Wrt.—I. (I) Choy

140A. Cultures and Societies of West and Central Africa (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Ethnographic survey of West Africa and Congo Basin with analyses of representative societies which illustrate problems of general theoretical concern. Major consideration will be the continuities and discontinuities between periods prior to Euro- pean contact and the present. GE credit: SocSci, Div., Wrt.

140B. Cultures and Societies of East and South Africa (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Ethnographic survey of Eastern and Southern Africa with analyses of selected societies which illustrate problems of interest to anthropologists. Major consideration will be the continuities and discontinuities between periods prior to European contact and the present. GE credit: SocSci, Div., Wrt.—III. (Ill.) J. Smith

141. Indians of North America (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Introductory survey of the Indians of North America: origins, languages, civilizations, and history. GE credit: SocSci, Div., Wrt.

141B. Ethnography of California and the Great Basin (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Peoples of the Middle East (including North Africa). Discussions of class relations, kinship organization, sex/gender systems, religious beliefs and behaviors, and political systems. Impact of world systems, political and religious movements and social change. (Former course 136) GE credit: SocSci, Div., Wrt.—II. (II) Joseph

142A. Ethnology of Southeast Asia (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Patterns of culture and social organization from prehistory to the present, in the context of historical, ecological, economic, and political settings. Emphasis on the relationship of ethnic minorities to national states. GE credit: SocSci, Div., Wrt.—II. (II) Yengoyan

143B. Philippine Societies and Culture (4)
Laboratory/discussion—4 hours. Prerequisite: course 2. Introduction to the ethnology of the Philippines. Nature and distribution of ethnic groups, social organizations, cultural patterns and social issues. Emphasis on ethnic minorities, rural populations, effects of modernization, and relation of the state to local groups. GE credit: SocSci, Div., Wrt.

144. Contemporary Societies and Cultures of Latin America (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Introduction to the contemporary social structure of Latin America: Origins, maintenance and changes in inequality: economic responses to poverty, sociocultural responses to discrimination, and political responses to powerlessness. GE credit: SocSci, Div., Wrt.—III. (Ill.) de la Cadena

145. Performance, Embodiment, and Space in South Asia (4)
Lecture/discussion—4 hours. Prerequisite: course 2 or consent of instructor. South Asian cultures and societies with a focus on performance, embodiment, and space from several disciplinary fields. Topics may include colonialism, nationalism, religious traditions, media, popular culture, cities, social movements, modernity, body-cultures, identity, gender, and diasporas. GE credit: ArtHum or SocSci, Div., Wrt.—II. (II) Sinivas

146. Peoples and Politics of Mexico and Central America (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Politics and culture in Mexico and Central America from the time of Independence to the present. Non-indigenous peoples and indigenous peoples. Regional focus will vary. GE credit: SocSci, Div., Wrt.

147. Peoples of the Pacific (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Ethnographic survey of aboriginal Australia. Comparison of origins, prehistory, and traditional social organization of peoples of Polynesia, Micronesia, and Melanesia. Consideration of recent changes associated with colonialism and national independence. GE credit: SocSci, Div., Wrt.

148A. Culture and Political Economy in Contemporary China (4)
Lecture/discussion—4 hours. Prerequisite: course 2 or consent of instructor. Examining contemporary Chinese culture and political economy through reading ethnographic studies on recent transformations in rural and urban Chinese society. Special attention is given to state power, popular culture, spatial mobilities, cultural space, and gender. GE Credit: Div, SocSci, Wrt.—II. (II) Zhang

148AS. Culture and Political Economy in Contemporary China (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor. Examination of contemporary central aspects of Chinese culture and political economy through reading ethnographic studies on recent transformations in rural and urban areas. Special attention is given to state power, privatization, popular culture, migration, consumption, lifestyle, city space, and gender relations. Taught in China. GE credit: SocSci, Div., Wrt.

148B. Family, Gender, and Population in Contemporary China (4)

148C. Ethnic Diversity of China (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Analysis of China’s ethnic diversity through time and across space. Comparison of ethnic systems in changing state systems examined among Han majority ethnic subgroups [e.g., Cantonese, Hakka] and borderlands minorities [e.g., Hmong, Tibetan]. Emphasis on intersections of gender and class with race/ethnicity/nationality. GE credit: SocSci, Div., Wrt.

149A. Traditional Japanese Society (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Introduction to contemporary Japanese culture and social organization from prehistoric to early twentieth-century Japan. Origins, prehistory, and traditional religious and political systems, marriage and kinship, language and culture. Changes and continuities in traditional and contemporary Japanese culture are addressed. GE credit: SocSci, Div., Wrt.

149B. Contemporary Japanese Society (4)
Lecture—3 hours; discussion—1 hour. Introduction to contemporary Japanese culture and social organization, religion, and patterns of culture. Analysis of rural-urban cultural continuities and contrasts, class relations, political and economic systems, kinship, sex/ gender systems, contemporary religious beliefs and behavior, conflict, consensus, and cultural stereotypes. GE credit: SocSci, Div., Wrt.

151. Primate Evolution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Biological Sciences 1B. Origin and relationships of the prosimians, monkeys, and apes. GE credit: SciEngr, Wrt.—III. McHenry

152. Human Evolution (5)
Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: course 1 or Biological Sciences 1B. Origin and nature and results of the evolutionary processes involved in the formation and differentiation of humans. GE credit: SciEngr, Wrt.—II. (II) McHenry

153. Human Biological Variation (5)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Biological Sciences 1B. Origin, adaptive significance and method of analysis of human differences among populations. Special attention given to racial differences such as those in blood groups, plasma proteins, red cell enzymes, physiology, morphology, pigmentation and disease syndromes. GE credit: SciEngr, Wrt.—I. (I) G. Smith

Quarter Offered: I-T, II-Winter, III-Spring, IV-Summer. 2009-2010 offering in parentheses.
154A. The Evolution of Primate Behavior (5)
Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: course 1. Examines ecological diversity and evolution of social systems of prosimians, monkeys, and apes, placing the social behavior of the primates in the context of appropriate ecological and evolutionary theory. GE credit: SciEng. Wrt.—I. (I.) Isbell

154BN. Primate Evolutionary Ecology (5)
Lecture—3 hours; lecture/discussion—1 hour; term paper. Prerequisite: course 54, 154A, or 154BN; Statistics 13 or its equivalent. Scientific methods of studying, describing and analyzing the behavior and ecology of primates. Offered in alternate years. (P/NP grading only)—III. Isbell

154CL. Laboratory in Primate Behavior (4)
Laboratory—6 hours; term paper. Prerequisite: course 54, 154A, or 154BN; Statistics 13 or its equivalent. Design and conduct of scientific “field courses” in the behavior of group-living primates at the California National Primate Research Center. Offered in alternate years.—III. Isbell

155. Comparative Primate Anatomy (4)
Lecture—2 hours; laboratory—2 hours. Prerequisite: course 54, 154A, or 154BN; Statistics 13 or its equivalent. Design and conduct of scientific “field studies” of the behavior of group-living primates at the California National Primate Research Center. Offered in alternate years.—III. Isbell

157. Anthropological Genetics (3)
Lecture—3 hours. Prerequisite: course 1 or Biological Sciences 1A, and either Genetics 100 or enrollment in course 157 (currently or following). Methods for identifying genetic variation in human blood group antigens, serum proteins and red cell enzymes. GE credit: SciEng. Wrt.—I. (I.) Weaver

157L. Laboratory in Anthropological Genetics (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 1 or Biological Sciences 1A, and either Genetics 100 or enrollment in course 157 (currently or following). Methods for identifying genetic variation in human blood group antigens, serum proteins and red cell enzymes (hemaglutination). General electrophoresis on starch, cellulose acetate and polyacrylamide, immunodiffusion and immunoelectrophoresis on agarose. (P/NP grading only) GE credit with concurrent enrollment in course 157: Wrt.—I. (I.) Weaver

158. The Evolution of Females and Males: Biological Perspective (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Current theoretical frameworks for explaining the evolution of sex differences and for understanding the interrelationship between biological processes and the construction of gender roles. GE credit: SciEng, Div, Wrt.—I. (I.) Marshall

159. Molecular Anthropology of Native America (4)
Seminar—3 hours; term paper. Prerequisite: course 1 or Biological Sciences 1A, enrollment in course 157 (currently or following). Use of DNA and other genetic polymorphisms to test hypotheses regarding genetic relationships among different Native American tribal groups and about prehistoric population replacements and migrations to and within the Americas. Integration with chrono- metric, archaeological, paleoenvironmental, linguistic and ethnohistorical evidence. —III. (I.) D. Smith

170. Archeological Theory and Method (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 154C and 154D. Introduction to history and development of archeological method, with particular emphasis on the basic dependency of the latter on the former. Focuses on historical development of archaeology in the New World. GE credit: SocSci, Div, Wrt.—I. (I.) Bettagner

171. Geoarcheology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 154D. Theories, methods, and techniques for studying the geomorphic context of archeological sites. Examination of soil attributes and analyses for understanding important local landform features and developmental histories of archeological sites. GE credit: SocSci, Wrt.

172. New World Prehistory: The First Arrivals (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or consent of instructor. Survey of data relating to the peopling of the New World, Cultural adaptation and demography of early inhabitants of North and South America. GE credit: SocSci, Div, Wrt.

173. New World Prehistory: Archaic Adaptations (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or consent of instructor; course 170 recommended. Introduction to and survey of prehistoric hunting and gathering adaptations across North America with emphasis on the Eastern, Midwest, Plains, Southwest, and Northwest. GE credit: SocSci, Div, Wrt.

175. Andean Prehistory: Archaeology of the Incas and their Ancestors (4)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 3. Prehistory of the Andean region, especially Peru, from the earliest hunting and gathering societies toward the Incas. Focus on the use of archeological data to reconstruct ancient human adaptations to the varied Andean environments.—I. (I.) Eerkens

176. Prehistory of California and the Great Basin (4)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 3 or consent of instructor. Description and analysis of the prehistoric peoples of California and the Great Basin from earliest times to European contact. GE credit: SocSci, Div, Wrt.—I. (I.) Bettagner

178. Hunter-Gatherers (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Study and interpretation of the ancient and modern lifeways in which peoples support themselves with primitive technologies and without benefit of domesticated plants and animals. GE credit: SocSci, Div, Wrt.—III. (III.) Bettagner

180. Zooarcheology (4)
Lecture—2 hours; discussion/laboratory—3 hours. Prerequisite: course 1 and 3 or consent of instructor. Theories and methods for studying animal skeletal remains from archaeological sites. Identification and quantification of zooarchaeological material in cultural and natural settings, especially animal bones, antlers, and pasturial, and use of faunal remains for determining past human diets and past environments. Offered in alternate years.—II. (II.) Darwent

181. Field Course in Archeological Method (9)
Lecture—6 hours; daily field investigation. Prerequire: course 3. On-site course in archeological method and techniques held at a field location in the western United States, generally California or Nevada. Investigates basic methods of archeological survey, mapping, and excavation. GE credit: SciEng.—IV

182. Archaeometry (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 3; Statistics 13 or the equivalent recommended. Scientific techniques used to study the chemical and physical properties of archaeological materials. Types of anthropological questions that can be addressed with different methods. Preparation and analysis of archaeological materials.

183. Laboratory in Archeological Analysis (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 181 or consent of instructor. Survey of data relating to the peopling of the New World, Cultural adaptation and demography of early inhabitants of North and South America. GE credit: SocSci, Div, Wrt.—I. (I.) Steele

184. Prehistoric Technology: The Material Aspects of Prehistoric Adaptation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 154C or 3. Examination of tools and ancient human artifacts and their place in prehistoric survival and development. Emphasis is descriptive, but the significance of material resources as factors in prehistoric adaptation, settlement patterns, and culture change are discussed. GE credit: SocSci.—III. (III.) Eerkens

Special Study Courses

191. Topics in Anthropology (4)
Lecture/discussion—3 hours; term paper. Prerequisite: junior or senior standing in anthropology. Intensive treatment of a special anthropological topic or problem. May be repeated once for credit when topic differs.—I. Darwent

192. Internship in Anthropology (1-12)
Internship—3-36 hours. Prerequisite: Upper division standing; consent of instructor. Work experience off- and on-campus in all subject areas offered in the Department of Anthropology under the supervision of a member of the faculty. Limited to Anthropology majors. May be repeated for a total of 12 units including 192 courses taken in other departments. (P/NP grading only)

194H. Special Study for Honors Students (1-6)
Prerequisite: open only to majors of senior standing who qualify for honors program. Independent study of an anthropological problem involving the writing of an honors thesis. May be repeated for a total of 12 units. (P/NP grading only)

197. Tutoring in Anthropology (1-5)
Tutorial—1-5 hours. Prerequisite: upper division standing with major in Anthropology and consent of Department Chairperson. Focus of small voluntary discussion groups affiliated with one of the department’s regular courses. May be repeated for credit. (P/NP grading only)

198. Directed Group Study (1-5)
(P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)

Graduate Courses

200. History of Anthropology (4)
Lecture/discussion—2 hours; term paper. Historical development of socio-cultural theory within anthropology, from mid-19th to mid-20th Centuries. Focus on original theoretical texts in context of historical developments in the field. —III. (III.) Breath, Winterhalder

201. Critical Readings in Ethnography (4)
Seminar—3 hours; term paper. Critical readings of selected ethnographies to examine a wide range of important topics and analytical issues in social and cultural anthropology. Exploration of how and why ethnographic writing has changed over time and its relationship with contemporary theoretical explorations.—I. (I.) Zhang

202. History and Theory of Biological Anthropology (4)
Seminar—3 hours; term paper. History of thought in biological anthropology and analysis of major theoretical problems in the field. Suggested for first-year graduate students lacking intensive preparation in biological anthropology.—II. (I.) McHenry

Quarter Offered: I-T (Fall), II-W (Winter), III-S (Spring), IV-S (Summer), 2009-2010 offering in parentheses

Seminar—3 hours; term paper. Prerequisite: graduate standing in one of the social sciences including History. Comparative examination of family systems in historical context and of reproductive behaviors and strategizing. A major theme is how family-system norms specify the relative desirability of differently configured offspring sets. Cases are drawn from Western Europe and South and East Asia.

232. Political Movements (4)
Seminar—3 hours; term paper. Prerequisite: completion of first-year graduate work recommended. An interdisciplinary approach to political movements of prominence, with a focus on emphasizing historical comparison and evaluation of major theoretical approaches including world systems, resource mobilization, state and culture, rational choice, moral economy, social class and gender.

239. Problems in African Society and Culture (4)
Seminar—3 hours; term paper. Diachronic analyses of traditional institutions in sub-Saharan Africa.

241. Topics in North American Ethnology (4)
Seminar—3 hours; term paper. Advanced study on current problems in North American ethnography and culture history. May be repeated for credit with consent of instructor.

245. Ethnology of Northern and Central Asia (4)
Seminar—3 hours; term paper. Prerequisite: a reading knowledge of German, Russian, Chinese, or Japanese. Lectures on anthropological studies of the peoples to the north of the Caucasus-Korea line. Supervised study of the primary and secondary sources. Work with informants when available.

246. Ethnology of Europe (4)
Seminar—3 hours; term paper. Prerequisite: reading knowledge of a European language other than English. Supervised study of the primary and secondary sources dealing with the ethnography and ethnology of the peoples of Europe. Emphasis upon folk, peasant, and minority groups.

248. Topics in Chinese Culture and Society (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing in the social sciences, history, or the humanities. Selected topics in the anthropology of Chinese society. Focus on one or more of the following topics: state-society dynamics, family and gender, city formation and urban life, social movement, labor politics, and religion and ideology in Chinese society. May be repeated for credit when topic differs.

250. Behavioral Ecology of Primates (4)
Seminar—3 hours; term paper. Prerequisite: course 154A (may be taken concurrently) or the equivalent, graduate standing. Concepts, issues, and hypotheses in primate behavioral ecology, with emphasis on the social and ecological determinants and consequences of variation in social organization for individuals.

252. Human Evolution Seminar (4)
Seminar—3 hours; term paper. Prerequisite: course 152 or the equivalent; consent of instructor. Study of selected topics in human evolutionary studies. Each year course will focus on one or more of the following: molecular evolution, primate evolutionary biology, Tertiary hominoid paleoanthropology, Homo erectus, archaic Homo sapiens, brain evolution. May be repeated for credit. —I. (II.) Weaver

253. Seminar in Human Biology (4)
Seminar—3 hours; term paper. Prerequisite: course 153, 157, or consent of instructor. Advanced study of selected topics in human biology. May be repeated for credit when topics vary. —III.
254. Current Issues in Primate Sociobiology (4)
Seminar—3 hours; term paper. Prerequisite: course 154B or the equivalent. Analysis of primate behavior, with particular emphasis on preparation for field studies. May be repeated for credit when topics differ.—II. (Ill.) Marshall

256. Primate Conservation Biology (4)
Seminar—3 hours; term paper. Prerequisite: course 154, graduate standing or upper division undergraduate with consent of instructor. Application of understanding of primate biology to conservation of primates and their habitat. Topics include evolution-ary anthropology, behavioral ecology, biogeography, macroecology, population biology, and soci-ecology of primates. May be repeated once for credit if term paper differs. (S/U grading only)—II. (Ill.) Marshall

261. Modeling the Evolution of Social Behavior (4)
Lecture—3 hours; extensive problem solving. Prereq-uisite: Mathematics 16C or the equivalent or consent of instructor. Tools and topics in modeling the evolution of social behavior in humans and other animals. Game theory, basic population genetics, animal conflict, altruism, reciprocity, signaling, and group selection.

262. Evolution and Human Behavior (4)
Discussion—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Exploration of the links between behavioral ecological theory and human cultural variation, focusing on reproduction, marriage, parental investment and family structure; implications of evolutionary theory for social organi-zation in human communities, historical and contempo-rary.

263. Human Applications of Foraging Theory (4)
Discussion—3 hours; laboratory—3 hours. Foraging theory models and their use in ethnographic and archaeological analyses of human behavior, with a focus on hunter-gatherers and resource selection, patch use, population and habitat, central places, sharing, stochastic processes, population dynamics, and conservation behavior. Not open for credit to students who have completed course 258.—III. Winterholder

265. Language, Performance, and Power (4)
Seminar—3 hours; term paper. Graduate standing or consent of instructor. Exploration of the intersec-tion between linguistic and social theories in the lan-guage-state relation and the performance of identity. Ideological sources of language differentiation; nation-building and linguistic difference. Political, economic, and ethnographic approaches to understanding linguistic inequality. (Same course as Linguistics 265.)—II. Shibamoto Smith

270. Anthropology Colloquium Seminar (1)
Seminar—1 hour. Reports and discussions of recent advances in the four subfields of anthropology. To be presented by guest speakers. May be repeated twice for credit. (S/U grading only)—I, II, III, III, III. (I) D. Smith

280. Current Anthropology Journal Editorial Workshop (4)
Workshop—1 hour; independent study—3 hours. Students must enroll for all three quarters. Reading and offering workshop papers of manuscripts sub-mitted for publication, and reading and discussion of other relevant work in anthropology and human ecology. Track and edit published comments and authors’ replies that accompany major features. Par-ticipation in the development of new sections for the electronic edition of the journal, including a “news and views” section and a debate section. (Same course as Ecology 280.) May be repeated for 12 units of credit with consent of instructor. (S/U grading only.)

291. Advanced Topics in Human Behavioral Ecology (4)
Discussion—2 hours; term paper. Prerequisite: course 261, 262, or 263, or comparable experi-ence in anthropology or related disciplines and con-sent of instructor. Topically focused, critical discussion of current and emerging research in the field of human behavioral ecology, giving special attention to theory, concepts, models, and methods for the evolutionary analysis of ethnographic and behavioral evidence. May be repeated one time for credit if topic differs.

292. Seminar in Linguistic Anthropology (4)
Seminar—3 hours; term paper. Selected topics in lin-guistic anthropology. May be repeated for credit when topic differs.

298. Group Study (1-4)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

299D. Dissertation Research (1-12)
(S/U grading only.)

Professional Courses

300. Teaching Anthropology (4)
Seminar—3 hours; practice—1 hour. Prerequisite: graduate standing in Anthropology or closely related discipline. Intellectual and practical elements of college teaching in the field of Anthropology, from curriculum design and the syllabus through grading and course evaluations, including course design and information technology methods, and problems and rewards of teaching in higher education. Offered in alternate years.—II.

306. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—I, II, III.

Applied Behavioral Sciences

See Community and Regional Development, on page 188.

Applied Biological Systems Technology

(College of Agricultural and Environmental Sciences)

Faculty. See under Department of Engineering: Biolo-gical and Agricultural, on page 227.

Courses in Applied Biological Systems Technology (ABT)

Lower Division Courses

13. Wood Properties and Coopering (2)
Lecture/discussion—1 hour; laboratory—2 hours. Identify wood types, properties and milling pro cesses: sawing, planing, drilling, clamping, marking and measurement. Examine wood strength, visual, odor and taste properties. Participate in individual barrelraising projects. Visit coopering facilities to observe barrel production and winery and distillery products. (P/NP grading only.)—II. (III.) Grimmer, Perkins

16. Metal Properties and Fabrication (2)
Lecture—1 hour; laboratory—3 hours. Study of metal properties and of techniques for fabricating in metal. Physical principles, design considerations, effects of techniques on quality and appearance, and evaluation of products. Experience in working with metal. (P/NP grading only)—I. (I) Perkins

17. Plastic Properties and Fabrication (2)
Lecture—1 hour; laboratory—3 hours. Study of the properties of plastic materials and the fundamentals of fabrication techniques. Experience in working with common plastics, with applications to biological systems. (P/NP grading only.)—III. (III.)

49. Field Equipment Operation (2)
Lecture—1 hour; laboratory—3 hours. Operation, adjustment, and troubleshooting of farm tractors and field equipment. Principles of operation, equipment terminology and uses of tillage, cultivating, thinning, and planting equipment. Typical sequences in crop ping practices. (P/NP grading only.)—III. (III.) Perkins

52. Field Equipment Welding (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 16 or consent of instructor. Intermediate weld ing to include hardfacing and inert gas welding. Class projects on repair and fabrication by welding. Troubleshooting and major repair of field equip ment. (P/NP grading only.)—II. (II.) Perkins

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Lower Division Students (1-5)
(P/NP grading only.)

Upper Division Courses

101. Engine Technology (3)
Lecture—2 hours; laboratory—2 hours. Prerequisite: upper division standing or consent of instructor. Principles of 2-stroke cycle, 4-stroke cycle gasoline and 4-stroke cycle diesel engine construction and opera tion. Engine systems, performance, troubleshooting, and overhaul.—II. (II.) Singh

121. Animal Housing and Environment Management (2)
Lecture—2 hours. Prerequisite: Animal Science 1 or 2. Optimal structures and environments for animal growth and comfort; heat and moisture transfer prin ciples; heating, cooling, ventilating principles and equipment; animal housing design; environmental regulations and waste management practices. Offered in alternate years.—II. (II.) Zhang

142. Equipment and Technology for Small Farms (2)
Lecture—1 hour; laboratory—3 hours. Types and characteristics of agricultural equipment and technolo gies appropriate for small commercial farming. Adjustment and calibration of equipment. Selection of and budgeting for equipment. (Same course as International Agricultural Development 142.)—III. (III.) Perkins

161. Water Quality Management for Aquaculture (3)
Lecture—3 hours. Prerequisite: Biological Sciences 18, Mathematics 16B, Chemistry 28. Basic principles of water chemistry and water treatment pro cesses as they relate to aquacultural systems. Offered in alternate years.—III. Perdriale

163. Aquaculture Systems Engineering (3)
Lecture—3 hours. Prerequisite: course 161. Design of aquacultural systems: design methodology; princi ples of fluid mechanics, selection and facility planning, management operations, computer model ing. Offered in alternate years.—III. Perdriale

165. Irrigation Practices for an Urban Environment (2)
Lecture—2 hours. Prerequisite: Physics 1A or 5A. Basic design, installation, and operation principles of irrigation systems for turf and landscape: golf courses, parks, highways, public buildings, etc. Emphasis on hardware association with sprinkler and drip/trickle systems.—III. (III.)
175. Introduction to Precision Agriculture (3)
Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: Agricultural Systems and Environment 21 or the equivalent computer experience. Concepts of precision agriculture. Variability in yield, yield monitors and mapping, remote sensing, variability in plant and soil conditions, global positioning system (GPS), geographic information system (GIS), sensors and actuators, map controlled variable rate application (VRT), socio-economic aspects of precision agriculture. —I. (I.) Upadhyaya

180. Introduction to Geographic Information Systems (4)
Lecture—3 hours; laboratory/discussion—3 hours. Prerequisite: Agricultural Management and Rangeland Resources 21 or equivalent familiarity with computers, Agricultural Management and Rangeland Resources 120 or the equivalent, Mathematics 16A. Management and analysis of georeferenced data. Spatial database management and modeling. Applications to agriculture, biological resource management, and social sciences. Cartographic modeling. Vector and raster-based geographic information systems. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 132. (Same course as Plant Sciences 180.) —II. Plant

181N. Concepts and Methods in Geographic Information Systems (4)
Lecture/laboratory—5 hours. Prerequisite: course 180 or Agricultural Management and Rangeland Resources 180 or Landscape Architecture 50 or consent of instructor. Data representation and analysis in geographic information systems (GIS). Creation of spatial data sets from analog and digital sources such as aerial photography and maps; data structures, data management, database design, georeferencing, georectification, surface models, analysis, and spatial data visualization. Offered in alternate years. —II. Plant

182. Environmental Analysis using GIS (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: course 180 or equivalent GIS experience and skills; general biology and/or ecology courses recommended. Ecosystem and landscape modeling with emphasis on hydrology and solute transport. Spatial analysis of environmental risk analysis including ecological risk assessment, natural resource management, spatial data structures, scripting, data models, and error analysis in GIS. Offered in alternate years. —III. Zhang

190C. Research Conference for Advanced Undergraduates (1)
Discussion—1 hour. Prerequisite: consent of instructor. Research conferences for specialized study in applied biological systems technology. May be repeated for credit. [P/NP grading only.]—I, II, III, IV, IV, III

192. Internship in Applied Biological Systems Technology (1-5)
Internship—3-1.5 hours. Prerequisite: upper division standing, approval of project prior to period of internship. Supervised internship in applied biological systems technology. May be repeated for credit. [P/NP grading only.]

197T. Tutoring in Applied Biological Systems Technology (1-5)
Tutorial. Tutoring individual students, leading small voluntary discussion groups, or assisting the instructor in laboratories affiliated with one of the department’s regular courses. May be repeated for credit if topic differs. [P/NP grading only.]

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. [P/NP grading only.]

199. Special Study for Advanced Undergraduates (1-5)
[P/NP grading only.]

Graduate Courses

233. Pest Control Practices (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Graduate standing or consent of instructor. Practical and theoretical considerations of pest control systems and techniques. Design, selection, and use of mechanical systems for field, orchard, greenhouse, and vector control use. Biological, legal, and environmental considerations in pest control and pesticide application. —II. Giles

290C. Graduate Research Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. Research problems, progress, and techniques in applied biological systems technology. May be repeated for credit. (S/U grading only.)—I, II, III, IV, IV, III

298. Group Study (1-5)

299. Research (1-12)
(S/U grading only.)

Professional Course

317. Teaching Agricultural Mechanics (2)
Lecture—1 hour, laboratory—3 hours. Prerequisite: a course in physics; 6 units related to agricultural mechanics; enrolled in Agricultural Education Teacher Credential Program. Preparation of the teacher to plan, organize, and conduct an agricultural mechanics program in secondary schools. Development of and presentation of lesson plans and teaching aids. Review of subject matter in metal fabrication, power and machinery and agricultural structures areas. —I. (I.) Perkins

Applied Computing and Information Systems

[College of Agricultural and Environmental Sciences]
This minor is for students interested in applying modern computer technology to management problems in agriculture, resource management, and other areas. Course work provides knowledge of the use of information technology and the methodology of applied quantitative and systems analysis. The minor is offered by the Department of Plant Sciences.

Minor Program Requirements:

Applied Computing and Information Systems

UNITS

Two or three of the following courses: Plant Sciences 120, 121, Animal Science 128, Engineering: Computer Science 167. (The third course may be taken in substitution for a course from either of the elective groups.) Remainder of the units to be made up of courses in one or both of the following groups: .................................................. 6-12


Minor Adviser. T. F. Famula (Animal Science)
Advising Center is located in 1220A Plant and Environmental Sciences (530) 752-1715.

Applied Mathematics
(A Graduate Group)

Group Office. 1130 Mathematical Sciences Bldg. (530) 752-8131
studentservices@math.ucdavis.edu
http://www.math.ucdavis.edu/grad/ggam

Faculty. The Group includes approximately 80 faculty members, of whom about one-third are in the Department of Mathematics. Membership comprises chemists, biologists, physicists, geologists, statisticians, computer scientists, and engineers. Research interests include biology, atmospheric sciences, mechanics, solid and fluid dynamics, optimization and control, theoretical chemistry, computer and engineering sciences, mathematical physics, signal and image processing, harmonic analysis, numerical analysis and nonlinear partial differential equations. A complete list of faculty and research areas are available on our Web page.

Graduate Study. Students prepare for careers where mathematics is applied to problems in the physical and life sciences, engineering, and management. The degree requirements consist of rigorous training in applied mathematics, including course work and a research dissertation under the direction of a member of the Graduate Group in Applied Mathematics. The M.S. degree provides preparation for further study in applied mathematics or an application area, or for a career in industry or public service. The Ph.D. degree provides preparation for a career in research and/or teaching, or in industrial or national research laboratories. For further information, please contact studentservices@math.ucdavis.edu or (530) 752-8131.

New applicants are admitted to the fall quarter only.

Preparation. The program admits qualified students with a bachelor’s degree in mathematics, physics, chemistry, engineering, economics, the life sciences and related fields. General and advanced mathematics GRE scores are required, and applicants should display evidence of strong quantitative skills. Undergraduate courses should include calculus (including vector calculus), linear algebra, and ordinary differential equations. Advanced calculus (introduction to real analysis) is strongly recommended. Additional background in probability, partial differential equations, and/or numerical analysis is a plus.

Graduate Advisers. Contact the Student Services Office at (530) 752-8131; studentservices@math.ucdavis.edu.

Courses. For a list of the courses in applied mathematics and mathematics, see Mathematics, on page 361.

Applied Physics

See Physics, on page 437.
### Art History

<table>
<thead>
<tr>
<th>College of Letters and Science</th>
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<tbody>
<tr>
<td>Simon Sadler, Ph.D., Professor</td>
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<tr>
<td>Jeffrey Ruda, Ph.D., Professor</td>
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<tr>
<td>Blaise Slimson, Ph.D., Professor</td>
</tr>
<tr>
<td>Diana Sacko Macleod, Ph.D., Professor</td>
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#### The Major Program

Art History studies the changing visual expression of values, beliefs and experiences across diverse cultures and over time. It provides training in historical, social and aesthetic understanding, critical thinking, scholarly research, and lucid, thoughtful analysis and writing. More than any other discipline art history sharpens its students' visual acuity and deepens their visual literacy. Two courses must be from areas a, b, and c, and two courses must be from areas d, e, f, ... 16

- (a) Art History 172A, 172B, 173, 175
- (b) Art History 163A, 163B, 163D, 164
- (c) Art History 155
- (d) Art History 178A, 178B, 178C, 179B
- (e) Art History 168, 182, 183A, 183B, 183C, 188A, 188B, 188D, 188E
- (f) Art History 184, 185, 186, 189

Any combination of upper division courses to be chosen in consultation with the major adviser. Appropriate course substitutions may be made with the consent of the major adviser. Art History 401 and 402 may be counted among the elective units.

#### Total Units for the Major

60

#### Minor Program Requirements:

**UNITS**

Three courses chosen from three of the following six areas. Two courses must be in area a, b, or c, and one course in area d, e, f,...

- (a) Art History 172A, 172B, 173, 175
- (b) Art History 163A, 163B, 163D, 164
- (c) Art History 155
- (d) Art History 178A, 178B, 178C, 179B
- (e) Art History 168, 182, 183A, 183B, 183C, 188A, 188B, 188D, 188E
- (f) Art History 184, 185, 186, 189

Two additional Art History courses; Art History 190A through 200A strongly recommended.

1

One lower division course may be substituted for upper division study in any of these areas. Other appropriate substitutions may be made with the consent of the major adviser.

#### Honors Program

The Honors Program is encouraged for Art History majors who are attending graduate school. To be eligible for the program, a student must have a grade point average of 3.70 in the major or consent of the major adviser. In addition to meeting the standard major requirements, the honors student completes one undergraduate seminar (course 190 or 190A-H), and writes an honors thesis (course 194H). Students participating in this Program are candidates for Departmental recommendation for graduation with High or High-Est Honors. See the Academic Information chapter, Letters and Science honors section, of this catalog and consult the department for more information.

#### Teaching Credential Subject Representative

Department Chairperson; see the Teacher Education program.

#### Graduate Study

The Program in Art History offers studies leading to the Master of Arts degree in History of Art as preparation for further graduate study or professional art. For more information, contact the Graduate Staff Adviser at (530) 752-0616 or see the Graduate Announcement.

#### Courses in Art History (AH)

#### Lower Division Courses

1. **Ancient Mediterranean Art (4)**
   - Lecture—3 hours; discussion—1 hour. Introduction to the art and architecture of the ancient Mediterranean world, including Mesopotamia, Egypt, Greece, and Rome. GE credit: ArtHum.—(II.)

2. **Medieval and Renaissance Art (4)**
   - Lecture—3 hours; discussion—1 hour. Survey of developments in western art and visual culture from 1600-present. Major artists and movements, theories of visuality, focused study on interpreting the visual manifestations of secular and religious ideas and ideals. Not open for credit to students who have completed course 1DV. GE credit: ArtHum, Div.—(II.)

3. **Baroque to Modern Art (4)**
   - Lecture—3 hours; lecture/discussion—1 hour. Survey of developments in western art and visual culture from 1600-present. Major artists and movements, theories of visuality, focused study on interpreting the visual manifestations of secular and religious ideas and ideals. Not open for credit to students who have completed course 1DV. GE credit: ArtHum, Div.—(II.)

4. **Islamic Art and Architecture (4)**
   - Lecture—3 hours; discussion—1 hour. Introduction to the art and architecture of the Islamic world including the Middle East, Africa, Europe, and South Asia, from the 7th century CE to the 20th. GE Credit: ArtHum, Div.—(II.)

5. **Introduction to Visual Culture (4)**
   - Lecture—2 hours; film viewing—2 hours; discussion—1 hour. Development of visual literacy for an increasingly visual world. Critical analyses focus on a wide variety of visual media—art, television, film, advertising, the Internet—intended for a diverse spectrum of audiences. GE credit: ArtHum, Div., Wrt.—Stimson

6. **Twenty Monuments (4)**
   - Lecture—3 hours; film viewing—1.5 hours; lecture/discussion—0.5 hour. Art history through focused analyses of about 20 world-historical monuments and artistic ideas by all members of the Art History faculty. Slide lectures are complemented by a weekly program of influential films raising issues and contrasting issues. GE credit: ArtHum.—III.

7. **Introduction to Architectural History (4)**
   - Lecture—3 hours; discussion—1 hour. Formal and social history of architecture, examining design principles, major traditions, and concepts of architectural history with a focus on issues in Western architecture. Emphasis on nineteenth and twentieth centuries. GE credit: ArtHum.—(II.)

8. **Directed Group Study (1-5)**
   - Prerequisite: consent of instructor. Restricted to lower division students. [P/NP grading only]

9. **Special Study for Undergraduates (1-5)**
   - Prerequisite: consent of instructor. [P/NP grading only]

#### Upper Division Courses

10. **Cultural History of Museums and Art Exhibitions (4)**
    - Lecture/discussion—3 hours; term paper. Prerequisite: course 1A or 1B or 1C or 1D. Evolution of museums in the western world from the “cabinet of curiosities” of sixteenth-century Europe to the modern...
150. Arts of Subsaharan Africa (4)
Lecture—3 hours; term paper or gallery studies and review. Traditional arts and crafts of Sub-Saharan Africa; particular attention to the relationships between sculpture and culture in West and Central Africa. GE credit: ArtHum, Div.

151. Art and Architecture of the Americas (4)
Lecture—3 hours; term paper or gallery studies and review. Development of art in North America, emphasizing ancient Mexico. South American relationships and parallels. Recent and contemporary Indian arts and crafts from Alaska to Chile. GE credit: ArtHum, Div.

152. Arts of Oceania and Prehistoric Europe (4)
Lecture—3 hours; term paper. Traditional arts of aboriginal Australia, Melanesia, Polynesia, and Micronesia, as seen in their cultural contexts. Prehistoric art of Europe and the Near East. GE credit: ArtHum, Div.

153. Art, Storytelling and Cultural Identity in the Pacific (4)
Lecture/discussion—3 hours; term paper. Representation of the cultural identities of indigenous and migrant groups of the Pacific in visual arts and storytelling. Offered in alternate years. GE credit: ArtHum, Div, Wrt.

155. The Islamic City (4)
Lecture—3 hours; term paper. Prerequisite: course 1E recommended. Introduction to the urban history of the Islamic world as well as critical and methodological aspects of the historiography of the Islamic city, development of urban form, institutions and rituals, and analysis of selected themes. GE Credit: ArtHum, Div, Wrt.—(II.) Waterhouse

163A. Chinese Art (4)
Lecture—3 hours; term paper or gallery studies and review. A survey from the beginning to the twelfth century focusing on the major art forms that are traditional as well as newly discovered through archaeology in China. GE credit: ArtHum, Div, Wrt.—(III.) Burnett

163B. Chinese Painting (4)
Lecture—3 hours; term paper or gallery studies and review. The themes and techniques of ink painting, with and without color, depicting human and animal figures, flowers-and-birds, and landscape—the favorite and enduring theme of the Chinese scholar-painter. GE credit: ArtHum, Div, Wrt.—Burnett

163C. Painting in the People's Republic of China (4)
Lecture—3 hours; term paper. Prerequisite: course 1D or upper division standing. Analysis of the interaction between art and politics in the emergence of China into the modern world. Integration of Western influence, implementation of Mao Zedong's thought on art, and the formation of contemporary Chinese painting. GE credit: ArtHum, Div, Wrt.—Burnett

163D. Visual Arts of Early Modern China (4)
Lecture—3 hours; term paper. Prerequisite: course 163B or consent of instructor, Variable topics in Chinese art history during the 17th to 19th centuries, considering artists' statements (visual and textual) within their historical contexts, asking what was at stake in the creation of new art forms. May be repeated for credit with consent of instructor. GE credit: ArtHum, Div, Wrt.—Burnett

164. The Arts of Japan (4)
Lecture—3 hours; term paper and/or gallery studies and review (determined by instructor each quarter course). Historical review of the significant achievements in architecture, painting, sculpture, and decorative arts from prehistoric age to nineteenth century. GE credit: ArtHum, Div, Wrt.

168. Great Cities (4)
Lecture—3 hours; term paper. Transformation in architecture and urban form in Paris, London, and Vienna in the context of varying social, political, and economic systems as well as very different cultural traditions, concentrating on the years 1830-1914. Offered in alternate years. GE credit: ArtHum, Wrt.

172A. Early Greek Art and Architecture (4)
Lecture—3 hours; term paper. Examination of the origin and development of the major monuments of Greek art and architecture from the eighth century to the mid-fifth century B.C. for credit to students who have completed course 154A. (Same course as Classics 172A.) Offered in alternate years. GE credit: ArtHum, Wrt.—II. Roller

172B. Later Greek Art and Architecture (4)
Lecture—3 hours; term paper. Study of the art and architecture of later Classical and Hellenistic Greece, from the mid-fifth century to the first century B.C. Not open for credit to students who have completed course 154B. (Same course as Classics 172B.) Offered in alternate years. GE credit: ArtHum, Wrt.—II. Roller

173. Roman Art and Architecture (4)
Lecture—3 hours; term paper. The art and architecture of Rome and the Roman Empire, from the founding of Rome through the fourth century C.E. Not open for credit to students who have completed course 155. (Same course as Classics 173.) Offered in alternate years. GE credit: ArtHum, Wrt.—III. Roller

175. Architecture and Urbanism in Mediterranean Antiquity (4)
Lecture—3 hours; extensive writing. Prerequisite: a lower division Classics course (except 30, 31), course 1A recommended. Architecture and urban development in the ancient Near East, Greece, and Rome. Special emphasis on the social structure of the ancient city as expressed in its architecture, and on the interaction between local traditions and the impact of Greek-Roman urbanism. (Same course as Classics 175.) Offered in alternate years. GE credit: ArtHum, Div, Wrt.—Burnett

176A. Art of the Middle Ages: Early Christian and Byzantine Art (4)
Lecture—3 hours; term paper or gallery studies and review. Painting, sculpture and architecture of the early Christian era and Byzantine Empire: through the later Roman Empire in the West and to the final capture of Constantinople in the East. GE credit: ArtHum, Wrt.

176B. Art of the Middle Ages: Early Medieval and Romanesque Art (4)
Lecture—3 hours; term paper or gallery studies and review. Painting, sculpture and architecture of western Europe in the early medieval era: from the rise of the barbarian kingdoms through the twelfth century. GE credit: ArtHum, Wrt.

176C. Art of the Middle Ages: Gothic (4)
Lecture—3 hours; term paper or gallery studies and review. Painting, sculpture and architecture in northern Europe from the twelfth through the fifteenth centuries.

177A. Northern European Art (4)
Lecture—3 hours; term paper or gallery studies and review. Painting and sculpture of the fifteenth century in Austria, Germany, and the Lowlands, including such artists as Jan van Eyck and Hieronymus Bosch. GE credit: ArtHum, Wrt.

177B. Northern European Art (4)
Lecture—3 hours; term paper or gallery studies and review. Painting and sculpture of the sixteenth century in Germany, France and the Lowlands, including such artists as Albrecht Dürer and Pieter Bruegel. GE credit: ArtHum, Wrt.

178A. Italian Renaissance Art (4)
Lecture—3 hours; term paper or gallery studies and review. Giottos and the origins of the Renaissance: painting and sculpture in Italy from Niccola Pisano through Lorenzo Monaco, with emphasis on Duccio, Giotto, and other leading artists of the early fourteenth century. GE credit: ArtHum, Wrt.—Ruda

178B. Italian Renaissance Art (4)
Lecture—3 hours; term paper or gallery studies and review. Early Renaissance in Florence; fifteenth-century artists from Donatello and Masaccio through Botticelli, in their artistic and cultural setting. GE credit: ArtHum, Wrt.—Ruda

178C. Italian Renaissance Art (4)
Lecture—3 hours; term paper or gallery studies and review. The High Renaissance: Leonardo, Michelangelo, Raphael, and Titian in their artistic and cultural settings—Florence, Rome, and Venice in the early sixteenth century. GE credit: ArtHum, Wrt.—Il. (III.) Ruda

179B. Baroque Art (4)
Lecture—3 hours; term paper or gallery studies and review. Seventeenth-century painting, including such artists as Caravaggio, Rubens, Rembrandt, and Velazquez. Offered in alternate years. GE credit: ArtHum, Wrt.—(II.) Ruda

182. British Art and Culture, 1750–1900 (4)
Lecture—3 hours; term paper. Prerequisite: course 1C recommended. British painting in relation to the position of women in society and the rise of the middle-class art market. Topics include Hogarth and popular culture, Queen Victoria and the female gaze, and Pre-Raphaelite artists and collectors. Not offered every year. GE credit: ArtHum, Wrt.—III.

183A. Art in the Age of Revolution, 1750–1850 (4)
Lecture—3 hours; term paper. Prerequisite: course 1C recommended. Emergence of modernism in Europe from the late 18th century to the middle of the 19th century. Modernism is examined against a revolutionary backdrop of changing attitudes toward identity, race, and gender. Not offered every year. GE credit: ArtHum, Wrt.—II.

183B. Impressionism and Post-Impressionism: Manet to 1900 (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1C recommended. Innovations of Impressionism, Post-Impressionism, and Symbolists in relation to social changes. Assessment of artistry, criticism, and theories of the artist-genre, and gender relations in French art and culture of the late 1800s. GE credit: ArtHum, Div, Wrt.—II. (II.) MacLeod

183C. Modernism in France, 1880–1940 (4)
Lecture—10 hours; discussion—3 hours; fieldwork—11 hours. Course will take place as a 3-week summer course in France. A survey of gender and patronage in the development of modern art in France. Post-Impressionism, Cubism, and Surrealism are considered in relation to the intervention of dealers and women collectors in the formation of modernism. GE credit: ArtHum, Div, Wrt.—IV. (IV.) MacLeod

183D. Modern Sculpture (4)
Lecture—3 hours; term paper or gallery studies and review. Sculpture from Neo-Classicism to the present.

184. Twentieth Century Architecture (4)
Lecture—3 hours; term paper. Prerequisite: course 25 recommended. Major movements in architecture of the twentieth century in Europe and America. Formal innovations are examined within the social, political, and economic changes in which they emerged. GE credit: ArtHum, Wrt.—II.

Lecture/discussion—4 hours. Prerequisite: one course in art history, or upper division standing and a major or minor in the arts or humanities recommended. Social, cultural, aesthetic, and theoretical development for artists and their audiences in the context of larger issues like the Russian and German revolutions, WWI, the Depression, WWII, etc., and a critical-theoretical inquiry into questions of modernism, modernity, and avant-gardism. Offered in alternate years. GE Credit: ArtHum, Div, Wrt.—Simsom
188. Art After Modernism, 1948–Present (4)
Lecture/discussion—4 hours. Prerequisite: course 186 or the equivalent, as determined by the major adviser. Offered only to students in the Art History Honors Program. Independent study of an art historical problem culminating in the writing of an honors thesis under the supervision of a faculty guidance committee.

198. Directed Group Study (1–5) (P/NP grading only.)
Graduate Courses

200A. Visual Theory and Interpretive Methods (4)
Discussion—3 hours; extensive writing. Close study of selected recent developments in interpretive methodology used by art historians and other analysts of visual culture and the place of those developments within art history’s history and in the larger field of social, cultural and historical analysis. May be repeated once for credit. —I. (II.) Macleod, Stimson 200B. Research and Writing Methods in Art History (4)
Discussion—3 hours; term paper. Restricted to graduate students in art history. Development of the research, writing, and editing skills necessary for producing publishable work. Focus on reference tools used by art historians and the mechanics of scholarship, from question framing and organization of ideas to writing clear, effective prose. —II. (II.) Burnett, Ruda, Strazdes

200Cc. Thesis Writing Colloquium (4)
Discussion—3 hours; term paper. Prerequisite: course 200B concurrently. Restricted to graduate students in art history. Structured, supportive environment for second-year art history graduate students writing masters’ theses. Students produce substantive sections of their theses, contributing to both the group writing and editing exercises. May be repeated twice for credit. (S/U grading only.) —II. (II.) Burnett, Ruda, Strazdes

250. Problems in Art Historical Research (4)
Seminar—3 hours; term paper. Major topics in art historical research, emphasizing special methods of investigation, and of historical and critical analysis. May be repeated for credit. —II. Stimson

251. Seminar in Tribal Arts (4)
Seminar—3 hours; term paper. Selected topics in the art and aesthetics of small scale societies. May be repeated for credit when topic differs and with consent of instructor.

254. Seminar in Classical Art (4)
Seminar—3 hours; term paper. Selected areas of special study in classical art of the Greek and Roman tradition. Course may be repeated for credit with consent of instructor.

263. Seminar in Chinese Art (4)
Seminar—3 hours; term paper. Selected areas of special study in Chinese Art. May be repeated for credit with consent of instructor. —II. Bennett

276. Seminar in Medieval Art (4)
Seminar—3 hours; term paper. Selected areas of special study in medieval art from early Christian to late Gothic. May be repeated for credit with consent of instructor.

278. Seminar in Italian Renaissance Art (4)
Seminar—3 hours; term paper. Selected areas of special study in Italian art from the fourteenth to the sixteenth century. May be repeated for credit with consent of instructor. —II. Ruda

283. Seminar in Visual Culture and Gender (4)
Seminar—3 hours; term paper. Selected areas of special study in the relationship between visual culture and gender in Europe and America from 1750 to present. May be repeated for credit with consent of instructor. Offered in alternate years. —I. Macleod

288. Seminar in European and American Architecture (4)
Seminar—3 hours; term paper. Exploration of selected topics in European and American architectural history with concentration on the Modern Period. May be repeated for credit with consent of instructor. —II. Strazdes

290. Special Topics in Art History (4)
Seminar—3 hours; term paper. Special research seminar in the theory or methods of Art History, or in a period of Art History. Topic will vary depending on the interests of the instructor or students. May be repeated for credit when topic differs and with consent of instructor. Not offered every year. —I, II, III

292. Internship (1–4)
Internship—3–12 hours. Prerequisite: graduate student consent of instructor. Supervised internship at professional art or cultural institution including museums, galleries, archives, government offices, visual resources libraries, etc. May be repeated up to eight units for credit. Graduate students in Art History only. Not offered every year. Limited enrollment. (S/U grading only)

298. Directed Group Study (1–5) (S/U grading only)

299. Individual Study (1–6) (S/U grading only)

Professional Courses

Note: Various of the below courses are not offered each year; check the quarterly Class Schedule and Registration Guide.

390. Introduction to Teaching Art History for Teaching Assistants (1)
Discussion—1 hour. Designed for teaching assistants with emphasis on problems and procedures encountered by teachers of undergraduate art history. (S/U grading only)

396. Teaching Assistant Training Practicum (1–4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)

Professional Courses

401. Museum Training: Curatorial Principles (4)

402. Museum Training: Exhibition Methods (4)
Seminar—3 hours; exhibition. Approved for graduate degree credit. History of exhibition methods in private and public collections. Comparisons of different types of museums and their exhibition problems. Lighting and techniques of display with emphasis on actual design. Experimental with unusual presentation forms. —II

Art Studio

[College of Letters and Science]
Teaching Credential Subject Representative. Department Chairperson; see the Teacher Education program.

Graduate Study. The Department of Art offers programs of study and research leading to the M.F.A. degree in the practice of art. For more information contact the Graduate Staff Adviser at (530) 752-0616.

Courses in Art Studio (ART)

Lower Division Courses


4. Beginning Figure Painting (4) Studio—6 hours. Prerequisite: course 2. Form in composition using the human figure as subject. —Hollowell, Pardee, Werfel

5. Beginning Sculpture (4) Studio—6 hours. Basic sculpture techniques using a variety of media. Form in space using cardboard, plaster, and/or cement, wood and/or metal and other media. —I, II, III, [I, II, III] Bills, Hill, Puls

7. Beginning Painting (4) Studio—6 hours. Introduction to techniques and concepts in the practice of painting. —Henderson, Hollowell, Pardee, Werfel

8. Beginning Ceramics (4) Studio—6 hours. Introduction to ceramics construction and processes. —Rosen

9. Beginning Photography (4) Studio—6 hours. Introduction to the fundamental technical, aesthetic, and formal aspects of photography. Camera skills, film developing and printing in the black and white darkroom. —Geiger, Suh

10. Introduction to Art Appreciation (3) Lecture—3 hours. The understanding and appreciation of painting, sculpture, architecture and industrial art. Illustrated lectures. Intended for nonmajors. GE credit: ArtHum.

11. Beginning Printmaking (4) Studio—6 hours. Introduction to printmaking techniques such as monotype, relief, and intaglio. Investigation of personal imagery through use of these techniques.

12. Beginning Video (4) Studio—6 hours. Production techniques of video shooting, editing, lighting, sound and effects. A conceptual framework for video-art techniques. —Martin

24. Introduction to Experimental Video and Film (4) Lecture—3 hours; discussion—1 hour; term paper. Evolution of moving image technologies. Shifts within avant-garde artistic practices. Conceptual and historical differences between film and video. Offered in alternate years. GE Credit: ArtHum. —[I] Martin

26. Photogapce (4) Lecture—3 hours; discussion—1 hour; term paper. Photography as performance-based art. History of performance art and performances designed specifically for the camera. Offered every other years. GE Credit: ArtHum, Wrt.—II] Geiger, Suh

30. Introduction to Contemporary Visual Culture (4) Lecture—3 hours; discussion/lab—1 hour. Establishing visual literacy across the media of fine art, photography, advertising, television and film; media culture; focus on critical decoding of contemporary visual culture. GE credit: ArtHum, Div, Wrt. —II] Geiger, Suh

98. Directed Group Study (1-5) Prerequisite: consent of instructor. Restricted to lower division students. (P/NP grading only)

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only)

Upper Division Courses

Pre-enrollment in upper division courses is restricted to art majors.

101. Intermediate Painting (4) Studio—6 hours. Prerequisite: courses 2, 7. Individualized projects exploring color and space in a variety of subject matter and approaches. Builds on basic skills and concepts from beginning drawing and painting courses. Study of historical and contemporary art in relation to studio practice. —Henderson, Hollowell, Pardee, Werfel

102A. Advanced Painting: Studio Projects (4) Studio—6 hours. Prerequisite: course 101. Sustained development of painting for advanced students. Approaches will vary according to the instructor. Pass 1 restricted to Art Studio majors. May be repeated for credit one time. —Henderson, Hollowell, Iliatto, Pardee, Werfel

102B. Advanced Painting: Figure (4) Studio—6 hours. Prerequisite: course 101. Advanced painting using the human figure as subject. Pass 1 restricted Art Studio majors. May be repeated for credit one time. —Henderson, Hollowell, Pardee, Werfel


105A. Advanced Drawing: Studio Projects (4) Studio—6 hours. Prerequisite: courses 2; course 103A or 103B. Exploration of composition and process in drawing. Emphasis on the role of drawing in contemporary art and on drawing as an interdisciplinary practice. Pass 1 restricted Art Studio majors. May be repeated for credit one time. —Henderson, Hollowell, Pardee, Werfel

105B. Advanced Drawing: Figure (4) Studio—6 hours. Prerequisite: courses 2; course 103A or 103B. Study of the figure through drawing of the model. Exploration of different methods and process of figure-drawing. Pass 1 restricted Art Studio majors. May be repeated for credit one time. —Henderson, Hollowell, Pardee, Werfel


111A. Advanced Photography: Color Analog (4) Studio—6 hours. Prerequisite: courses 9 and 110A. Color photography using the analog darkroom. Expands on the technical and conceptual under-
111B. Advanced Photography: Digital Imaging (4)
Studio—6 hours. Prerequisite: courses 9, 110B. In-depth exploration of digital photography, including refined digital imaging techniques. Theoretical issues involved in digital media. May be repeated for credit one time. Pass 1 restricted Art Studio majors.—Geiger, Suh

125B. Intermediate Printmaking: Intaglio (4)
Studio—6 hours. Prerequisite: course 11. Metal plate etching, aquatint, hard and soft ground, burin engraving and related printmaking techniques. May be repeated for credit one time. Pass 1 restricted Art Studio majors.—Berry

125C. Intermediate Printmaking: Lithography (4)
Studio—6 hours. Prerequisite: course 11. Stone and metal-plate lithography and other planographic printmaking methods. Exploration of the basic chemistry and printing procedure inherent in stone lithography. May be repeated for credit one time. Pass 1 restricted Art Studio majors.—Berry

125D. Intermediate Printmaking: Serigraphy (4)
Studio—6 hours. Prerequisite: course 11. Printmaking techniques in silk screen and related stencil methods. Development of visual imagery using the language of printmaking. May be repeated for credit one time. Pass 1 restricted Art Studio majors.

129. Advanced Printmaking (4)
Studio—6 hours. Prerequisite: completion of two of: 125A, 125B, 125C, or 125D. Development of intermediary printmaking. Advanced modes in printmaking techniques: relief, serigraphy, intaglio, surface, as well as addition of digitized imagery. May be repeated for credit two times. Pass 1 restricted Art Studio majors.

138. The Artist’s Book (4)
Studio—6 hours. Prerequisite: completion of three upper division Art Studio courses. Creation of an artist’s book in an edition of three. Use of a variety of media. May be repeated for credit one time. Pass 1 restricted Art Studio majors. Offered in alternate years.—Geiger, Hill, Suh

142A. Intermediate Ceramic Sculpture: Mold Work (4)
Studio—6 hours. Prerequisite: course 8. Creation of ceramic sculpture employing moldworking processes such as: slip casting, hump molds, and sprigging. Pass 1 restricted Art Studio majors.—Rosen

142B. Intermediate Ceramic Sculpture: Clay, Glaze, and Kiln (4)
Studio—6 hours. Prerequisite: course 8. Study and practice of glaze formation. Concentration on the use of color in ceramic sculpture. Practical experience with kilns. Pass 1 restricted Art Studio majors.—Rosen

143A. Advanced Ceramic Sculpture: Studio Projects (4)
Studio—6 hours. Prerequisite: course 8; 142A or 142B. Explorations of ceramic fabrication. Hollow and solid building, casting, throwing, using fired, found, and fabricated ceramic elements. May be repeated for credit two times. Pass 1 restricted Art Studio majors.—Rosen

143B. Advanced Ceramic Sculpture: Issues in Contemporary Ceramics (4)
Studio—6 hours. Prerequisite: course 8; 142A or 142B. Individual studio work in conjunction with readings, field trips, critiques and writing about contemporary ceramic art. May be repeated for credit two times. Pass 1 restricted Art Studio majors.—Rosen

147. Theory and Criticism of Photography (4)
Lecture—3 hours; term paper. Prerequisite: course 9. Development of camera vision, ideas, and aesthetics and their relationship to the fine arts from 1839 to the present. Offered in alternate years. GE credit: ArtHum, Wrt.—Geiger, Suh

148. Theory and Criticism: Painting and Sculpture (4)
Lecture—3 hours; term paper. Prerequisite: course 5 or 7. Study of forms and styles in historic and contemporary masterpieces. Offered in alternate years. GE credit: ArtHum, Wrt.—I. Thiebaud

149. Introduction to Critical Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: two of Art History 1B, 1C, 133. An overview of 20th century critical theories of culture and their relation to visual art and mass media culture. GE credit: ArtHum, Div. Wrt.

150. Theory and Criticism of Electronic Media (4)
Lecture—3 hours, term paper. Prerequisite: course 24 recommended. Study of electronic media, focusing on critique, application, and relationship to art practice. Analysis of the conceptual basis of electronic media as an artistic mode of expression. Offered in alternate years. GE credit: ArtHum, Wrt.—(I) Martin

151. Intermediate Sculpture (4)
Studio—6 hours. Prerequisite: course 5. Individualized explorations through multiple projects in a variety of sculpture media and techniques. Builds upon technical skills and concepts covered in Art 5.—(I, II, III, IV) Bills, Hill, Puls

152A. Advanced Sculpture: Studio Projects (4)
Studio—6 hours. Prerequisite: courses 5, 151. Sculpture for advanced students. Emphasis on concept, design, idea development and execution of multiple projects. Approaches and projects will vary according to the instructor. May be repeated for credit one time when topic differs. Pass 1 restricted Art Studio majors.—Bills, Hill, Puls

152B. Advanced Sculpture: Material Explorations (4)
Studio—6 hours. Prerequisite: courses 5, 151. Primary application and exploration of a single sculpture material chosen by the student. Examination of its properties, qualities, and characteristics for three-dimensional expression. May be repeated for credit one time. Pass 1 restricted Art Studio majors.—Puls

152C. Advanced Sculpture: Concepts (4)
Studio—6 hours. Prerequisite: courses 5, 151. Investigation of a specific idea chosen by the class. Relationship of idea to form and content. Individual development of conceptual awareness. May be repeated for credit one time. Pass 1 restricted Art Studio majors.—Puls

152D. Advanced Sculpture: Metals (4)
Studio—6 hours. Prerequisite: courses 5, 151. Technical aspects of the use of metals in contemporary art practice. Projects assigned to demonstrate the evolution of concepts and processes. May be repeated for credit one time. Pass 1 restricted Art Studio majors.—Puls

152E. Advanced Sculpture: Site Specific Public Sculpture (4)
Studio—6 hours. Prerequisite: courses 5, 151. Place and site specificity in contemporary sculpture. Individual and group work to conceive and fabricate sculpture in a public space. May be repeated for credit one time. Pass 1 restricted Art Studio majors.—Hill

152F. Advanced Sculpture: Figure (4)
Studio—6 hours. Prerequisite: courses 5, 151. Exploration of historical and contemporary approaches to the body in three-dimensions. Projects based on observational and conceptual strategies. Variety of media and techniques, including clay, wood, plaster, plastics, found objects, and others. May be repeated for credit one time. Pass 1 restricted Art Studio majors.

152G. Advanced Sculpture: The Miniature and Gigantic (4)
Studio—6 hours. Prerequisite: courses 5, 151. Exploration of scale, from the very small to the very large in a series of projects in a variety of media. Tools and techniques of enlargement and miniaturization. May be repeated for credit one time. Pass 1 restricted Art Studio majors.

171. Mexican and Chicano Mural Workshop (4)
Studio—8 hours; independent study—1 hour. Prerequisite: Chicano/o Studies 70 and/or written consent of instructor. The Mural: a collective art process
Asian American Studies

(College of Letters and Science)

Wendy Ho, Ph.D., Program Director

Program Office, 3102 Hart Hall (530) 752-3625; http://asas.ucdavis.edu

Committee in Charge
Darrell Y. Hamamoto, Ph.D. (Asian American Studies)
Bill Ong Hing, J.D. (School of Law, Asian American Studies)
Wendy Ho, Ph.D. (Asian American Studies, Women and Gender Studies)
Richard S. Kim, Ph.D. (Asian American Studies)
Sunaina Maoi, Ed.D. (Asian American Studies)
Suzette Min, Ph.D. (Asian American Studies)
Khacel S. Parreitais, Ph.D. (Asian American Studies)
Stanley Sue, Ph.D. (Psychology, Asian American Studies)
Caroline Kieu Linh Valverde, Ph.D. (Asian American Studies)
Nolan Zane, Ph.D. (Psychology, Asian American Studies)

Faculty
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Caroline Kieu Linh Valverde, Ph.D., Assistant Professor
Nolan Zane, Ph.D., Professor

Emeriti Faculty
Isao Fujimoto, M.A., Senior Lecturer Emeritus

The Major Program
The Asian American Studies Program offers an interdisciplinary major that examines the experiences of various Asian American groups in the United States. Pertinent to these experiences are the historical, cultural, legal, political, social-psychological, class, racial, and gender contexts for Asian Americans.

The Program. Majors take a prescribed set of lower division and upper division courses in Asian American Studies.

Career Alternatives. Asian American Studies prepares students for a variety of careers. Given the multicultural nature of society and the relationships with different societies, many occupations seek individuals with background and expertise in ethnic relations and cultural issues. Graduates often enter the fields of teaching, research, government service, law, social services, etc., as well as graduate schools for advanced degrees in various disciplines.

A.B. Major Requirements: 

UNITS

Humanities Emphasis

Preparatory Subject Matter.........................34

Asian American Studies 1, 2, 20 .....

One Asian language: Cantonese 1, 2, 3; Japanese 1, 2, 3; Korean 1, 2, 3; or equivalent Asian language .....

Note: For courses in Asian languages, see Chinese and Japanese Languages for one Asian language for East Asian Languages and Cultures.

At least two lower division courses from the following departments or programs: African American and African Studies, Chicana/o Studies, Native American Studies, Women and Gender Studies (all lower division courses of at least 4 units are acceptable except those numbered 92, 97T, 98, and 99) ..............8

Depth Subject Matter .......................44-47

At least seven upper division Asian American Studies courses (excluding 197T, 198, 199) and not more than 3 units of internships .............28-30

Select four courses from one of the following tracks: ..............16

Literature/Culture Track
Comparative Literature 153; Dramatic Art 154, 155; English 178, 179, 185A, 185B

History/Culture Track
Dramatic Art 154, 155; History 191F, 194C, 196B, 173, 178

Total Units for the Major ...................78-81

Social Science Emphasis

Preparatory Subject Matter.......................32

Asian American Studies 1, 2 ..............8

Select four courses from the following: Anthropology 2, 4, 20, Communication 1, 3; Human Development 30; Psychology 41; Sociology 46A, 46B; Statistics 13 (at least two of the courses must be methodological/statistical in nature and selected from Anthropology 2; Psychology 41; Sociology 46A, 46B, or Statistics 13) ...............16

At least two lower division courses from the following departments or programs: African American and African Studies, Chicana/o Studies, Native American Studies, Women and Gender Studies (all lower division courses of at least 4 units are acceptable except those numbered 92, 97T, 98, and 99) ..............8

Depth Subject Matter .......................44-46

At least seven upper division Asian American Studies courses (excluding 197T, 198, 199) and not more than 3 units of internships ..................28-30

Select four courses from one of the following tracks: ..............16

Anthropology Track
Anthropology 123BN, 132, 133, 134, 138, 139AN, 143B, 147

Sociology/Psychology Track
Human Development 124; Psychology 142; Sociology 125, 128, 129, 130, 172

Total Units for the Major ...................76-78

Major Adviser: MD. Nguyen, (530) 752-4447 or mdnguyen@ucdavis.edu

Substitutions for disciplinary track courses will be considered by the Program Director on a case by case basis. Likewise, any substitutions of Major/Minor criteria will be considered by the Program Director.

Minor Program Requirements: 

UNITS

Asian American Studies ......................... 20

Five courses from Asian American Studies 100, 110, 111, 112, 120, 130, 136, 140, 150, 150B, 150C, 150D, 155, 192, 198, and 199 (no more than 4 units of 192, 198, and 199 may be counted toward this total)

Minor Adviser: MD. Nguyen, (530) 752-4447 or mdnguyen@ucdavis.edu

American History and Institutions. This univer-
sity requirement can be satisfied by (under the fol-
lowing courses in Asian American Studies: 1, 2; see also under University Requirements.

Courses in Asian American Studies (ASA)

Direct questions pertaining to the following courses to the instructor or to Asian American Studies Program in 3102 Hart Hall (530) 752-3625.
Lower Division Courses

1. Historical Experience of Asian Americans (4)
Lecture—2 hours; discussion—1 hour. Introduction to Asian American Studies through an overview of the history of Asians in America from the 1840s to the present within the context of the development of the United States. GE credit: SocSci, Div. Wrt.—I, II, III. [I, II, III]

2. Contemporary Issues of Asian Americans (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Introduction to Asian American Studies through the critical analysis of the impact of race, racism, ethnicity, imperialism, and immigration since post-World War II on Asian Americans. Topics may include sexuality, criminality, class, hate crimes, and inter-ethnic relations. GE credit: SocSci, Div. Wrt.—I, II, III. [I, II, III]

3. Social and Psychological Perspectives of Asian Americans (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. An introduction to Asian American Studies through an examination of the social, psychological, and historical contexts using theoretical perspectives from social sciences, humanities/arts: identity, racialization, immigration, gender, sexuality, labor, socialization, family, and nationalism. Offered in alternate years. GE credit: ArtHum or SocSci, Div.—I. [I] Ho, Parreñas

113. Asian American Sexuality (4)
Lecture/discussion—4 hours. Prerequisites: course 1, 2, or 3. Restrictive US immigration laws, labor exploitation, race-based exclusionary laws, removal and internment, anti-miscegenation laws, and other examples of social control are used to assess their role in shaping the sexual expression of the different Asian American groups. —II. [II] Hamamoto

114. Asian Diasporas (4)
Lecture—4 hours. Prerequisites: course 1 or 2; upper division status or consent of instructor. Asian diasporic communities and the experiences of its members in the United States and internationally. Community building, cyberspace, gender issues, labor, transnational practices, effects of globalization, political organizing, anti-racist struggles, and its diasporic significance. Offered in alternate years. GE credit: SocSci, Div.—I. [III.] Kim, Parreñas, Valverde

115. Multiracial Asian Pacific American Issues (4)
Lecture/discussion—4 hours. Prerequisites: course 1, 2, or 3; consent of instructor. Introduction to the experiences of bicultural and multiracial Asian Pacific people in the U.S. including theories of race, racial identity formation, culture, media, and anti-racist struggles. Critical approaches to the analysis of popular media and academic representations. Offered in alternate years.—I. Kieu Linh, Valverde

116. Asian American Youth (4)
Lecture—3 hours; term paper. Prerequisites: course 1, 2, or 3; Social experiences of diverse groups of Asian American youth. Ways in which youth themselves actively create cultural expressions and political interventions. GE credit: Div.—I. Maira, Parreñas

120. Multiracial Asian Pacific American Issues (4)
Lecture/discussion—4 hours. Prerequisites: course 1, 2, or 3; consent of instructor. Introduction to the experiences of bicultural and multiracial Asian Pacific people in the U.S., concentrating on theories of race, racial identity formation, culture, media, and anti-racist struggles. Critical approaches to the analysis of popular media and academic representations. Offered in alternate years. GE credit: Div.—II. Valverde

121. Asian American Performance (4)
Lecture/discussion—4 hours. Prerequisites: course 1, 2, or 3; consent of instructor. Performance work by, for, and/or about Asian Americans including drama, dance, and film. Ethnicity, gender and sexuality, class and age as they intersect with Asian Pacific American identities in and through dramatic performance. Offered in alternate years. —II. Kim

130. Asian American Literature (4)
Lecture/discussion—4 hours. Prerequisites: course 1, 2 or 3; consent of instructor. Works of Asian American literature by authors from the major ethnic subgroups, examining cultural, academic and historical contexts. Intertextual analysis of their thematic and formal elements to form an understanding of Asian American literary traditions. GE credit: ArtHum,—II. [III.] Kim, Parreñas, Valverde

136. Asian American Performance (4)
Lecture/discussion—4 hours. Prerequisites: course 1, 2, 3, or consent of instructor. Performance work by, for, and/or about Asian Americans including dramatic literature, dance, and film. Ethnicity, gender and sexuality, class and age as they intersect with Asian Pacific American identities in and through dramatic performance. Offered in alternate years.—II. [III.] Win

140. Asian Americans and Media (4)
Lecture—4 hours. Prerequisites: course 1 or 2. Upper division standing. The political and social representation in print, radio, television, film, and new media will be examined in tandem with sustained discussion of alternatives offered by independent Asian American media arts. GE credit: ArtHum, Div, SocSci, Wrt.—I. [I] Hamamoto

150. Filipino American Experience (4)
Lecture/discussion—4 hours. Prerequisites: course 1 or 2. Examination of the relationship between the Filipino American community, the Philippine home community and the larger American society through a critical evaluation of the historical and contemporary conditions, problems and prospects of Filipinos in the U.S.—Parreñas

150B. Japanese American Experience (4)
Lecture—3 hours; term paper. Prerequisite: course 1 and upper division standing or consent of instructor. Analytical approaches to understanding Japanese American history, culture and the significance of its alternate years. GE credit: SocSci, Div. Wrt.—II. Hamamoto

150C. Chinese American Experience (4)
Lecture/discussion—4 hours. Prerequisites: course 1, 2, or 3; consent of instructor. Survey of the historical and contemporary experiences of Chinese in the United States, starting with the gold rush era and concluding with the present-day phenomenon of Chinese transnational movements in the United States and its diasporic significance. Offered in alternate years. GE credit: SocSci, Div.—III. Hamamoto

150D. Korean American Experience (4)
Lecture/discussion—4 hours. Prerequisites: course 1, 2, or 3; consent of instructor. Historical survey of the historical and contemporary experiences of Koreans in the United States from the late nineteenth century to the present. Offered in alternate years. GE credit: SocSci, Div.—III. Valverde

150F. South Asian American History, Culture, & Politics (4)
Lecture/discussion—4 hours. Prerequisites: course 1, 2, 3, or 4; consent of instructor. South Asian American experiences, focusing on the histories, cultures, and politics of Indian, Pakistani, Bangladeshi, and Sri Lankan communities in the United States. Interdisciplinary approaches to migration, labor, gender, racialization, ethnicity, youth, community mobilization. Offered in alternate years. GE credit: ArtHum, SocSci,—II. Maira

155. Asian American Legal History (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 2, or 3; consent of instructor. Legal history of Asian Americans, from the mid-19th century to present. Laws and administrative policies affecting Asian American communities, including those governing immigration, social and economic participation, violent inter-ret, and affirmative action.—Hing

171. Health Issues for Asian Americans and Pacific Islanders (4)
Lecture/discussion—4 hours. Health issues confronting Asian Americans and Pacific Islanders. (Same course as Epidemiology and Preventive Medicine 171.)—Chen

189A-I. Topics in Asian American Studies (4)
Asian Studies

See Asian American Studies, on page 159; East Asian Languages and Cultures, on page 207; and East Asian Studies, on page 207.

Astronomy

See Physics, on page 437.

Atmospheric Science

(College of Agricultural and Environmental Sciences)

Faculty. See under Department of Land, Air, and Water Resources, on page 342.

The Major Program

Atmospheric science is the study of the layer of air that surrounds the planet. It includes all weather phenomena, such as frontal systems and clouds, as well as severe weather events such as hurricanes and tornadoes. The effects of human and other biotic activity on the quality of the air we breathe, and on changes in regional and global climate are also central to this field of study.

The Program. Modern meteorology is a quantitative science that is becoming increasingly computer oriented. In the interest of a broad preparation in atmospheric science, the program deals with fundamental physical processes that involve the general circulation of the atmosphere; turbulent mass and energy transfers at the planetary surface and within the atmosphere; solar and terrestrial radiation; atmospheric interaction with the biosphere; climate variations; and developments in modern meteorological instrumentation. In addition, the program has significant expertise in the areas of air quality and atmospheric chemistry. As well as providing a broad background in meteorology, the major includes an informal minor area to be chosen from mathematics, computer science, environmental studies, resource management or a physical or biological science.

Internships and Career Alternatives. Atmospheric science students have participated in internships with the California Air Resources Board, various county Air Pollution Control Districts, and the National Weather Service. Numerous career opportunities exist in the federal and state governments, research and development in the private sector, and education. Examples of career areas are weather forecasting, agricultural meteorology, air-pollution forecasting and control, weather modification, hurricane and severe weather forecasting and research, weather satellite meteorological and environmental consulting, and weather research. About half of our graduates continue their education by seeking the M.S. or Ph.D. degree in atmospheric science.

B.S. Major Requirements:

United States

English Composition Requirement: 3-11

See College requirement: 0-8

University Writing Program: 19

Communication: 1, Drama, Art: 10 or University Writing Program: 104, 3

Preparatory Subject Matter: 59-60

Biological Sciences 1C or Plant Sciences 2... 4-5

Chemistry 22B or 28... 10

Computer Science Engineering 30 or course selected with adviser’s approval: 4


Atmospheric Science 30... 4

Physics 9A, 9B, 9C... 12

Statistics 13... 3

Breadth/General Education: 28

Satisfaction of General Education requirement: additional units in social sciences and humanities to total 28 units.

Depth Subject Matter: 36

Atmospheric Science 110, 111, 111L, 120, 121A, 121B, 124, 128... 28

Upper Division Atmospheric Sciences courses selected with adviser’s approval, not including courses 192 and 199... 4

Engineering, Atmospheric Science 150, Civil and Environmental Engineering 119A or course selected with adviser’s approval... 4

Restricted Electives: 15

Coordinated group of courses (minor area) to be chosen with adviser’s approval from mathematics, computer science, environmental studies, resource management, or a physical or biological science (at least 10 upper division units)... 15

Unrestricted Electives: 30-39

Total Units for the Degree: 180

Major Adviser. Shu Hua Chen

Advising Center for the major as well as for graduate studies is located in 1152 Plant and Environmental Sciences Building, Land, Air, and Water Resources Teaching Center (530) 752-1669; lawadvising@ucdavis.edu.

Minor Program Requirements:

Minor Program. The minor in Atmospheric Science provides a broad treatment of weather and climate, with the option to specialize in such topics as climate change, meteorological instrumentation, and satellite remote sensing. Students undertaking the minor should have completed minimum preparatory course work in calculus and physics (Mathematics 16A-16B, Physics 5A or 7A). Some upper division courses in Atmospheric Science have the Mathematics 21 and 22 series and the Physics 9 series as prerequisites.

United States

Atmospheric Science: 20-24

Atmospheric Science 60, 110... 8

Four courses selected with the approval of the minor program adviser from upper division Atmospheric Science courses (excluding 192 or 199) or Environmental and Resource Sciences 131... 12-16

Minor Adviser. K. T. Paw U

Graduate Study. You can specialize in particular areas of atmospheric science through graduate study and research leading to the M.S. and Ph.D. degrees. For details, see the Atmospheric Science (A Graduate Group), on page 163, and Graduate Studies, on page 104.


Courses in Atmospheric Science (ATM)

Questions pertaining to the following courses should be directed to the instructor or to the Land, Air, and Water Resources Teaching Center in 1152 Plant & Environmental Sciences Building (530) 752-1669.

Lower Division Courses

5. Global Climate Change (3)


6. Fundamentals of Atmospheric Pollution (3)

Lecture—3 hours. Effects of human emissions on the atmosphere: smog, ozone pollution, and ozone depletion; indoor air pollution; global warming; acid rain. Impacts of these problems on the earth, ecosystems, and humans. Strategies to reduce atmospheric pollution. GE credit: SciEng. — I. [I] Anastasio

10. Severe and Unusual Weather (3)

Lecture—2 hours; discussion—1 hour. Prerequisite: high school physics. Introduction to physical principles of severe and unusual weather; flood, blizzards, thunderstorms, lightning, tornadoes, and hurricanes. Emphasis on scientific perspective and human context. Not open to students who have received credit for course 100. GE credit: SciEng. 110, 112, 113. [I, II] Grotjahn, Reck

30. Issues in Atmospheric Science (2)

Lecture—1 hour; discussion—1 hour. Prerequisite: high school physics. Introduction to selected topics in atmospheric science, such as: meteorological aspects of acid rain, use of computer models in weather forecasting, theories of global climate change, impact of satellites on meteorology, and modern meteorological instrumentation. [P/NP grading only].—II. (II.) Reck

60. Atmospheric Physics and Dynamics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16A and Physics 5A or 7A. Composition and thermal structure of the atmosphere. Radiation and the heat budget of the earth and its atmosphere. Cloud formation and precipitation processes. The atmosphere in motion, thunderstorms and other severe weather phenomena. —I. (I) Faloon

92. Atmospheric Science Internship (1-12)

Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Internship off and on campus in atmospheric science. Internship supervised by a member of the faculty. [P/NP grading only].
192. Atmospheric Science Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Internship off and on campus in atmospheric science. Internship supervised by a member of the faculty. (P/NP grading only)

198. Directed Group Study (1-5)
Prerequisite: three upper division units in Atmospheric Science. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: three upper division units in Atmospheric Science and at least an overall B average. (P/NP grading only)

Graduate Courses

215. Advanced Hydroclimatology (3)
Lecture—3 hours. Prerequisite: course 115. Theoretical and applied aspects of energy and mass fluxes linking the earth’s surface, atmosphere, and hydrologic system. Emphasis on regional scale analysis and modeling, spatial data representation, and climate change influences on precipitation and its hydroclimatic expression. Offered in alternate years.

221. Advanced Atmospheric Dynamics (3)
Lecture—3 hours. Prerequisite: course 121B. Conditions for instability in stratified atmospheres; baroclinic instability; forced topographic Rossby Waves; wavenumber flow interaction theory; tropical dynamics; stratospheric dynamics. Offered in alternate years.

223. Advanced Boundary-Layer Meteorology (3)
Lecture—3 hours. Prerequisite: course 230. Characteristics of the atmospheric boundary layer under convective and nocturnal conditions. Heat budget at the surface and boundary layer forcing. Similarity theory and scaling of the boundary layer. Measurement and simulation techniques. Offered in alternate years.

230. Atmospheric Turbulence (3)
Lecture—3 hours. Prerequisite: course 121B or 158. Dynamics and energetics of turbulence in the atmosphere including vorticity dynamics. Statistical description of turbulence; Eulerian and Lagrangian scales, spectral analysis, conditional sampling techniques. Turbulent diffusion; the closure problem, gradient-diffusion and second-order methods. Offered in alternate years.

231. Advanced Air Pollution Meteorology (3)
Lecture—3 hours. Prerequisite: Course 149A, 160 and one course in fluid dynamics. Processes determining transport and diffusion of primary and secondary pollutants. Models of chemical transformation, of the atmosphere, and mesoscale boundary layer and of mesoscale wind fields, as applicable to pollutant dispersion problems. Offered in alternate years.

233. Advance Biometeorology (3)
Lecture/discussion—3 hours. Prerequisite: course 133 or consent of instructor. Current topics in biometeorology. Physical and biological basis for water vapor, other gases, and energy exchange with the atmosphere. Topics include: human thermal comfort; effects of turbulent transport from plant canopies, surface temperatures and energy budgets, bio-aerosol physics and aerobiology. Offered in alternate years.

240. General Circulation of the Atmosphere (4)
Lecture/discussion—4 hours. Prerequisite: course 121B. Large-scale, observed atmospheric properties. Radiation, momentum and energy balances derived and compared with observations. Lectures and homework synthesize observations and theories, then apply them to understand the large-scale circulations. Offered in alternate years.

II. Paw U, Snyder

233 Meteorology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 230, Physics 9B, and a computer programming course such as Engineering Computer Science 3D. Additional courses in fluid dynamics (course 121A or 103) and two Fourier transforms (Mathematics 118C or Physics 104A) are helpful, but not required. Computational techniques used in physical sciences. Integral and differential equations of convection: mainly finite differencing and spectral (Fourier transform) methods. Time series applications (time- permitting). Specific applications drawn from meteorology.

Accelerated introduction to FORTRAN including program assignments. Enrollment limited to 12, preference to Atmospheric Science majors. Offered in alternate years. P/NP grading only.

I. Grothahn

158 Boundary-Layer Meteorology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 121A. Growth, development and structure of the atmospheric layer directly influenced by the underlying surface and extending to a maximum of about two kilometers under convective conditions. Turbulent diffusion in the boundary layer. The microclimate at and near the ground surface. III. Faloona

160 Introduction to Atmospheric Chemistry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 2B. Quantitative examination of current local, regional and global problems in atmospheric chemistry (includes: physical smog, acid deposition, climate change, and stratospheric ozone depletion) using fundamental concepts from chemistry. Basic chemical modeling of atmospheric reaction systems.

II. Anastasio

241 Climate Dynamics (3)
Lecture/discussion—3 hours. Prerequisite: course 121B. Dynamics of large-scale climatic variations over time periods from weeks to centuries. Descrip-
200. Meso-Scale Meteorology (3)
Lecture—3 hours. Prerequisite: graduate standing, course 150, a course in partial differential equations; or consent of instructor. The study of weather phenomena with horizontal spatial dimensions between 2.5 and 2500 kilometers. Methods of observational study and numerical modeling of the structure and temporal behavior of these weather systems. Offered in alternate years.—I. Chen

205. Numerical Modeling of the Atmosphere (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 121B and Engineering 5; course 150 recommended. Principles of numerical modeling of the dynamic, thermodynamic and physical processes of the atmosphere. Findings and their applications in model development using the shallow water equations and the primitive equations. Operational forecast models. Offered in alternate years.—I. Chen

260. Atmospheric Chemistry (3)
Lecture—3 hours. Prerequisite: course 160. Chemistry and photochemistry in tropospheric condensed phases (fog, cloud, and rain drops and aerosol particles). Gas-gas and gas-particle partitioning of compounds and effects of reactions in condensed phases on the fates and transformations of tropospheric chemical species. Offered in alternate years.—III. Anastasio

270A-G. Topics in Atmospheric Science (1-3)
Discussion—1-3 hours. Applications and concepts in (A) Meteorological Statistics; (B) Computer Modeling of the Atmosphere; (C) Design of Experiments and Field Studies in Meteorology; (D) Solar and Infrared Radiation in the Atmosphere; (E) Aerosol and Cloud Physics; (F) Atmospheric Chemistry; (G) General Meteorology.—I, II, III. (I, II, III.)

280A. Air Quality Policy in the Real World (4)
Project. Prerequisite: consent of instructor; Atmospheric Science 149 or Engineering: Civil and Environmental 149, and Engineering: Civil and Environmental 242 or equivalent. In-depth investigation of an air quality problem with a team and mentor from government or industry. Science, engineering and policy will be involved. Findings will be presented orally and in writing. Not offered every year. (Deferred grading only, pending completion of sequence.)—II, III. (I, II, III.)

280B. Air Quality Policy in the Real World (4)
Project. Prerequisite: course 280A; consent of instructor. In-depth investigation of an air quality problem with a team and mentor from government or industry. Science, engineering and policy will be involved. Findings will be presented orally and in writing. (Deferred grading only, pending completion of sequence.) Not offered every year.—II, III. (I, II, III.)

290. Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing in Atmospheric Science or related field. Current developments in selected areas of atmospheric research. Topics will vary according to student and faculty interests. (S/U grading only.)—I, II, III. (I, II, III.)

295. Research Conference in Atmospheric Science (1-3)
Lecture/discussion—1-3 hours. Prerequisite: consent of instructor. Review and discussion of current literature and research in: (A) Air Quality Meteorology; (B) Fine meteorology; (C) Boundary Layer Meteorology; (D) Climate Dynamics; (E) General Meteorology; (F) Atmospheric Chemistry. May be repeated up to a total of 6 units per semester. (S/U grading only.)—I, II, III. (I, II, III)

298. Group Study (1-5)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

299. Research (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Course 390
Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Atmospheric Science (A Graduate Group)

Bryan C. Weare, Ph.D., Chairperson of the Group (530) 752-3445
Group Office. 141 Hoagland Hall, 1152 Plant and Environmental Sciences Building, (530) 752-1669; http://atm.ucdavis.edu

Faculty
Cort Anastasio, Ph.D., Associate Professor Stephen S. Cliff, Ph.D., Research Engineer Bryan Weare, Ph.D., Professor Daniel P.Y. Chang, Ph.D., Professor Emeritus F.A. Bradley, Ph.D., Professor Emeritus Steven S. Cliff, Ph.D., Research Engineer John Carroll, Ph.D., Professor Emeritus Kyaw Tha Paw U, Ph.D., Professor Emeritus Maryl Shelton, Ph.D., Professor Emeritus

Emeriti Faculty
Thomas A. Cahill, Ph.D., Professor Emeritus Daniel P.Y. Chang, Ph.D., Professor Emeritus Theodore Hasho, Ph.D., Professor Emeritus Roger Shaw, Ph.D., Professor Emeritus Marilyn Shelton, Ph.D., Professor Emeritus

Affiliated Faculty
Lowell Ashbaugh, Ph.D., Associate Researcher Steven S. Cliff, Ph.D., Research Engineer Ann Dillner, Ph.D., Research Engineer Richard L. Snyder, Ph.D., Professor Emeritus (Atmospheric Science) and Specialist in Cooperative Extension

Graduate Study. The Graduate Group in Atmospheric Science offers both the M.S. and Ph.D. degree programs. A student may place emphasis on graduate work in one or more of the following fields: air quality meteorology, atmospheric chemistry, bio-meteorology, micrometeorology, numerical weather prediction, remote sensing, climate dynamics, large scale dynamics, and mesoscale meteorology. The diverse and extensive backgrounds of the faculty allow opportunities for interdisciplinary training and research.

Preparation. The Group encourages applications from all interested students with backgrounds in the physical or natural sciences. Basic qualifications for students entering the Atmospheric Science graduate program include mathematics to the level of vector calculus and differential equations, and one year of college-level physics. Flexibility may be allowed for students with high academic potential, but it is expected that deficiencies in preparatory material and in the undergraduate atmosphere science courses be completed within the first year of graduate study.

Graduate Adviser. C. Anastasio (Land, Air, and Water Resources) (530) 754-6095
Graduate Admissions Officer. S. S. Cliff (Applied Sciences) (530) 667-2037

Avian Medicine

See Medicine and Epidemiology (VME), on page 306.

Avian Sciences

(College of Agricultural and Environmental Sciences)

Faculty. See under Animal Science, on page 141.

Master Adviser. F.A. Bradley

Advising Center for the major is located in 1202 Meyer Hall (530) 754-7915.

The Major Program

Avian Sciences is the study of birds and the ways in which they relate to and are useful to humans. The major combines the study of avian wildlife and their environments, production and marketing of domestic birds and eggs, cage farming, bird management, and basic and applied laboratory research on birds with a broad introduction to biological science.

The Program. The flexibility of the program and the close personal interaction between students, faculty, and specialists in the field give students a large role in selecting and designing their own course work. Students may specialize in a bachelor’s program that qualifies them for a particular career or they may choose a program to meet other broader intellectual and cultural interests.

Internships and Career Alternatives, Independent Study, Undergraduate Research, and Internships are emphasized in the Avian Sciences program. Birds for laboratory or special study are housed within the main building as well as at the research farm and the experimental aviary. An Avian Sciences major has a variety of career options: health-oriented research, teaching biology, game bird production, domestic and foreign agricultural extension and advisory services, government agencies, or the domestic or exotic bird industries. A recent survey has shown that the majority of Avian Sciences graduates enter graduate school or are employed by the domestic bird industry. The remainder of the graduates were evenly distributed in the categories of professional schools, avian biology agencies, educational fields, and individual jobs indirectly associated with birds.

B.S. Major Requirements:

English Composition Requirement ..............0-8

See College requirement.

Preparatory Subject Matter .........................61-73

At least 3 units from Avian Sciences 11, 12, 13, 14, 15, 16, 17, 18 ...................................................3-5
Biological Sciences 1A, 1B, 1C or 2A, 2B, 2C ........................................................................14-15

Chemistry 2A, 2B, 2C, 8A, 8B ........................................................................21

Plant Sciences 21 or Engineering

Computer Science 15 .........................................................................................................................3-4

Mathematics 1A-1B-1C or 17A-17B-17C or 21A-21B-21C ..................................................9-12

Physics 1A-1B or 7A-7B-7C .................6-12

One course from Statistics 13, 100, or Plant Sciences 120 .........................................................4

Breadth Subject Matter ..............................24

See General Education requirement.

Depth Subject Matter .................................26

Animal Biology 102 and 103 or Biological Sciences 102, 103 and Nutrition 123, 123 .................................................10

Biological Sciences 101 ............................................4

Avian Sciences 103, 150 .........................................4

Neurobiology, Physiology, and Behavior 101 .................................................................5

Laboratory units in above listed subjects ............................3

Quarter Offered: I-Tall, II-Winter, III-Spring, IV-Summer. 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Social-Cultural Diversity; Wrt=Writing Experience
196. Designing and Performing Experiments in Avian Sciences (2)
Laboratory—6 hours. Prerequisite: course 100 or Wildlife, Fish, and Conservation Biology 111 or Evolution and Ecology 137 or consent of instructor. Experiments in current problems in avian biology. Introduction to experimental design. Students choose a project, design a protocol, perform an experiment and report their findings. May be repeated for credit with consent of instructor.—I, II, III, II, III

197. Tutoring in Avian Sciences (1-3)
Tutorial—1-3 hours. Prerequisite: Avian Sciences or related major, advanced standing, consent of instructor. Tutoring of students in lower division avian sciences courses; weekly conference with instructors in charge of courses; written critiques of teaching procedures. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200. Seminar (1)
Seminar—1 hour. Reports and discussions of recent advances and selected topics of current interest in avian genetics, physiology, nutrition, and poultry technology.—I, II, III

200C. Seminar Conference (1)
Prerequisite: consent of instructor.—I, II, III, II, III

200RC. Research Conference (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Major professors lead research discussions with their graduate students. Research papers are reviewed and project proposals are presented and evaluated. Corequisite: seminar or discussion. (S/U grading only)—I, II, III, II, III

2977. Supervised Teaching in Avian Sciences (1-6)
Tutoring—1-4 hours. Prerequisite: graduate standing and consent of instructor. Tutoring of students in lower, upper division, and graduate courses in Avian Sciences; weekly conference with instructor in charge of course; written critiques of teaching methods in lectures and laboratories. (S/U grading only)

298. Group Study (1-5)
Prerequisite: consent of instructor.
Biochemistry and Molecular Biology

See Molecular and Cellular Biology, on page 406; Biochemistry and Molecular Biology (A Graduate Group), on page 165.

Biochemistry and Molecular Biology (A Graduate Group)

JoaAnne Engebrecht, Ph.D., Chairperson of the Group

Group Office. 306 Life Sciences; (530) 752-9091; http://www.ggdc.ucdavis.edu/ggc/bmb

Faculty

Steffen Abel, Ph.D., Associate Professor (Plant Sciences)
James Ames, Ph.D., Associate Professor (Chemistry)
Peter Armstrong, Ph.D., Professor (Molecular and Cellular Biology)
Enoch Baldwin, Ph.D., Associate Professor (Molecular and Cellular Biology)
Kenneth A Beck, Ph.D., Associate Professor (Cell Biology and Human Anatomy)
Diane Beckles, Ph.D., Assistant Professor (Plant Sciences)
Alan Bennett, Ph.D., Professor (Plant Sciences)
Charles Bevin, Ph.D., Professor (Medical Microbiology and Immunology)
Linda F. Bisson, Ph.D., Professor (Viticulture and Enology)
Edurado Blumwald, Ph.D., Professor (Plant Sciences)
Sue Bodine, Ph.D., Professor (Virology and Medical Microbiology and Immunology)
R. David Brit, Ph.D., Professor (Chemistry)
Sean Burgess, Ph.D., Associate Professor (Cell Biology and Cellular Biology) 
Marie E. Burns, Ph.D., Associate Professor (Center for Neuroscience)
Judy Callis, Ph.D., Professor (Molecular and Cellular Biology)
Kermit L. Carraway, Ph.D. Associate Professor (Center for Neuromuscular Disorders)
Frederic Chedin, Ph.D., Assistant Professor (Plant Biology)
Hongwu Chen, Ph.D., Professor (Cancer Center UCDMC)
Tung-Yu Chen Ph.D., Associate Professor (Center for Neuroscience)
Xinlin Chen, Ph.D., Director (Surgical and Radiological Science)
Hwi-Jong Cheng, Ph.D., Associate Professor (Neurobiology, Physiology, and Behavior)
R. Holland Cheng, Ph.D., Professor (Molecular and Cellular Biology)
Gino A. Cortopassi, Ph.D., Professor (Molecular Biosciences)
Michael C. Dawson, Ph.D., Professor (Molecular and Cellular Biology)
Sheila David, Ph.D., Professor (Chemistry)
Scott Dawson, Ph.D., Assistant Professor (Microbiology)
William Denello, Ph.D., Assistant Professor (Center for Neuroscience)
Katyayoon Dehesh, Ph.D., Professor (Plant Biology)
Wenbin Deng, Ph.D., Assistant Professor (Cell Biology and Human Anatomy)
Michael S. Denison, Ph.D., Professor (Environmental Toxicology)
Elva Diaz, Ph.D., Assistant Professor (Pharmacology and Toxicology)
Bruce Draper, Ph.D., Assistant Professor (Molecular and Cellular Biology)
JoaAnne Engebrecht, Ph.D., Associate Professor (Molecular and Cellular Biology)
Carol Erickson, Ph.D., Professor (Molecular and Cellular Biology)
Marilynn E. Etzler, Ph.D., Professor (Molecular and Cellular Biology)
Robert H. Fairclough, Ph.D., Associate Professor (Neurology)
Peggy Farnham, Ph.D., Professor (Medical Pharmacology and Toxicology)
Oliver Fiehn, Ph.D., Associate Professor (Genome Center and Bioinformatics)
Andrew Fisher, Ph.D., Associate Professor (Chemistry)
Paul G. Fitzgerald, Ph.D., Professor (Cell Biology and Human Anatomy)
J. David Furlow, Ph.D., Associate Professor (Neurobiology, Physiology, and Behavior)
Charles S. Gasser, Ph.D., Professor (Molecular and Cellular Biology)
Angela Gelli, Ph.D., Assistant Professor (Medical Pharmacology and Toxicology)
Paramita Ghosh, Ph.D., Assistant Adjunct Professor (Urology)
Cecilia Giulivi, Ph.D., Professor (Molecular Biosciences)
Tsizora Goldkorn, Ph.D., Professor (Internal Medicine)
Qizhi Gao, Ph.D., Assistant Professor (Cell Biology and Human Anatomy)
Paul Hageman, Ph.D., Professor (Biochemistry and Molecular Medicine)
Nobuko Hagiwara, Ph.D., Assistant Professor (Internal Medicine: Cardiac Vascular Medicine)
Fawaz Haj, Ph.D., Assistant Professor (Nutrition)
Bruce D. Hammock, Ph.D., Professor (Entomology)
John H. Harada, Ph.D., Professor (Plant Biology)
Stacey L. Harmer, Ph.D., Assistant Professor (Plant Biology)
Jerry L. Hedrick, Ph.D., Professor (Animal Science: Distinguished Graduate Mentoring Award)
Wolf-Dietrich Heyer, Ph.D., Professor (Microbiology)
Neil Hunter, Ph.D., Assistant Professor (Microbiology)
Kentarou Inoue, Ph.D., Assistant Professor (Plant Sciences)
Clarence I. Kado, Ph.D., Professor (Plant Pathology)
Ken Kaplan, Ph.D., Associate Professor (Molecular and Cellular Biology)
Daniel Kliebenstein, Ph.D., Assistant Professor (Plant Sciences)
Ian Korf, Ph.D., Assistant Professor (Molecular and Cellular Biology)
Stephen C. Kowalczykowski, Ph.D., Professor (Microbiology)
Hsing-Jien Kung, Ph.D., Professor (Cancer Center UCDMC)
J. Clark Lagarias, Ph.D., Professor (Molecular and Cellular Biology)
Kit S. Lam, Ph.D., Professor (Hematology—Oncology)
Janine LaSalle, Ph.D., Professor (Medical Microbiology and Immunology)
Jerald A. Last, Ph.D., Professor (Internal Medicine)
Walter Leal, Ph.D., Professor (Entomology)
Julie A. Leary, Ph.D., Professor (Molecular and Cellular Biology)
Noelle L'Etoile, Ph.D., Assistant Professor (Center for Neuroscience)
Su-Jo Lin, Ph.D., Assistant Professor (Microbiology)
Yufung Lin, Ph.D., Assistant Professor (Physiology and Membrane Biology)
Su Hao Lo, Ph.D., Assistant Professor (Orthopaedic Surgery)
Angie Louie, Ph.D., Assistant Professor (Biomedical Engineering)
Paul Luciv, Ph.D., Professor (Pathology)
Kimberley A. McAllister, Ph.D., Associate Professor (Center for Neuroscience)
Francis J. McNally, Ph.D., Associate Professor (Molecular and Cellular Biology)
Claude F. Meares, Ph.D., Professor (Chemistry)

Graduate Adviser. Consult program office.

Quarter Offered: I—Fall; II—Winter; III—Spring; IV—Summer; 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Social-Cultural Diversity; Wrt—Writing Experience
Biological Chemistry

See Medicine, School of, on page 367.

Biological and Agricultural Engineering

[College of Agricultural and Environmental Sciences]

Michael J. Delwiche, Ph.D., Chairperson of the Department

Department Office. 2300 Bainer Hall; (530) 752-0102; http://www.engr.ucdavis.edu/\~bae

Faculty

Michael J. Delwiche, Ph.D., Professor
Julia Fan, Ph.D., Assistant Professor
Fadi A. Fathallah, Ph.D., Associate Professor
D. Ken Giles, Ph.D., Professor
Mark E. Grismer, Ph.D., Professor
(Biology, Anatomy, Physiology, and Behavior)
Andrew T. Vaughan, Ph.D., Professor
(Research Oncology)
Ana Vazquez, Ph.D., Assistant Adjunct Professor
(Otolaryngology)

John V. Voss, Ph.D., Associate Professor
(Biochemistry and Molecular Medicine)
P. Richard Villiet, Ph.D., D.V.M., Professor
(Molecular Biosciences)

Robert H. Weiss, M.D., Professor

(Ideal Medicine, Nephrology)

David Wilson, Ph.D., Professor
(Molecular and Cellular Biology)

Matthew Wood, Ph.D., Assistant Professor
(Environmetal Toxicology)

Michael Wright, Ph.D., Assistant Professor
(Medical Pharmacology and Toxicology)

Reen Wu, Ph.D., Professor

(Internal Medicine, Nephrology)

John L. Yoder, Ph.D., Professor
(Yokohama, Ph.D., Assistant Professor
(Biomedical Engineering)

Glenn Young, Ph.D., Professor

(Food Science and Technology)

Vincent A. Ziboh, Ph.D., Professor
(Dermatology)

Karen Zito, Ph.D., Assistant Professor
(Neurobiology, Physiology, and Behavior)

Graduate Study

The Graduate Group in Biochemistry and Molecular Biology offers programs of study and research leading to the M.S. and Ph.D. degrees. Strong preference is given to Ph.D. applicants. Graduate work involves a broad overview of biochemistry and molecular biology in addition to specialization in one or more areas. Examples of areas of emphasis include gene expression, molecular basis of development, protein structure, molecular virology, protein synthesis, enzymology, signal transduction, membrane transport and structural biology. For more information contact the chairperson of the group.

Graduate Advisers.

R. Fairclough (Neurology), T. Powers (Molecular and Cellular Biology), L. Rose (Molecular and Cellular Biology), M. Singer (Microbiology)

Courses in Biochemistry and Molecular Biology (MBM)

Graduate Courses

290. Seminar (1)

Seminar—1 hour. Prerequisite: consent of instructor. (S/U grading only).—I, II, III (I, II, III)

299. Research (1-12)

(S/U grading only)

Biological Sciences

[College of Biological Sciences]

College of Biological Sciences, Dean's Office. 202 Life Sciences
(530) 752-0410; http://www.biosci.ucdavis.edu

Faculty

The Biological Science major and the Bodega Marine Laboratory Spring Quarter Program are offered jointly by the departments of the college. The faculty in the college are members of the Departments of Evolution and Ecology, Microbiology, Molecular and Cellular Biology, Neurobiology, Physiology, and Behavior, Plant Biology. See each department for a list of their faculty.

The Biological Sciences Major

[Departments of Evolution and Ecology, Microbiology, Molecular and Cellular Biology, Neurobiology, Physiology, and Behavior, and Plant Biology]

The Program.

The Biological Sciences major is broad in concept, spanning the numerous core disciplines of biology. The Bachelor of Science program includes mathematics, general and organic chemistry, physics, and biology. While emphasizing breadth, the B.S. degree program also features an area of emphasis requirement that provides concentrated attention on one facet of biology at the upper division level. Each area of emphasis coincides with one of the departments of the college. The Bachelor of Arts program emphasizes biological diversity, evaluation, and ecology, all built on a foundation of general and organic chemistry, physics and biology.
Research and internships are encouraged in both programs.

Career Alternatives. Both degree programs prepare students for admission to graduate schools or professional schools, leading to a variety of professional health careers or further study in basic and applied areas of biology. They provide suitable preparation for careers in teaching, biological and biotechnological research with various governmental agencies or private companies, government regulatory agencies, environmental consulting, biological illustration and writing, pharmaceutical sales, biological/environmental law, and biomedical engineering.

The A.B. degree program is also appropriate for students interested in teaching biology at the secondary school level and for careers that bear on the ecological problems that require the development of public policy.

A.B. Major Requirements:

Preparatory Subject Matter..................39-52

<table>
<thead>
<tr>
<th>Subject Category</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Sciences 2A-2B-2C</td>
<td>14</td>
</tr>
<tr>
<td>Chemistry 2A-2B</td>
<td>10</td>
</tr>
<tr>
<td>Microbiology, Physiology, and Behavior 101</td>
<td>3-5</td>
</tr>
<tr>
<td>Environmental Horticulture 102</td>
<td>3-5</td>
</tr>
<tr>
<td>Evolution: One from Evolution and Ecology 100, 140; Geology 107; or Plant Biology 116</td>
<td>3-5</td>
</tr>
<tr>
<td>Ecology: One from Environmental Science and Policy 100; Evolution and Ecology 101, 117; or Plant Biology 117, 147</td>
<td>3-5</td>
</tr>
<tr>
<td>Philosophy of Biological Science: One from Nature and Culture 100, 120, 140; Plant Biology 108; Science and Technology Studies 130A, 130B, 131; or Veterinary Medicine 170</td>
<td>3-5</td>
</tr>
<tr>
<td>Zoology: One from Environmental Science and Policy 100; Evolution and Ecology 101, 117, 147</td>
<td>3-5</td>
</tr>
<tr>
<td>Animal diversity</td>
<td>3-5</td>
</tr>
<tr>
<td>Evolution: One from Evolution and Ecology 100, 140; Geology 107; or Plant Biology 116</td>
<td>3-5</td>
</tr>
<tr>
<td>Evolution and Ecology 111</td>
<td>3-5</td>
</tr>
<tr>
<td>Microbiology: Food Science and Technology 104; Microbiology 101, 102, 140, 150, 151; Pathology, Microbiology, and Immunology 127, 128; Plant Biology 118, 119, 148; Plant Pathology 148; Soil Science 111</td>
<td>3-5</td>
</tr>
<tr>
<td>Additional upper division course work in biological sciences to achieve a total of 39 or more units (see “Approved Biology Electives” list below).</td>
<td></td>
</tr>
<tr>
<td>Upper division course work must include at least 2 units (6 hours per week) of laboratory and/or field work.</td>
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<tr>
<td>Note: Although a course may be listed in more than one category, that course may satisfy only one requirement.</td>
<td></td>
</tr>
</tbody>
</table>

Total units for the major .................77-94

B.S. Major Requirements:

Preparatory Subject Matter..................59-69

<table>
<thead>
<tr>
<th>Subject Category</th>
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<tr>
<td>Biological Sciences 2A-2B-2C</td>
<td>14</td>
</tr>
<tr>
<td>Chemistry 2A-2B-2C</td>
<td>15</td>
</tr>
<tr>
<td>Chemistry BA-BB or 118A-118B-119C</td>
<td>6-12</td>
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<tr>
<td>Mathematics 16A-16B-16C or 17A-17B-17C</td>
<td>9-12</td>
</tr>
<tr>
<td>Physics 2A-2B-2C</td>
<td>12</td>
</tr>
<tr>
<td>Statistics 13, 32, 100 or 102</td>
<td>3-4</td>
</tr>
</tbody>
</table>

Depth Subject Matter........................45

<table>
<thead>
<tr>
<th>Subject Category</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Sciences 101, 105 (or 102+103)*; 104</td>
<td>6-12</td>
</tr>
<tr>
<td>*Students in the following Areas of Emphasis must complete Biological Sciences 102+103; Microbiology, Microbial Physiology and Molecular Genetics, and Microbial Diversity and Ecology options only, and Molecular and Cellular Biology. All other students (including the Biotechnology and Applied Microbiology option, and Medical Microbiology option in the Microbiology Area of Emphasis) may choose between completing Biological Sciences 105 or 102+103.</td>
<td></td>
</tr>
<tr>
<td>Field Requirement, Area of Emphasis Requirement, and additional units (if necessary) for 45 units or more</td>
<td>32-35</td>
</tr>
<tr>
<td>Note: Although a course may be listed in more than one category, that course may satisfy only one requirement.</td>
<td></td>
</tr>
</tbody>
</table>

Field Course Lists

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evolution: Anthropology 151, 152, 154A; Evolution and Ecology 100; Geology 107; Plant Biology 143</td>
<td>3-5</td>
</tr>
<tr>
<td>Ecology: Anthropology 134; Biological Sciences 122; Entomology 104, 156; Environmental Science and Policy 100, 121; Evolution and Ecology 101; Microbiology 120; Wildlife, Fish, and Conservation Biology 151</td>
<td>3-4</td>
</tr>
<tr>
<td>Microbiology: Food Science and Technology 104; Microbiology 101, 102, 140, 150; Pathology, Microbiology, and Immunology 127, 128; Plant Biology 118, 119, 148; Plant Pathology 148; Soil Science 111</td>
<td>3-5</td>
</tr>
<tr>
<td>Neurobiology, physiology, and behavior: Anthropology 15A, 124B; Entomology 102, 104; Neurobiology, Physiology, and Behavior 100, 101, 102, 141</td>
<td>3-5</td>
</tr>
<tr>
<td>Area of Emphasis Requirement: Depth in one area of biology is achieved by completing all requirements for one of the six areas of emphasis listed below. It will include at least 2 units (6 hours per week) of laboratory designated in the area of emphasis. Although a course may be listed in more than one category (including the field requirements), that course may be used only once and may satisfy only one requirement.</td>
<td></td>
</tr>
</tbody>
</table>

Evolution, Ecology and Biodiversity emphasis..........................12

Field requirement: Students must take Evolution and Ecology 100 to satisfy Field requirement (a), and Evolution and Ecology 101 to satisfy Field requirement (b).

(1) At least 12 units including at least one course from each of the following two groups:


(2) Laboratory/Fieldwork Requirement. Included in the above 12 units, complete a total of 2 units or a total of 6 days/week of fieldwork or laboratory work. Acceptable courses for this requirement are identified above by an asterisk [*].

Marine Biology emphasis..........................13-19

Field requirement: Students must take complete Biological Sciences 105 or 102+103 for this emphasis.


Marine Organismal Biology: At least 3 units from Animal Science 119, 131; Evolution and Ecology 106, 110, 112+112L, 114; Neurobiology, Physiology, and Behavior 141; Plant Biology 118; Wildlife, Fish, and Conservation Biology 120+120L, 121.

Immersion Requirement: One field/lab/research course or course combination taken during the spring quarter or summer sessions at Bodega Marine Laboratory from the theoretical or equivalent, requires residence at Bodega Lab.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option 1: Choose one course from each of the following groups</td>
<td>7-8</td>
</tr>
<tr>
<td>A. Environmental Science and Policy 124</td>
<td>3-5</td>
</tr>
<tr>
<td>Evolution and Ecology 106, 110, 114; Geology 150C</td>
<td>3-4</td>
</tr>
<tr>
<td>B. Biological Sciences 124</td>
<td>3</td>
</tr>
<tr>
<td>C. Environmental Science and Policy/</td>
<td>3</td>
</tr>
<tr>
<td>Evolution and Ecology 111</td>
<td>3</td>
</tr>
<tr>
<td>Option 2: Environmental Toxicology/Nutrition</td>
<td>10</td>
</tr>
<tr>
<td>Option 3: Choose one course from each of the following two groups</td>
<td>8</td>
</tr>
<tr>
<td>A. Biological Sciences 122; Neurobiology, Physiology, and Behavior 141</td>
<td>3</td>
</tr>
<tr>
<td>B. Biological Sciences 122*; Neurobiology, Physiology, and Behavior 141P</td>
<td>5</td>
</tr>
</tbody>
</table>

Each course may only be used in satisfaction of one area of emphasis and field requirement.

Microbiology emphasis..........................15-20

Field requirement: Students must take Microbiology 102 to satisfy the area of emphasis laboratory requirement.

Quarter Offered: I—Fall; II—Winter; III—Spring; IV—Summer; 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Social-Cultural Diversity; Wrt—Writing Experience
Select courses from at least two of the following three areas and include one laboratory from: Neurobiology, Physiology, and Behavior 101L, 104L, 141P, or 160L. ........................................ 15
(2) Physiology: Anatomy, Physiology and Cell Biology 100; Entomology 102; Exercise Biology 101, 110, 111, 125; Neurobiology, Physiology, and Behavior 101, 101L, 103, 104L, 105, 106, 111C, 111L, 113, 114, 117, 121, 121L, 122, 123, 127, 128, 130, 131, 139, 140, 141, 141P, 152; Microbiology, Microbiology, and Immunology 126; Wildlife, Fish, and Conservation Biology 121.
(3) Behavior: Anthropology 154A, 154B; Entomology 104; Neurobiology, Physiology, and Behavior 102, 150, 152, 159, 162; Psychology 122, 123, 129.
Note: Neurobiology, Physiology, and Behavior 106, 152 or Psychology 129 may be used only once to satisfy Area of Emphasis requirements.

**Plant Biology emphasis .................. 14-17**

Students choose to complete Biological Sciences 105 or 102+103 for this emphasis.

Select one course from each of the following four areas. A course may be listed in more than one area or field, but may be used to satisfy only one requirement.

(1) Anatomy and morphology: Evolution and Ecology 100, 116, 118. .............. 4-5
(2) Physiology, development and molecular biology: Plant Biology 111, 112, 113; Plant Pathology 130 .................. 4
(3) Evolution and ecology: Evolution and Ecology 100, 117; Plant Biology 117, 143. ........................................ 3-4

**Total Units for the Major ............ 104-114**

**Approved Biology Electives**

These courses are accepted without petition for upper division units in the Biological Sciences major.

Many other approved courses may be substituted with consent of your adviser.

Anatomy, Physiology and Cell Biology 100

Anthropology 151, 152, 153, 154A, 154B, 155, 156, 157

Avian Sciences 100, 150

Biological Sciences—All upper division courses

Cell Biology and Human Anatomy 101, 101L


Entomology—All upper division courses

Environmental Horticulture 102, 105

Environmental Science and Policy 100, 110, 121, 123, 124, 150A, 150B, 150C, 151, 151L

Evolution and Ecology—All upper division courses

Exercise Biology 101, 110, 111, 113

Food Science and Technology 102A, 104 Geology 107, 107L, 150A, 150B, 150C

Medical Microbiology 115, 116

Microbiology—All upper division courses

Molecular and Cellular Biology—All upper division courses

Nature and Culture 100, 120, 140

Nematology 110, 110

Neurobiology, Physiology, and Behavior—All upper division courses

Nutrition 101, 111

Pathology, Microbiology, and Immunology 101, 102, 126, 127, 128

Philosophy 108

Plant Biology—All upper division courses, except 189

Plant Sciences 110A, 135

Plant Pathology 120, 130

Psychology 121, 122, 123, 124, 128

Science and Technology Studies 130A, 130B, 130I

Soil Science 111

Veterinary Medicine 170

Viticulture and Enology 186

Wildlife, Fish, and Conservation Biology 110, 110L, 111, 111L, 120, 120L, 121, 122, 130, 136, 140, 151

**Other Upper Division Courses**

There is a limitation on variable-unit courses that may be counted toward the major. Of these courses, up to 4 units of 199 courses may be counted, and no units of 192 or 197 courses may be counted.

**Minor Program Requirements:**

**UNITS**

Biological Sciences .................................. 18

Complete at least 3 units from each of the five numbered groups to total at least 18 units.

Appropriate alternative courses may be used with approval of an adviser.

(1) Cell and Molecular Biology: Biological Sciences 101, 102 ................................ 3-4

(2) Animal Biology: Anthropology 151, Anatomy, Physiology and Cell Biology 100/ Neurobiology, Physiology, and Behavior 123; Entomology 100; Evolution and Ecology 105, 112+112L, 134; Nematology 100, 110; Neurobiology, Physiology, and Behavior 100, 101, 102, 117; Wildlife, Fish, and Conservation Biology 110, 111, 120 ........................................ 2-5

(3) Microbiology: Microbiology 101, 102, 162; Pathology, Microbiology, and Immunology 128; Plant Biology/Plant Pathology 148 .................. 3-5

(4) Plant Biology: Environmental and Resource Sciences/Plant Sciences 144; Plant Biology 105, 111, 112, 116, 118, 126; Plant Biology/Plant Pathology 148; Plant Sciences 141, 171 .................. 3-5

(5) Evolution and Ecology: Anthropology 151, 152, 154; Entomology 100; Evolution and Ecology 100, 101, 108, 115, 117, 119, 128, 140, 147; Plant Biology 102, 108, 117, 119, 143; Plant Pathology 150; Plant Sciences 142, 146; Wildlife, Fish, and Conservation Biology 151 ........................................ 3-5

Additional courses (if necessary) from above numbered groups to reach 18 units.

Advisers and Advising. Information on the Biological Sciences major or minor can be obtained from the Undergraduate Academic Programs in the College of Biological Sciences Dean's Office in 202 Life Sciences.

Citation for Outstanding Performance. The College of Biological Sciences confers Citations for Outstanding Performance on undergraduates majoring in Biological Sciences who have demonstrated superior academic performance and individual achievement in research. Students who wish to be considered for a citation must first meet or exceed a specified grade point average and participate in an appropriate research project.

Teaching Credential Subject Representative. Associate Director of Teacher Education (School of Education); see the Teaching Credential/M.A. Program on page 109.
Courses in Biological Sciences (BIS)

1A. Introductory Biology (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: Chemistry 2B (may be taken concurrently). Introduction to biological molecules, bioenergetics, cell structure and function, elements of molecular biology and genetics, and viruses. Interdisciplinary course for majors in the biological sciences.

1B. Introductory Biology (5)
Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Introduction to evolution and animal diversity, including transmission and population genetics, micro and macroevolution, systems, classification, and a survey of major animal groups.

1C. Introductory Biology (5)
Lecture—3 hours; laboratory—3 hours. Survey of diversity within the plant, protozoa, and fungi kingdoms, emphasizing flowering plant structure, function, evolution, and ecology. Ecological principles, including population dynamics, life history patterns, community interactions and composition, ecosystems, and world biomes. GE credit: SciEng, Wrt.—I.

2A. Introduction to Biology: Essentials of Life on Earth (4)
Lecture—3 hours; discussion—1 hour. Essentials of life including sources and use of energy, information storage, responsiveness to natural selection and cellularity. Origin of life and influence of living things on the chemistry of the Earth. Not open for credit to students who have completed course 1A with a grade of C or better.—I, II, III (I, II, III) Roth

2B. Introduction to Biology: Principles of Ecology and Evolution (5)
Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 2A or 2B. Introduction to basic principles of ecology and evolutionary biology, focusing on the fundamental mechanisms that generate and maintain biological diversity across scales ranging from molecules and genes to global processes and patterns. Not open for credit for students who have completed Biological Sciences 118B or 128B with a grade of C or better.—I, II, III (I, II, III) Grosberg, Holyoak, Keen, Patricelli, Rosenberg, Schwartz, Stochowicz, Stanton, Strong

2C. Introduction to Biology: Biodiversity and the Tree of Life (5)
Lecture—4 hours; laboratory—3 hours. Prerequisite: course 2B or 2B. Introduction to organizational diversity, using the phylogenetic tree of life as an organizing theme. Lectures and laboratories cover methods of phylogenetic reconstruction, current knowledge of the tree of life, and the evolution of life’s most important and interesting innovations. Not open for credit to students who have completed course 1C with a grade of C or better.—I, II, III (I, II, III) Eisen, Keen, Maloof, Shaffer, Wainwright, Ward

10. General Biology (4)
Lecture/discussion—3 hours. Concepts and issues in biology. Emphasis on composition and structure of organisms, regulation and signaling, heredity, evolution and the interaction and interdependence among life forms and their environments. Designed for students not specializing in biology. Not open for credit to students who have completed course 1A, 2A or 10. GE credit: SciEng. —I (I) Goldberg

10V. General Biology (4)
Web virtual laboratory—3 hours; web electronic discussion—1 hour. Course and issues in biology. Emphasis on composition and structure of organisms; regulation and signaling; heredity, evolution and the interaction and interdependence among life forms and their environments. Significant writing is required. Designed for students not specializing in biology. Not open for credit to students who have completed course 1A or 10. GE credit: SciEng, Wrt.—III. (III) Westerdal

11. Issues in the Life Sciences (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: enrollment limited to BUSP students, consent of instructor. The range of subjects and approaches in the field of biology. In-depth with basic and applied research topics.—I (I)

11B. Basic Life Sciences Laboratories (2)
Laboratory—6 hours. Prerequisite: enrollment limited to BUSP students, consent of instructor. Basic laboratory skills in life sciences research, including microscopy, molecular biology, and genetics. —IV (IV)

20Q. Modeling in Biology (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: Mathematics 16B (may be taken concurrently). Introduction to the use of quantitative methods to biological problems. Students will use a mathematical software package to tackle problems drawn from all aspects of biology:—I, II, III (I, II, III) Wilson, Maginier, Suthers

92. Internship in Biological Sciences (1-12)
Internship—3.63 hours. Prerequisite: lower division standing and consent of instructor. (P/NP grading only)

Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only)

99. Special Study for Undergraduates (1-5)
Prerequisite: lower division standing and consent of instructor. (P/NP grading only)

Upper Division Courses

101. Genes and Gene Expression (4)
Lecture—4 hours. Prerequisite: courses BIS 1A and 1B, or 2A, 2B and 2C (2C may be taken concurrently); Chemistry 88 or 118B or 128B (may be taken concurrently). Nucleic acid structure and function; gene expression and its regulation; transcription, translation, transmission genetics; molecular evolution.—I, II, III (I, II, III) Bowman, S. Chan, Dvorak, Gottlieb, Heyer, O’Neill, Quiros, Rodriguez, Rose

10D. Genes and Gene Expression Discussion (1)
Discussion—1 hour. Prerequisite: course 101 concurrently. Discussion and problem solving related to fundamental principles of chemical and molecular genetics as presented in course 101. (P/NP grading only)—I, II, III (I, II, III)

102. Structure and Function of Biomolecules (3)
Lecture—3 hours. Prerequisite: Chemistry 88 or 118B or 128B. Structure and function of macromolecules with emphasis on proteins, enzymes, vitamins, receptors and signal transduction, cell trafficking, cell cycle; cell growth and division; extracellular matrix and cell-cell junctions; cell development; immune system.—I, II, III (I, II, III) Bellis, Doi, Fiehn, Hill, I. Segel, L. Segel

104. Regulation of Cell Function (3)
Lecture—3 hours. Prerequisite: course 101, 102 or 103. The control of cell receptors and signal transduction; cell trafficking; cell cycle; cell growth and division; extracellular matrix and cell-cell junctions; cell development; immune system.—I, II, III (I, II, III) Edwards, Ester, Kaplan, S. Lin, Myles, Privalsky, Shiozaki, Starr

105. Biomolecules and Metabolism (3)
Lecture—3 hours. Prerequisites: courses 1A, 1B, and 1C, or 2A, 2B, and 2C; course 101, Chemistry 88 or 118B or 128B. Fundamentals of biochemical processes, with emphasis on protein structure and activity; energy metabolism; catalysis of sugars, amino acids, and lipids, and gluconeogenesis. One unit of credit for students who have completed course 102 or 103. No credit for students who have completed both courses 102 and 103.—II, III (I, II, III) Murphy, Theyg

120. Developmental Biology of Marine Invertebrates (4)
Lecture—30 hours total; laboratory—30 hours total. Prerequisite: Molecular and Cellular Biology 150-150L; Biological Sciences 102 and 103; course 123 concurrently. Phylogenetic patterns of reproduction and development among the marine invertebrates. Emphasis on both modern and classical approaches to understanding genetogenesis, gamete interaction and fertilization, cleavage, cell differentiation, morphogenesis, and larval development and metamorphosis. Offered at Bodega Marine Laboratory. (See above description for Bodega Marine Laboratory Program.)—I, II, III

120P. Developmental Biology of Marine Invertebrates/Advanced Laboratory Topics (6)
Laboratory—150 hours total; discussion—10 hours total. Prerequisites: Molecular and Cellular Biology 150-150L; Biological Sciences 102 and 103; course 123 concurrently. Students pick a research topic for intense study. Research will be related to a topic covered in course 120 and will be conducted at the Bodega Marine Laboratory with close supervision of research. (See above description for Bodega Marine Laboratory Program.)—III (III)

122. Population Biology and Ecology (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: courses 1A, 1B, or 1C, or 2A, 2B, 2C; residence at Bodega Marine Laboratory required. Biological and physical processes affecting plant and animal populations in the rich array of habitats at the Bodega Marine Laboratory ecological preserve. Emphasis on field experience, with complementing lectures to address population and community processes. See Bodega Marine Laboratory Program.—III (III) Morgan, Strong

122P. Population Biology and Ecology/ Advanced Laboratory Topics (5)
Laboratory—12 hours; discussion—1 hour. Prerequisite: course 122 concurrently. Residence at Bodega Marine Laboratory required. Training in scientific research, from hypothesis testing to publication, including methods of library research. Research related to topic covered in course 122. Final presentation both oral and written. (See Bodega Marine Laboratory Program.)—III (III) Chang, Cherr, Morgan

123. Undergraduate Colloquium in Marine Science (1)
Seminar—1 hour. Prerequisite: enrolled student at the Bodega Marine Laboratory. Series of weekly seminars by recognized authorities in various disciplines of marine science from within and outside the UC system. Includes informal discussion with speaker. Course will be held at Bodega Marine Lab-
124. Coastal Marine Research (3)
Laboratory—6 hours; fieldwork—6 hours; laboratory/discussion—1 hour. Prerequisite: upper division standing or consent of instructor; concurrent enrollment in at least one course from Environmental Science and Policy 124, 152, Evolution and Ecology 106, 110, 114; residence at or near Bodega Marine Lab required. Student must complete the application available at http://www.bml.ucdavis.edu. Independent research on topics related to the accompanying core Bodega Marine Laboratory summer courses. Students will select one instructor to be primary mentor, but integrative topics that draw on the expertise of several BML faculty members will be encouraged. May be repeated two times for credit.—I, II, III. [W] Gaylord, Hill, Largier, Morgan, Sanford

132. Introduction to Dynamic Models in Modern Biology (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: Mathematics 16C, Statistics 13, or upper division course in Biology or the equivalent; Dynamic modeling in the biological sciences, including matrix models, difference equations, differential equations, and complex dynamic models. Examples include classic models in ecology, cell biology, physiology, and neuroscience. Emphasis on understanding models, their assumptions, and implications for modern biology. GE credit. [W] H. [I] Hamm

133. Collaborative Studies in Mathematical Biology (3)
Lecture/discussion—3 hours. Prerequisite: Mathematics 16ABC, Statistics 13, or upper division course in Biology or the equivalent; Interdisciplinary research and training that uses mathematics and computation to solve current problems in biology. Not offered every year. May be repeated six times for credit. I, II, III. [W] H. [I] Hamm

192. Internship in Biological Sciences (1-12)
Internship—3-36 hours. Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

194H. Research Honors (2)
Independent study—6 hours. Prerequisite: senior standing. Students majoring in Biological Sciences who have completed two quarters (3-5 units per quarter) of 199 and who qualify for the honors program as defined by the current catalog. Opportunity for Biological Sciences majors to pursue intensive research culminating in the writing of a senior thesis with the guidance of faculty advisors. (P/NP grading only)

195A. Science Teaching Internship Program (4)
Lecture/discussion—2 hours; internship—6 hours. Prerequisite: upper division standing in a science major or consent of instructor. Basic teaching techniques including lesson planning, classroom management, and presentation skills. Interns spend time in K-12 science classrooms working with a master teacher observing, assisting with labs and activities, managing students, and teaching lessons. (P/NP grading only.)

195B. Science Teaching Internship (1-5)
Internship—3-15 hours. Prerequisite: course 195A. Reinforcement of teaching techniques learned in 195A with additional classroom experiences in K-12 science classrooms working with a master teacher observing, assisting with labs and activities, managing students, and teaching lessons. May be repeated once for credit with consent of instructor. (P/NP grading only.)

197T. Tutoring in Biological Sciences (1-5)
Discussion—2-6 hours. Prerequisite: upper division standing and consent of instructor. Assisting the instructor by tutoring students in one of the Biological Sciences’ regular courses. May be repeated for credit. (P/NP grading only.) I, II, III (I, II, III)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study in Biological Sciences (1-5)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

Graduate Course

298. Group Study (1-5)
Prerequisite: consent of instructor. Students enrolled in the graduate program may enroll in groups to study specific topics. May be repeated two times for credit. (P/NP grading only.)—IV. (IV.) Gaylord, Ramsey D. Badawi, Ph.D., Assistant Professor

Biomedical Engineering (A Graduate Group)

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Group Office. 2303 Genome and Biomedical Sciences Facility; (530) 752-2611; http://www.bme.ucdavis.edu

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Marjorie Longo, Ph.D., Chairperson of the Group

Course Offering: 310 Life Sciences; (530) 752-4863; http://biosci2.ucdavis.edu/ggc/bph/

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Rajiv R. Singh, Ph.D., Professor (Physics)
Hening Stallberg, Ph.D., Associate Professor (Molecular and Cellular Biology)

Courses in Biophysics (BPH)

Graduate Courses

200. Current Techniques in Biophysics (2) Lecture—2 hours. Prerequisite: graduate standing; Biophysical Sciences 102 or 104 or the equivalent. Current techniques in biophysics research including diffraction, magnetic resonance spectroscopy, calorimetry, optical spectroscopy, and electrophysiology. (Same course as Molecular and Cellular Biology 200C.) (S/U grading only.)—I, II, III. (I, II, III.)

200A. Current Techniques in Biophysics (3) Lecture—3 hours. Prerequisite: Biological Sciences 102 or equivalent; Chemistry 110A or equivalent. Current techniques in Biophysics. Topics in 200A include mathematical methods, modeling, mass spectrometry, stochastic process, scanning probe microscopy, electron microscopy, fluorescence, membrane diffusion/mechanics, and single particle tracking. (S/U grading only.)—I, II, III. (I, II, III.)

200B. Current Techniques in Biophysics (3) Lecture—3 hours. Prerequisite: Biological Sciences 102 or equivalent; Chemistry 110A or equivalent. Current techniques in Biophysics. Topics include protein folding, membrane structure and dynamics, Raman spectroscopy, fluorescence resonance energy transfer, time resolved fluorescence, quantum dot, fluorescence imaging, esr, high resolution nmr, and in vivo nmr. (S/U grading only.)—I, II, III. (I, II, III.)

200LA. Biophysics Laboratory (3) Laboratory—18 hours. Prerequisite: course 200 may be taken concurrently. One five-week laboratory assignment in the research laboratory of a Biophysics Graduate Group faculty member. Individual research projects with emphasis on methodological/procedural experience and experimental design. May be repeated for credit four times. —I, II, III, (I, II, III.)

200LB. Biophysics Laboratory (6) Laboratory—two 18-hour rotations. Prerequisite: course 200 may be taken concurrently. Two five-week laboratory assignments in the research laboratories of Biophysics Graduate Group faculty members. Individual research projects with emphasis on methodological/procedural experience and experimental design. May be repeated for credit two times. —I, II, III, (I, II, III.)
Biology Technology

222. Biostatistics: Survival Analysis (4)
   Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: Statistics 131C. Regression model selection methods; the art and craft of survival analysis; the role of statistical software in analyzing survival data; evaluation of model fit, interactions, censoring. (Same course as Statistics 222.) Offered in alternate years—II, III.

223. Biostatistics: Generalized Linear Models (4)
   Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: Statistics 131C. Regression models for binary, count, and other outcomes; generalized linear models; model building. (Same course as Statistics 223.)—I, III.

224. Analysis of Longitudinal Data (4)
   Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 222, 223, Statistics 232B or consent of instructor. Advanced statistical methods for longitudinal data analysis; mixed-effects models; non-linear models; survival models; applications in epidemiology, biotechnology, and clinical trials. (Same course as Statistics 224.)—II, III.

225. Clinical Trials (4)
   Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 223 or consent of instructor. Basic statistical principles of clinical designs, including bias, randomization, blocking, and masking. Practical applications of widely-used designs, including dose-finding, comparative and cluster randomization trials. Clinical trials, drug development, and regulatory issues. (Same course as Statistics 225.) Offered in alternate years—II, III.

226. Statistical Methods for Bioinformatics (4)
   Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 131C or consent of instructor; data analysis experience recommended. Standard and advanced statistical methodology, theory, algorithms, and applications relevant for the analysis of omics data. (Same course as Statistics 226.) Offered in alternate years—II, III.

252. Advanced Topics in Biostatistics (4)
   Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 222, 223. Bayes methods in biostatistics and models selected from the following: genetics, bioinformatics and genomics; longitudinal or functional data; clinical trials and experimental design; analysis of environmental data; dose-response, nutrition and toxicology; survival analysis; observational studies and epidemiology; computer-intensive or Bayesian methods in biostatistics. May be repeated for credit with consent of adviser when topic differs. (Same course as Statistics 252.) Offered in alternate years—II, III.

290. Seminar in Biostatistics (1)
   Seminar—1 hour. Seminar on advanced topics in the field of biostatistics. Prerequisites: consent of instructor. May be repeated for credit with consent of adviser when topic differs. (Same course as Statistics 290.)—II, III.

298. Directed Group Study (1-5)
   Prerequisite: consent of instructor.

299. Special Study for Biostatistics Graduate Students (1-12)
   Prerequisite: consent of instructor. Research in statistics under the supervision of a major professor. (S/U grading only.)

299D. Dissertation Research (1-12)
   Prerequisite: advancement to Candidacy for Ph.D. and consent of instructor. Research in biostatistics under the supervision of a major professor. (S/U grading only.)

The Major Program

Every living organism, from the smallest and most primitive bacteria to every plant, insect, animal or human being, contains DNA as the primary genetic material. DNA directs all cellular processes, creating the incredible variety and diversity of living organisms in the biosphere. Biotechnology focuses on the mechanics of life processes and their application. Biotechnology means “life technology” and represents an integrated, multidisciplinary field, with a profound impact today on almost every aspect of human endeavor.

Preparatory Requirements. UC Davis students who wish to change their major to Biotechnology must complete the following preparatory courses with a combined grade point average of at least 2.50. All of these courses must be taken for a letter grade:

- Plant Sciences 120 or Statistics 100 ........................................... 4
- Biological Sciences 1A, 1B, 1C or 2A, 2B, 2C ........................................... 4
- Chemistry 2A, 2B, 2C ................................................................. 4
- Chemistry 8A, 8B or Chemistry 118A, 118B, 118C; or Chemistry 128A, 128B, 128C, 129A ......................................................... 4
- Math, one of the following groups ........... 6-8
  - Math 16A, 16B; or Math 17A, 17B; or Math 21A, 21B

The Program. In the first two years, students develop a strong and general background in biological science with an emphasis on fundamental concepts and basic principles of genetics, molecular biology, and cell biology. Four options, Animal Biotechnology, Plant Biotechnology, Fermentation/Microbial Biotechnology, and Bioinformatics, provide in-depth training and specialized knowledge in an aspect of biotechnology. Each option has a strong laboratory component to reinforce the theoretical concepts. Students also do an internship in a biotechnology company or university or government laboratory.

Internships and Career Opportunities. In the last decade, more industries are turning to biotechnology to solve problems and create new products, creating a growing job market for individuals trained in biotechnology in the agricultural, food and beverage, health care, chemical, pharmaceutical and bio-chemical, and environmental and bio-remediation industries.

Graduates trained in the technologies designed for biotechnology will find their training applicable to advanced research in molecular biology, genetics, biochemistry, and the plant and animal sciences.

B.S. Major Requirements:

English Composition Requirement ........................................... 8

See College requirement. select at least one course from:

- University Writing Program 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, 104E or 104F

Preparatory Subject Matter ...................................................... 57-66

- Biological Sciences 1A, 1B, 1C or 2A, 2B, 2C ........................................... 14-15
- Chemistry 2A, 2B, 2C ................................................................. 15
- Chemistry 8A, 8B or 118A, 118B, 118C or 128A, 128B, 128C, 129A ......................................................... 6-12
- Mathematics 1A, 1B, 1C or 17A, 17B or 21A, 21B ......................................................... 6-8
- Physics 7A, 7B ................................................................. 8
- Plant Sciences 120 or Statistics 100 ......................................................... 4
- Biotechnology ................................................................. 4

Breadth/General Education ....................................................... 24

Depth Subject Matter ............................................................... 26-32

- Biological Sciences 101 ......................................................... 4
- Microbiology 102 ................................................................. 4
- Animal Biology 102 or Biological Sciences 102 ......................................................... 4
- Animal Biology 103 or Biological Sciences 103 ......................................................... 3-5
- Biological Sciences 104 ......................................................... 3
- Molecular and Cellular Biology 161 ......................................................... 3
- Biotechnology 171 ................................................................. 3
- Internship or independent research; course 192 or 199 or Biotechnology 189 ......................................................... 3
- Undergraduate research proposal: Biotechnology 188 (optional) ......................................................... 3
- Honors undergraduate thesis (optional) ......................................................... 1

Areas of Specialization (choose one)

Fermentation/Microbial Biotechnology Option ......................................................... 41-34

- Engineering: Chemical Engineering 140 and 140L, Microbiology 170, Microbiology 180L or Food Science and Technology 104L
- Molecular and Cellular Biology 160L or Biotechnology 161A ......................................................... 16-19
- Restricted Electives ......................................................... 15
92. Internship in Biotechnology (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Work experience on or off campus in subject area pertaining to biotechnology or in a business, industry or agency associated with biotechnology. Internship supervised by faculty member in the animal or plant sciences. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

Upper Division Courses

150. Applied Bioinformatics (4)
Lecture—2 hours; laboratory/discussion—2 hours. Prerequisite: Computer Science Engineering 10 or 15 or Plant Sciences 21; Biological Sciences 101 and 104; Plant Sciences 120 or Statistics 13 or Statistics 100. Concepts and programs needed to apply bioinformatics to research. Sequence analysis and annotation and use of plant and animal databases for students in biological and agricultural sciences. Limited enrollment. Two units of credit for students who have completed Computer Science Engineering 124. I. (I.) Dubcovsky, Neale.

160. Principles of Plant Biotechnology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A or 2A; Biological Sciences 101 or Plant Sciences 152. Principles and concepts of plant biotechnology including recombinant DNA technology, molecular biology, genomics, cell and tissue culture, gene transfer and crop improvement strategies using transgenic crops. Not open for credit to students who have completed Plant Biology 160. (Former course Plant Biology 160.) I, II. (I, II.) Dandekar.

161A. Genetics and Biotechnology Laboratory (6)
Lecture—3 hours; laboratory—9 hours. Prerequisite: Plant Sciences 152 or Biological Sciences 101. Techniques of genetic analysis at the molecular level including recombinant DNA, gene mapping and basic computational biology. Not open for credit to students who have completed Plant Biology 161A. (Former course Plant Biology 161A.) I, II. (I, II.) Bickel.

161B. Plant Genetics and Biotechnology Laboratory (6)
Lecture—3 hours; laboratory—9 hours. Prerequisite: Plant Sciences 152 or Biological Sciences 101. Advanced techniques of genetic analysis at the molecular and organismal levels, including transformation, gene expression, analysis of transgenic plants and QTL analysis. Not open for credit to students who have taken Plant Biology 161B. (Former course Plant Biology 161B.) I, II, III. (I, II, III.) Yoder, Bradford.

171. Professionalism and Ethics in Genomics and Biotechnology (3)
Lecture—1 hour; discussion—2 hours. Prerequisite: upper division standing in a natural science major. Real and hypothetical cases to illustrate ethical dilemmas and quandaries in genomics and biotechnology. Training and practice in difficult ethical situations and evaluating personal and social consequences. I, II, III. (I, II, III.) Leary, Blumwald.

188. Undergraduate Research Proposal (3)
Lecture/discussion—3 hours. Prerequisite: upper division standing. Preparation and review of a scientific proposal. Problem definition, identification of objectives, literature review, hypothesis formulation, design of experiments, data analysis, proposal outline and presentation. (Same course as Plant Sciences 188.) GE Credit: Writ. III. (III.)

189L. Laboratory Research in Genomics and Biotechnology (2-5)
Laboratory—3-12 hours; discussion—1 hour. Prerequisite: course 188 and consent of instructor. Formulating experimental approaches to current questions in biotechnology; performance of proposed experiments. May be repeated for credit up to 12 units. (P/NP grading only.) I, II, III. (I, II, III.)

Bodega Marine Laboratory Program

http://www.bml.ucdavis.edu/
See also Biological Sciences, Bodega Marine Laboratory Program, on page 169.

Spring Quarter Program

A full quarter of undergraduate course work in marine biology is available each spring quarter at the Bodega Marine Laboratory, located in Bodega Bay, California. Course offerings include lecture and laboratory instruction in the developmental biology and physiological adaptation of marine organisms, and population biology and ecology; a weekly colloquium; and an intensive individual research experience under the direction of a laboratory faculty (Biological Sciences courses 120, 120P, 122, 122P, 123; Neurobiology, Physiology, and Behavior 141, 141P). This is a 15 unit program and course offerings and instructors may vary from year to year. Applications are due January 31. For more course detail, see full description under appropriate academic department listing or http://www.bml.ucdavis.edu/.

Summer Special Session Courses

This integrated program offers students a multidisciplinary understanding of the marine environment through intensive, hands on courses taught at BML. The program offers students three sequences of instruction with up to 10 units in each. Two sequences occur during the first Summer Session dates and one sequence in the second Summer Session dates. Applications are due May 1. For more course detail, see full description under appropriate academic department listing or http://www.bml.ucdavis.edu/.

Sequences are:
- Marine Organisms and Ecology of the California Coast. Evolution and Ecology 106, 114, 111, 110, Biological Sciences 124
- Effects of Coastal Pollution on Marine Organisms. Environmental Toxicology/Nutrition 127
- Oceanography. Environmental Science and Policy 152, Geology/Environmental Science and Policy 150C, Biological Sciences 124

Course offerings, sequence structure and instructors may vary from year to year. Bodega Marine Laboratory spring and summer programs are residential, with students housed on the laboratory grounds. Participants are assessed a room and board fee in addition to standard campus registration fees. Applications and consent of instructors are required.
Botany

See Plant Biology, on page 443; and Plant Biology (A Graduate Group), on page 443.

Business Management

See Managerial Economics, on page 360, for undergraduate study; and Management, Graduate School of, on page 337.

Cantonese

See Asian American Studies, on page 159.

Cell Biology

See Molecular and Cellular Biology, on page 406.

Cell and Developmental Biology

(A Graduate Group)

Kenneth A Beck, Ph.D., Chairperson of the Group
[530] 752-8445
Group Office. 306 Life Sciences
[530] 752-9091;  
http://biasc2.ucdavis.edu/gpc/cdb/

Faculty

Peter Armstrong, Ph.D., Professor
(Molecular and Cell Biology)
Kenneth A Beck, Ph.D., Associate Professor
(Cell Biology and Human Anatomy)
Patricia Berger, Ph.D., Professor (Animal Science)
Laura Barondisy, Ph.D., Assistant Professor
(Physiology and Membrane Biology)
Pete M. Cala, Ph.D., Professor (Human Physiology)
Frederic Chein, Ph.D., Assistant Professor
(Molecular and Cellular Biology)
Hwai-Jong Cheng, Ph.D., Assistant Professor
(Neurobiology, Physiology, and Behavior)
James S. Clegg, Ph.D., Professor
(Bodega Marine Laboratory)
Wenbin Deng, Ph.D., Assistant Professor
(Cell Biology and Human Anatomy)
Elva Diaz, Ph.D., Assistant Professor
(Medical Pharmacology and Toxicology)
Gordon Douglas, Ph.D., Adjunct Professor
(Cell Biology and Human Anatomy; MED)
Bruce Draper, Ph.D., Assistant Professor
(Molecular and Cellular Biology)
Joanne Engelbrecht, Ph.D., Professor
(Molecular and Cellular Biology)
Carol Erickson, Ph.D., Professor
(VM: Anatomy, Physiology, and Cell Biology)
Dwight Parsons, Ph.D., Professor
(Medical Pharmacology and Toxicology)
Peggy J. Farnham, Ph.D., Professor
(Medical Pharmacology and Toxicology)
Michael Ferns, Ph.D., Associate Professor
(Physiology and Membrane Biology)
Andrew Fisher, Ph.D., Professor (Entomology)
John Harada, Ph.D., Professor (Plant Biology)
Jen Rozario, Ph.D., Professor
(Plant Biology and Plant Molecular Biology)
J. David Furlow, Ph.D., Associate Professor
(Neurobiology, Physiology, and Behavior)
Angela Gelli, Ph.D., Assistant Professor
(Medical Pharmacology and Toxicology)
Qizhi Gong, Ph.D., Assistant Professor
(Cell Biology and Human Anatomy)
Nabuko Hagiwara, Ph.D., Assistant Professor
(Cardiovascular Medicine)
Bruce Hammock, Ph.D., Professor (Entomology)
John S. Hammar, Ph.D., Professor (Plant Biology)
Ilan Hedrick, Ph.D., Professor
(Animal Science)
Distinguished Graduate Mentoring Award
Neil Hunter, Ph.D., Assistant Professor
(Medical Pharmacology and Toxicology)
Rivkah Isseroff, Ph.D., Professor (Dermatology)
Ken Kaplan, Ph.D., Associate Professor
(Molecular and Cellular Biology)
Paul Knoepfler, Ph.D., Assistant Professor
(Cell Biology and Human Anatomy)
Anne Knowlton, Ph.D., Professor
(Molecular and Cellular Cardiology)
Annym Kopp, Ph.D., Assistant Professor
(Center of Genetics and Development)
Nancy E. Lane, Ph.D., Professor (General Medicine)
Julie A. Leary, Ph.D., Professor
(Molecular and Cellular Biology)
Noelle L'Etoile, Ph.D., Assistant Professor
(Psychiatry)
Ronald Li, Ph.D., Associate Professor
(Cell Biology and Human Anatomy; MED)
Su-Ju Lin, Ph.D., Assistant Professor (Microbiology)
Su Hao Lo, Ph.D., Associate Professor
(Ortho Research Labs, UCDMC)
Francis J. McNally, Ph.D., Associate Professor
(Molecular and Cellular Biology)
Jeanette E. Natzie, Ph.D., Associate Professor
(Molecular and Cellular Biology)
Judith M. Nunnari, Ph.D., Professor
(Molecular and Cellular Biology)
Martha E. O'Donnell, Ph.D., Professor
(Physiology and Membrane Biology)
Paul Primakoff, Ph.D., Professor
(Cell Biology and Human Anatomy)
A. Hari Reddi, Ph.D., Professor
(Ortho Research Labs, UCDMC)
Robert H. Rice, Ph.D., Professor
(Enological/Procedural Experience and Experimental design)
Leslie Rose, Ph.D., Associate Professor
(Molecular and Cellular Biology)
Jonathan M. Scholey, Ph.D., Professor
(Molecular and Cellular Biology)
Dan Starr, Ph.D., Assistant Professor
(Molecular and Cellular Biology)
Colline Sweeney, Ph.D., Professor
(Cancer Center, Basic Science)
Fern Tablin, V.M.D., Ph.D., Professor
(Anatomy, Physiology and Cell Biology)
Alice Tarantal, Ph.D., Professor
(Cell Biology and Human Anatomy)
James S. Trimner, Ph.D., Professor
(Medical Pharmacology and Toxicology)
Richard W. Tucker, Ph.D., Professor
(Cell Biology and Human Anatomy)
Judith L. Turgeon, Ph.D., Professor
(Physiology and Membrane Biology)
Robert H. Weiss, M.D., Professor
(Internal Medicine)
Matthew Wood, Ph.D., Assistant Professor
(Cell Biology and Human Anatomy; MED)

Bruce Wu, Ph.D., Professor
(Anatomy, Physiology and Cell Biology)
Carolyn Yamada, Ph.D., Assistant Professor
(Biomedical Engineering)
Elaine Yellowley, Ph.D., Professor
(Molecular and Cellular Biology)
Chengqi Zhou, Ph.D., Assistant Professor
(Cell Biology and Human Anatomy; MED)
Karen Zito, Ph.D., Assistant Professor
(Neurobiology, Physiology, and Behavior)

Graduate Study. The Graduate Group in Cell and Developmental Biology offers programs of study leading to the M.S. and Ph.D. degrees. Cell and Developmental Biology is a broad interdepartmental program. The curriculum consists of core courses in cell biology or developmental biology as well as courses jointly staffed with other graduate programs. Specific programs of study are decided upon by an advisory committee chaired by the student's research advisor, and the choice of major core courses will reflect the student's primary research interest.

Preparation. Appropriate preparation is an under-graduate degree in a biological or physical science. Preparation should include a year of calculus, physics, general chemistry and organic chemistry, and introductory courses in statistics, biochemistry, genetics and cell biology.

Graduate Advisers. F. McNally, E. Diaz, R. Tucker

Courses in Cell and Developmental Biology (CDB)

Graduate Courses

200. Current Techniques in Cell Biology (2)
Lecture—2 hours. Prerequisite: graduate standing; Biological Sciences 104 and Molecular and Cellular Biology 141 or the equivalent courses. Current techniques used in cell biology research including microscopy, spectroscopy, electrophysiology, immunocytochemistry, histology, organelle isolation, calorimetry, tissue culture and gel electrophoresis. Lectures are presented by experts on each technique, with an emphasis on pitfalls to avoid when using the technique. (Same course as Molecular and Cellular Biology 200A.) (S/U grading only.)—I, II. Beck

200A. Cell and Developmental Biology Laboratory (3)
Laboratory—18 hours. Prerequisite: course 200 (may be taken concurrently). One five-week assignment in the research laboratory of a Cell and Developmental Biology Graduate Group member. Individual research problems with emphasis on meth- odological/procedural experience and experimental design. May be repeated for credit four times. —I, II, III. (I, II, III)

200B. Cell and Developmental Biology Laboratory (6)
Laboratory—18 hours. Prerequisite: course 200 (may be taken concurrently). Two five-week assignments in research laboratories of Cell and Developmental Biology Graduate Group members. Individual research problems with emphasis on meth- odological/procedural experience and experimental design. May be repeated for credit. —I, II, III. (I, II, III)

205. Topics in Cell Biology of the Cytoskeleton (2)
Lecture—0.4 hours; discussion—1 hour; seminar—0.6 hours. Prerequisite: graduate standing. Roles of individual proteins in regulating the organization and function of the actin, microtubule and intermedi- ate filament cytoskeletal systems. Emphasis on primary literature. Topics may vary. May be repeated for credit when topic differs. —I, II. McNally

290. Current Topics in Cell and Developmental Biology (1)
Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Seminars presented by guest lecturers discussing their research activities. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III)
Cell Biology and Human Anatomy

See Medicine, School of, on page 367.

Chemistry

(College of Letters and Science)

R. David Britt, Ph.D., Chairperson of the Department
Neil E. Schore, Ph.D., Vice-Chairperson of the Department
Philip P. Power, Ph.D. Vice-Chairperson of the Department

Department Office, 108 Chemistry Building
(530) 754-9245/752-0503/752-0953
Fax (530) 752-3975
http://www.chem.ucdavis.edu

Faculty

Toby Allen, Ph.D. Assistant Professor
James Ames, Ph.D., Associate Professor
Matthew P. Augustine, Ph.D., Associate Professor
Alan L. Balch, Ph.D., Professor
Enoch Baldwin, Ph.D. Associate Professor
Peter Beal, Ph.D., Professor
R. David Britt, Ph.D., Professor
William Casey, Ph.D., Professor
Xi Chen, Ph.D., Assistant Professor
Sheila David, Ph.D., Professor
Andrew J. Fisher, Ph.D., Associate Professor
Amaneile K. Frazz, Ph.D., Assistant Professor
Giuliana Galli, Ph.D., Professor
Jacquelyn Gervay Hague, Ph.D., Professor
Ting Guo, Ph.D., Associate Professor
Susan M. Kazaurliz, Ph.D., Professor
Distinguished Graduate Mentoring Award
Peter B. Kelly, Ph.D., Professor
Mark J. Kurth, Ph.D., Professor
Donald P. Land, Ph.D., Associate Professor
Delmar Larsen, Ph.D., Assistant Professor
Julie A. Leary, Ph.D., Professor
Carlitto B. Lebrilla, Ph.D., Professor
Gang-Ni Liu, Ph.D., Professor
C. Villi McCundy, Ph.D., Professor
Mark Mascel, Ph.D., Associate Professor
Claude F. Meares, Ph.D., Professor
Distinguished Graduate Mentoring Award
Krishnan P. Nambari, Ph.D., Associate Professor
Distinguished Graduate Mentoring Award
Alexandra Nawrotsky, Ph.D., Professor
Cheuk-Yiu Ng, Ph.D., Professor
Marilin Olmstead, Ph.D., Professor
Frank Ostlerah, Ph.D., Associate Professor
Timothy E. Patten, Ph.D., Associate Professor
Philip P. Power, FRS, Ph.D., Professor
Carol W. Sorensen, Ph.D., Professor
Neil E. Schore, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Jared T. Shaw, Ph.D., Assistant Professor
Alexes P. Stuchabeuck, Ph.D., Professor
Dean Tantillo, Ph.D., Assistant Professor
Michael Toney, Ph.D., Associate Professor
Nancy S. True, Ph.D., Professor
Fred E. Wood, Ph.D., Senior Lecturer

Emeriti Faculty

Thomas L. Allen, Ph.D., Professor Emeritus
W. Ronald Fawcett, Ph.D., Professor Emeritus
William H. Fink, Ph.D., Professor Emeritus
Edwin Friedrich, Ph.D., Professor Emeritus
Hakan Hope, Cand. Real., Professor Emeritus
William M. Jackson, Ph.D., Professor Emeritus
Raymond M. Keefer, Ph.D., Professor Emeritus
Gerd N. LaMarr, Ph.D., Professor Emeritus
August H. Mark, Ph.D., Professor Emeritus
Donald A. McQuarrie, Ph.D., Professor Emeritus
Academic Senate Distinguished Teaching Award
W. Kenneth Musker, Ph.D., Professor Emeritus
A. B. Major Requirements:

UNITS

Preparatory Subject Matter............36-39
Chemistry 2A-2B-2C or
2AH-2BH-2CH.................................15
Physics 7A-7B-7C......................12
Mathematics 21A-21B-21C, 12
16A-16B-16C.................................9-12

Depth Subject Matter.............43
Chemistry 105, 110A, 110B, 110C, 124A,
At least 11 additional upper division units
in chemistry or its allied fields (except Chemistry 107A, 107B),
including one formal lecture course.

Total Units for the Major...........79-82

B.S. Major Requirements:

UNITS

Preparatory Subject Matter..........56
Chemistry 2A-2B-2C or
2AH-2BH-2CH...................15
Physics 9A, 9B, 9C, 9D..................19
Mathematics 21A, 21B, 21C, 21D, 22A,
22B..................................................22

Depth Subject Matter..............54
Chemistry 105, 110A, 110B, 110C, 115,
124A, 124B or 124L, 125, 128A,
At least 7 additional upper division units
in chemistry (except Chemistry 107A, 107B),
including one formal lecture course.

Total Units for the Major.........110

Applied Chemistry—Chemical Physics Emphasis

UNITS

Preparatory Subject Matter........44-48
Chemistry 2A-2B-2C or
2AH-2BH-2CH...................15
Physics 7A, 7B, 7C..................12
Mathematics 16A-16B-16C or
21A-21B-21C.................................9-12
Biological Sciences 1A..........................5
Statistics 122 or 122H................3-4

Depth Subject Matter...........53-62
Chemistry 100, 105, 107A-107B or
110A-110B-110C, 115, 118A-118B-118C
or 128A-128B-128C-129A-129B,
124A................................................47
Other units as specified (e.g.,
Environmental Science and Policy 110),
Environmental Toxicology 101, 102B,
102C, 120, 131, 135, 146, Geology
150A, Soil Science 111, 114, 119
At least 3 additional upper division units
in chemistry (except Chemistry 107A, 107B)

Total Units for the Major.........110

Applied Chemistry—Environmental Chemistry Emphasis

UNITS

Preparatory Subject Matter........48-55
Chemistry 2A-2B-2C or
2AH-2BH-2CH...................15
Physics 7A-7B-7C or 9A-9B-9C........12-15
Mathematics 16A-16B-16C or
21A-21B-21C.................................9-12
Biological Sciences 1A..........................5
Environmental Toxicology 20..................4
Statistics 13, 32, 100 or 102..........................3-4

Quarter Offered: I—Fall, II—Winter, III—Spring, IV—Summer, 2009-2010 offerings in parentheses

## High School Chemistry Requirements

### Lower Division Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Prerequisites</th>
</tr>
</thead>
</table>

**Note:** The minor program has prerequisites of Chemistry 2A-2B, Chemistry 1A-2A, and Physics 7A-7B or their equivalents. Students wishing to earn a Chemistry minor should consult with a Chemistry major advisor.

### Honors and Honors Programs

The student must take courses 194AH, 194HB, and 194HC.

### Graduate Study

The Department of Chemistry offers programs of study and research leading to the M.S. and Ph.D. degrees in Chemistry. Detailed information on the graduate study may be obtained by writing to the Graduate Advisor, Department of Chemistry. See also Graduate Studies, on page 104.

### Courses in Chemistry (CHE)

#### Diagnostic Examinations

To enroll in Chemistry 2A or 2AH, all students (including those with Advanced Placement examination credit or transfer units for any courses in chemistry or mathematics) must pass both the Chemistry Diagnostic Test and the Precalculus Diagnostic Examination with satisfactory scores.

#### Upper Division Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A. General Chemistry (5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lecture 3 hours; laboratory/discussion 4 hours.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prerequisite: High school chemistry and physics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>satisfactorily score on diagnostic examinations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matematics 1A (may be taken concurrently) or consent of instructor.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limited enrollment course with a more rigorous treatment of material covered in course 2A.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students completing course 2AH can continue with course 2B or 2BH.</td>
<td></td>
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</tr>
</tbody>
</table>

#### 2B. General Chemistry (5)

Lecture 3 hours; laboratory/discussion 4 hours. Prerequisite: course 2A or 2AH. Condensed phases and intermolecular forces, chemical thermodynamics, chemical equilibria, acids and bases, solubility. Laboratory experiments in thermochemistry, equilibria, and qualitative analysis using volumetric methods. GE credit: SciEn, —I, II, III. |

#### 2B. Honors General Chemistry (5)

Lecture 3 hours; laboratory/discussion 4 hours. Prerequisite: course 2A with consent of instructor or course 2AH with a grade of C or better; and Mathematics 21B (may be taken concurrently) or consent of instructor. Limited enrollment course with a more rigorous treatment of material covered in course 2A. Students completing course 2B can continue with course 2BH or 2CH or 2C. |

#### 2C. General Chemistry (5)

Lecture 3 hours; laboratory/discussion 4 hours. Prerequisite: course 2B or 2BH. Continuation of course 2B. Kinetics, electrochemistry, spectroscopy, structure and bonding of organic and inorganic compounds, application of principles to chemical reactions. Laboratory experiments in selected analytical methods and syntheses. GE credit: SciEn, —I, III, (I, II). |

#### 2CH. Honors General Chemistry (5)

Lecture 3 hours; laboratory—6 hours. Prerequisite: course 2B, 2BH with a grade of C or better, and Mathematics 21C (may be taken concurrently) or consent of instructor. Limited enrollment course with a more rigorous treatment of material covered in course 2C. |

#### 8A. Organic Chemistry: Brief Course (2)

Lecture 2 hours. Prerequisite: course 2B with a grade of C or higher. With course 8B, an introduction to the nomenclature, structure, chemistry, and reaction mechanisms of organic compounds. Intended for students majoring in areas other than organic chemistry. —I, II, (I, III). |

#### 8B. Organic Chemistry: Brief Course (4)

Lecture 3 hours; laboratory—3 hours. Prerequisite: course 8A or 118A. Continuation of course 8A. Lab-oratory concerned primarily with organic laboratory techniques and the chemistry of the common classes of organic compounds. —I, II, (I, II). |

### Concepts of Chemistry (4)

Lecture 4 hours. A survey of basic concepts and contemporary applications of chemistry. Designed for non-science majors and not as preparation for Chemistry 2A. Course Not open for credit to students who have had Chemistry 2A; but students with credit for course 10 may take Chemistry 2A for full credit. GE credit: SciEn, Wrt, —I, II, Wood.

#### 98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

### Upper Division Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Prerequisites</th>
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<tbody>
<tr>
<td>100. Environmental Water Chemistry (3)</td>
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<tr>
<td>Lecture 3 hours. Prerequisite: course 2C. Practical aspects of water chemistry in the environment, including thermodynamic relations, coordination chemistry, solubility calculations, and rate laws. Computer modeling of the evolution in water chemistry from contact with minerals and gases. —I, II, (I) Casey</td>
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#### 104. Forensic Applications of Analytical Chemistry (3)

Lecture 2 hours; laboratory—3 hours. Prerequisite: course 2C. Theory and application of standard methods of chemical analysis to evidentiary samples. Use and evaluation of separations tests, FTIR, GC and GCMS to various sample types encountered in forensics. —I, II, Land |

#### 105. Analytical and Physical Chemical Methods (4)

Lecture 2 hours; laboratory—6 hours. Prerequisite: course 110A (may be taken concurrently) or courses 107A-107B. Fundamental theory and laboratory techniques in analytical and physical chemistry. Errors and data analysis methods. Basic electrical circuits in instruments. Advanced solution equilibria. Potentiometric analysis. Chromatographic separation to visible spectroscopy. —I, II, (I, III). |

#### 107A. Physical Chemistry for the Life Sciences (3)

Lecture 3 hours. Prerequisite: course 2C, Mathematics 16C or 21C, one year of college level physics. Physical chemistry intended for majors in the life science area. Introduction of classical and statistical thermodynamics including equilibrium principles and solutions of both non-electrolytes and electrolytes. The thermodynamic basis of electro-chemistry and membrane potentials. —I, II, (I, II). |

#### 107B. Physical Chemistry for the Life Sciences (3)

Lecture 3 hours. Prerequisite: course 107A. Continuation of course 107A. Kinetic theory of gases and transport processes in linear chemical kinetics, enzyme kinetics and theories of reaction rates. Introduction to quantum theory, atomic and molecular structure, and spectroscopy. Application to problems in the biological sciences. —I, II, (I, II). |

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*Quarter Offered:* Fall, Winter, Spring, Summer. 2009-2010 offering in parenthesis

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**General Education (GE) credit:** ArtHum—Arts and Humanities, SciEng—Science and Engineering, SocSci—Social Sciences, Div—Social-Cultural Diversity, Wrt—Writing Experience
Graduate Courses

201. Chemical Uses of Symmetry and Group Theory (3)
Lecture—3 hours. Prerequisite: course 124A and 110B, or consent of instructor. Symmetry elements and operations, point groups, representations of groups. Applications to molecular orbital theory, ligand field theory, molecular vibrations, and angular momentum. Crystallographic symmetry. —I. (II.)

204. Mathematical Methods in Chemistry (3)

205. Symmetry, Spectroscopy, and Structure (3)
Lecture—3 hours. Prerequisite: course 201 or the equivalent. Vibrational and rotational spectra; electronic spectra and photoelectron spectroscopy; magnetism; electron spin and nuclear quadrupole resonance spectroscopy; nuclear magnetic resonance spectroscopy; other spectroscopic methods. —II. (III.)

209. Special Topics in Physical Chemistry (3)
Lecture—3 hours. Prerequisite: courses 210A and 211A; graduate standing in Chemistry. Advanced topics in physical chemistry, biophysical chemistry or chemical physics from areas of current research interest. May be repeated for credit.

210A. Quantum Chemistry: Introduction and Stationary-State Properties (3)
Lecture—3 hours. Prerequisite: course 110B and 110C or consent of instructor. Stationary-state quantum chemistry: postulates of quantum mechanics, simple solutions, central field problems and angular momenta, hydrogen atom, perturbation theory, variational theory, atoms and molecules. —II. (III.)

218. Quantum Chemistry: Time-Dependent Systems (3)
Lecture—3 hours. Prerequisite: course 210A. Matrix mechanics and time-dependent quantum chemistry: matrix formulation of quantum mechanics, Heisenberg representation, time-dependent perturbation theory, selection rules, density matrices, and miscellaneous molecular properties. —III. (III.)

210C. Quantum Chemistry: Molecular Spectroscopy (3)
Lecture—3 hours. Prerequisite: course 210B. Molecular spectroscopy: Born-Oppenheimer approximation, rotational, vibrational and electronic spectroscopy, spin systems, and molecular photochemistry. —I. (II.)

211A. Advanced Physical Chemistry: Statistical Thermodynamics (3)
Lecture—3 hours. Prerequisite: consent of instructor. Principles and applications of statistical mechanics; ensemble theory; statistical thermodynamics of gases, solids, liquids, electrolyte solutions and polymers; chemical equilibrium. —I. (II.)

211B. Statistical Mechanics (3)
Lecture—3 hours. Prerequisite: course 211A. Statistical mechanics of nonequilibrium systems, including the rigorous kinetic theory of gases, continuum mechanics transport in dense fluids, stochastic processes, Brownian motion and linear response theory. Offered in alternate years. —II.

212. Chemical Dynamics (3)
Lecture—3 hours. Prerequisite: consent of instructor. Introduction to modern concepts in chemical reaction dynamics for graduate students in chemistry. Emphasis will be placed on experimental techniques as well as emerging physical models for characterizing chemical reactivity at a microscopic level. Offered in alternate years. —II.

215. Theoretical and Computational Chemistry (3)
Lecture—3 hours. Prerequisite: courses 211A and 210B or consent of instructor. Mathematics of wide utility in chemistry, computational methods for guidance or alternative to experiment, and modern formulations of chemical reactions. Chemical reactivity may be presented as a success. May be repeated for credit when topic differs. Offered in alternate years. —III. (III.)

216. Magnetic Resonance Spectroscopy (3)
Lecture—3 hours. Prerequisites: courses 210A, 210B (may be taken concurrently). Quantum mechanics of spin and orbital angular momentum, nuclear magnetic resonance, theory of chemical shift and multiplet structure, electron spin resonance, theory of g-tensor in organic and transition ions, spin Hamiltonians, nuclear quadrupolar resonance, spin relaxation processes. Offered in alternate years. —III. (III.)

217. X-Ray Structure Determination (3)
Lecture—3 hours. Prerequisite: consent of instructor. Introduction to x-ray structure determination; crystals, symmetry, diffraction geometry, sample preparation and handling, diffraction apparatus and data collection, methods of structure solution and refinement; preparation of reports, technical writing and graphics, crystallographic literature. —III. (III.)

218. Macromolecules: Physical Principles (3)
Lecture—3 hours. Prerequisites: courses 110A, 110B, 110C or the equivalent. Introduction to macromolecular structure; equilibrium properties and macromolecular dynamics; physical chemical determination of macromolecular structure. Offered in alternate years. —III.

219. Spectroscopy of Organic Compounds (4)
Lecture—3 hours; laboratory—2.5 hours. Prerequisite: course 128C or the equivalent. Identification of organic compounds using application of spectroscopic and chemical reaction mechanism phenomena using spectroscopic methods—principally NMR, IR and MS. —III. (III.)

219L. Laboratory in Spectroscopy of Organic Compounds (1)
Laboratory—2.5 hours. Prerequisite: course 219 (may be taken concurrently); open to Chemistry graduate students only or consent of instructor. Practical application of NMR, IR and MS techniques for organic molecules. (S/U grading only.)—III. (III.)

221A-H. Special Topics in Organic Chemistry (3)
Lecture—3 hours. Selected topics of current interest in organic chemistry, the role of intermediates and stereochemistry, and chemical mechanisms of reactions and reactions of both organic and inorganic compounds. —I. (II.)

226. Principles of Transition Metal Chemistry (3)
Lecture—3 hours. Prerequisite: course 124A or the equivalent. Electronic structures, bonding, and reactivity of transition metal compounds. —I. (II.)

228A. Bio-inorganic Chemistry (3)
Lecture—3 hours. Prerequisite: course 226 or consent of instructor. Defines role of inorganic chemistry in the functioning of biological systems by identifying the functions of metal ions and main group compounds in biological systems and discussing the chemistry of model and isolated biological compounds. Offered every third year.

228B. Main Group Chemistry (3)
Lecture—3 hours. Prerequisite: course 226 or consent of instructor. Principles, physical properties, reactions and bonding of main group compounds. Discussions of concepts of electron deficiency, hyper-valency, and non-classical bonding. Chemistry of the main group elements will be treated systematically. Offered every third year. —III.

228C. Solid-State Chemistry (3)
Lecture—3 hours. Prerequisites: courses 124A, 110B, 226, or the equivalent. Design and synthesis, structure and bonding of solids, physical properties and characterization of solids; topics of current interest such as low-dimensional materials, inorganic polymers, materials for catalysis. Offered every third year.

228D. Homogeneous Catalysis (3)
Lecture—3 hours. Prerequisite: course 226. Overview of homogeneous catalysis and related methods, with emphasis on kinetics, mechanisms, applications for organic synthesis. The related methods may include cluster, colloid, phase transfer, enzymatic, heterogenous and polymer-supported catalysis. Offered in alternate years. —III.

231A. Organic Synthesis: Methods and Strategies (4)
Lecture—3 hours; lecture/discussion—3 hours. Prerequisite: course 128C or equivalent. Current strategies and methods in synthetic organic chemistry. Focus on construction of complex molecules, control of relative and absolute stereochemistry and retrosynthetic strategies. Use of databases and molecular modeling software in multistep strategies. Only one unit of credit for students who have completed course 131. Not open for credit to students who have taken course 231. —II. (II.)

231B. Advanced Organic Synthesis (3)
Lecture—3 hours. Prerequisite: course 231A. Current strategies and methods in synthetic organic chemistry. Continuation of course 231A. Organic synthesis of complex target molecules. Stereochmiere considerations and asymmetric synthesis. Organometallics for selective transformations. Carbocyclic and heterocyclic ring formation. Not open for credit to students who have taken course 231. —III. (III.)

233. Physical-Organic Chemistry (3)
Lecture—3 hours. Prerequisite: courses 128A-128B-128C and 110A-110B-110C or the equivalent. Introduction to elementary concepts in physical-organic chemistry including the application of simple numerical techniques in characterizing and modeling organic reactions. —I. (II.)

235. Organometallic Chemistry in Organic Synthesis (3)
Lecture—3 hours. Prerequisite: course 128C. Current trends in use of organometallics for organic synthesis; preparations, properties, applications, and limitations of organometallic reagents derived from transition and/or main group metals. Offered in alternate years. —III. (III.)

236. Chemistry of Natural Products (3)
Lecture—3 hours. Prerequisite: course 128C or the equivalent. Advanced treatment of chemistry of naturally occurring compounds isolated from a variety of sources. Topics will include isolation, structure determination, chemical transformation, total synthesis, biological activity, and biosynthesis. Biosynthetic origin will be used as a unifying theme. —II. (II.)

237. Bio-organic Chemistry (3)
Lecture—3 hours. Prerequisite: course 128C or the equivalent. Structure and function of biomolecules; molecular recognition; enzyme reaction mechanisms; design of suicide substrates for enzymes; enzyme engineering; design of artificial enzymes and application of enzymes in organic synthesis. Offered in alternate years. —I.

240. Advanced Analytical Chemistry (3)
Lecture—3 hours. Prerequisite: courses 110A and 115 or the equivalent. Numerical treatment of experimental data: thermodynamics of electrostatic and non-electrolyte solutions; complex equilibria in aqueous and non-aqueous solutions; potentiometry and specific ion electrodes; mass transfer in liquid solutions; fundamentals of separation science, including column, gas and liquid chromatography. —I. (II.)

241A. Surface Analytical Chemistry (3)
Lecture—3 hours. Prerequisite: course 110C or the equivalent. Concepts of surfaces and interfaces: physical properties, unusual electronic effects. Focus on gas-solid interfaces, with some discussion of liquid-solid interfaces. Offered in alternate years. —I.

241B. Laser and X-ray Spectroscopy (3)
Lecture—3 hours. Prerequisite: course 110B or the equivalent. Concepts and mechanisms of light-matter interactions. Chemical applications of modern spec-
troscopic methods, including multiphoton spectroscopy, time-resolved laser and x-ray photolysis, and phase-contrast x-ray imaging. Offered in alternate years.—I.

241C. Mass Spectrometry (3) Lecture—3 hours. Prerequisite: course 110C and 115 or the equivalent. Mass spectrometry and related methods with emphasis on ionization methods, mass analyzers, and detectors. Related methods may include ion-molecule reactions, unimolecular dissociation of organic and bioorganic compounds, and applications in biological and environmental analysis. Offered in alternate years.—II.

241D. Electroanalytical Chemistry (3) Lecture—3 hours. Prerequisite: course 110C and 115 or the equivalent. Electroanalytical chemistry with consideration of mass transfer and electrode kinetics for polarizable electrodes. Current-potential curves for a variety of conditions, including both potentials and current-gain of analytic control, and their application in chemical analysis. Offered in alternate years.—II.

241E. Microscopy and Imaging Techniques (3) Lecture—3 hours. Prerequisite: course 110C and 115 or the equivalent. Introduction to modern microscopy and imaging techniques: scanning tunneling, atomic force, far-field optical, fluorescence, scanning near-field optical, and scanning electron microscopy. Application to nanoscience and analytical and bioanalytical chemistry. Some laboratory demonstrations. Offered in alternate years.—II.

261. Current Topics in Chemical Research (2) Lecture—2 hours. Prerequisite: graduate standing in Chemistry or consent of instructor. Designed to help chemistry graduate students develop and maintain familiarity with the current and past literature in their immediate field of research and related areas. May be repeated for credit when topics differ.—I, II, III (P/NP grading only).

263. Introduction to Chemical Research Methodology (3) Laboratory/discussion—9 hours. Prerequisite: course 293 and graduate student standing in Chemistry; consent of instructor. Introduction to identification, formulation, and solution of meaningful scientific problems including experimental design and/or theoretical analyses of new and prevailing techniques, theories and hypotheses. May be repeated for credit when topics differ. (S/U grading only)—I, II, III, (P/NP grading only).

264. Advanced Chemical Research Methodology (6) Laboratory/discussion—18 hours. Prerequisite: course 263 or consent of instructor. Applications of the methodology developed in Chemistry 263 to experimental and theoretical studies. Advanced methods of interpretation of results are developed. Includes professional training in manuscript preparation for publication. May be repeated for credit when topics differ. (S/U grading only)—I, II, III, (I, II, III).

265. Seminar in Ethics for Scientists (2) Seminar—2 hours. Prerequisite: graduate standing in any department of Science or Engineering. Studies of topical and historical issues in the ethics of science, possibly including issues such as proper authorship, peer review, fraud, plagiarism, responsible collaboration, and conflict of interest. Limited enrollment. (Same course as Engineering Chemical and Materials Science 280 and Physics 280.) (S/U grading only)—I, II, III, (I, II, III).

290. Seminar (2) Seminar—2 hours. Prerequisite: consent of instructor. (S/U grading only)—I, II, III, (I, II, III).

293. Introduction to Chemistry Research (1) Discussion—2 hours. Designed for incoming graduate students preparing for higher degrees in chemistry; group and individual discussion of research activities in the Department and research topic selection. (S/U grading only)—I (I).

295. Careers in Chemistry (1) Seminar—2 hours. Prerequisite: graduate standing in Chemistry. Designed to give Chemistry graduate students an in-depth appreciation of career opportunities with a M.S. or Ph.D. degree in chemistry. Professional chemists (and allied professionals) give seminars describing both research and career insights. May be repeated for credit 3 times. (S/U grading only)—I.

298. Group Study (1-5)

299. Research (1-12)

The laboratory is open to qualified graduate students who wish to pursue original investigation. Students wishing to enroll should communicate with the department well in advance of the quarter in which the work is to be undertaken. (S/U grading only.)

Professional Courses

390. Methods of Teaching Chemistry (2) Lecture—1 hour; discussion—1 hour. Prerequisite: graduate student standing in Chemistry and consent of instructor. Practical experience in methods and problems of teaching chemistry. Includes analyses of texts and supporting material, discussion of teaching techniques, preparing for and conducting of discussion sessions and student laboratories. Participation in the teaching program required for Ph.D. in chemistry. May be repeated for credit. (S/U grading only)—I, II, III (I, II, III).

392. Advanced Methods of Teaching Chemistry (2) Lecture—2 hours. Prerequisite: course 290. Advanced topics in teaching chemistry. Analysis and discussion of curricular design, curricula materials, teaching methods and evaluation. For students who are planning a career in teaching chemistry. (P/NP grading only)—III (I, II, III).

Chicana/Chicano Studies

(College of Letters and Science) Adela de la Torre, Ph.D., Program Director Program Office, 2102 Hart Hall Tel:(530) 752-2421 Fax:(530) 752-8814 http://chi.ucdavis.edu


Faculty Angie C. Chabram-Dennisersen, Ph.D., Professor Mirolaca Lopez-Garcia, Ph.D., Associate Professor Sergio de la Marfa, Ph.D., Associate Professor Adela de la Torre, Ph.D., Professor Yvette Flores, Ph.D., Professor Lorena Garcia, Dr.P.H., Assistant Professor Carlos F. Jackson, M.F.A. Assistant Professor Maluqias Montoya, B.F.A., Professor

Emeriti Faculty Beatriz Pesquera, Ph.D., Associate Professor Emerita Refugio Rochin, Ph.D., Professor Emeritus Adolfo Sosa-Riddell, Ph.D., Senior Lecturer Emerita

The Major Program

The Chicana/Chicano Studies Program offers an interdisciplinary curriculum focusing on the Chicana/Chicano experience through an analysis of class, race, ethnicity, gender and sexuality, and cultural expression. The program offers a major leading to the Bachelor of Arts degree for a minor that can satisfy breadth requirements for the College of Letters and Science. Both the major and minor frame an analysis within the history and contemporary experiences of Chicanas/os in the Americas. The major gives students an opportunity to specialize in one of two emphases: Cultural Studies or Social/Policy Studies. Students in the major are expected to read, write, and speak Spanish at a level suitable for future study and work in Chicana/o and Latina/o settings. There is no requirement for the minor, and all Chicana/Chicano Studies courses are open to students in any major.

The Program. At the lower division level, the major curriculum provides an interdisciplinary overview of various topics. Students are advised to take courses that serve as prerequisites for certain upper division courses. At the upper division level, majors pursue advanced interdisciplinary course work in both the humanities and social sciences. At this level, students will find courses in Chicana/Chicano history, theory, and several courses taught from a variety of disciplinary perspectives. Majors may specialize in one of two emphases for the A.B. degree. The Cultural Studies emphasis integrates literature, culture, and artistic expression. Social/Policy Studies emphasizes social theory, research methods, area studies in community/political economy, family, societal and health issues.

Career Alternatives. Students interested in careers involving communications, social work, non-profit work, or human services may be interested in the Chicana/o Studies major. The major provides specialized training in Chicana/o Studies and in Chicana/o Studies methodology. The Chicana/o Studies major is designed to prepare students for professional work in cross-cultural education, cultural/art centers, artistic expression and communications. The Social/Policy Studies emphasis prepares students for professional work in human service delivery, community development, legal services assistance, health services, social welfare and education. Both emphases in the major prepare students for advanced graduate and/or professional studies in related fields.

A.B. Major Requirements:

Cultural Studies Emphasis:

Preparatory Subject Matter........................................16-31
Chicana/o Studies 10, 50........................................8
Chicana/o Studies 21 or 40........................................4
One of Chicana/o Studies 60, 65, 70, or 73.................4
Spanish 1, 2, 3, or 28, 31, 32 or the equivalent..................0-15

Depth Subject Matter........................................40
One course from Chicana/o Studies 150, 181 History 165, 166B, 169A, 169B ........................................4
Two courses from Chicana/o Studies 100, 110, 111, 112, 130, 131, 132, 181 ........................................8
Comparative ethnicity/gender: two upper division courses selected from two of the following areas: African American and African Studies, Asian American Studies, Native American Studies, or Women’s Studies..........................8
Two courses from Chicana/o Studies 119, 120, 121, 122, 123 ........................................8

Total Units for the Major........................................56-71

Social/Policy Studies Emphasis:

Preparatory Subject Matter........................................20-35
Chicana/o Studies 10, 50........................................8
Chicana/o Studies 21 or 40........................................4
One from Chicana/o Studies 60, 65, 70, or 73..................4
One from Chicana/o Studies 23, 140A Sociology 46A or Psychology 41 ........................................4
Spanish 1, 2, 3, or 28, 31, 32 or the equivalent.................0-15

Depth Subject Matter........................................40
One from Chicana/o Studies 150, 181, History 165, 166B, 169A or 169B ........................................4

Quarter Offered: I-Tall II-Winter, III-Spring, IV-Summer; 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Social-Cultural Diversity; Wrt=Writing Experience
40. Comparative Health: Top Leading Causes of Death in Mexico
Lecture/discussion—3 hours; discussion—1 hour. Prerequisite: Statistics 13 or consent by instructor. Introduction to the epidemiology of the leading causes of death for ethnic/racial minorities. Assessment of disproportionate rates at which ethnic/racial minorities suffer and die from chronic and infectious diseases and injuries and statistical methods used to calculate these rates. Not open for credit to students who have completed course 405. GE Credit: Div, SocSci, Wrt.—II, III, (II, III) Garcia

40S. Comparative Health: Leading Causes of Death (4)
Lecture—4 hours. Prerequisite: Statistics 13 or consent by instructor. Introduction to the epidemiology of the leading causes of death for ethnic/racial minorities. Assessment of disproportionate rates at which ethnic/racial minorities suffer and die from chronic and infectious diseases & injuries & statistical methods used to calculate these rates. Offered abroad. Not open for credit to students who have completed course 40. GE Credit: Div, SocSci, Wrt.—I. (I) de la Mora

50. Chicana and Chicano Culture (4)
Lecture—3 hours; discussion—1 hour. Interdisciplinary survey of Chicana/o cultural representation in the 20th century. Examines Chicana/o culture within a national and transnational context. Explores how Chicana/o cultural forms and practices intersect with social/material forces, intellectual formations and cultural discourses. (Former course 20.) GE Credit: Div—II, III, (II, III) Chaham-Dennerses, de la Mora

60. Chicana and Chicano Representation in Cinema (4)
Lecture—3 hours; discussion—1 hour; film viewing—2 hours. Introductory-level study of Chicana/o and Chicano representation in cinema. Depiction of Chicana/o and Chicano representation by Chicana/o filmmakers, as well as by non-Chicanas, including independent filmmakers and the commercial industry. GE Credit: ArtHum, Div.—I. (I) de la Mora

65. New Latin American Cinema (4)
Lecture/discussion—2 hours; discussion—1 hour; film viewing—3 hour. Historical, critical, and theoretical survey of the cinemas of Latin America and their relationship to the emergence of U.S. Latin American cinema. Emphasis on representation of social and identity issues, including gender, sexuality, class, race and ethnicity. GE Credit: ArtHum, Div—II, III, (II, III) Flores, de la Mora

70. Survey of Chicana/o Art (4)
Lecture—4 hours. Survey of contemporary Chicana/o art in context of the social turmoil from which it springs. Includes political use of the poster and the mural, the influence of the Mexican mural and graphic movement, and social responsibility of the artist. GE Credit: Div—I. (I) Jackson, Montoya

73. Chicana/o Art Expression Through Silk Screen (4)
Studio—8 hours; laboratory—4 hours. Introductory level studio course using silk screen and basic printing techniques to explore and develop images of Chicana/o cultural themes and expressions. Students will experiment with images and symbols from their immediate environment/culture. Integrated approach to Chicana/o philosophy of art.—I. (I) Jackson, Montoya

92. Internship in Chicana/o Studies (1-12)
Internship—3-36 hours. Prerequisite: course 10 or consent of instructor. Academic guidance combined with internship in community agencies serving Mexican/Latina/Latino/Chicana/Chicano clients. Use of bilingual skills and knowledge of history, culture, economics, politics and social issues. May be repeated for credit up to 12 units. (P/NP grading only)

98. Directed Group Study (1-5)
(P/NP grading only)

99. Special Study for Undergraduates (1-5)
(P/NP grading only)
123. Psychological Perspectives on Chicana/o and Latina/o Children and Adolescents (4)
Lecture—3 hours; term paper. Prerequisite: course 10 or 21, and upper division standing. Psychological and educational development of Chicana/Latina children and adolescents. Special attention to the formation of ethnic, gender, class, race, and sexual identities. GE Credit: Div, SocSci, Wri. — II. (III.) Garcia

125. Latino Families in the Age of Globalization: Migration and Transculturation (4)
Lecture/discussion—4 hours. Prerequisite: Spanish 3 or equivalent highly recommended. Impact of globalization on Latino families in the American context. Relationships of political structure, economics and family. Intimate partner violence, child maltreatment and alcohol/drug abuse in contemporary Latino families. Offered in a Spanish speaking country. — IV. (V.) Flores

130. United States-Mexico Border Relations (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing. Theories of U.S.-Mexican border relations, with an overview of the political, economic, and social relationships and an in-depth analysis of immigration issues, border industrialization, women's organizations, economic crises, and legal issues. GE Credit: Div.— I. (II., III.) Chávez-García, de la Torre

131. Chicanas in Politics and Public Policy (4)
Lecture/discussion—4 hours. Prerequisite: course 30 or Political Science 1. Historical and political analysis of Chicana/Latina political involvement and activities in the general political system, women's movements, Chicano movement, and Chicana movement. Course also examines the public policy process and the relationship of Chicanas/Latinas to public policy formation. Offered in alternate years. GE Credit: SocSci, Div.— II. (II.) Chávez-García, de la Torre

131S. Chicanas in Politics and Public Policy (4)
Lecture/discussion—4 hours. Historical and political analysis of Chicana/Latina political involvement and activities in the general political system, women's movement, Chicano movement, and Chicana movement. Course also examines the public policy process and the relationship of Chicanas/Latinas to public policy formation. Offered abroad. Not open for credit to students who have completed course 131. GE Credit: Div, SocSci,— I. (I.) de la Torre

132. Political Economy of Chicana/o Communities (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing; lower division Chicana/o Studies course recommended. Historical and contemporary study of political and economic forces which define and influence the development of Chicana/o communities. Includes critiques of traditional and Marxist theories and concepts applicable to Chicana/o communities, case studies of Chicana/o communities, especially in California and Texas. — III. (III.) de la Torre

135S. Transnational Latina/o Political Economy (4)
Lecture—3 hours; term paper. Prerequisite: Spanish 3 or equivalent, or consent of instructor; Economics 1A and 1B recommended. Intensive reading, discussion and research on selected topics from Latin America and the US with regard to immigrant and native communities. Topics include comparative immigration and macroeconomic policies in the US and Latin America. Offered in a Spanish speaking country. — IV. (IV., V.) de la Torre

140A. Quantitative Methods: Chicano/ Chicana Latino Health Research (4)
Lecture—3 hours; discussion/labatory—1 hour. Prerequisite: two years of high school algebra or the equivalent in college. Focuses on measuring Latino/Chicana health outcomes using a quantitative approach. Assesses main types of study designs and addresses measurement of disease frequency and health effects. GE Credit: SciEng.— I. (I., III.) Garcia

145S. Bi-National Health (5)
Lecture—5 hours. Prerequisite: Biological Sciences 1A and 1B, Spanish 21 or 31 or consent of instructor; upper division standing. Examination of health status and intervention strategies presented in public health care settings, private clinics and by indigenous healers in Mexico. Analysis of impact of high risk diseases. Offered in a Spanish speaking country under supervision of UC Davis faculty/lecturer. — I. (I.) de la Torre

150. The Chicana and Chicano Movement (4)
Lecture—3 hours; term paper. Development of the Chicana/o Movement within the context of the socio-political movements of the 1960's in a national and global perspective. Ideological/political perspectives include academic, and political involvement and historical analysis of Chicano/a novelists. Bilingual readings, lectures, discussions, and writing in Spanish. (Former course Spanish 126A.) GE Credit: ArtHum, Div, Wri.— I. III. (II.) Chávez-García, de la Torre

154. The Chicana/o Novel (4)
Lecture—4 hours. Prerequisite: intermediate Spanish or consent of instructor. Introduction to the forms and themes of the Chicana/o novel with special attention to the construction of gender, nationality, sexuality, social class, and the family by contemporary Chicana/o novelists. Lectures, discussions, and writing in Spanish. (Former course Spanish 126B.) GE Credit: ArtHum, Div.— III. (II.) Chabram-Dernersesian

155. Chicana/o Theater (4)
Lecture—4 hours. Prerequisite: intermediate Spanish or consent of instructor. Examination of the formal and thematic dimensions of Chicana/o theater in the contemporary period with special emphasis on El Teatro Campesino and Chicana Feminist Theater. Bilingual readings, lectures, discussions, and writing in Spanish. (Former course Spanish 126B.)— II. (I.) Chabram-Dernersesian

156. Chicanas, Latinas and Poetry (4)
Lecture—4 hours. Prerequisite: intermediate Spanish or consent of instructor. Survey of Chicana/o poetry with special emphasis on its thematic and formal dimensions. Bilingual readings, lectures, discussions, and writing in Spanish. (Former course Spanish 126C.)— III. (II.) Chabram-Dernersesian

160. Mexican Film and Greater Mexican Identity (4)
Lecture/discussion—4 hours; film viewing—1 hour. Prerequisite: intermediate Spanish. Survey of the role Mexican cinema plays in consolidation and contestation of post-revolutionary Mexican state and in the formation of a greater Mexican cultural identity including Chicano/a identity. Showcases genres, periods, auteurs, movements, and emphasis on gendered and sexualized narratives. GE Credit: ArtHum, Div.— II. (III.) de la Mora

165. Chicanas, Latinos and Mexicans in Commercial Media (4)
Lecture/discussion—4 hours; laboratory—2 hours. Prerequisite: course 60 or other film or feminist theory course; conversational fluency in Spanish. The portrayal of Chicano/a/Latino/a and Mexican/a in commercial media. The relation between the representation of Chicana, Latina, and Mexican women in commercial television and cinema and the role of women in Mexico. Bilingual U.S. societies. Offered in alternate years. — III. de la Mora

170. Contemporary Issues in Chicana Art (4)
Lecture—4 hours; issues and conflicts in the dismantling of the Contemporary Chicana Art Movement; Response and challenge to the dominant culture. — II. (II.) Jackson, Montoya

171. Mexican and Chicana Mural Workshop (4)
Studio—8 hours; independent study—1 hour. Prerequisite: course 70 and/or written consent of instructor. The Mural: a collective art process that empowers students and people through design and execution of mural paintings in the tradition of the Mexican Mural Movement; introduces materials and techniques. May be repeated once for credit. [Same course as Art Studio 171.]—I. (II.) Jackson, Montoya

172. Chicana/o Voice/Poster Silk Screen Workshop (4)
Studio—8 hours; independent study—1 hour. Prerequisite: course 70 and/or 73 and/or written consent of instructor. The poster as a voice art form used by Chicanas/o and other people of color to point to the defects of society and the possibility for change, from the Chicana/o artist's perspective. May be repeated once for credit.— II. (II.) Jackson, Montoya

180. Grant Writing in the Chicana/o/Latina/o Community (4)
Lecture—4 hours. Prerequisite: course 10, 23 or consent of instructor. Upper division standing. Overview of key elements for grant writing. Topics include community needs assessment, development of human subjects protocols, data collection, methods, evaluation designs and community based methodologies for grant development applications in the Latino community. — III. (III.) de la Torre

181. Chicanas and Latinas in the U.S.: Historical Perspectives (4)
Lecture/discussion—4 hours. Prerequisite: course 10 or Women's Studies 50. Historical issues in the lives of Chicanas, PuertoRican, and Mexican-American women. GE credit: ArtHum, Div, Wri. — II. Chávez-García

182. Race and Juvenile Justice (4)
Lecture—4 hours. Prerequisite: course 10, Women's Studies 10, or Sociology 10, or equivalent. Individual and institutional responses to "troublesome" youth of color through history and in contemporary society. Emphasis on how race, as well as ethnicity, class, and gender have informed the treatment of "delinquent" youth. Offered in alternate years. GE Credit: ArtHum, Div, SocSci,— III. Chávez-García

192. Internship in the Chicana/o/Latina/o Community (1-12)
Internship—3-36 hours. Prerequisite: course 10, 21, or 50, Spanish 3 or the equivalent. Academic guid- ance combined with internship in community agencies serving Mexican/Latina/Latino/Chicana/ Chicano clients. Use of bilingual skills and knowl- edge of history, culture, economics, politics and social issues. Internship project required. May be repeated for credit up to 12 units. [P/NP grading only.]

1925. Internship (1-12)
Internship. Prerequisite: consent of instructor; course 10, 21, or 50, Spanish 3 or equivalent. May be repeated for credit. [P/NP grading only.]— I, II, III. (II., III., IV.)

194HA-194HB-194HC. Senior Honors Research Project (2-5)
Independent study—6-15 hours. Prerequisite: senior standing in Chicana/o Studies major. Student is required to read, research, and write Honors Thesis on Chicana/o Studies topics. (Deferred grading only, pending completion of sequence.)

198. Directing Projects Study (1-5)
Prerequisite: upper division standing and consent of Program Chairperson. [P/NP grading only.]

1985. Directed Group Study (1-5)
Prerequisite: consent of instructor. [P/NP grading only.]

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: upper division standing and consent of Program Chairperson. [P/NP grading only.]

1995. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. [P/NP grading only.]

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer. 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Social-Cultural Diversity; Wri—Writing Experience

Chicana/Chicano Studies 181
Child Development (A Graduate Group)

Lawrence V. Harper, Ph.D., Chairperson of the Group

Group Office, 1337 Hart Hall (530) 754-4109; http://humandevelopment.ucdavis.edu/

Faculty

Thomas F. Anders, M.D., Professor Emeritus (Psychiatry)
Brenda K. Bryant, Ph.D., Professor (Human and Community Development)
Zhe Chen, Ph.D., Professor (Human and Community Development)
Katherine J. Conger, Ph.D., Assistant Professor (Human and Community Development)
Rand Conger, Ph.D., Professor (Human and Community Development)
Kathryn G. Dewey, Ph.D., Professor (Nutrition)
Emilio Ferrer, Ph.D., Assistant Professor (Psychology)
Lorena Garcia, M.P.H. Dr.P.H., Assistant Professor (Chicano Studies)
Beth Goodkind-Jones, Ph.D., Associate Professor (Psychiatry)
Gail Goodman, Ph.D., Professor (Psychology)
Randi Hageman, M.D., Director (M.I.N.D. Institute)
Robin L. Hansen, M.D., Associate Professor (Pediatrics)
Michelle Hardee, Ph.D., Professor (Human and Community Development)
Christine McClelland, Ph.D., Professor (Human and Community Development)
Penelope Knap, M.D., Professor (Psychiatry)
Rosemarie Kraft, Ph.D., Lecturer SE (Human and Community Development)
Anne Mysterious, Ph.D., Assistant Adjunct Professor (Human and Community Development)
Katherine Masyn, Ph.D., Assistant Professor (Human and Community Development)
Elizabeth Miller, M.D., Ph.D., Assistant Professor (Pediatrics)
Lisa Miller, Ph.D., Associate Professor (Human and Community Development)
Adrienne Nishina, Ph.D., Assistant Professor (Human and Community Development)
Lisa Oakes, Ph.D., Professor (Psychology)
Beth A. Ober, Ph.D., Professor (Human and Community Development)

Lenna Ontai, Ph.D., Assistant Extension Specialist (Human and Community Development)
Richard Pasco, Ph.D., Extension Specialist (Human and Community Development)
Susan Rivera, Ph.D., Assistant Professor (Psychology)
Richard W. Robins, Ph.D., Professor (Psychology)
Sally Rogers, Ph.D., Professor (Psychology)
Julie Schweitzer, Ph.D., Associate Professor (Psychiatry)
Philip Skovron, Ph.D., Professor (Psychology)
Ross A. Thompson, Ph.D., Professor (Psychology)
Susan Timmer, Ph.D., Clinical Specialist (Pediatrics)
Anthony Urquiza, Ph.D., Associate Professor (Pediatrics)
Karen Watson-Gegge, Ph.D., Professor (Education)

Graduate Adviser: Contact Group Office.

Chinese

See Asian American Studies, on page 159; East Asian Languages and Cultures, on page 204; and East Asian Studies, on page 207.

Classics

[College of Letters and Science]

David A. Traill, Ph.D., Program Director

Department Office, Spanish and Classics, 610 Sproul Hall; (530) 752-0835; http://classics.ucdavis.edu/

Faculty

Emily Albu, Ph.D., Associate Professor
Lynn E. Roller, Ph.D., Professor (Art History)
Seth L. Schein, Ph.D., Professor (Comparative Literature)
Rex Stem, Ph.D., Assistant Professor
David A. Traill, Ph.D., Professor

Emeriti Faculty

Wesley E. Thompson, Ph.D., Professor Emeritus

Affiliated Faculty

Patricia Bulman, Ph.D., Lecturer
John Kuhn, Ph.D., Lecturer

The Major Program

Classical Civilization is an interdisciplinary major that examines the ancient Mediterranean cultures of Greece, Rome and the Near East, with courses offered on the languages, history, literature, religion, myth, art, and archaeology of these societies, their achievements in rhetoric and philosophy, and their political and social institutions. Minor programs in Classical Civilization, Greek, and Latin, and many General Education courses are offered also.

The Program. The major has two tracks: (1) Classical and Mediterranean Civilizations, and (2) Classical Languages and Literatures. The core of both major tracks consists of two years of Latin, Greek or Hebrew, the introductory sequence on the ancient Mediterranean world (Classics 1, 2, 3), the advanced seminar (Classics 190), and a number of electives. The Classical and Mediterranean Civilization track allows students to choose their electives from a broadly balanced program in history, archaeology, literature, philosophy and rhetoric. The Classical Languages and Literatures track focuses more intensively on language and literature, requiring the study of two languages and allowing fewer electives. Students planning to go on to graduate work in Classics should take Track 2 and study as much Latin and Greek as possible. They should make a point of talking to an advisor early in their undergraduate program. They are also advised to acquire a reading knowledge of French or German.

Career Opportunities. A degree in Classical Civilization represents a solid liberal arts education that provides an excellent foundation for a wide variety of careers. In the last twenty-five years, many majors have applied to Law or Medical School and practically all have been accepted. Additional career options include library and museum work, teaching, journalism, and graduate study in Classics, art, archaeology, history, literature, philosophy, and religion.

Classical Civilization

A. Major Requirements:

UNITs

Classical and Mediterranean Civilizations track

Preparatory Subject Matter............. 26-27
Latin 1-2-3, or Greek 1-2-3, or Hebrew 1-2-3.... 15
Two courses from Classics 1, 2, 3........... 8
One additional course from: Art History 1A; Classics courses 1 through 50 (except 30 and 31); Comparative Literature 1; Philosophy 21; Religious Studies 21, 40................. 34

Depth Subject Matter................. 40
Upper division courses in Latin, Greek or Hebrew........................................... 12
Six additional courses selected from at least three of the following groups........ 24
Of these 24 units, at least 12 must be in Latin, Greek, Hebrew, or Classics, and one course must be selected from group (a).

(a) Literature and Rhetoric:
Additional upper division courses in Latin, Greek and Hebrew: Classics 102, 110, 140, 141, 142, 143

(b) History:
History 102A, 111A, 111B, 111C; Religious Studies 102, 125

(c) Art and Archaeology:
Classics 171, 172A, 172B, 173, 174, 175

(d) Philosophy and Religion:
Classics 150, Philosophy 143, 160, 161, 162; Political Science 118A; Religious Studies 141A, 141B, 141C

Total Units for the Major............. 66-67

Classical Languages and Literatures track

Preparatory Subject Matter............. 34
Two of the following sequences: Latin 1-2-3, Greek 1-2-3; Hebrew 1-2-3............. 30
Classics 1, 2, or 3........................ 4

Depth Subject Matter................. 36
Six upper division courses in the two chosen languages, with at least two courses in each language -...................... 24
Classes 190 ......................................... 4
Two additional courses selected from any of the following groups: 8
(a) Literature and Rhetoric: Additional upper division courses in Latin, Greek, Hebrew; Classics 102, 110, 140, 141, 142, 143
(b) History: History 102A, 111A, 111B, 111C; Religious Studies 102, 125
(c) Art and Archaeology: Classics 171, 172A, 172B, 173, 174, 175
(d) Philosophy and Religion: Classics 150; Philosophy 143, 160, 161, 162; Political Science 118A; Religious Studies 141A, 141B, 141C

Total Units for the Major .......................... 70
Major Advisers: E.M. Albu, P.A. Bulman, D.A. Trail

Minor Program Requirements:
The Department offers minors in Classical Civilization, Greek and Latin for those wishing to follow a shorter but formally recognized program of study in Classics.

UNITS

Classical Civilization ................................ 20
Classics 1, 2, or 3..................................... 4
One upper division course in Latin or Greek. 4
Two additional upper division courses in Classics, Latin, or Greek. 8
One additional upper division course selected from any of the groups (a) through (d) in the Classical Civilization major. 4

Greek .................................................. 20
Classics 1 or 2........................................ 4
Three upper division courses in Greek. 12
One additional upper division course in Classics, Latin, or Greek. 4

Latin ............................................... 20
Classics 3 ........................................... 4
Three upper division courses in Latin. 12
One additional upper division course in Classics, Latin, or Greek. 4

Honors Program. Candidates for high or highest honors in Classical Civilization must write a senior honors thesis under the direction of a faculty member in Classics. Potential candidates for the honors program must enroll in Classics 194HA and 194HB normally during the first two quarters of the senior year. Enrollment is limited to upper division students with a minimum of 135 units, and a 3.50 grade point average in courses in the Classical Civilization major. For further information, students should consult with the major adviser or program director. The requirements for the honors program are in addition to the regular requirements for the major in Classical Civilization.

Graduate Study. The Department offers a master’s degree in Classics with emphasis on either Greek or Latin; however, admission into the graduate program has been suspended.

Prerequisite credit. Credit will not normally be given for a lower division course in Latin or Greek if it is the prerequisite of a course already successfully completed. Exceptions can be made by the Program Director only.

Courses in Classics (CLA)

Lower Division Courses

Lecture—3 hours; term paper. Introduction to the literature, art, and social and political institutions of ancient Mesopotamia, Egypt, Palestine, and early Greece from 3000 to 500 B.C.E. GE credit: ArtHum, Wrt.—(II.) Bulman

2. Ancient Greece and the Near East: 500 to 146 B.C.E. (4)
Lecture—3 hours; term paper. Introduction to the literature, art, and thought and the political and social institutions and values of Greece and its eastern Mediterranean neighbors—the Persians, Egyptians, and (III) Judeans. GE credit: ArtHum, Wrt.—(II.) Traill

3. Rome and the Mediterranean: 800 B.C.E. to 500 C.E. (4)
Lecture—3 hours; discussion—1 hour. Introduction to the history, literature, material culture, political and social institutions, and values and Romanization, with an emphasis on the development of the Roman Empire and the interactions of Roman culture with other Mediterranean cultures. GE credit: ArtHum. — III. (III) Stem

10. Greek, Roman, and Near Eastern Mythology (3)
Lecture—3 hours. Examination of major myths of Greece, Rome, and the Ancient Near East; their place in the religion, literature and art of the societies that produced them; their subsequent development, influence and interpretation. GE credit: ArtHum. — I. I, II, III. (I, II, III) Rundin, Stem, Traill

15. Women in Classical Antiquity (4)
Lecture—3 hours; term paper. Lives and roles of women in ancient Greece and Rome. Readings from history, philosophy, medical and legal documents, literature and myth. GE credit: ArtHum, Div, Wrt.—III. (III)

20. Pompeii AD 79 (4)
Lecture—3 hours; term paper. Roman life in an urban community at the time of the eruption of Vesuvius. Slide presentations of the archeological evidence will be supplemented by readings from Petronius’ Satyricon and other ancient authors. Offered in alternate years. GE credit: ArtHum, Wrt.—Traill

30. Greek and Latin Elements in English Vocabulary (3)
Lecture—3 hours. Knowledge of Latin and Greek not required. Elements of Greek and Latin vocabulary for increased understanding of English word formation and improved ability to understand and retain unfamiliar words. Emphasis on Greek and Latin elements rather than other languages not neglected. —III. (III) Albu, Bulman

31. Greek and Latin Elements in Technical Vocabulary (3)
Lecture—3 hours. Knowledge of Latin and Greek not required. Elements of Greek and Latin vocabulary to increase understanding of English word formation in medical, scientific and technical terminology and improve ability to understand and retain unfamiliar terms.

50. The Rise of Science in Ancient Greece (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1, 2, 10, 15, or Anthropology 3 recommended. Architectural monuments of the ancient Near East, including Egypt and Mesopotamia, and of Greece and Crete during the Bronze Age. Special emphasis on the problems of state formation and on the coexistence and collapse of Bronze Age societies. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—Roller

51. Greek and Roman Art and Architecture (4)
Lecture—3 hours; term paper. Examination of the origin and development of the major monuments of Greek art and architecture from the eighth century to the mid-fifth century B.C. Not open for credit to students who have completed Art History 154A. (Same course as Art History 172A.) Offered in alternate years. GE credit: ArtHum, Wrt.—Roller

172A. Early Greek Art and Architecture (4)
Lecture—3 hours; term paper. Study of the art and architecture of early Classical and Hellenistic Greece, from the mid-fifth century to the first century B.C. Not open for credit to students who have completed Art History 154B. (Same course as Art History 172B.) Offered in alternate years. GE credit: ArtHum, Wrt.—(II) Roller

173. Roman Art and Architecture (4)
Lecture—3 hours; term paper. The art and architecture of Rome and the Roman Empire, from the founding of Rome through the fourth century C.E. Not open for credit to students who have completed Art History 155. (Same course as Art History 172C.) Offered in alternate years. GE credit: ArtHum, Wrt.—(II) Roller

174. Greek Religion and Society (4)
Lecture—3 hours; term paper. Prerequisite: a lower division Classics course 3, 20, 30, or 31. Cults, festivals, and rituals of Greek religious practice and their relationship to Greek social and
political institutions, and to Greek private life.
Includes discussion of major sanctuaries at Olympia, Delphi, Athens, and others. Offered in alternate years. GE credit: ArtHum, Wrt.—Roller

175. Architecture and Urbanism in Mediterranean Antiquity (4)
Lecture—5 hours; extended reading, writing. Prerequisite: a lower division course (except 30, 31); Art History 1A recommended. Architecture and urban development in the ancient Near East, Greece, and Rome. Special emphasis on the social structure of the ancient city as expressed in its architecture, and on the interaction between local traditions and the impact of Greco-Roman urbanism. (Same course as Art History 175.) Offered in alternate years. GE credit: ArtHum, Div. Wrt.—II. [J] Roller

190. Senior Seminar (4)
Seminar—3 hours, term paper. Prerequisite: completion of one upper division course in Latin, Greek, or Hebrew or consent of instructor. Advanced interdisciplinary study of a problem in the ancient Mediterranean world using the techniques of history, archaeology, art history and philology. May be repeated for credit with consent of instructor. GE credit: ArtHum, Wrt.—I.

194HA-194HB. Special Study for Honors Students (3-3)
Discussion—1 hour, independent study; term paper. Prerequisite: admission to honors program and consent of faculty member supervising honors thesis. Directed reading, research and writing culminating in the completion of a senior honors thesis under the direction of faculty adviser. (Deferred grading only, pending completion of sequence: P/NP grading only—II, IIIII.

197TC. Community Tutoring in Classical Languages (1-5)
Tutoring—1-5 hours. Prerequisite: consent of instructor. Supervised instruction of Greek or Latin in nearby schools qualified students in department. May be repeated for credit up to 5 units. (P/NP grading only)

198. Directed Group Study (1-5)
Prerequisite: upper division standing. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only)

Graduate Courses

200A. Approaches to the Classical Past (4)
Seminar—3 hours, term paper. Survey of major areas of classical scholarship, with special emphasis on the continuing impact of Mediterranean antiquity on later literature, history, art, and culture. Offered in alternate years. —[II] Abul, Trail

200B. Approaches to the Classical Past (4)
Seminar—3 hours, term paper. Survey of major contemporary areas of classical scholarship with special attention devoted to current problems in literary and textual criticism. —Trail

201. Introduction to Classical Philology (4)
Seminar—3 hours, term paper. Survey of major contemporary areas of classical scholarship with special emphasis devoted to current problems in literary and textual criticism. —Trail

202. Homer (4)
Seminar—3 hours, term paper. Readings in the Iliad and Odyssey: the origins and transmission of the poems.

203. Vergil (4)
Seminar—3 hours, term paper. Reading of selected books of the Eclogues, Georgics, and Aeneid. Emphasis will be placed on the study of Vergilian poetic language. —Trail

204. Greek and Roman Comedy (4)
Seminar—3 hours, term paper. Historical and critical problems in Aristophanes or New Comedy. May be repeated for credit.

205. Latin Lyric and Elegy (4)
Seminar—3 hours, term paper. Critical examination of the works of Catullus, Horace, or Propertius. May be repeated for credit. —Trail

206. Greek Historiography (4)
Seminar—3 hours, term paper. Development of historical writing in Greece. May be repeated for credit.

207. Greek Drama (4)
Seminar—3 hours, term paper. Literary and philosophical analysis of the plays of Euripides, Sophocles, or Aeschylus. May be repeated for credit.

299. Research (1-12)
Prerequisite: consent of instructor. [S/U grading only]

Courses in Greek (GRK)

Lower Division Courses

1. Elementary Greek (5)
Lecture—5 hours. Introduction to the basic grammar and vocabulary of Classical and New Testament Greek. Development of translation skills with emphasis on Greek-English. [Students who have successfully completed Greek 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student’s P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.]—II. [I] Bulman

2. Elementary Greek (5)
Lecture—5 hours. Prerequisite: course 1. Continuation of course 1—II. [II] Bulman

2NT. Elementary New Testament Greek (1)
Lecture—1 hour. Prerequisite: course 2 (concurrent). Supplementary study of New Testament Greek. —II. [II] Bulman

3. Intermediate Greek (5)
Lecture—5 hours. Prerequisite: course 2. Continuation of course 2. Selected readings from Greek authors. —III. [III] Bulman

3NT. Elementary New Testament Greek (1)
Lecture—1 hour. Prerequisite: course 3 (concurrent). Supplementary study of New Testament Greek. —III. [III] Bulman

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

Upper Division Courses

100N. Readings in Greek Prose (4)
Lecture—3 hours, recitation—1 hour. Prerequisite: course 3. Selected readings from pagan and Christian sources. May be repeated for credit with consent of instructor. GE credit: ArtHum, Wrt.—I. [I] Rundin

101. Plato (4)
Lecture—3 hours, term paper. Prerequisite: course 3. GE credit: ArtHum, Wrt.—II. [II] Trail

102. Euripides (4)
Lecture—3 hours, term paper. Prerequisite: course 101. GE credit: ArtHum, Wrt.—III. [III] Bulman

103A. Homer: Iliad (4)
Recitation—3 hours, term paper. Prerequisite: course 3. GE credit: ArtHum, Wrt.—II. [II] Schein, Trail

103B. Homer: Odyssey (4)
Recitation—3 hours, term paper. Prerequisite: course 3. GE credit: ArtHum, Wrt.—II. [II] Schein, Trail

104. Menander (4)
Lecture—3 hours, term paper. Prerequisite: course 3. GE credit: ArtHum, Wrt.

105N. Attic Orators (4)
Lecture—3 hours, term paper. Prerequisite: course 3. Selected readings from the orators of 4th and 5th century Athens. May be repeated for credit with consent of instructor. Offered in alternate years. GE credit: ArtHum, Wrt.

111. Sophocles (4)
Lecture—3 hours, term paper. Prerequisite: course 103. GE credit: ArtHum, Wrt.

112. Aristophanes (4)
Lecture—3 hours, term paper. Prerequisite: course 103. GE credit: ArtHum, Wrt.

113. Thucydides (4)
Lecture—3 hours, term paper. Prerequisite: course 103. Offered in alternate years. GE credit: ArtHum, Wrt.—Roller

114. Lyric Poetry (4)
Lecture—3 hours, term paper. Prerequisite: course 103. Offered in alternate years. GE credit: ArtHum, Wrt.

115. Aeschylus (4)
Lecture—3 hours, term paper. Prerequisite: course 103. Offered in alternate years. GE credit: ArtHum, Wrt.—Schein

116. Herodotus (4)
Lecture—3 hours, term paper. Prerequisite: course 103. Offered in alternate years. GE credit: ArtHum, Wrt.—Trail

198. Directed Group Study (1-5)
(P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)

Courses in Latin (LAT)

Lower Division Courses

1. Elementary Latin (5)
Lecture—5 hours. Introduction to basic grammar and vocabulary and development of translation skills with emphasis on Latin to English. [Students who have successfully completed Latin 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student’s P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.]—I. [I] Bulman, Rundin

2. Elementary Latin (5)
Lecture—5 hours. Prerequisite: course 1. Continuation of course 1—II. [II] Bulman

3. Intermediate Latin (5)
Lecture—5 hours. Prerequisite: course 2. Continuation of course 2. Selected readings from Latin authors. —III. [III] Rundin

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

Upper Division Courses

100N. Readings in Latin Prose (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3. Review of basic forms, grammar, and vocabulary. Readings in prose authors, including Julius Caesar. Not open for credit to students who have completed course 110. GE credit: ArtHum, Wrt.—I. [I] Trail

101. Livy (4)
Lecture—3 hours, term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt.—II. [II] Stern

102. Roman Comedy (5)
Lecture—4 hours, term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt.—II. [II] Albu

103. Vergil: Aeneid (4)
Lecture—3 hours, term paper. Prerequisite: course 3. Offered in alternate years. GE credit: ArtHum, Wrt.—II. Trail, Albu

Quarter Offered: I—Fall, II—Winter, III—Spring, IV—Summer; 2009-2010 offering in parentheses

Clinical Nutrition

Clinical Nutrition and Metabolism

See Internal Medicine (IMD), on page 384.

Clinical Psychology

See Medicine, School of, on page 367.

Clinical Research (A Graduate Group)

Frederick J. Meyers, M.D., Chairperson of the Group

Group Office: CBISP, 1451, 2921 Stockton Blvd., Sacramento, CA 95817; (916) 703-9110

Faculty

Timothy Albertson, M.D., Ph.D. (Internal Medicine: Pulmonary and Critical Care Medicine)

Laurel Beckett, Ph.D. (Public Health Sciences)

Iars Berglund, M.D., Ph.D. (Internal Medicine: Endocrinology, Clinical Nutrition, and Vascular Medicine)

Richard Bold, M.D. (Surgery: Oncology)

Cameron Carter, MMBS (Psychiatry and Behavioral Sciences)

Fitz-Roy Curry, Ph.D. (Psychology and Physiology/Behavioral Sciences)

Charles DeCarli, M.D., (Neurology)

Ralph deVere White, M.D., (Urology)

Jose Galvez, M.D. (Pathology & Laboratory Medicine)

Randi Hagerman, M.D. (Pediatrics)

R. J. Hinton, M.D. (Psychiatry and Behavioral Sciences)

R. M. Joaid, M.D. (Pediatrics: Pulmonary)

Richard Kravitz, M.D., MSPH (Internal Medicine: Endocrinology, Clinical Nutrition, and Vascular Medicine)

Nancy Lane, M.D. (Internal Medicine: Geriatric Medicine)

Stephen Mc Curdy, M.D., MPH (Public Health Sciences)

Fred Meyers, M.D. (Internal Medicine: Hematology and Oncology)

David Pleasure, M.D. (Neurology)

Richard Paltard, M.D. (Internal Medicine: Infectious and Immunologic Diseases)

Claire Pomeroy, M.D., MBA (Internal Medicine: Infectious and Immunologic Diseases)

Peter Yelllowes, MBBS (Psychiatry and Behavioral Sciences)

Graduate Study. The Mentored Clinical Research Training Program (MCRT) is an interdisciplinary graduate group in clinical research with a Master of Advanced Study degree in Clinical Research. The MCRT provides a solid clinical/translational, patient-oriented research foundation for junior faculty, clinical and pre-clinical fellows, and post-doctoral scholars. The program centers around three core elements: didactic instruction, mentored research, and special experiences.

Mandatory course work includes biostatistics, epidemiology, patient-oriented research, health services research, data management / informatics, scientific communication, research management, responsible conduct of research and career development. The instruction includes a 12-week summer curriculum followed by a two-year core curriculum and electives that can be tailored to best meet each scholars career development needs.

Degree Offered. M.A.S. Plan II

Clinical Nutrition

[College of Agricultural and Environmental Sciences]

Faculty

See the Department of Nutrition, on page 427.

The Major Program

The Clinical Nutrition major provides students with training in normal and therapeutic nutrition, biological and social sciences, food science, communication, business management, and food service management. This major fulfills the academic requirements for admission into a dietetics internship or its equivalent, which must be completed before qualifying for registration as a dietician.

The Program. The Clinical Nutrition major (formerly Dietetics) includes the same basic core of nutrition classes as the Nutrition Science major, but includes additional courses such as food service management, education, sociology, and communication skills to prepare for work with the public. Clinical Nutrition students spend the first two years completing preparatory course work in the basic biological sciences, along with several of the social sciences. In the final two years, students take courses in normal and clinical nutrition, food science, biochemistry, and management techniques. Entering freshman or transfer students are assumed to have basic computer skills and to demonstrate mathematics competency adequate to pass the Pre-calculus Diagnostic Examination with a minimum score of 27, or have taken calculus at a community college or other four-year institution.

Career Alternatives. The Clinical Nutrition major qualifies students to apply for the American Dietetics Association "accredited internship," enabling them to become a Registered Dietitian, the professional credential necessary to work in a clinical setting. Once dietitians are registered, they generally seek employment in administrative, therapeutic, teaching, research, or public health/public service positions in clinics, hospitals, schools, or other similar institutions. There is a growing role for dietitians working in settings outside of the traditional hospital (for example, in state and federal nutrition programs, nutrition education, Peace Corps and Cooperative Extension Work). Students who complete the upper-graduate preparation in clinical nutrition are also qualified to enter graduate programs in dietetics, nutrition science, public health nutrition, and food service management.

B.S. Major Requirements:

<table>
<thead>
<tr>
<th>B.S. Major Requirements</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written/Oral Expression</td>
<td>8</td>
</tr>
<tr>
<td>English 3 or University Writing Program 1-2...</td>
<td>4</td>
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<tr>
<td>Communication 1 ...........................</td>
<td>4</td>
</tr>
<tr>
<td>Above courses simultaneously satisfy College requirement</td>
<td></td>
</tr>
<tr>
<td>Preparatory Subject Matter.................</td>
<td>47-48</td>
</tr>
<tr>
<td>Biological Sciences Sciences [1A &amp; 1B] or</td>
<td></td>
</tr>
<tr>
<td>[2A &amp; 2B] ..................................</td>
<td>9-10</td>
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<tr>
<td>Chemistry 2A, 2B, 2A, 8A, 8B ................</td>
<td>21</td>
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<tr>
<td>Economics 1A or 1B ..........................</td>
<td>4</td>
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<tr>
<td>Psychology 1 ......................</td>
<td>4</td>
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<tr>
<td>Sociology 1 or 3 or Anthropology 2 .........</td>
<td>4-5</td>
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<tr>
<td>Statistics 13 ...............................</td>
<td>4</td>
</tr>
<tr>
<td>Breadth/General Education...............</td>
<td>6-24</td>
</tr>
<tr>
<td>Satisfaction of General Education requirement</td>
<td></td>
</tr>
<tr>
<td>Depth Subject Matter ....................</td>
<td>84</td>
</tr>
<tr>
<td>Agricultural and Resource Economics 112</td>
<td>4</td>
</tr>
<tr>
<td>Animal Biology 102 and 103 ...............</td>
<td>4</td>
</tr>
<tr>
<td>Biological Sciences 101 ..................</td>
<td>4</td>
</tr>
<tr>
<td>Food Science and Technology 100A, 100B, 101A, 101B, 108 ...</td>
<td>15</td>
</tr>
<tr>
<td>Food Service Management 120, 120L, 122 ..................</td>
<td>8</td>
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<tr>
<td>Food Science and Technology 104-104L ....</td>
<td>7</td>
</tr>
<tr>
<td>Neuropathology, Physiology, and Behavior 101, 101L .......</td>
<td>8</td>
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<tr>
<td>Additional upper division Nutrition electives ..........................</td>
<td>4</td>
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<tr>
<td>Unrestricted Electives ..................</td>
<td>16-35</td>
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<tr>
<td>Total Units for the Major ................</td>
<td>180</td>
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<tr>
<td>Major Adviser. A.J. Clifford (Nutrition)</td>
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<tr>
<td>Advising Center for the major is located in 3212 Meyer Hall (S30) 752-2512.</td>
<td></td>
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<tr>
<td>Graduate Study. See Graduate Studies, on page 104.</td>
<td></td>
</tr>
</tbody>
</table>

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer. 2009-2010 offering in parentheses.

General Education (GE) credit: ArtHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Social-Cultural Diversity; Wrt=Writing Experience
Communication

Requirements:
Candidates must meet the following minimum requirements:
Completed one of the following degrees:
High level of interest and potential to pursue innovative pre-clinical/translational or clinical research as a major focus of career plan, and a long-term goal of entering clinical research career.
Submission of an application: 2-4 page research proposal. Description of training plan with identified mentor. Curriculum vitae. Letters of support from the prospective mentor and Department Chair, and commitment of release time from the candidates' department chair or division chief is also required. Personal Interview.
Graduate Advisers. L. Berglund (School of Medicine, Endocrinology), K. Lloyd (School of Vet. Medicine, Anatomy/Physiology & Cell Biology), L. Becket (School of Medicine, Epidemiology & Preventive Medicine)

Communication

(College of Letters and Science)
Charles R. Berger, Chairperson of the Department
Department Office. 108 Sprout Hall; (330) 752-1222
Faculty
Robert A. Bell, Ph.D., Professor
Charles R. Berger, Ph.D., Professor
Jae-Ho Cho, Ph.D., Assistant Professor
Bo Feng, Ph. D., Assistant Professor
Mikayla Hughes, Ph.D., Assistant Professor
Myunsoo Hwang, Ph.D., Assistant Professor
Michael T. Molley, Ph.D., Professor
Nicholas A. Palamara, Ph.D., Assistant Professor
Laramie Taylor, Ph.D., Assistant Professor
Narine Yegian, Ph.D., Assistant Professor
Emeriti Faculty
Rina Alcalay, Ph.D., Professor Emerita
James J. Murphy, Ph.D., Professor Emeritus,
Academic Senate Distinguished Teaching Award
Ralph S. Pomera, Ph.D., Professor Emeritus
John L. Yohs, M.A., Senior Lecturer Emeritus
Affiliated Faculty
Virginia O. Hamilton, Ph.D., Lecturer
Catherine Puckering, M.A., Lecturer
Alisa Shubb, M.A., Lecturer
John Theobald, M.A., Lecturer
The Major Program
The major in communication focuses upon human symbolic behavior in interpersonal and mediated contexts.

The Program. The program of study in communication examines communication processes at several different levels of analysis. Courses dealing with communication at the individual, interpersonal, organizational and systemic levels of analysis are offered. Classes addressing such topics as communication and cognition, message systems, interpersonal communication, nonverbal communication, communication and persuasion, organizational communication, mass media effects and public communication campaigns explore communication at these levels of analysis. Related social science courses are also part of the major.

Preparatory Requirements. Before declaring a major in communication, students must complete the following courses with a combined grade point average of at least 2.500 at the University of California at least 3.000 GPA may be required for similar courses taken at community college. All courses must be taken for a letter grade.

Anthropology 4 or Linguistics 1. 1-4 units
Psychology 1. 1-4 units
Sociology 1. 5 units
Statistics 13. 4 units

Career Alternatives. Communication graduates have found careers in such fields as broadcast and print journalism, administration, sales, management, politics and government, education, social work, and public relations. A communication degree is also excellent preparation for law school or other graduate programs.

A.B. Major Requirements:

Preparatory Subject Matter

1. Introduction to Public Speaking
Lecture—1 hour; discussion—3 hours. Practice in the preparation and delivery of speeches based on contemporary principles and strategies of informing and persuading audiences. GE credit: Writ [cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously].—I, II, III

3. Interpersonal Communication Competence
Lecture—2 hours; discussion—2 hours. Communication in interpersonal contexts. Sender, receiver, and message variables, and their interaction with communication competence. Participation in simulations and experiential exercises. —I, II, III, IV

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

Upper Division Courses

101. Communication Theories (4)
Lecture/discussion—4 hours. Examination of the forms, functions, development, and testing of theory in the social sciences. Survey and comparison of significant micro and macro theories and models of human communication. Application of theories to real world problems. Not open for credit to students who have completed course 114. GE credit: SocSci. —I, II, III, F

102. Empirical Methods in Communication (4)
Lecture—4 hours. Prerequisite: course 101 or 114, Statistics 13 or the equivalents served by social scientific research methods commonly employed in the communication discipline. Topics include research design, measurement, sampling, questionnaire construction, survey research, experimental research, content analysis, and interaction analysis. Not open for credit to students who have completed course 115.—I, II, III

103. Gender Differences in Communication (4)
Lecture—4 hours. Prerequisite: upper division standing in Communication. Examination of communication differences between men and women as sources of male/female stereotypes, misunderstandings, dilemmas, and difficulties (real and imagined). Treatment of genders as cultures. Topics include male/female differences in discursive practices and patterns, language attitudes, and relationship dynamics. GE credit: SocSci. —I, II, Palamara

105. Semantic and Pragmatic Functions of Language (4)
Lecture—4 hours. Prerequisite: course 115. The role of language in shaping attitudes and perceptions of self and others. The use and abuse of verbal symbols in communicative situations. Concepts of meaning in discourse. GE credit: SocSci. —II, III, Hamilton

134. Interpersonal Communication (4)
Lecture—4 hours. Prerequisite: course 1 or 3, or the equivalent. Communication between two individuals in social and task settings. One-to-one communication, verbal and nonverbal, in developing relationships. Consideration of theory and research on relevant variables such as shyness, self-disclosure, reciprocity, games, and conflict. GE credit: SocSci. —I, II, III, Hughes, Molley

135. Nonverbal Communication (4)
Lecture—4 hours. Examination of the interaction between nonverbal communication and verbal communication channels in influencing outcomes in interpersonal and mass mediated communication contexts. Underlying functions served by nonverbal communication will also be considered. GE credit: SocSci, Div.—I, II, III, Berger

136. Organizational Communication (4)
Lecture—4 hours. examines communication in various organizational situations. Focuses on the use of effective communication strategies for achieving organizational and individual goals. Emphasis is placed on identifying and amending ineffective communication within organizations. GE credit: SocSci. —I, II, Hamilton

138. Communication and Cognition (4)
Lecture/discussion—4 hours. Prerequisite: upper division standing. Relationship between communication and cognition. Models of meaning, the influences of extension and production, the influence of language attitudes on social judgments, and the effects of information processing on decision making are explored. GE credit: SocSci. —I, II, III, Shubb

140. The Media Industry (4)
Lecture/discussion—4 hours. Examines the economic, social, and political forces that shape media content. Topics include the historical evolution of the
print and broadcast media; emerging technologies, including the Internet and interactive media; and the global influence of the Internet; patterns of media ownership. GE credit: SocSci—I, II, III. Theobald

141. Media Effects: Theory and Research (4)
Lecture/discussion—4 hours. Prerequisite: course 115 or the equivalent; course 140 recommended. Social scientific studies of the effects of mass media messages on audience members’ actions, attitudes, beliefs, and emotions. Topics include the cognitive processing of messages, television violence, political socialization, cultivation of beliefs, agenda-setting, and the impact of new technologies. GE credit: SocSci—I, II, III. Hwang, Taylor

Lecture—4 hours. Exploration of processes and constraints in the gathering, editing, and reporting of news. Examination of studies on the effects of news, contemporary challenges to news reporting presented by new technologies, and the relationship of news to other social institutions. GE credit: SocSci.—I, II, III. Cho

143. Analysis of Media Messages (4)
Lecture—1 hour; discussion—2 hours; term paper. Prerequisite: course 112, 114, 115, and 141 recommended. Examination of alternative approaches to the analysis, interpretation, and evaluation of media messages, including those disseminated through broadcasting, print, and new technologies. Both content analytic and interpretive approaches covered. GE credit: SocSci. Wrt.—I, II, III. Theobald

144. Media Entertainment (4)
Lecture/discussion—4 hours. Prerequisite: course 102; course 141 recommended. Effects and appeal of media entertainment, emphasizing emotional reactions. Topics include key concepts of entertainment research such as mood management, and the respective features and emotional/social-psychological effects of genres such as comedy, mystery, thriller, sports, music, horror, and erotica. GE credit: SocSci.—I, II, III. Taylor

146. Communication Campaigns (4)
Lecture/discussion—3 hours; term paper. Strategic uses of media and interpersonal communication channels in health, environmental advocacy, and political campaigns. Emphasis is on general principles relevant to most campaign types, including public information, social marketing, and media advocacy campaigns. Not open for credit to students who have completed course 160. GE credit: SocSci.—I, II, III. Hughes

152. Theories of Persuasion (4)
Lecture—4 hours. Prerequisite: course 115. Survey of communication and social psychological theories of persuasion. Examination of influence tactics and message strategies in product advertising, propaganda campaigns, and health promotion. GE credit: SocSci.—I, II, III. Bell, Hughes

163. Media and Health (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 115 or the equivalent. Content and effects of messages in news, entertainment, and advertising. Topics include health news reporting, portrayals of disease, disability, death and health-related behaviors; representations of health professionals; promotion of drugs and other health products; tobacco and alcohol advertising. GE credit: SocSci.—I, II, III. Bell, Hughes

170. Communication, Technology, and Society (4)
Lecture/discussion—4 hours. Prerequisite: course 114, 115, and upper division standing. Survey of how communication technologies transform our lives at the individual and society levels. Topics include human-computer interaction; the effects of communication technologies in education, health and business; and social and political implications of technological development. GE credit: SocSci.—I, II. Theobald

172. Computer-Mediated Communication (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101 and 102. Uses and impacts of computer-mediated communication. Theories and research findings pertaining to how computer-mediated interaction affects various interpersonal behaviors, including impression formation, development of personal relationships, group decision making, collaborative work, and community building. GE credit: SocSci.—I, II, III. Hwang, Taylor

180. Current Topics in Communication (4)
Seminar—4 hours. Prerequisite: upper division standing with a major in Communication or consent of instructor. Group study of a special topic in communication. May be repeated once for credit. Enrollment limited.

189A. Proseminar in Social Interaction (3)
Seminar—3 hours; term paper. Prerequisite: course 114 and 115. Reading, discussion, research, and writing on a selected topic in the specialty of mass communication. Potential topics include relationship initiation, maintenance, and deterioration; communication failure; nonverbal communication; conversational management; semantics and pragmatics of language; and sexual communication. May be repeated for credit when topic differs. Offered in alternate years. GE credit: SocSci. Wrt.—II, III.

189B. Proseminar in Mass Communication (4)
Seminar—3 hours; term paper. Prerequisite: course 114 and 115. Reading, discussion, research, and writing on a selected topic in the specialty of mass communication. Potential topics include agenda-setting, the cultivation of beliefs, television violence, media portrayals of underprivileged groups, mediated political discourse, interactive technologies, and international/global communications. May be repeated for credit when topic differs. Offered in alternate years. GE credit: SocSci. Wrt.—II, III.

189C. Proseminar in Health Communication (4)
Seminar—3 hours; term paper. Prerequisite: course 114 and 115. Reading, discussion, research, and writing on a selected topic in health communication. Potential topics include health communication design and evaluation, media advocacy, physician-patient interaction, uses of communication technologies in health settings, and health-related advertising. May be repeated for credit when topic differs. Offered in alternate years. GE credit: SocSci. Wrt.—II, III.

189D. Proseminar in Organizational Communication (4)
Seminar—3 hours; term paper. Prerequisite: course 114 and 115. Reading, discussion, research, and writing on a selected topic in the specialty of organizational communication. Potential topics include power and influence, organizational conflict and its resolution, mediation, bargaining and negotiation, superior-subordinate interaction, leadership styles, and inter-organizational communication. May be repeated for credit when topic differs. Offered in alternate years. GE credit: SocSci. Wrt.

192. Internship in Communication (1-6)
Internship—3-18 hours. Prerequisite: completion of courses 114 and 115. Communication major who has completed 20 units of upper division communication courses. Supervised work experience requiring the application of communication principles and strategies, or the evaluation of communication practices in a professional setting. Relevant experiences include public relations, advertising, sales, human resources, health promotion, political campaigns, journalism, and broadcasting. May be repeated up to 6 units of credit. (P/NP grading only.)

194H. Senior Honors Thesis (4)
Seminar—1 hour; individual tutoring on research project—3 hours; term paper. Prerequisite standing and approval by Honors Committee. Directed reading, research, and writing culminating in the preparation of honors thesis under direction of faculty adviser.

197T. Tutoring in Communication (2-4)
Seminar—1 hour; laboratory—1-2 hours. Prerequisite: upper division standing with major in Communication and consent of Department Chairperson. Tutoring in undergraduate Communication courses, including leadership of discussion groups affiliated with departmental courses. May be repeated for credit up to a total of six units. (P/NP grading only)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)

Graduate Courses

201. Theoretical Perspectives on Strategic Communication (4)
Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. Explores the intentional use of discourse and nonverbal behavior to reach goals. Explores theories and models that elucidate the processes that enable the realization of intentions in message plans and discourse. GE credit: SocSci.—I. (I.) Berger

202. Communication Theory Construction (4)
Seminar—4 hours. Prerequisite: consent of instructor; graduate standing. Alternative meta-theoretical perspectives for theory generation in communication inquiry. Processes of construct explication, operationalization and theory construction. Emphasis on the critique of extant communication theories and the development of theory construction skills. Not offered every year. (II.) Berger

210. Evaluation of Communication Effects (4)
Lecture—4 hours. Prerequisite: graduate standing; one course in Inferential Statistics; consent of instructor. Research methods for understanding communication effects, including the outcomes of communication interventions. Issues to be examined include measurement, experimental and quasi-experimental design, and evaluation research. GE credit: SocSci.—I. (I.) Molley, Palomares

211. Audience Assessment and Analysis (4)
Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. Interdisciplinary perspectives on the “audience” concept. Methodological approaches to audience segmentation based on demographics and geodemographics, psychographics, audience needs and assessments, and value and normative and summative research methods for assessing audience attitudes, values, beliefs and behaviors. GE credit: SocSci.—I. (I.) Cho, Taylor

220. Persuasion Theories and Message Design (4)
Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. Major social scientific theories and perspectives on attitude change and persuasion. Application of classical persuasion theories and principles to persuasive message design in applied contexts. GE credit: SocSci.—II. (III.) Hughes

221. Communication and Cognition (4)
Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. Explores the cognitive structures and processes that enable the production, comprehension and interpretation of messages in face-to-face and mediated communication contexts. Explores the communication outcomes associated with these processes in the material years. GE credit: SocSci.—II. (III.) Berger, Yegiyan

222. Risk Communication (4)
Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. Theories and models of individual risk information processing. Media depictions of threats and risk-related information and their potential effects on audiences. Implications for the design and implementation of messages concerning threat and risk. Not offered every year. Berger
281. Special Topics in Mediated Communication (4)
Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. Reading, discussion, research, and writing on a selected topic in the speciality of mediated communication. May be repeated for credit when topic differs. Not offered every year. — Cho, Hwang, Taylor, Yejiyan

282. Special Topics in Health Communication (4)
Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. Reading, discussion, research, and writing on a focused topic in health communication. May be repeated for credit when topic differs. [Same course as Epidemiology and Preventive Medicine 282]. Not offered every year. — Bell

283. Special Topics in Organizational Communication (4)
Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. Reading, discussion, research, and writing on a selected topic in the speciality of organizational communication. May be repeated for credit when topic differs. Not offered every year.

298. Group Study (1-5)
Lecture—3 hours. (S/U grading only.)

299. Individual Study (1-12)
(S/U grading only)

299B. Thesis Research (1-12)
Independent study—3-36 hours. Prerequisite: graduate standing in Communication. (S/U grading only)

Professional Course
396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)

Community and Regional Development

[College of Agricultural and Environmental Sciences]
Faculty. See the Department of Human and Community Development, on page 323.

The Major Program
The Community and Regional Development major (formerly Applied Behavioral Sciences) aims to provide a broad comparative understanding of theories, methodologies, and research relevant to the study of communities and the people in them. The program focuses on the ways that economic, political and socio-cultural forces are transforming regions and local communities, and it considers how knowledge can be used to improve the quality of community life.

The Program. Principal subjects of study within the major are community and organizational development, social change processes, the role of culture and ethnicity in shaping community life, community research methodologies, the impacts of innovation and technology on community development, and the effects of social, economic and political systems on communities. The program is organized to allow students to develop fields of concentration that meet their career goals.

Internships and Career Alternatives. Community and Regional Development students are required to complete an internship in their field before graduation. Internships have been arranged with local, county, and state planning units, health departments, schools, housing offices, and community education programs. Career Development Center staff assist students in securing internships. New Career Development Center graduates are prepared for occupations in community development, social research, program evaluation, organizational and educational consulting, city and regional planning, and for-profit organizations. The major also provides effective preparation for graduate or professional study in the social and behavioral sciences, or for professional degrees.

B.S. Major Requirements:

**UNITS**

**English Composition Requirement**
4-12
One course from English 3, University Writing Program 1, 3, 18, 19, 101, 104, 104A, 104B, 104C, 104D, or 104E

**Additional course from above or:**
Comparative Literature 1, 2, 3, 4, Native American Studies 5 or Communication 1, University Writing Program 102

**Additional course from University Writing Program 101, 102 104A, 104B, 104C, 104D, or 104E**

**Preparatory Subject Matter**
22-25
Community and Regional Development
1, 2

Agricultural Systems and Environment 21 or Computer Science 192. Engineering (GE) credit: 3-4
Economics 1A or 1B
Anthropology 2 or Sociology 1
Statistics 13 or Sociology 468

**Breadth/General Education Requirement**
24
Satisfaction of General Education requirement.

**Depth Subject Matter**
40
Two courses from Community and Regional Development 151, 151L, 160, 161, or 168

Two courses from Community and Regional Development 140, 142, 152, 153A, or 153B.

Community and Regional Development 154, 157, 158, or 171

Two courses from Community and Regional Development 164, 172, 173, or 174

Two courses from Community and Regional Development 118, 141, 156, or 162, or International Agricultural Development 103

Internship: Community and Regional Development

**Areas of Specialization**
Take 20 units from each of two options or 40 units from one option. The Areas of Specialization must include two Community and Regional Development courses. Up to 4 units of variable-unit course work may be counted toward this requirement (e.g., Community and Regional Development 192).

**Community Groups Option**
40
Students must consult with a faculty adviser to identify an emphasis within the option and to select suitable courses.

Community and Regional Development 151, 152, 153, 154, 157, 160, 161, 172, 176, American Studies 156, Human Development 103

African Americans: African American and African American Studies 100, 123, 130, 145A, Sociology 128, 129, 130, 134

Asian Americans: Asian American Studies 100, 110, 111, 120, 121, 131, 132, 140, Political Science 168


Youth: American Studies 152, Human Development 100A, 100B, 101, 102, 105, 130, 131, 140, 140E, 140S, 142, 151, Psychology 112, Sociology 122, 152

Aging: Community and International Health 180, Human Development 100C, 143, 160, 162, 191, Sociology 154

Gender: American Studies 152, Anthropology 130, Political Science 166, Psychology 114, Sociology 132, 133,
Policy

1458, Women’s Studies 103, 130, 140, 187
Specially Challenged Individuals: Education 115, Human Development 130, 131
Cross: Sociology 140, 185

Economic Development Option

Students must consult with a faculty adviser to identify an emphasis within the option and to select suitable courses.

Communication: Communication 114, 130, 136, 152, Community and Regional Development 173


Organization and Management Option

Students must consult with a faculty adviser to identify an emphasis within the option and to select suitable courses.

Administration: Community and Regional Development 157, 158, 168, Agricultural Economics 100A, 171A, Computer Science Engineering 167, Economics 104, 105, 115A, Political Science 100, 105, 142, 145, 153, 182, 183
Communication: Communication 114, 130, 134, 136, 140, 152, Community and Regional Development 173, 175, Educational Psychology 120, 126, 163
Human Resources: Community and Regional Development 151, 160, 161, 172, 176, Economics 151B, Food Service Management 140, Food Science 143, 144, 145, 183, Sociology 120, 128, 129
Management: Community and Regional Development 118, 140, 141, 154, 161, 162, 164, Agricultural Economics 112, 113, History 174A, Political Science 188, Sociology 138, 139, 158, 159, 180A, 180B

Policy and Planning Option

Students must consult with a faculty adviser to identify an emphasis within the option and to select suitable courses.

General: Community and Regional Development 118, 142, 151, 153, 154, 156, 160, 161, 162, 168, Environmental Science and Policy 165, Political Science 100, 103, 105, 108, 109, 142, 173, 183
Law and Policy: Sociology 120, 152, 155, Political Science 103, 105, 154, 155, 181, 182
Urban and Regional Planning: Community and Regional Development 140, 141, 152, 157, 158, 159, 171, Economics 115A, Environmental Planning and Management 110, 124, Environmental Science and Policy 171, 173, Geography 155, Political Science 100, 101, 102

Social Services Option

Students must consult with a faculty adviser to identify an emphasis within the option and to select suitable courses.

Community Health: Community and Regional Development 164, Community Health 101, Environmental Science and Policy 126, Psychology 160, Sociology 154
Aging: Community Health 180, Human Development 100C, 143, 160, 162
Counseling (Communication 134, 135, Education 160, 163, Human Development 121, 130, Psychology 143, 145, 168
Youth: American Studies 152, Human Development 100A, 100B, 101, 102, 103, 130, 131, 140, 140L, 141, 142, 151, Psychology 112, Sociology 122, 152
The Family: Human Development 110, Sociology 131, 134, 135
Education (Community and Regional Development 173, 175, Agricultural Education 100, 160, 163, Education 100, 110, 114, 120, Psychology 136, Sociology 124
Bilingual Education: Education 151, 152, 153, Psychology 132

Unrestricted Electives:

Total Units for the Degree: 180

Major Adviser: M. Wells

Advising Center for the major is located in 1303 Hart Hall (530) 752-2244

Minor Program Requirements:

The Community and Regional Development faculty offers the following minor program:

UNITs

Community Development

Community and Regional Development 1

Four courses selected from Community and Regional Development 140, 141, 142, 151 and 151L

Minor Adviser: M. Wells

Graduate Study. See Graduate Studies, on page 1104.

Related Courses. See Environmental Science and Policy 10, 101, 103.

Courses in Community and Regional Development (CRD)

Lower Division Courses

1. The Community (4)

Lecture—3 hours; discussion—1 hour. Basic concepts of community analysis and planned social change. The dynamics of community change through case studies of communities including peasant, urban ghetto, suburban mainline, and California farm workers. GE credit: SocSci, Div, Wrt.—I, II, III, (I, II, III) Tarallo, Marcolle

2. Ethnicity and American Communities (4)

Lecture—3 hours; discussion—1 hour. Historical and cultural survey of role of various ethnic groups in the development of American communities. Examines ethnicity as a cultural factor, ethnicity as power and issues related to selected American ethnic groups. GE credit: SocSci, Div, Wrt.—I, II, III, (I, II, III) Lipkin, Guarino

17. Population and Community: Issues in Human Ecology (4)

Lecture/discussion—4 hours. Dynamics and challenges of demographic changes in California and the world community, solutions as well as problems, implications for individuals, their possible contributions towards resolving global problems through community action. GE credit: SocSci, Div, Wrt.

Fieldwork—3.9 hours. Prerequisite: course 151L must be taken concurrently; course 1 and any upper division Community and Regional Development course are recommended. Focus on conducting community research using structural analytic, elite interviewing, ethnographic research, and other qualitative research methods. GE credit: SocSci, Div, Wrt.—II, III, Tarallo

Laboratory in Community Research and Analysis: Field Experience (1-3)

Fieldwork—3.9 hours. Prerequisite: course 151L concurrently. Field research focused on community or organizational issues and their resolution. Includes participation with local agencies or community-based organizations. Focus will be conducting community research using such methods as structural analysis, elite interviewing, ethnographic research, and comparative community studies. —II, III, Tarallo

Community Development (4)

Lecture—4 hours. Prerequisite: course 1 or 151, Sociology 2, Anthropology 2, Asian American Studies 100, Chicana/o Studies 132, Geography 5, or African American and African Studies 101 or consent of instructor. Introduction to principles and strategies of community organizing and development. Examination of non-profit organizations, citizen participation, approaches to reducing poverty, community needs assessment, and regional development strategies. GE credit: SocSci, Wrt.—II, III, Bradshaw

International Community Development: Asia (4)

Lecture—4 hours. Prerequisite: course 1, Anthropology 2, International Agricultural Development 10. Examination and analysis of community development efforts in Japan and the impact of global forces in different settings. Alternative strategies with
emphasis on self-reliance and locally controlled development. Course is based in Kyoto, Japan, and includes field trips. [S/U grading only.]—Fujimoto

1538. International Community Development: Europe (4)
Lecture—4 hours. Prerequisite: course 1 or 2, Anthropology 2, International Agricultural Development 10; course 164, equivalent recommended. Examination and analysis of community development efforts in Europe and the impact of global forces in different settings. Alternative strategies with emphasis on self-reliance and locally controlled development. Course is based in Freiburg, Germany, and includes field trips to France and Switzerland. GE credit: SocSci, Div.—Hirtz

154. Social Theory and Community Change (4)
Lecture—4 hours. Prerequisite: course 1, Sociology 1, or Anthropology 2. A comparative overview of the dominant social science paradigms for the study of community development change. Among the paradigms discussed are functionalism, conflict theory/ Marxism, structuralism, and methodological individualism. GE credit: SocSci, Div, Wrt.—II. [II.]—Brady

156. Community Economic Development (4)
Lecture—4 hours. Prerequisite: course 152 or consent of instructor. How government and community organizations help firms grow and create jobs through local and national development corporations, small business centers, revolving loan funds, incubators, and many other programs. Techniques to analyze community economic potential and identify a variety of appropriate intervention tools. Group project.—II. Bradshaw

157. Politics and Community Development (4)
Lecture—4 hours. Prerequisite: prior course work in sociology or political science recommended. Analyzes political, economic and socioeconomic factors shaping the form and function of local communities in the U.S. Considers theories of the state, the community and social change and case studies of actual community development in comparative historical perspective. GE credit: SocSci, Div, Wrt.—II. Smith

158. Small Community Governance (4)
Lecture/discussion—3 hours, fieldwork—3 hours. Prerequisite: course 151 or 152 or Political Science 100. Governing institutions and political processes in rural and small urban places. Local government organization, community autonomy, leadership, political change and development, and selected policy issues including public finance. Field research on political processes or policy issues in select communities. Offered in alternate years.—I. Campbell

160. Research Design and Method in Community Studies (4)
Lecture—4 hours. Prerequisite: course 1, Statistics 13 or the equivalent. Application of behavioral science research methodology to multidisciplinary problems confronting communities and community organizations. Focuses on design, sampling, measurement and analysis.—I. [I]—II. Smith

161. Ethnographic Research in America (4)
Lecture—3 hours, discussion—1 hour. Prerequisite: completion of 8 units of course work in Anthropology, Sociology, or Community and Regional Development. Methodologies, ethics and goals of qualitative research. Emphasis on analyzing and conducting ethnographic research in American communities; problem formulation, analytic modes, data correction and interpretation. Offered in alternate years.

162. People, Work and Technology (4)
Lecture—4 hours. Prerequisite: upper division standing; eight units of sociology, anthropology, or community and regional development. Relationship between work, technology, and people's lives. Such topics as industrialization, bureaucratization, orga- nization, the structure of work-linked communities, education and the labor market, work and the economic system and the future of work.—II. Smith

164. Theories of Organizations and Their Roles in Community Change (4)
Lecture—4 hours. Prerequisite: course 1 or 2. Planned change within and through community organizations. Private voluntary organizations, local community associations, and local government. Relationship between community organizations and social capital.—II. Hirtz

168. Program Evaluation and the Management of Organizations (4)
Lecture—4 hours. Prerequisite: courses 160, 161, Role of private participation in organizational design and development. GE credit: SocSci, Div, Wrt.—II. [II.]

171. Housing and Social Policy (4)
Lecture—4 hours. Social impact, economics, and politics of housing in the United States. Special attention given to alternative policy strategies at the national and local levels.—III. Wiener

172. Social Inequality: Issues and Innovations (4)
Lecture—4 hours. Prerequisite: upper division standing; 8 units of sociology or anthropology or combination. Study of the phenomenon of inequality in the U.S. Various approaches to inequality examined, including structural and historical explanations, prejudice and discrimination, the “culture of poverty,” and arguments concerning race, sex, and genetic potential. Examination of analytical approaches to and issues arising from the study of ethnicity, through utilization of data from a range of different societies. GE credit: SocSci, Div, Wrt.—II. Guarimonte

180. Transnational Community Development (4)
Lecture/discussion—4 hours; extensive writing; project; term paper. Prerequisite: course 1, or Anthropology 2, or Sociology 1. The effects of grassroots, non-state, non-corporate actors from abroad on local, national and international development. Socioeconomic, political, and cultural implications of transnational actions undertaken by international non-governmental organizations, individual migrants, and migrant grassroots civic organizations. GE credit: SocSci.—III. [III.]—Guarnizo

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Supervised internship off and on campus, in community and institutional settings. (P/NP grading only)

198. Directed Group Study (1-5)
(P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)

Graduate Courses
240. Community Development Theory (4)
Lecture/discussion—4 hours. Introduction to theories of community development and different concepts of community, poverty, and development. Emphasis on building theory, linking applied development techniques to theory, evaluating development policy, and examining case studies of community development organizations and projects.—I. [I.] Bradshaw

241. The Economics of Community Development (4)
Seminars—4 hours. Prerequisite: graduate standing. Economic theories and methods of planning for communities. Human resources, community services and infrastructure, industrialization, technological change, and regional growth. The community's role in the greater economy.—I. Kenney

242. Community Development Organizations (4)
Seminar—4 hours. Prerequisite: course 240. Theory and practice of organizations with social change agendas at the community level. Emphasis on nonprofit organizations and philanthropic foundations.—III. Hirtz

245. The Political Economy of Urban and Regional Development (4)
Lecture—4 hours. Prerequisite: course 157, 244, or the equivalent. How global, political and economic restructuring and national and state policies are mediated by community politics; social production of urban form; role of the state in uneven development; dynamics of urban growth and decline, regional development in California.—III. [III.]—Smith

246. The Political Economy of Transnational Migration (4)
Lecture—4 hours. Prerequisite: graduate standing. Theoretical perspectives and empirical research on social, cultural, political and economic processes of transnational migration to the U.S. Discussion of conventional theories will precede contemporary comparative perspectives on class, race, citizenship, ethnicity, and the ethnic economy.—II. [II.]

247. Transformation of Work (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing in history or social science degree program or consent of instructor. Exploration of the ways that the experience, organization, and systems of work are being reconfigured in the late twentieth century. The impacts of economic restructuring on local communities and workers.—III. Wells

248. Social Policy, Welfare Theories and Communities (4)
Seminar—4 hours. Prerequisite: graduate standing. Theories and comparative histories of modern welfare states and social policy in relation to legal, normative, organizational, and administrative aspects. Analysis of specific social issues within the U.S./California context. Not open for credit to students having completed course 248A and 248B. Offered in alternate years.—III. Hirtz

248A. Social Policy, Welfare Theories and Communities 1 (2)
Seminar—2 hours. Prerequisite: graduate standing. Theories and comparative histories of modern welfare states. Theories of welfare and social policy in relation to legal, normative, organizational, and administrative aspects of welfare and social policy. Offered in alternate years.

248B. Social Policy, Welfare Theories and Communities 2 (2)
Seminar—2 hours. Prerequisite: graduate standing, course 248A concurrently. Analysis of a specific set of social issues within the U.S./California context. Issues may include poverty, hunger, housing, health, family, disability, economic opportunity, affirmative action orientations, gender, old age, or special social groups. Offered in alternate years—Hirtz

290. Seminar (1)
Seminar—1 hour. Analysis of research in applied behavioral sciences. (S/U grading only.)—II. Hirtz

292. Graduate Internship (1-12)
Internship—3-36 hours. Individually designed supervised internship, off campus, in community or institutional setting. Developed with advice of faculty mentor. (S/U grading only)

298. Group Study (1-5)

299. Research (1-12)
(S/U grading only)

Professional Courses
396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III, IV, V, VI.

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer, 2009-2010 offering in parentheses

General Education (GE) credit: Arts and Humanities, Science and Engineering, SocSci—Social Sciences, Div—Social-Cultural Diversity, Wrt—Writing Experience
Community Development (A Graduate Group)

Frank Hirtz, Ph.D., Chairperson of the Group

Group Office, 1303 Hart Hall (Human and Community Development); (530) 752-1926; http://hcd.ucdavis.edu

Faculty

Chris Benner, Ph.D., Associate Professor (Human and Community Development)
Mark Blanchard, Ph.D., Professor (Comparative Literature)
Stephen B. Brush, Ph.D., Professor (Human and Community Development)
Adela De La Torre, Ph.D., Professor (Chicana/o Studies, Studies in Race and Ethnicity)
Chicana/o Studies, Studies in Race and Ethnicity
Deborah Elliott-Fish, Ph.D., Professor (Wildlife, Fish, and Conservation Biology)
Patsy Eubanks-Owens, M.L.A., Associate Professor (Landscape Architecture)
Yvette Flores-Oritz, Ph.D., Professor (Chicana/o Studies)
Franciszek, M.L.A., Professor (Environmental Design)
Ryan E. Galt, Ph.D., Assistant Professor (Human and Community Development)
Luis Guarrizzo, Ph.D., Associate Professor (Human and Community Development)
Susan Handy, Ph.D., Professor (Environmental Science and Policy)
Paul Heckman, Ph.D., Professor (School of Education)
Robin Hill, Ph.D., Associate Professor (Art, Art History)
Carlos Jackson, M.F.A., Assistant Professor (Chicana/o Studies)
Frank Hirtz, Ph.D., Associate Professor (Human and Community Development)
Susan B. Kaiser, Ph.D., Professor (Textiles and Clothing)
Martin Kenney, Ph.D., Professor (Human and Community Development)
William Lacy, Ph.D., Professor, Vice Provost (Human and Community Development, Outreach and International Programs)
Mark Lubell, Ph.D., Associate Professor (Environmental Sciences and Policy)
Elizabeth Miller, M.D., Ph.D., Assistant Professor (UCDHS: Pediatrics)
Ben Orlove, Ph.D., Professor (Environmental Sciences and Policy)
Richard Pan, Ph.D., Associate Professor (MED General Pediatrics)
Dennis Pendleton, Ph.D., Dean (UC Davis Extension)
Michael Rios, Ph.D., Assistant Professor (Environmental Design)
Michael P. Smith, Ph.D., Professor (Human and Community Development)
Julie Sze, Ph.D., Assistant Professor (American Studies)
Tom Tomich, Ph.D., Professor (Human and Community Development)
Karen Watson-Gegeo, Ph.D., Professor (School of Education) Distinguished Graduate Mentoring Award
Miriam J. Wells, Ph.D., Professor (Human and Community Development)
Steve Wheeler, Ph.D., Assistant Professor (Environmental Design)

Diane Wolf, Ph.D., Professor (Sociology)

Emeritus Faculty

Isao Fujimoto, M.A., Lecturer SOE Emeritus
Janet D. Morsen, Ph.D., Professor (Human and Community Development) Distinguished Graduate Mentoring Award
Alvin D. Sokolow, Ph.D., Extension Specialist Emeritus (Human and Community Development)
Geoffrey A. Wandesforde-Smith, Ph.D., Associate Professor Emeritus (Political Science, Environmental Science and Policy)

Affiliated Faculty

David Campbell, Ph.D., Associate Specialist in Cooperative Extension (Human and Community Development)
James I. Grieshop, Ph.D., Specialist in Cooperative Extension and Lecturer (Human and Community Development)
Joyce Gutek, Ph.D., Director (Public Service Research Program)
Michael Lawler, Ph.D., Chair, Human Services (UC Davis Extension)
Jonathan London, Ph.D., Director (Center for the Study of Regional Change)
Jeff Loux, Ph.D., Director (Land Use and Natural Resources, UC Davis Extension)
Deborah Paterniti, Ph.D., Associate Director (UCDHS: Center for Health SVCS Research in Primary Care)
Carolyn Penny, Ph.D., Director (Common Ground/UC Davis Extension)
Bernadette Tarallo, Ph.D., Lecturer (Human and Community Development)
Mark Van Horn, Director, (PSTC/SF)

Graduate Study. The Graduate Group in Community Development offers a multidisciplinary program of study which leads to the M.S. degree. The program prepares students for professional roles as administrators, designers, planners, or researchers, with emphasis upon urban and rural communities and human service organizations. Graduate study in community development also prepares individuals to work within government or non-profit organizations in the realm of social and economic change. Students have the opportunity to specialize in (1) urban and rural development, (2) community economic and political development, (3) community design and planning, (4) racial and ethnic relations, (5) international migration and development, (6) gender and community development, and (7) social policy analysis.

Preparation. Applicants to this program can prepare themselves by enrolling for upper division courses in the social or behavioral sciences, e.g., anthropology, economics, sociology, psychology, cultural geography, or political science, and courses in community studies.

Graduate Advisers. Contact the Group office.

Community Health

See Epidemiology and Preventive Medicine (EPP), on page 380; and Family and Community Medicine (FAP), on page 381.

Community Nutrition

See Nutrition Science, on page 430.
study in medicine, dentistry, veterinary medicine, and other science fields as well as law and business, besides, journalism and publishing, teaching, or graduate study in literature.

A.B. Major Requirements:

Option A

UNITS
Preparatory Subject Matter............... 14-44
Comparative Literature 1 or 2, 3 or 4 ...... 8
Two other lower division courses in Comparative Literature [selected from 1-53C, excluding the 10 series (cannot include the two required courses in the 1-4 series)] ....... 8
Foreign language: sufficient preparation to ensure satisfactory performance at the upper division level in an Asian language ....... 0-30
Depth Subject Matter ...................... 40
Five upper division Comparative Literature courses including at least one course in a major period (such as 164A-164B-164C-164D), movement (such as 168A-168B, 169) or genre (such as 160A-160B, 161A-161B, 163, 166A-166B) and including
Comparative Literature 141 .............. 20
Three upper division literature courses in a language other than English ............ 12
Two additional upper division literature courses in Comparative Literature or in any other program including English or literature in translation ........................................... 8
Total Units for the Major

(OPTION A).................................. 56-86

Recommended
Anthropology 2; Classics 10; English 171A, 171B; French 114; History 4A-48C-4C, 101; Linguistics 1, 4, 163; Philosophy 24, 123; Religious Studies 2

Major Adviser: J. Sharlet

Option B: Asian Emphasis

Preparatory Subject Matter............... 14-44
Comparative Literature 1 or 2, 3 or 4 ...... 8
Two other lower division courses from Comparative Literature 53 series ............ 6
Foreign language: sufficient preparation to ensure satisfactory performance at the upper division level in an Asian language .......... 0-30

Depth Subject Matter ...................... 40
Comparative Literature 141 and 151 ...... 8
Four other upper division Comparative Literature courses such as Comparative Literature 153 or 165, (or any other Comparative Literature courses with an Asian emphasis)................................. 12
Notes: Courses in the East Asian Languages and Cultures Department can be substituted for these courses with the approval of an adviser.
Three upper division literature courses in an Asian language .................. 12
One additional upper division course selected from Film Studies, Asian American Studies, History or Religious Studies .......................................................... 4
Total Units for the Major

(OPTION B: Asian Emphasis)............. 54-84

Minor Program Requirements:

The minor in Comparative Literature allows students to combine courses in Comparative Literature courses with a national emphasis, including English or foreign literature in translation. There is no foreign language requirement for the minor.

Comparative Literature 141 recommended ........................................... 20

Courses should be chosen in consultation with, and with the approval of, the adviser.

Minor Adviser: Same as Major Adviser.

Advising: All Comparative Literature majors and minors must consult an adviser, individually, at least once at the beginning and once at the end of each academic year.

Honors Program. Candidates for high or highest honors in Comparative Literature must write a senior thesis under the direction of a faculty member approved by the Program Director. For this purpose, in addition to fulfilling all other major requirements, honors candidates must enroll in 6 units of Comparative Literature 199.1 during the first two quarters in the senior year. Only students who have attained a cumulative GPA of 3.50 in all courses satisfying the major (except elementary foreign language courses) at the end of the junior year will be eligible for the honors program.

Teaching Credential Subject Representative. The Staff; see the Teaching Credential/M.A. Program on page 109.

Graduate Study. See Comparative Literature (A Graduate Program), on page 195. See also Graduate Studies, on page 104.

Courses in Comparative Literature (COM)

Lower Division Courses

Great Books of Western Culture: The Ancient World (4)
Lecture/discussion—4 hours. Prerequisite: completion of Subject A requirement. An introduction, through class discussion and frequent written assignments, to the great books of western civilization from The Epic of Gilgamesh to St. Augustine’s Confessions. GE credit: ArtHum, Wrt (cannot be used to satisfy a college or university composition requirement.) GE writing experience simultaneously.—I, II, III, (II, III.)

3. Great Books of Western Culture: The Middle Ages to the Enlightenment (4)
Lecture/discussion—4 hours. Prerequisite: completion of Subject A requirement. An introduction, through class discussion and frequent written assignments, to some of the great books of western civilization from Dante’s Inferno to Swift’s Gulliver’s Travels. GE credit: ArtHum, Wrt (cannot be used to satisfy a college or university composition requirement.) GE writing experience simultaneously.—I, II, III, (II, III.)

Great Books of Western Culture: The Modern Crisis (4)
Lecture/discussion—4 hours. Prerequisite: completion of Subject A requirement. An introduction, through class discussion and frequent written assignments, to some of the great books of western civilization from Stendhal’s Chartreuse ofSubmitted and Rimbaud’s A Season in Hell. GE credit: ArtHum, Wrt (cannot be used to satisfy a college or university composition requirement.) GE writing experience simultaneously.—I, II, III, (II, III.)

4. Major Books of the Contemporary World (4)
Lecture/discussion—4 hours. Prerequisite: completion of Subject A requirement. Comparative study of selected major Western and non-Western texts composed in the period from 1945 to the present. Intensive focus on writing about these texts, with frequent papers written about these works. GE credit: ArtHum, Div, Wrt (cannot be used to satisfy a college or university composition requirement.) GE writing experience simultaneously.—I, II, III, (II, III.)

5. Metaphysical, Symbolic, and Literary Studies (4)
Lecture—3 hours. Prerequisite: completion of Subject A requirement. A survey of the major trends in modern literary studies. GE credit: ArtHum, Div, Wrt.—I, II, III, (II, III.)

6. Myths and Legends (4)
Lecture—3 hours; discussion—1 hour. Introduction to the comparative study of myths and legends, excluding those of Greece and Rome, with readings from Near Eastern, Teutonic, Celtic, Indian, Chinese, African, and Central American literary sources. GE credit: ArtHum, Div, Wrt.—I, II, III, (II, III.)

7. Literature of Fantasy and the Supernatural (4)
Lecture—3 hours; discussion—1 hour. The role of fantasy and the supernatural in literature: tales of magic, hallucination, ghosts, and metamorphosis, including diverse authors such as Shakespeare, Pu Sung-Ling, Kafka, Kawabata, Fuentes, and Morris.
GE credit: ArtHum, Div, Wrt.—II, III, (II, III.)

8. Utopias and their Transformations (4)
Lecture/discussion—3 hours; term paper. Prerequisite: satisfaction of the Subject A requirement. A consideration, in literary works from different ages, of visionary and rational perceptions of a lost paradise, Golden Age, or Atlantis—and of the inhuman nightmares that can result from the utopian dream of perfection. GE credit: ArtHum, Div, Wrt.—II, III, (II, III.)

9. The Short Story and Novella (4)
Lecture/discussion—3 hours; term paper. An introduction to shorter forms of fiction by major authors of different countries, with special emphasis on the modern period. GE credit: ArtHum, Div, Wrt.—III, (II, III.)

10. Master Authors in World Literature (2)
Lecture/discussion—2 hours. Designed primarily to acquaint the non-literature major with a cross-section of writings by the world’s most important authors, readings in English translation. Content alternates among the following segments: (A) Gilgamesh, Amadzam, Beowulf, Nibelungenged, (B) Metamorphoses, Decameron, Arabian Nights, Canterbury Tales, (C) Chaucer, Dante, El Cid, Cid, Garibaldi’s Campaign, Morte D’Arthur; (D) Sakuntala, Tristan and Isolde, Aucassin and Nicolette, Gawayin and the Green Knight; (E) Swift, Rabelais, La Celestina, Simplicissimus; (F) Cervantes, Satíkku, Fielding, Voltaire; (G) Machiavelli, Shakespeare, Lope de Vega, Calderon, Molieres, Racine, Lessing, Schiller; (H) Goethe, Byron, Stendhal, Pushkin, Lermontov; (I) Hoffmann, Gogol, Poe, Hawthorne, Maupassant, Chekhov, Melville; (J) Flaubert, Twain, Turgenev, Dostoevsky, Tolstoi, Hardy, Lawrence, Shaw, Strindberg; (K) Nano, Conrad, Gide, Kafka, Faulkner; (M) Rilke/Yesas, Joyce, Woolf, Mann, Celine, Bulgakov/Tanizaki, O’Neill/ Brecht, Lorca/Pirandello; (N) Camus/Sartre, Garcia Marquez/Grazz, Borges/Sarrace, Bellow/ Nabakov, Beckett/Pinter, Genet/ Dis embarrassments, must be repeated for credit in different subject area. Limited enrollment. (P/NP grading only)—I, II, III, (II, III.)

12. Introduction to Women Writers (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: completion of subject A requirement. Survey of fiction, drama, and poetry by women writers from all continents. Concerns of women compared in light of their varied social and cultural backgrounds. Literary analysis of voice, imagery, narrative strategies and fiction. GE credit: ArtHum, Div, Wrt.—II, III, (II, III.)

13. Dramatic Literature (3)
Lecture—3 hours. Prerequisite: completion of Subject A requirement or the equivalent. Introduction, through careful reading of selected plays, to some of the major forms of Western drama, from the earliest tragedies of ancient Greece to the contemporary American theater. Offered alternate years. GE credit: ArtHum, Div, Wrt.—II, III

14. Introduction to Poetry (3)
Lecture/discussion—3 hours. Prerequisite: completion of Subject A requirement. Comparative study of poetry in a variety of lyric and other poetic forms
from different historical periods and different linguistic, national, and cultural traditions. Offered in alternate years. GE credit: ArtHum, Writ.—II. (II.) McLean 20. Humans and the Natural World (4) Lecture/discussion—3 hours; term paper. Changing relationship between humans and the natural environment in ancient and modern authors as Virgil, Li Po, Basho, Thoreau. GE credit: ArtHum, Writ.—II. (II.) Schiesari 138. Gender and Interpretation (4) Lecture/discussion—3 hours; term paper. Prerequisite: completion of Subject A requirement and at least one course in literature. Study of the representa-
tion of gender by gender in literary texts from various periods, societies, and cultures in light of research and theory on gender, with atten-
tion to gender as a topic for literary interpretation. GE credit: ArtHum, Writ.—II. (II.) Schiesari 139. Shakespeare and the Classical World (4) Lecture/discussion—3 hours; term paper. Prerequi-
tive: at least one course in literature. Shakespeare's representation of gender in the light of selected ancient texts and Renaissance conceptions of Antiquity, with special attention to the depiction of politics and history. Offered in alternate years. GE credit: ArtHum, Writ.—II. (II.) Schiesari 140. Thematic and Structural Study of Literature (4) Lecture/discussion—3 hours; term paper. Interpre-
tation of selected works illustrating the historical evolu-
tion of themes and forms. May be repeated for credit when sub-
stance of course varies. GE credit: ArtHum, Writ.—II. (II.) Schiesari 141. Introduction to Critical Theoretical Approaches to Literature and Culture (4) Lecture/discussion—3 hours; term paper. Prerequisite: one upper division literature course or consent of instructor. Introduction to critical theory and its use for interpreting literary texts, film, and media forms in our present global culture. (Same course as Criti-
tical Theory 110.) GE credit: ArtHum, Writ.—III. (III.) Blanchard 142. Critical Reading and Analysis (4) Lecture/discussion—3 hours; term paper. Prerequisite:
consent of instructor. Close reading of selected texts; scrutiny of very limited amount of material, with attention to the problems of texts in translation. GE credit: ArtHum, Writ.—I. (I.) Sharlet 90X. Lower Division Seminar (1-2) Seminar—1-4 hours. Prerequisite: consent of instruc-
tor. Examination of a special topic in a small group setting. 98. Directed Group Study (1-5) I. II. III. The Staff (Director in charge) Restricted to lower division students. (P/NP grading only.) 99. Special Study for Undergraduates (1-5) (P/NP grading only.) Upper Division Courses 100. World Cinema (4) Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: upper-division standing, or consent of instructor. A comparative, cross-cultural study of a topic, theme, or movement in world cinema beyond the boundary of a single national tradition. Topics may include "postsocialist cinemas in East Europe and Asia," "cinema and globalization," and "popu-
lar Asian cinema." May be repeated three times for credit when topic differs. GE credit: ArtHum, Div, Wri.—I, II, III. (I. III.) Lu 120. Writing Nature: 1750 to the Present (4) Lecture/discussion—3 hours; term paper. Prerequi-
tive: completion of Subject A requirement and at least one course in literature. Study of representa-
tions, descriptions, and discussions of humankind's problematical relationship with the non-human world in texts written in a variety of European and Ameri-
can traditions between 1750 and the present. Offered in alternate years. GE credit: ArtHum, Writ.—III. (III.) W continues. 135. Women Writers (4) Lecture/discussion—3 hours; term paper. An explo-
ration of women's differing views of self and society as revealed in major works by female authors of vari-
ous times and cultures. Readings, principally of fic-
tion, will include such writers as Lady Murasaki, Mme de Lafayette, and Charlotte Bronte. GE credit: ArtHum, Div, Writ.—II. (II.) Schiesari 152. Literature of the Americas (4) Lecture/discussion—3 hours; term paper. Prerequi-
tive: completion of Subject A requirement and at least one course in literature, or consent of instructor. Various styl-
histic, historical, social, and cultural factors that con-
tribute to a hemispheric vision of American literature, encompassing works by Canadian, United States, Caribbean, Brazilian, and Spanish-American writers. Offered in alternate years. GE credit: ArtHum, Div, Writ.—I. (I.) Blanchard 152S. Literature of the Americas (Taught in Mexico) (4) Lecture/discussion—6 hours; term paper; field-
work—6 hours. Prerequisite: Subject A; at least one course in literature, or consent of instructor. Various styl-
histic, historical, social, and cultural factors that con-
tribute to a hemispheric vision of American litera-
ture, encompassing works by Canadian, United States, Caribbean, Brazilian, and Spanish-American writers. May be repeated as course 152. GE credit: ArtHum, Div, Writ.—I. (I.) Schildgen 153. The Forms of Asian Literature (4) Lecture/discussion—3 hours, term paper. Prerequi-
tive: upper division standing. Introduction to distinc-
tive Asian literary forms, such as haiku, noh, the Chinese novel and tale, and the reading of major works. Comparison with Western genres and study of native and Western critical traditions. GE credit: ArtHum, Div, Writ.—I. (I.) Sharlet 154. African Literature (4) Lecture—3 hours; term paper. Prerequisite: comple-
tion of Subject A requirement and at least one course in literature. Pre- and post-colonial sub-Africa-
nian literature and the African oral traditions from which it emerged. Genres and themes of Afri-
can literature in the 19th and 20th centuries. GE credit: ArtHum, Div, Writ.—III. (III.) Schildgen 155. Classical Literatures of the Islamic World 600-1800 (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Subject A or consent of instructor. Major classical texts of the Islamic world with attention to intermin-
gling of diverse cultural influences and historical con-
text. Includes epic, romance, lyric, mystical narrative, fairy tales, essays. Texts from Arabic, Per-
sian, Ottoman Turkish, and Urdu literature. Offered in alternate years. GE credit: ArtHum, Div, Writ.—II. (II.) Sharlet 157. War and Peace in Literature (4) Lecture/discussion—3 hours; term paper. Prerequi-
tive: course 1, 2, or 3, or consent of instructor. Through study of a few major works from Western and non-Western literature the course seeks to illumi-
nate the way in which literature from antiquity to the present has dealt with the anti
tomy, peace-war through the ages. GE credit: ArtHum, Writ. 158. The Detective Story as Literature (4) Lecture—3 hours; term paper. Study of the origins, literary and social background, development and implications of the literature of detection in a com-
parative context. GE credit: ArtHum, Writ.—I. Can-
on 159. Women in Literature (4) Lecture—3 hours; term paper. Prerequisite: course 1, 2, 3, or 4 or the equivalent recommended. Portray-
als of women in literature, comparing selected hero-
ae who represent a particular theme, period, or genre. Texts range around the globe and from ancient to modern works, such as Lesistrata, Emma, Hedda Gabler, The Makoka Sisters, and Top Girls. GE credit: ArtHum, Div, Writ.—II. (II.) Lamb 160A. The Modern Novel (4) Lecture/discussion—3 hours; term paper. The chang-
ing image of man and his world as seen in novels by such writers as Joyce, Proust, and Mann. GE credit: ArtHum, Writ.—II. (III.)
160B. The Modern Drama (4)
Lecture/discussion—3 hours; term paper. Readings in modern drama; authors such as Ibsen, Strindberg, Chekhov, Pirandello and Brecht. GE credit: ArtHum, Wrt.—I. [II] Finney

161A. Tragedy (4)
Lecture/discussion—3 hours; term paper. Persistent and changing aspects of the tragic vision in literature from ancient times to the present. GE credit: ArtHum, Wrt.

161B. Comedy (4)
Lecture/discussion—3 hours; term paper. Comic attitudes towards life in literary works of different ages. GE credit: ArtHum, Wrt.

163. Biography and Autobiography (4)
Lecture/discussion—3 hours; term paper. Portrayals of a human life in biographies and/or autobiographies of different countries and ages. Offered in alternate years. GE credit: ArtHum, Wrt.—II. (I.) Schildgen

164A. The European Middle Ages (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Subject A. Medieval literary genres as the foundation for modern literary forms. Topics and themes as love, God, vision, nature, history and politics, and sign theory. GE credit: ArtHum, Wrt.—II. [I.] Schildgen

164B. The Renaissance (4)
Lecture/discussion—4 hours; term paper. Prerequisite: Subject A. Literature, new science, gender, politics, and exploration in European Renaissance. Readings in Petrarch, Machiavelli, Montaigne, Tasso, Ariosto, Stampa, Shakespeare, Lobo and Apha Behn. GE credit: ArtHum, Wrt.—II. [I.] Schiesari

164C. Baroque and Neoclassicism (4)
Lecture/discussion—3 hours; term paper. Readings in major authors such as Calderón, Corneille, Pascal, Racine, Milton, and Grimmelshausen, with consideration of the tension between the expansive energies of the "baroque" and the restraints of dogma and reason. GE credit: ArtHum, Wrt.

164D. The Enlightenment (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Subject A. Enlightenment writers such as Swift, Voltaire, Sterne, Rousseau, Volstonteck, and Kant. Emphasis on the revolutionary impact of eighteenth-century philosophical ideas and literary forms on modern political, social, and aesthetic culture. Offered in alternate years. GE credit: ArtHum, Wrt.

165. Caribbean Literatures (4)
Lecture/discussion—4 hours. Prerequisite: upper division standing. Comparative approach to the multi-lingual, multi-cultural literatures of the Caribbean. Works from English, French, and Spanish speaking regions with special attention to problems of identity, diaspora and resistance, class, gender, race. Not open for credit to students who have completed course 165S. GE credit: ArtHum, Div, Wrt.—II. [I.] Blanchard

165A. Caribbean Literatures (4)
Lecture/discussion—4 hours. Prerequisite: upper division standing. Comparative approach to the multi-lingual, multi-cultural literatures of the Caribbean. Works from English, French, and Spanish speaking regions with special attention to problems of identity, diaspora and resistance, class, gender, race. Taught at the University of Havana, Cuba. Not open for credit to students who have completed course 165S. GE credit: ArtHum, Div, Wrt.—II. [I.] Blanchard

166. Literatures of the Modern Middle East (4)
Lecture/discussion—3 hours; term paper. Major translated works in modern Middle Eastern and North African literature, including Arabic, Hebrew, Persian, and Turkish. Social and historical formation, with topics such as conflict and coexistence, journeys, and displaced people, gender and family. GE credit: ArtHum, Wrt.—I. [I.] Sharlet

166A. The Epic (4)
Lecture/discussion—3 hours; term paper. Study of various forms of epic poetry in both the oral and literary traditions. May be repeated for credit in different subject area. GE credit: ArtHum, Wrt.—[I] Schein

166B. The Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Subject A. The novel as global genre: picaresque, epistolary, Bildungsroman, historical novel, contemporary forms. May be repeated one time for credit. GE credit: ArtHum, Wrt.

167. Comparative Study of Major Authors (4)
Lecture/discussion—3 hours; term paper. Prerequisite: consent of instructor. Pivotal works of authors in the Western mainstream, such as Dante, Shakespeare, Cervantes, Goethe, Tolstoi, Proust, and Joyce. GE credit: ArtHum, Wrt.

168A. Romanticism (4)
Discussion—3 hours; term paper. Prerequisite: any introductory course in literature. Introduction to the Romantic movement with emphasis upon Romantic concepts of the self, irony, love, the imagination and artistic creativity, and the relationship of the individual to nature and society. GE credit: ArtHum, Wrt.—I. McLean, Lokke

168B. Realism and Naturalism (4)
Discussion—3 hours; term paper. Studies in movements such as surrealism, expressionism and the absurd. GE credit: ArtHum, Wrt.—II. Finney

169. The Avant-Garde (4)
Lecture/discussion—3 hours; term paper. Study of modernist novels from different parts of the world, including Asia, Africa, Latin America, Europe, and the United States, in the period from the Second World War to the present. GE credit: ArtHum, Wrt.

180. Selected Topics in Comparative Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of Subject A requirement and at least one course in literature. Study of a selected topic or topics appropriate to student and faculty interests and areas of specialization of the instructor. May be repeated once for credit when topic differs. GE credit: ArtHum, Wrt.

180S. Selected Topics in Comparative Literature (Taught Abroad) (4)
Lecture/discussion—6 hours; extensive writing; fieldwork—6 hours. Prerequisite: Subject A; at least one course in literature, or consent of instructor. Study of selected topics appropriate to student and faculty interests and areas of specialization of the instructor. May be repeated one time for credit when topic differs. GE credit: ArtHum, Wrt.—IV. [IV]

194H. Special Study for Honors Students (1-5)
Independent study—1-5 hours. Prerequisite: open only to major in French requiring who qualify for honors program. Guided research, under the direction of a faculty member approved by the Program Director, leading to a senior honors thesis on a comparative topic. May be repeated for credit. (P/NP grading only)

195. Seminar in Comparative Literature (4)
Seminar—3 hours; term paper. Prerequisite: junior standing and major in Comparative Literature, or consent of instructor. Advanced comparative study of selected topics and texts, with explicit emphasis on the theoretical and interpretive approaches that define Comparative Literature as a discipline and distinguish it from other literary disciplines. May be repeated once for credit when topic differs. Offered in alternate years.—(III) Blumberg

197. Tutoring in Comparative Literature (1-5)
Discussion—2-4 hours. Prerequisite: upper division standing with declared major in Comparative Literature. Tutoring in undergraduate courses including leadership in small voluntary discussion groups affiliated with current courses offered by Comparative Literature. May be repeated for credit for a total of 6 units. (P/NP grading only)

198. Directed Group Study for Advanced Undergraduates (1-5)
(P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)

Graduate Courses

210. Topics and Themes in Comparative Literature (4)
Discussion—3 hours; term paper. Prerequisite: graduate standing in Comparative Literature, English, or a foreign-language literature, or consent of instructor. Comparative, interpretative study of treatment of specific topics and themes in literary works from various periods, societies, and cultures, in light of these works' historical and sociocultural contexts. May be repeated for credit when topic differs.—III. (II.)

214. Approaches to Lyric Poetry (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Analysis and interpretation of poetry in a number of changing periods and national literatures, with consideration of major theoretical developments in the understanding of poetic discourse. Offered in alternate years.—(III) Schiesari

215. Forms of the Spiritual Quest (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor; knowledge of at least one foreign language. An exploration, culminating in a research paper, of changing forms of the quest for transcendence in different cultures, mainly in major works of Western literature, but also in other traditions and from the perspectives of other disciplines.

220. Literary Genres (4)
Discussion—3 hours; term paper. Prerequisite: graduate standing in Comparative Literature, English, or a foreign-language literature, or consent of instructor. Comparative literature of major works in a particular genre from various linguistic, national, and cultural traditions, with particular attention to historical and aesthetic developments within the genre and to genre theory. May be repeated for credit when topic differs.—I. Schein

238. Gender and Interpretation (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of how literary texts from different periods, societies, and cultures represent gender roles and gender hierarchy, building on recent work on gender in anthropology, literature, psychology, and women's studies.

250A. Research in Comparative Literature (4)

250B. Research in Comparative Study of Author, Period, or Genre (4)
Seminar—2-3 hours. Individual instruction—1 hour. Individually guided research, under the supervision of a faculty member, in the specialized study of an individual author, historical period, or literary genre culminating in a term paper. Required of Ph.D. candidates.—I, II, III, (II., III.)
250C. Basic Research for the Dissertation (4 units)

250D. Dissertation Prospectus (4 units)
Independent study. Individually guided writing of the dissertation prospectus under supervision of a faculty member. Must be taken prior to completion of the qualifying exam. Required of Ph.D. candidates. (S/U grading only)—I, II, III, (II, III).

255. Colloquium (2 units)
Lecture/discussion—2 hours. Prerequisite: graduate standing. Oral presentation and critique of research papers; discussion of current problems in teaching and research in Comparative Literature. May be repeated for credit. (S/U grading only)—II.

260. Contexts of the 19th-Century Novel (4 units)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Development in 19th-century history, culture, and society in relation to major trends in the 19th-century novel. Offered in alternate years. Prerequisite: — I.

298. Directed Group Study (1-5 units)
Prerequisite: graduate standing. (S/U grading only.)—I. (I.)

299. Individual Study (1-12 units)
Prerequisite: graduate standing. (S/U grading only.)—(II.)

299D. Special Study for the Doctoral Dissertation (1-12 units)
Prerequisite: graduate standing. (S/U grading only.)

Professional Courses

390. Teaching Comparative Literature in College (3 units)
Lecture—1 hour; discussion—2 hours. Methods of teaching Comparative Literature with specific application to the introductory courses 1, 2, and 3, in relation to major cultural and social developments. Discussion also of ways to teach analytical writing. (S/U grading only)—I. (I)

392. Teaching Internship in Comparative Literature (1 unit)
Discussion—1 hour. Regular consultations between the student instructor teaching Comparative Literature courses and a supervisor. Inclass evaluation of teaching. May be repeated for credit after consultation with supervisor. (S/U grading only)—I, II, III, (II, III).

396. Teaching Assistant Training Practicum (1-4 units)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—I, II, III, (II, III).

Comparative Literature (A Graduate Group)

Juliana Schiesari, Ph.D., Chairperson of the Group
Group Office, 611 Sproul Hall
(530) 752-5799

Faculty

Moradewun Adejunmo, Ph.D., Professor
(African Studies)
Marcel Blanchard, Ph.D., Professor
(Comparative Literature, French)
Joo Ann Cannon, Ph.D., Professor
(Italian)
Xiaomei Chen, Ph.D., Professor
(East Asian Languages and Cultures)
Margaret Ferguson, Ph.D., Professor
(English)
Goil Finney, Ph.D., Professor
(Comparative Literature, German) Distinguished Teaching Award-Graduate/Professional

Inéz Hernández Avila, Professor
(Native American Studies)
Neil Iversen, Ph.D., Professor
(Comparative Literature, Critical Theory)
Kari Lokke, Ph.D., Professor
(Comparative Literature, D.V.M.)
Sheldon Lu, Ph.D., Professor
(Comparative Literature)
Seth Schein, Ph.D., Professor
(Comparative Literature)
Juliana Schiesari, Ph.D., Professor
(Italian, Comparative Literature)
Brenda Schiffgen, Ph.D., Professor
(Comparative Literature and Reproduction)
Jocelyn Sharet, Ph.D., Assistant Professor
(Comparative Literature)
Michelle Teh, Ph.D., Professor
(East Asian Languages and Cultures)

Graduate Study. The Comparative Literature Program offers the Ph.D. degree with a strong emphasis on individual research under the supervision of a faculty member. Candidates for the Ph.D., in addition to research of a comparative nature, study three literatures [one of which may be English and/or American] in the original languages, acquiring an extensive knowledge of the overall development of the field. Students may choose to focus on a special topic instead of on a third literary tradition. Within this framework, each student’s program will be tailored to individual interests, and may center on a major historical period, such as the Renaissance or the modern age; a genre, such as lyric poetry, epic, drama, or the novel; or any other special emphasis approved by the Graduate Adviser.

Preparation. For admission to the Ph.D. Program candidates should have an undergraduate major in literature and reading ability in two foreign languages. The Graduate Adviser requires three letters of recommendation and a sample of recent written work, and it is recommended that students submit their GRE scores.

Graduate Adviser: J. Schiesari (Italian, Comparative Literature)

Comparative Pathology (A Graduate Group)

Reen Wu, Ph.D., Chairperson of the Group
Group Office, 5215, Vet Med 3A
(530) 752-2657;
http://www.vetmed.ucdavis.edu/pmi/compath/

Faculty

Alaa Afify, M.D., Associate Professor of Pathology
(Pulmonary and Immunology)
Barry A. Ball, D.V.M., Ph.D., Professor
(Population Health and Reproduction)
Danika Bannasch, D.V.M., Ph.D., Associate Professor
(Population Health and Reproduction)
Peter A. Barry, Ph.D., Associate Professor
(Pathology and Oncology)
Stephen W. Barthold, D.V.M., Ph.D., Professor
(Pathology, Microbiology, and Immunology)
Nicole Baumgarten, D.V.M., Ph.D., Associate Professor
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Charles L. Bevins, M.D., Ph.D., Professor
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(Population Health and Reproduction)
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(Pathology, Microbiology, and Immunology)
Aarón C. Bravall, Ph.D., Professor
(Pathology Microbiology and Immunology)

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(Orchestrology)
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(Surgical and Radiological Sciences)
Barbara A. Byrne, D.V.M., Ph.D., Assistant Professor
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(Population Health and Reproduction)
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(Pathology, Microbiology, and Immunology)
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(Pathology, Microbiology, and Immunology)
Alan J. Conley, D.V.M., Ph.D., Professor
(Pathology and Reproduction)
Patricia A. Conrad, D.V.M., Ph.D., Professor
(Pathology, Microbiology, and Immunology)
Janett J. Cullor, D.V.M., Ph.D., Professor
(Biomedical Engineering)
Sanyia Daniels, Ph.D., Professor
(Microbiology and Immunology)
Wenbin Deng, B.M., M.S., Ph.D., Assistant Professor
(Cell Biology and Human Anatomy)
William G. Ellis, M.D., Professor
(Pathology and Oncology)
Kench L. Erickson, Ph.D., Professor
(Anatomy)
Thomas B. Farver, Ph.D., Professor
(Pathology and Reproduction)
Janet Foley, M.S., D.V.M., Ph.D., Assistant Professor
(Pathology and Immunology)
Laurel J. Gershwin, D.V.M., Ph.D., Professor
(Pathology, Microbiology, and Immunology)
M. Eric Gershwin, M.D., Professor
(Rheumatology)
Sergio A. Granado, M.D., Ph.D., Professor
(Dermatology)
Clare R. Gregory, D.V.M., Professor
(Surgical and Radiological Sciences)
Steve Haskins, D.V.M., M.S., Ph.D., Professor
(Surgical and Radiological Sciences)
Kei Hayashi, D.V.M., B.V.M.S., M.S., Ph.D., Assistant Professor
(Pathology and Oncology)
Ronald P. Hedrick, Ph.D., Professor
(Medicine and Epidemiology)
Bruce S. Hoar, D.V.M., M.Vet Sci., Ph.D., Assistant Professor
(Medicine and Epidemiology)
Dallas M. Hyde, Ph.D., Professor
(Anatomy, Physiology and Cell Biology)
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(Pathology and Immunology)
James H. Jones, D.V.M., Ph.D., Professor
(Surgical and Radiological Sciences)
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(Pathology and Immunology)
Gerald J. Kost, M.D., Professor
(Pathology and Oncology)
Kit S. Lam, M.D., Ph.D., Professor
(Hematology/Oncology)
Gregory C. Lanzaro, M.S., Ph.D., Professor
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(Pathology and Reproduction)
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(Surgical and Radiological Sciences)
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(Pathology, Microbiology, and Immunology)
Nicholas, W. Lichte, D.V.M., M.V.M., Professor
(Pathology, Microbiology, and Immunology)
Irwin K. Liu, D.V.M., Ph.D., Professor
(Pathology and Reproduction)
Kent C.C. Lloyd, D.V.M., Ph.D., Professor
(Anatomy, Physiology and Cell Biology)
Hoa Lai, M.A., Ph.D., Associate Professor
(Orthopaedic Surgery)
Linda J. Lowenstein, D.V.M., Ph.D., Professor
(Pathology, Microbiology, and Immunology)
Paul A. Luciw, Ph.D., Professor
(Pathology and Oncology)
Bruce G. Lyeth, M.S., M.D., Ph.D., Professor
(Neurological Surgery)
Computer Science

See Computer Science, on page 196; Computer Science (A Graduate Group), on page 197; Engineering: Computer Science, on page 249; and Engineering: Electrical and Computer Engineering, on page 254.

The Major Program

The computer science major prepares students for careers involving the design of computer systems and their application to science, industry, and management.

The Program. Students taking this major receive solid grounding in fundamentals of computer languages, operating systems, computer architecture, and the mathematical abstraction required to use the computer in solving complex tasks. For students interested in the engineering aspects of computer science, see Engineering: Computer Science, on page 249.

Career Alternatives. The computer science program prepares students for advanced work in computer science or in other disciplines requiring advanced knowledge of the use of computers.

B.S. Major Requirements

Preparatory Subject Matter.......................... 52-58
Mathematics 21A-21B-21C, 22A or 67 ............................................... 15-16
Statistics 32 ............................................................................ 3
Computer Science Engineering 20, 30, 40, 60 ........................................................................... 16
Computer Science Engineering 50, 54, 70 ............................................................................... 4
One series from the following four ............... 14-19
(a) Chemistry 2A-2B-2C
(b) Chemistry 2A-2B and Biological Sciences 2A
(c) Chemistry 2AH-2BH-2CH
(d) Physics 9A-9B-9C and Mathematics 21D

Depth Subject Matter ...................... 46-50
Computer Science Engineering 120 or 1228 (completion of only 120 or 1228 will satisfy the core requirement, but not a computer science elective simultaneously); 122A, 140A, 150, 154A ............................................. 20
Computer Science/Mathematics electives ........................................................................... 26-30
Minimum of 7 courses including at least one mathematics or statistics course from:
Minor Program Requirements:

**Computer Science** ........................................ 24

Computer Science Engineering 50 .............. 4

Upper division Computer Science

Engineering courses ...................................... 20


maximum of 3 units from approved 192 or 199.

Graduate Study. See Graduate Studies, on page 104.

Computer Science (A Graduate Group)

Charles Martel, Ph.D., Chairperson of the Group

Group Office, 2063 Engineering II (Department of Computer Science)

(530) 752-7004; gradinfoc@ucdavis.edu; http://www.cs.ucdavis.edu

Faculty

Demet Aksoy, Ph.D., Assistant Professor

(CS)

Nina Amenta, Ph.D., Associate Professor

(CS)

Zhaojun Bai, Ph.D., Professor (Computer Science)

Matthew Bishop, Ph.D., Associate Professor

(CS)

Hemant Bhargava, Ph.D., Professor

(CS)

John Bruno, Ph.D., Professor (Computer Science)

T.S. Chang, Ph.D., Professor

(CS)

Hao Chen, Ph.D., Assistant Professor

(CS)

Harry Cheng, Ph.D., Professor

(Mechanical and Aeronautical Engineering)

R. Holland Cheng, Ph.D., Professor

(Molecular and Cellular Biology)

Frederic Chong, Ph.D., Associate Professor

(CS)

Chen-Nee Chuah, Ph.D., Assistant Professor

(CS)

Nello Cristianini, Ph.D., Associate Professor

(Statistics)

Jesus M. D’Souza, Ph.D., Assistant Professor

(Mechanical and Aeronautical Engineering)

Jesus DeLoera, Ph.D., Professor

(Mathematics)

Prem Devanbu, Ph.D., Associate Professor

(CS)

Matthew Farners, Ph.D., Professor

(CS)

Vladimir Filkov, Ph.D., Assistant Professor

(CS)

Gary Ford, Ph.D., Professor

(CS)

Andrew Frank, Ph.D., Professor

(Mechanical and Aeronautical Engineering)

Matthew Franklin, Ph.D., Professor

(CS)

Michael Gertz, Ph.D., Associate Professor

(CS)

Dipak Ghosal, Ph.D., Professor

(CS)

Daniel Gusfield, Ph.D., Professor (Computer Science)

Bernd Hamann, Ph.D., Professor (Computer Science)

Michael Haggstrom, Ph.D., Assistant Professor

(School of Medicine)

Mont Hubbard, Ph.D., Professor

(Mechanical and Aeronautical Engineering)

Sanjay Joshi, Ph.D., Assistant Professor

(Mechanical and Aeronautical Engineering)

Kenneth Joy, Ph.D., Professor (Computer Science)

Patrice Koehl, Ph.D., Associate Professor

(Computer Science)

Karl LeBitt, Ph.D., Professor (Computer Science)

Xin Liu, Ph.D., Assistant Professor

(Computer Science)

Kwan-Lei Ma, Ph.D., Professor

(Computer Science)

Bertram Ludaescher, Ph.D., Associate Professor

(Computer Science)

Charles Martel, Ph.D., Professor (Computer Science)

Norman Matloff, Ph.D., Professor (Computer Science)

Nelson Max, Ph.D., Professor (Applied Science)

E.O. Milton, Ph.D., Professor (Mathematics)

Deb Niemeier, Ph.D., Professor

(Civil and Environmental Engineering)

Pramat Mohapatra, Ph.D., Associate Professor

(Computer Science)

Biswa Nathan Mukherjee, Ph.D., Professor (Computer Science)

Distinguished Graduate Mentoring Award

Vojin G. Oklobdzija, Ph.D., Professor

(Electrical and Computer Engineering)

Ronald Olsson, Ph.D., Professor (Computer Science)

John Owens, Ph.D., Assistant Professor

(Electrical and Computer Engineering)

Raju Pandey, Ph.D., Associate Professor

(Computer Science)

Robert Redinbo, Ph.D., Professor

(Electrical and Computer Engineering)

David Rocke, Ph.D., Professor (Applied Science)

Gary Rodrigue, Ph.D., Professor (Applied Science)

Phillip Rogaway, Ph.D., Professor

(Computer Science)

Kenneth Shackell, Ph.D., Professor

(Biological and Agricultural Engineering)

Oliver Staatli, Ph.D., Assistant Professor

(Computer Science)

Henning Stahlberg, Ph.D., Assistant Professor

(Molecular and Cellular Biology)

Susan Ustin, Ph.D., Professor

(Plant Sciences)

S. Felix Wu, Ph.D., Associate Professor

(Computer Science)

Rao Vemuri, Ph.D., Professor (Applied Science)

Shih-Ho Wang, Ph.D., Professor

(Electrical and Computer Engineering)

Kari Wilken, Ph.D., Associate Professor

(Electrical and Computer Engineering)

David Woodruff, Ph.D., Professor

(Graduate School of Management)

Felix Xu, Ph.D., Associate Professor

(Computer Science)

Catherine Yang, Ph.D., Assistant Professor

(Graduate School of Management)

Peter Youngblood, Ph.D., Professor

(School of Medicine)

Ben Yao, Ph.D., Professor

(Electrical and Computer Engineering)

Emirati Faculty

Ralph Algazi, Ph.D., Professor Emeritus

Meera Blattner, Ph.D., Professor Emeritus

S. L. Hakimi, Ph.D., Professor Emeritus

Peter Unz, Ph.D., Professor Emeritus

Manfred Ruschitzka, Ph.D., Professor Emeritus

Michael Soderstrand, Ph.D., Professor Emeritus

Donald Topkis, Ph.D., Professor Emeritus

Richard Walters, Ph.D., Professor Emeritus

Affiliated Faculty

Owen Carmichael, Ph.D., Visiting Assistant Professor

(Computer Science)

Farrid Dowla, Ph.D., Adjunct Associate Professor

(Applied Science)

Graduate Study. The Graduate Group in Computer Science offers programs of study leading to the M.S. and Ph.D. degrees in Computer Science. The varied nature of the faculty brings a wide variety of research interests to the program. Research strengths lie in algorithms, computational biology, computer architecture, computer graphics and visualization, database systems, computer security and cryptography, computer networks, program specifications and verification, programming languages and compilers, parallel and distributed systems, scientific computation, and software engineering. Interdisciplinary research in computer science is encouraged.

Preparation. Normal preparation for the program is a bachelor's degree in either computer science or in a closely related field (such as electrical engineering or mathematics, with substantial coursework in computer science). Applications are also considered from students with outstanding records in other disciplines. M.S. students may either complete a thesis or pass a comprehensive examination. Ph.D. students must pass a qualifying oral examination and complete a dissertation demonstrating original research in an area approved by the Graduate Group.


Conservation Biology

See Ecology (A Graduate Group), on page 209; Environmental Biology and Management, on page 274; and Wildlife, Fish, and Conservation Biology, on page 516.

Consumer Science

(Graduate of Agricultural and Environmental Sciences)

Major Faculty. See also the Division of Textiles and Clothing, on page 492.

Major Programs. The Consumer Food Science option under the Food Science major is a related program. See also Food Science and Technology, on page 295, Nutrition, on page 427, and Textiles and Clothing, on page 492.

Graduate Study. For graduate study, see Graduate Studies, on page 104.

Courses in Consumer Science (CNS)

Questions pertaining to the following courses should be directed to the Division of Textiles and Clothing Advising office in 129 Everson Hall.

Lower Division Course

92. Internship in Consumer Science (1-12)

Internship—3.36 hours. Prerequisite: consent of instructor. Internship on and off campus in a consumer science-related area. (P/NP grading only.)

Upper Division Courses

100. Consumer Behavior (3)

Lecture—3 hours. Prerequisite: preparation in areas of psychology or sociology and economics recommended. Provides a set of behavioral concepts and theories useful in understanding consumer behavior on the part of the individual, business, and social organizations. Conceptual models to help guide and understand consumer research will be presented. GE credit: SocSci, Div. Writ.

192. Internship in Consumer Science (1-12)

Internship—3.36 hours. Prerequisite: completion of a minimum of 84 units; consent of instructor. Internship on and off campus in a consumer science-related area. (P/NP grading only)

198. Directed Group Study (1-5)

(P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only)
Contemporary Leadership

The Science and Society Program offers a minor in Contemporary Leadership, open to all undergraduate students regardless of major. The minor provides a broad overview of leadership theory and practice, and engages students in critical thinking, self-reflection, problem solving and multicultural education. Students should contact the minor adviser for course selection and plan approval.

Minor Program Requirements:

<table>
<thead>
<tr>
<th>UNITS</th>
<th>Course Title</th>
<th>Prerequisite</th>
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<tbody>
<tr>
<td>24</td>
<td>Contemporary Leadership</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Science and Society 130</td>
<td></td>
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<tr>
<td>2</td>
<td>Science and Society 192 taken concurrent with an approved internship</td>
<td></td>
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<td>2</td>
<td>Science and Society 190X</td>
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</tbody>
</table>

Preparatory Subject Matter

One upper division course from each of the following four areas:

Ethics and Values


Communication, Interpersonal Relationships and Human Dynamics

- Anthropology 139AN, Communication 134, 135, 136, Community and Regional Development 172, 174, Linguistics 163, Psychology 145, Sociology 126, 132, University Writing Program 104  | 4

Organizational Structure and Cultures

- American Studies 125, Anthropology 105, 123BPH, Community and Regional Development 152, 154, 158, 164, Psychology 156, Sociology 30A, 125, 156, 180A, 180B, 183, Women's Studies 140  | 4

Multiculturalism, the Global Community and Social Change

- American Studies 133, 153, 156, Community and Regional Development 176, English 179, History 173, 178, Native American Studies 134, Political Science 124, Sociology 125, 130, Textiles and Clothing 174  | 4

Minor Adviser: Consult the Center For Leadership Learning Office in 168 La Rue Road. To request an advising appointment send an e-mail to clm@ucdavis.edu

Critical Theory

Scott C. Shershov, Ph.D., Program Director
Program Office, 611 Sproul Hall  | 530-752-5799 | http://criticaltheory.ucdavis.edu|
Committee in Charge
Jeff Fort, Ph.D. (French and Italian)  | Neil Larson, Ph.D. (Comparative Literature)

Gerhard Richter, Ph.D. (German)  | David Simpson, Ph.D. (English)  | Blake Stimson, Ph.D. (Art History)

Graduate Study

The program in Critical Theory offers study and research leading to the Ph.D. with a designated emphasis in Critical Theory. The program provides theoretical emphasis and interdisciplinary perspective to students already preparing for the Ph.D. in one of 13 participating departments [Anthropology, Comparative Literature, Culture Studies, Education, English, French, German, History, Music, Native American Studies, Sociology, Spanish, and Theatre and Dance]. Students complete all requirements for the Ph.D., including the dissertation, in one of the participating departments. Minimum coursework for the Critical Theory Designated Emphasis consists of four courses. The first three of these, Critical Theory 200A, 200B, and 200C, form a coherent sequence and are normally taken in consecutive order. For the fourth course, students have the option of taking another section of Critical Theory 200B or an approved course from any affiliated department.

Graduate Adviser: Consult Critical Theory Program office

Courses in Critical Theory (CRI)

Upper Division Courses

101. Introduction to Critical Theoretical Approaches to Literature and Culture (4) Lecture/discussion—3 hours; term paper. Prerequisite: one upper division literature course or consent of instructor. Introduction to critical theory and its use for interpreting literary texts, film, and media forms in our present global culture. (Same course as Comparative Literature 141.) GE credit: ArtHum, Wrt.—Ill. (III.)

Graduate Courses

200A. Approaches to Critical Theory (4) Seminar—3 hours; term paper. Prerequisite: graduate standing in a participating program. The problem of interpreting thought in 20th-century thought with a critical overview of various theoretical approaches [e.g., semiotics, hermeneutics, deconstruction, social and cultural critique, feminist theory, psychoanalysis].—I, II, Ill. (I, II, Ill.)

200B. Problems in Critical Theory (4) Seminar—3 hours; term paper. Focused study of a particular critical theoretical approach, school or perspective. Topics may include but are not limited to: critical approaches to the study of culture, film, historiography, visual culture, the body, and aesthetic. May be repeated for credit with consent of instructor if topic differs.—I, II, Ill. (I, II, Ill.)

200C. History of Critical Theory (4) Seminar—3 hours; term paper. Critical analysis and discussion of pre-twentieth century theories of literary and cultural criticism. Topics may include but are not limited to: ancient and early modern philosophy; nature and culture in the Renaissance; theories of Mimicry from antiquity to the Renaissance. May be repeated for credit with consent of instructor if topic differs.—I, II, Ill. (I, II, Ill.)

201. Critical Theory Special Topics (4) Seminar—3 hours; term paper. Prerequisite: course 200A. Application of theoretical principles to one specific research topic. May be repeated for credit with consent of instructor when topic differs.—I, II, Ill. (I, II, Ill.)

202. Visual Culture (4) Lecture/discussion—4 hours. Prerequisite: course 200A strongly recommended. Analysis of image production in the contemporary world (photography, film, television, advertising, etc.) and their effects on individual subcultures and collective social identities.—II, (III)

298. Directed Group Study (1-5)

299. Individual Study (1-12) (S/U grading only)

Crop Science and Management

This major will be discontinued as of Fall 2008; see Plant Sciences, on page 448.

(College of Agricultural and Environmental Sciences)

Faculty: See under Plant Sciences, on page 448.

Related Major Programs. The major relies on courses taught in conjunction with numerous other major programs, particularly Plant Biology, Plant Sciences, and Agricultural and Resource Economics.

The Major Program

The Crop Science and Management major trains students in biological and natural sciences and economics as they apply to the production, protection, and maintenance of crop plants, and their quality following harvest.

The Program: Students majoring in crop science and management spend the first two years of study developing the scientific and general background necessary for upper division work. The science courses include chemistry, biology, botany, physics, and mathematics. Management courses include economics and accounting. General background is provided by courses in the social sciences/humanities (English, rhetoric, and the general education program). At the upper division level, students take courses in areas supportive of crop science and farm management, such as entomology, weed science, water and soil science, plant pathology, nematology, plant physiology and agricultural economics. Students may specialize by electing courses pertinent to specific crop types (vegetables, fruits and nuts, small grains, or nursery crops).

Internships and Career Alternatives. This program prepares graduates for careers in farm management and various other technical and management positions in agricultural business and associated enterprises, such as banking and equipment and supply companies, as well as private, state and federal service in consulting and research. Graduates are also qualified to pursue graduate studies in sciences such as plant biology, horticulture, agriculture, agroecology, pest management, economics or business management. Internships are available in local companies involved in farm production and in extension work with farm advisors.

B.S. Major Requirements:

<table>
<thead>
<tr>
<th>Units</th>
<th>Course Title</th>
<th>Prerequisite</th>
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<tbody>
<tr>
<td>8</td>
<td>English Composition Requirement</td>
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</tbody>
</table>

See College requirement.

Preparatory Subject Matter

| 60-62 | Biological Sciences 1A, 1B, 1A, 1C |  |  
| 15    | Chemistry 2A, 2B, 8A, 8B |  |  
| 16    | Mathematics 16A, 16B |  |  
| 6     | Physics 1A-1B or 1A-1B |  |  
| 8     | Plant Sciences 21 |  |  
| 3     | Economics 1A, 1B |  |  
| 8     | Plant Sciences 120, Statistics 13 or 102 |  |  
| 4      | Applied Biological Systems Technology |  |  

Breadth/General Education

| 24 | See General Education requirement and consult your adviser. |

Depth Subject Matter

| 57-60 | Crop and Soil Science Component |  |  
| 22-24 | Plant Biology 111 or Environmental Horticulture 102, Plant Biology 142, Soil Science 100, Hydrology 110 or 124 |  |  

In consultation with adviser select a minimum of 8 additional units from Plant Sciences 110A, 110B, 110C, 110L, Environmental Horticulture 125, Plant Biology 173, 174, Viticulture and Enology 115  |  |  

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer; 2009-2010 offering in parentheses.

Cultural Studies (A Graduate Group)

Caren Kaplan, Ph.D., Director of the Group

Group Office. 3337 Hart Hall (530) 752-1717

culturalstudies.ucdavis.edu

Committee in Charge
Robert Irwin, Ph.D. (Spanish and Classics)
Susan Kaiser, Ph.D. (Drama and Clothing, Women and Gender Studies)
Caren Kaplan, Ph.D. (Women and Gender Studies)
Betina Ng'weno, Ph.D. (African American and African Studies)
Rhael Parnenas, Ph.D. (Asian American Studies)
Eric Smoodin, Ph.D. (American Studies)

Affiliated Faculty
Moradewun Adejunmobi, Ph.D., Professor
David Biale, Ph.D., Professor (History, Jewish Studies)
Patrick Carroll, Ph.D., Assistant Professor (Sociology, Science and Technology Studies)
Angie Chabrat-Dennissen, Ph.D., Professor (Chicana/o Studies)
Miraslava Chavez-Garcia, Ph.D., Associate Professor (Chicana/o Studies)
Elizabeth Conklin, Ph.D., Associate Professor (French and Italian)
Allison Couvert, Ph.D., Professor (Religious Studies)
Marisol de la Cadena, Ph.D., Associate Professor (Anthropology)
Sergio de la Mora, Ph.D., Associate Professor (Chicana/o Studies)
Carolyn de la Peña, Ph.D., Associate Professor (American Studies)
Gregory Dobbins, Ph.D., Assistant Professor (English)
Donald Donham, Ph.D., Professor (Anthropology)
Joseph Dunt, Ph.D., Associate Professor (Anthropology, Science and Technology Studies)
Frances Dyson, Ph.D., Associate Professor (Technology and Environmental Policy)
Osmar El Shakry, Ph.D., Assistant Professor (History)
Gail Finney, Ph.D., Professor (Comparative Literature, German and Russian)
Distinguished (Theatre and Dance)
Jaimey Fisher, Ph.D., Associate Professor (German and Russian)
Yvette Flores, Ph.D., Professor ( Chicano/a Studies)
Elizabeth Freeman, Ph.D., Associate Professor (English)
Gayatri Gopinath, Ph.D., Assistant Professor (Women and Gender Studies)
Ryken Grotte, Ph.D., Associate Professor (Sociology)
Laura Grindstahl, Ph.D., Associate Professor (Sociology)
John R. Hall, Ph.D., Professor (Sociology)
Bruce Haynes, Ph.D., Associate Professor (Sociology)
Wendy Ho, Ph.D., Associate Professor (Asian American Studies, Women and Gender Studies)
Lynnette Hunter, Ph.D., Professor (Theatre and Dance)
Robert Irwin, Ph.D., Associate Professor (Spanish and Classics)
Kevin Johnson, J.D., Professor (School of Law)
Alessa Johns, Ph.D., Associate Professor (English)
Suad Joseph, Ph.D., Professor (Anthropology and Gender Studies)
Douglas Kahn, Ph.D., Professor (Technocultural Studies)
Susan Kaiser, Ph.D., Professor (Textiles and Clothing, (American Studies and Women)
Caren Kaplan, Ph.D., Professor (Women and Gender Studies)
Ari Y. Kelman, Ph.D., Assistant Professor (American Studies)
Richard Kim, Ph.D., Assistant Professor (Asian American Studies)
Elisabeth Krimmer, Ph.D., Associate Professor (German and Russian)
Catherine Kudlick, Ph.D., Professor (History)
Anna K. Kuhn, Ph.D., Professor (Women and Gender Studies)
Benjamin Lawrence, Ph.D., Assistant Professor (History)
Michael Lazzara, Ph.D., Assistant Professor (Spanish and Classics)
Sheldon Lu, Ph.D., Professor (Comparative Literature)
Dean MacCannell, Ph.D., Professor Emeritus (Environmental Design)
Suainna MAira, Ph.D., Associate Professor (Asian American Studies)
Desiree Martin, Ph.D., Assistant Professor (English)
Jay Mechling, Ph.D., Professor (American Studies)
Luz Mena, Ph.D., Assistant Professor (Women and Gender Studies)
Colin Milburn, Ph.D., Assistant Professor (English)
Susette Min, Ph.D., Assistant Professor (Asian American Studies)
Patricia Moran, Ph.D., Professor (English)
Kimberly Nettles, Ph.D., Assistant Professor (Women and Gender Studies)
Judith Newton, Ph.D., Professor (Women and Gender Studies)
Betina Ng’weno, Ph.D., Assistant Professor (African American and African Studies)
Jacobs Olupona, Ph.D., Professor (African American Studies)
Robert Ostertag, Ph.D., Professor (Technocultural Studies)
Halifu Osumare, Ph.D., Associate Professor (African American and African Studies)
Rhael Parreñas, Ph.D., Professor (Asian American Studies)
Riché Richardson, Ph.D., Associate Professor (English)
Catherine Rosbom, Ph.D., Associate Professor (English)
Jon Rossini, Ph.D., Assistant Professor (Theatre and Dance)
Parama Roy, Ph.D., Associate Professor (English)
Margaret Rucker, Ph.D., Professor (Textiles and Clothing)
Suzana Sawyer, Ph.D., Associate Professor (Anthropology)
Juliana Schieren, Ph.D., Professor (Comparative Literature, French and Italian)
Barbara Sellers-Young, Ph.D., Professor (Human and Cultural Development)
Scott Simmon, Ph.D., Professor (English)
Julia Simon, Ph.D., Professor (French and Italian)
Michael P. Smith, Ph.D., Professor (Sociology, Science and Technology Studies)
Eric Smoodin, Ph.D., Professor (American Studies)
Smiti Srinivas, Ph.D., Associate Professor (Anthropology)
Blake Stimson, Ph.D., Professor (Art History)
Stanley Sue, Ph.D., Professor (Psychology, Asian American Studies)
Maria Yum, Ph.D., Professor (Women and Gender Studies, Women and Gender Studies)
Margaret Swain, Ph.D., Associate Adjunct Professor (Women and Gender Studies)
Julie Sze, Ph.D., Assistant Professor (American Studies)
Patricia Turner, Ph.D., Professor (African American and African Studies)
David Van Leer, Ph.D., Professor (English)
Clarence Walker, Ph.D., Professor (School of Law)
Hehgner Waterpauget, Ph.D., Associate Professor (Art History)
Evan Watkins, Ph.D., Professor (English)
Karen Watson-Gregg, Ph.D., Professor (Education)
Distinguished Graduate Mentoring Award
Diane Wolf, Ph.D., Professor (Sociology)
Ari Y. Kelman, Ph.D., Assistant Professor (American Studies)
Julie Wyman, Ph.D., Assistant Professor (Technocultural Studies)
Li Zhang, Ph.D., Associate Professor (Anthropology)

Graduate Study, The Cultural Studies Graduate Program offers both M.A. and Ph.D. degrees in Cultural Studies. The program emphasizes an interdisciplinary approach to cultural inquiry that includes analyses of intersecting categories such as class, gender, race, ethnicity, sexuality, nationality, and the like. Students entering the program will use and develop methodologies from many fields to suit their objects of study. Students may pursue research in the following designated areas (1) gender (including masculinity studies), (2) sexualities, (3) comparative race studies, (4) media and popular cultural representation, (5) science and society, (6) transnational and global studies, (7) religions, communities, and politics, (8) hyloric and critical theory, and (9) disability studies. Or, with the close guidance and supervision of a faculty committee, students may create their own areas of emphasis.

Preparation. Normal preparation for the program is a bachelor’s degree in a related field. MA students must pass an examination. Ph.D. students must pass a qualifying examination, a comprehensive examination, and complete a dissertation demonstrating original research in an area approved by the Graduate Group. In addition to the standard UC Davis graduate application (which requires a statement of purpose), we also require three letters of recommendation, transcripts, GRE scores, writing sample (ten-page minimum, not exceeding twenty pages), and a fellowship application.

Graduate Advisers. Caren Kaplan (Women and Gender Studies), Susan Kaiser (Textiles and Clothing), Eric Smoodin (American Studies)

Courses in Cultural Studies (CST)

200A. Histories of Cultural Studies (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing or consent of instructor. Undergraduate coursework in the humanities or social sciences recommended. Histories and traditions of cultural studies internationally; multiple legacies of cultural studies as a field of inquiry in various geographical contexts; foregrounds important critical perspectives resulting from social and intellectual movements worldwide. (1)
200. Theories of Cultural Studies (4) Lecture/discussion—4 hours. Prerequisite: course 200A or consent of instructor. Definitions of "critical" scholarship and examination of various contexts in which cultural studies theory has emerged worldwide. Both mainstream and alternative theoretical traditions, such as those developed by people of color and by other minoritized groups. —II. (III.)

200C. Practices of Cultural Studies (4) Lecture/discussion—4 hours. Prerequisite: courses 200A and 200B or consent of instructor. Methodological innovations in cultural studies research. Critical analyses of ethnography, textual analysis, social change, community development, and identity formation. Emphasis given to students' unique versions of cultural studies practices. —II. (III.)

204. History and Theory of Sexualities (4) Lecture/discussion—4 hours. Prerequisite: course 200A (may be taken concurrently) or consent of instructor. Studies of sexualities in feminist, literary, historical, and cultural studies research, specifically examining the emergence of "sexuality" as a field of research and the relationship of sexuality studies to cultural forms, subjectivity, and social relations generally. Not offered every year. —I. (II.)

206. Studies in Race Theory (4) Lecture/discussion—4 hours. Prerequisite: course 200A (may be taken concurrently) or consent of instructor. Theoretical framework for the critical study of race, drawing upon cultural studies and postcolonial scholarship in order to understand the social production of "race" as a category for organizing social groups and determining group processes. Not offered every year. —II. (III.)

208. Studies in Nationalism, Transnationalism, and Late Capitalism (4) Lecture/discussion—4 hours. Prerequisite: course 200A (may be taken concurrently) or consent of instructor. Contemporary theories of nation, nationalism, postcolonialism, and transnationalism. Specific attention to the relationship between cultural production and the formation of ideas about nation and nationalism, including examination of both "legitimating" and resistant discourses. Not offered every year. —III. (III.)

212. Studies in the Rhetorics of Culture (4) Lecture/discussion—4 hours. Prerequisite: course 200A (may be taken concurrently) or consent of instructor. Survey of critical and analytical approaches to the study of texts. Examination of multi-mediated objects to understand their cultural import by focusing on differential production, distribution, and reception processes, and related shifts in power relations. Not offered every year. —I. (II.)

214. Studies in Political and Cultural Representations (4) Lecture/discussion—12 hours. Prerequisite: course 200A (may be taken concurrently) or consent of instructor. Framework for the analysis of political and popular cultural representations. Emphasis on concepts, theories, and methodologies illuminating dominant and vernacular cultural representation, appropriation, and innovation in transnational contexts. May be repeated for credit up to 4 times when topic differs. Not offered every year. —II. (II.)

250. Research Seminar (4) Seminar—4 hours. Prerequisite: courses 200A, 200B, 200C or consent of instructor. Designed to facilitate student interaction and promote student research by guiding students through the production of a publishable essay. Essays submitted, distributed, and discussed by seminar participants. May be repeated up to 12 units of credit. —II. (II.)

270A-270B-270C. Individually Guided Research in Cultural Studies (4-4-4) Discussion—1 hour; independent study—2 hours; extensive writing. Prerequisite: course 200C, 250, consent of instructor. Individualized research, under the supervision of a faculty member, on a Cultural Studies topic related to the student's proposed dissertation project to produce a dissertation prospectus. —I, II, III. (I, II, III.)

290. Colloquium (1) Lecture—1 hour. Prerequisite: graduate standing or consent of instructor. Designed to provide cohort identity and faculty student exchange. Opportunity to present papers, hear guest lecturers, and see faculty presentations, gather for organizational and administrative news, exchange information, and make announcements. May be repeated up to 12 units of credit. (S/U grading only) —I, II, III. (I, II, III.)

295. Special Topics (4) Lecture/discussion—4 hours. Prerequisite: graduate standing or consent of instructor. Special topic courses offered according to faculty and student interests and demands. May be repeated for credit with consent of adviser. —I, II, III. (I, II, III.)

298. Group Research (1-5) (S/U grading only) —I, II, III. (I, II, III.)

299. Directed Research (1-5) (S/U grading only) —I, II, III. (I, II, III.)

299D. Dissertation Research (1-12) Independent study—3-36 hours. Prerequisite: advancement to doctoral candidacy. (S/U grading only) —I, II, III. (I, II, III.)

Professional Course

396. Teaching Assistant Training Practicum (1-4) Prerequisite: graduate standing. May be repeated for credit. (S/U grading only) —I, II, III. (I, II, III.)

Design

[College of Letters and Science]

Patrick Harrison, M. Arch., Program Director

Program Office, 142 Walker Hall

Program offers a creative, challenging, and meaningful program into further graduate study, clothing, graphic design, interior design and architectural firms, exhibit and display work in galleries and museums, and theatrical and textile companies. In addition, students have become entrepreneurs through freelance and commissioned work in many related areas. The Design program encourages students to experience design abroad through a variety of sponsored programs. Contact the Education Abroad Center for more information.

A.B. Major Requirements:

INTERIOR ARCHITECTURE

Preparatory Subject Matter.................. 28
Design 1, 14, 15, 16.................................. 16
Design 21, 50...................................... 8
Design 40A or 408.............................. 4

Depth Subject Matter....................... 40
Design 134A, 134B, 138, 150A,.............. 16
Choose three courses from one of the following groups:.......................... 12

Podtering Subject Matter.................. 28
Design 144...................................... 4

Interior: Design 150B, 180A, 180B
Furniture Design 135A, 135B, 1508
Lighting: Design 134A, 134B, 137A, 1378

Two courses from Art History 168, 184,
188A, 188B, Design 142A, 142B, at least
one of which must be from Art History 168,
184, 188A, 188B................................. 8

Total Units for the Major..................... 68

Textile and Fashion Design emphasis:

Preparatory Subject Matter................. 28
Design 1, 14, 15, 16............................ 16
Two courses from Design 70, 77.............. 8
Design 40A or 408.............................. 4

Depth Subject Matter....................... 40
Select seven courses from 107, 127, 131,
132A, 132C, 160, 161, 170, 171, 177,
179.................................................. 28

Three courses from Design 142A, 142B,
143, 144, 145 at least two of which must be
from Design 142A, 142B, 143, 145.............. 12

Total Units for the Major..................... 68

Visual Communication emphasis:

Preparatory Subject Matter................. 28
Design 1, 14, 15, 16............................ 16
Design 13............................................. 4
Design 40A or 408.............................. 4

Depth Subject Matter....................... 44
Design 113, 115, 116, 117.................... 16
One course from Design 161, 185, 186, 187...

The Program. Foundation courses, Design and Visual Culture, Design Drawing, Design Media, and Graphic Design and Computer Technology, are required of all design majors. Beyond these, students take courses in their depth subject major emphasizing their interests. Students select one of four areas of emphasis to focus undergraduate study: Textile and Fashion Design; Interior Architecture, including furniture and lighting design; Visual Communication and Exhibition. The selected emphasis determines the required core of courses, all emphases are complemented by classes in design history. A more detailed explanation is available through the Design Advising office in 152 Walker Hall (530) 752-1165.
Three courses from Design 154, 155A, 157, FCS 103 = Social-Cultural Diversity; ArtHum, WRT
Design 45
Two courses from Design 142A, 142B, 143, 144, Art History 110 = ArtHum, WRT

Total Units for the Major = 68

Major Adviser: Information on the current Academic Adviser can be obtained by contacting the Undergraduate Adviser (530) 752-1165.

Graduate Study: The program in Textile and Costume Design leading to the Master of Fine Arts degree offers students opportunities for independent, creative, innovative interdisciplinary study combining design with anthropological, critical theory, consumer issues, art, engineering, the sciences and theater. Faculty work closely with students to build individual programs based upon a student’s current knowledge in textile and costume design. Study in new technologies and experimental approaches are encouraged. Areas of emphasis include constructed textiles (off-loom and woven, surface design, computer-integrated textile design, and functional, ethnographic, and aesthetic costumes). The Textile and Costume Study Collection, which houses over 8,500 artifacts, is a valuable resource in enriching studies emphasizing multicultural expression. For information about specific requirements, please contact the Advising Center (530) 752-1165.

Graduate Adviser: Please contact the Program at (530) 752-1165.

Courses in Design (DES)
Questions pertaining to the following courses should be directed to the instructor or to the Design Advising office in 152 Walker Hall (530) 752-1165. Scheduling of classes is subject to change; please contact the Advising office to confirm when a course is offered.

Lower Division Courses
1. Introduction to Design (4)
   Lecture = 4 hours. Introduction to the design discipline through readings, writing, visual problem solving, and critical analysis. Topics: design principles and elements, vocabulary, color theory, Gestalt principles, conceptualizing, strategies. Role of designer and products in contemporary culture including social responsibility and sustainability. — [I] Sylva

3. Photography for Designers (4)
   Studio = 6 hours; lecture = 2 hours. Prerequisite: course 1, 14, 15. Photography for designers with emphasis on 35mm camera photography, black and white processes, and darkroom techniques. Brief introduction to digital photography. The role of photography's anthropological, critical analysis of photographs. Priority given to Design majors. — [IV] Sylva

10. Photography for Designers (4)
   Studio = 6 hours; lecture = 2 hours. Prerequisite: course 1, 14, 15. Photography for designers with emphasis on 35mm camera photography, black and white processes, and darkroom techniques. Brief introduction to digital photography. The role of photography's anthropological, critical analysis of photographs. Priority given to Design majors.

14. Design Drawing (4)
   Studio = 5 hours; lecture = 2 hours. Prerequisite: course 1; students with a background in drawing or Advanced Placement Art Studio units are encouraged to submit a portfolio for review to waive this course. Priority to Design majors. Drawing as a tool for design. Basic skills in objective observation and representation, including line, shape, tone, and space. Drawing as a tool for formulating and working through design problems.

15. Form and Color (4)
   Studio = 5 hours; lecture = 2 hours. Prerequisite: course 1, 14 or consent of instructor. Priority to Design majors. Understanding color, form and composition as ways of communicating design concepts and context. Color theory, color mixing, interaction of color. Explores a variety of materials, media and presentation techniques.

16. Graphic Design and Computer Technology (4)
   Studio = 6 hours; lecture = 1 hour. Prerequisite: course 1, 14, 15. Introduction to computers in design with emphasis on development of a general understanding of graphic design, including theory, practice, and technology. Includes principles of color, visual organization, visual hierarchy, typograhy, image enhancement. Projects created on Macintosh computers. Priority given to sophomore and junior Design majors.

21. Drafting and Perspective (4)
   Studio = 8 hours. Prerequisite: course in drawing recommended. Creation of three-dimensional designs on two-dimensional surfaces.

40A. History of Design: Ancient through Industrial Revolution (4)
   Lecture = 4 hours. Prerequisite: course 1. Priority to Design majors. A social and stylistic history of design (crafts and industrial products, costume, architecture, landscape, graphic) up to the 19th century. Emphasis on changing methods of design and production in the 19th century. Field trip required. Not open for credit to students who have completed course 40 or course 140. GE credit: ArtHum, WRT.

40B. History of Modern Design (4)
   Lecture = 4 hours. Prerequisite: course 1; course 40A or art history through the 19th century recommended, or consent of instructor. Priority given to Design majors. Social and stylistic history of design (crafts and industrial products, costume, architecture, landscape, visual communication) from the mid-nineteenth century up to the present. Emphasis is on design reform and the growth of modernism in Europe and America. Field trip required. GE credit: ArtHum, WRT.

50. Model Making (4)
   Lecture = 2 hours; studio = 5 hours. Prerequisite: courses 1, 14, 15, 21 or consent of instructor. Priority to Design majors. Introduction to concepts, methods and materials for model making in design. The use of models for idea generation, as well as specifics for study models, semi-detailed and presentation models. — Kessler

60. Introduction to Surface Design (4)
   Lecture = 2 hours; studio = 5 hours. Prerequisite: courses 1, 14, 15. Priority to Design majors. Introduction to diverse methods for creating imagery, patterns, and textures on cloth. Explorations and experimentation with dyes and pigments, mechanical resists, color, and chemical alterations of textile surfaces and structures.

70. Introduction to Textile Design Structures (4)
   Lecture = 2 hours; studio = 5 hours. Prerequisite: course 1. Priority given to Design majors. Introduction to diverse methods for creating textile structures. Exploration of the creative potential of hand-constructed textiles, manipulation of fabric to create dimension and texture, in abstract and representational fabrics. Not open for credit for students who have completed courses 23 or 24. Not open for credit for students who have completed both 23 and 24. — Savageau

77. Introduction to Structural Design for Fashion (4)
   Lecture = 2 hours; studio = 5 hours. Prerequisite: courses 1, 14, 15, 70. Priority given to Design majors. The study and practice of designing clothing for the human body. Emphasis on flat pattern development, structural joining sequences and the development of three-dimensional garments from two-dimensional drawings. Not open for credit to students who have completed course 77A.

99. Special Study for Undergraduates (1-5)
   Prerequisite: consent of instructor. (P/NP grading only)

Upper Division Courses
107. Advanced Structural Design for Fashion (4)
   Lecture = 2 hours; studio = 5 hours. Prerequisite: courses 1, 14, 15, 70, 77 (77A also acceptable) or consent of instructor. Priority given to Design majors. Advanced study and practice of designing clothing for the human body through pattern development and structural joining. Emphasis on draping techniques and advanced conceptualization for fashion design. Not open for credit to students who have taken course 77B.

113. Visual Communication: Digital Imaging (4)
   Lecture = 2 hours; studio = 5 hours. Prerequisite: courses 1, 13, 15, 16, or consent of instructor, priority to Design majors. Digital imaging for designers, combining theoretical perspectives with practical applications. Expansion of use of the single photographic image through collage techniques, grids, triptychs and image sequencing. Alteration of image meaning through the addition of text. — Sylva

115. Letterforms and Typography (4)
   Lecture = 2 hours; studio = 5 hours. Prerequisite: courses 1, 14, 15, 16. Fundamentals of letterforms and typography. Characteristics of typefaces, formatting and composing. Principles of legibility, visual hierarchy, rules and blocks, grids, and integration of type with images. Not available for credit to students having completed course 22.

116. Visual Communication: Graphic Design Studio (4)
   Studio = 5 hours; lecture = 2 hours. Prerequisite: courses 1, 13, 14, 15, 16, 113, 115. Priority to Design majors. Through multiple, conceptually-linked assignments, this course presents fundamental choices designers make in translating concepts into graphic form, taking projects from initial concept and research, to design strategies, to project resolution and audience reception. Not open for credit to students who have completed course 152 or 152A.

117. Visual Communication: Internet and Interactive Design (4)
   Lecture = 2 hours; studio = 5 hours. Prerequisite: courses 1, 13, 14, 15, 16, 113, 115. Priority to Design majors. Technical and conceptual aspects of creating interactive visual media for screen-based delivery, concentrating on web sites. Attention to conceptual framework, visual design, information architecture and interactivity. Research and written pre-production materials required. Not open for credit to students who have completed course 153.

127. Critical Issues in Design and Art: Environmental Conservation (4)
   Lecture = 2 hours; studio = 4 hours. Prerequisite: course 1, Art 5 or Landscape Architecture 1 or consent of instructor. Analysis of responsible and sustainable design and art that addresses issues in visual and environmental arts addressing issues in renewable resources; working with nature, reuse/recycling, post-consumer products, reclamation, endangered sources, and new/alternative uses of products and materials. Required field trip. — [Ill] Laky

127A. Sustainable Design (4)
   Lecture = 4 hours. Prerequisite: course 1, 14, 15, and 16 recommended. Principles, practice and materials of contemporary sustainable design in the context of environmental crisis. History of sustain-
Design

able design in relation to the fields of textiles, visual communication, interior architecture, exhibit planning, and lighting. Only two units of credit for students who have completed course 127.—II. (II.) Savageau

127B. Studio Practice in Sustainable Design (4)
Lecture—2 hours; studio—5 hours. Prerequisite: courses 1, 14, 15, 16 and 127A. Analysis and practice of sustainable design within studio context. Design project that incorporates the reuse of past consumer materials vs. sustainable materials; Cradle to Cradle philosophy and practice; biomimicry; Life Cycle Analysis. Required field trips. Not open for credit to students who have completed course 127.—III. (III.) Savageau

130. Introduction to Interior Design—Residential (4)
Lecture/discussion—2 hours; studio—5 hours. Prerequisite: course 1, 13, 14, 15, 16, and 21. Introduction to the theory and practice of interior design with focus on residential spaces. Basic methods of design conceptualization, development, and presentation. For Design majors only.—Kessler

132. Loom-Constructed Textile Design (4)
Studio—8 hours. Prerequisite: course 132A. Intermediate level study of complex fabric structure with emphasis on pattern in relation to surface, dimension, and material.

134A. Introduction to Interior Design—Residential (4)
Lecture/discussion—2 hours; studio—5 hours. Prerequisite: course 1, 13, 14, 15, 16, and 21. Introduction to the theory and practice of interior design with focus on residential spaces. Basic methods of design conceptualization, development, and presentation. For Design majors only.—Kessler

134B. Introduction to Interior Design—Commercial and Technical Spaces (4)
Studio—5 hours; lecture/discussion—2 hours. Prerequisite: Course 1, 13, 14, 15, 16, 21. 134A. Introduction to the theory and practice of interior design with focus on small commercial and technical spaces. Archetypal spaces, non-residential building systems, ADA accessibility, design programming and research methods. Priority to Design majors.—Kessler

135A. Furniture Design (4)
Studio—8 hours. Prerequisite: course 21; course 134A recommended. Development of designs for contemporary furniture. Consideration of behavioral and physical requirements, cultural and historic expression, and structural and aesthetic qualities. Process includes research, drawings, and construction of scale models. Required field trip.

135B. Furniture Design (4)
Studio—8 hours. Prerequisite: course 135A or consent of instructor. Design and construction of full size prototype furniture based on preliminary work completed in course 135A. Material technology, construction methods, and finishes discussed. Process includes development of shop drawings and furniture construction. Required field trip.

136A. Lighting Technology and Interior Design (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: courses 1, 14, 16, 21; courses 134A and 134B recommended; consent of instructor. Priority given to Design majors. Introduction to lighting design and technology. Understanding the role of lighting in the development of functional and aesthetically pleasing environments. Energy efficiency in lighting. Limited enrollment.—Smiatovitch

136B. Designing with Light (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: Simes 1, 14, 16, 21, 136A; courses 134A and 134B recommended; consent of instructor. Priority given to Design majors. Design and manipulation of light sources, luminaires, and lighting controls to enhance the psychological and aesthetic impact of interior and exterior spaces. Design projects explore lighting effects, light distribution characteristics, and luminaire design. Limited enrollment.—Smiatovitch

137A. Principles of Daylighting (4)
Lecture/discussion—3 hours; studio—4 hours. Prerequisite: courses 1, 14, 15, 16, 21, 134A and 134B or consent of instructor; course 50 recommended. Prior presentation includes Design and Engineering majors. The impact of natural light on the built environment and methods to control glare and maximize energy savings.—Pampanichal

137B. Daylighting Design Studio (4)
Lecture/discussion—Pre-1 hours; studio—4 hours. Prerequisite: course 137A; courses 136A and 136B recommended. Daylighting design issues; ambient and task lighting, lighting requirements in residential, commercial, and industrial applications; daylight analysis and design; side and top lighting; glazing selection; shading systems; integration with electric lighting; daylighting and energy efficiency; photo-sensor lighting; Lighting Control. GE Credit: ArtHum, SciEng.—Pampanichal

138. Materials and Methods in Interior Design (4)
Lecture/discussion—3 hours; project—1 hour. Prerequisite: course 1, 14, 15, and 21. Introduction to the finish materials used for interior design with special emphasis on sustainable and recycled products. Performance factors, relative costs and energy impacts, installation conditions and construction details, and design potential for a full range of interior materials. Two field trips required. Offered in alternate years.

142A. World Textiles: Eastern Hemisphere (4)
Lecture—4 hours. Prerequisite: course 1; Art History 1A, 1B, 1C, or 1D recommended. Social contexts, meanings, aesthetics, stylistic developments, and methods significant in eastern hemisphere textiles. Emphasis on Japan, China, Indonesia, Oceania, Southern and Central Asia, Africa. GE credit: ArtHum, Div.—Rivers

142B. World Textiles: Western Hemisphere (4)
Lecture—4 hours. Prerequisite: course 1, Art History 1A, 1B, or 1C recommended. Social context, aesthetics, stylistic developments and methods significant in western hemisphere textiles. History of the Middle East, Europe, and the Americas up to contemporary times. Two required field trips. GE credit: ArtHum, Div.—Savageau

143. History of Fashion (4)
Lecture—4 hours. Prerequisite: course 1; course 40A or 40B recommended. Priority to upper division Design majors. History of fashion from the earliest times to the present with emphasis on both aesthetic and functional aspects. GE credit: ArtHum. Div.—Avila

144A. History of Interior Design (4)
Lecture—4 hours. Prerequisite: course 40A or 40B; Art History 1C recommended. Priority to Design majors. History of interior design in Europe and America from the Middle Ages to the modern times. Emphasis on the dwelling in its cultural setting and the development of the theory of modern interior design. One all-day field trip required. GE credit: ArtHum, Wrt.

145. History of Visual Communication (4)
Lecture—4 hours. Prerequisite: Art History 1A, 1B, or 1C; course 1; course 40 recommended. Priority to Design majors. Historical developments of visual communication, the technological and aesthetic development of graphic design; origins and manifestations of current issues in visual communication; provide framework for analysis of current and future trends in visual communication.

150A. Computer-Assisted Drawing for Designers (4)
Lecture—2 hours; studio—4 hours. Prerequisite: course 16 and 21 or consent of instructor. Priority to Design majors. Computer assisted drawing and modeling using a mid-level, multi-use CAD program. Basic architectural drawing and modeling techniques in both two-dimensional and three-dimensional CAD environments. Not open for credit to students who have taken course 150B.

150B. Computer-Assisted Presentations for Interior Architecture (4)
Lecture—2 hours; studio—4 hours. Prerequisite: course 16 and 150A or consent of instructor. Priority to Design majors. Computer-assisted architectural presentation including the development of complex 3D models, techniques of photo-realistic rendering and computer simulation of movement through architectural and interior space.

154. Visual Communication: Message Campaign Design (4)
Lecture—2 hours; studio—5 hours. Prerequisite: courses 1, 13, 14, 15, 16, 113, 115, 116. Priority to Design majors. Principles and application of visual communication. Students design campaigns for advertising Emphasis on promotion of design for social change. Creation of public visual-media campaign. Not open for credit to students who have completed course 152B.—Sydler

155A. Topics Studio: Pattern, Form and Surface (4)
Lecture—2 hours; studio—5 hours. Prerequisite: courses 1, 13, 14, 15, 16, 113, 115, 116. Priority to Design majors. Design approaches in visual communications arising from a critical examination of the history of form, pattern, and surface in design disciplines. Through experimentation and exploration, students will develop the methodological working methods to arrive at innovative solutions to traditional graphic media.

156B. Visual Presentation: Visual Merchandising (4)
Studio—8 hours. Prerequisite: course 14 and 15 or consent of instructor. Priority to Design majors. Design and placement of objects in spatial relationships that enhance non-verbal communication. Three-dimensional design as visual merchandising. Not open for credit to students who have completed course 126A. Field trips required.—I, IV. (II.) Gotelli

157. Visual Communications: Intermediate Internet and Interactive Design (4)
Lecture—2 hours; studio—5 hours. Prerequisite: course 13, 14, 15, 16, 113, 115, 117. Priority given to Design majors. Design approaches in visual communications arising from a critical examination of the history of form, pattern, and surface in design disciplines. Through experimentation and exploration, students will develop the methodological working methods to arrive at innovative solutions to traditional graphic media.

160. Textile Surface Design: Patterns and Resist (4)
Lecture—2 hours; studio—5 hours. Prerequisite: courses 1, 13, 14, 15, 70. Priority given to Design majors. Use of traditional and contemporary processes to create images and patterns on fabric using discharge, fiber-reactive, vat, acid dyes, and textile pigments. Emphasis on individual exploration and interpretation of processes and techniques. Not open for credit to students who have completed course 160A.—Rivers

161. Textile Surface Design: Screen and Digital Printing (4)
Studio—5 hours; lecture—2 hours. Prerequisite: courses 1, 13, 14, 15, 16, 160 or consent of instructor. Priority given to Design majors. Design and production of textiles and screen printing on fabrics; soft-product development; integration of hand-produced and digitally generated imagery on cloth. Not open for credit to students who have completed course 160B.—Rivers
170. Experimental Fashion Design (4)
Lecture—2 hours; studio—5 hours. Prerequisite: courses 1, 14, 15, 16, 70, 77, 107. Priority given to Design majors. Fashion design as a vehicle for contemporary self expression. Emphasis on development of two-dimensional conceptualization of ideas and transformation of self-fabricated garments utilizing new fabric technologies and archetypal forms. Field trip required. Not open for credit to students who have completed course 170A.—Avila

171. Fashion Drawing: Technical and Illustration (4)
Lecture—2 hours; studio—5 hours. Prerequisite: courses 1, 14, 15, 16, 77, 70, 107. Priority given to Design majors. Exploration of fashion design processes for industry within the social and physical context. Emphasis on two-dimensional conceptualization of ideas, garment construction, and ideation processes utilizing commercial textiles. Field Trip required. Not open for credit to students who have completed course 170B.—Avila

177. Computer-Assisted Fashion Design (4)
Lecture—2 hours; studio—5 hours. Prerequisite: courses 1, 14, 15, 16, 77, 107 required; 170, 171 recommended. Priority to Design majors. Advanced exploration of apparel design processes for industry and personal expression with emphasis on computer-assisted design applications. Field trip required.—Avila

179. Fashion Design: Signature Collection (4)
Lecture/discussion—3.5 hours; studio—3.5 hours. Prerequisite: courses 1, 14, 15, 16, 70, 77, 107, 170, consent of instructor. Priority to Senior Design majors. Advanced exploration of fashion design with an emphasis on professional portfolio development and presentation. Emphasis on conceptualizing, designing, and fabricating a cohesive line of wearable garments suitable for presenting in a public fashion show. May be repeated once for credit. Not open for credit to students who have taken more than eight units of course 191A.—Avila

180A. Advanced Interior Design: Institutional Spaces (4)
Lecture/discussion—2 hours; studio—5 hours. Prerequisite: courses 1, 16, 21, 134A, 134B; courses 13B, 144 and 150A highly recommended; consent of instructor. Priority given to Design majors. Advanced interior design problems focused on complex institutional spaces. Introduction to building codes related to design. Integration of building systems with interior design solutions.—Kessler

180B. Advanced Interior Architecture (4)
Lecture—2 hours; studio—5 hours. Prerequisite: courses 134A, 134B, 180A and senior standing; priority to Design majors. Advanced problems in interior architectural design emphasizing space planning for corporate and institutional environments. Field trip required.—Kessler

185. Exhibition Design (4)
Lecture—2 hours; studio—5 hours. Prerequisite: course 1, 14, 15, 16, 21, 50, 150A or consent of instructor; priority given to Design majors. Design of museum and commercial exhibition environments. Exhibition design concept development and object selection, spatial planning, display furniture, object placement and staging, interpretive strategies and architectural finishes.—McNeil

186. Environmental Graphic Design (4)
Lecture—2 hours; studio—5 hours. Prerequisite: course 1, 14, 15, 16, 50, 115 or consent of instructor; course 21 recommended; priority given to Design majors. Design of informational and directional graphics for the built environment. Application and integration of typography, imagery and symbols into the architectural landscape. Development of universal wayfinding and graphic navigational systems to help people find their way.—McNeil

187. Narrative Environments (4)
Lecture—2 hours; studio—5 hours. Prerequisite: course 185 or 186 or consent of instructor; priority given to Design majors. Design of narrative environments and multi-sensory experiences for cultural, commercial, entertainment and public spaces. Interpretive planning and design for specific exhibit audiences. The manipulation of objects and the communication of complex ideas in the exhibition environment.—McNeil

190. Professional Practice (1-6)
Seminar—1 hour. Prerequisite: design major or consent of instructor. Philosophies of design explored through discussion and presentation of research results. May be repeated three times for credit. (P/NP grading only.)

191A-D. Workshops in Design (4-12)
Seminar—1 hour; studio or field experience—3 hours per unit (units determined by instructor and student); field trip. Prerequisite: course 14, 15; upper division standing and consent of instructor. Faculty-initiated workshops featuring advanced studies and applications of original work in Design: (A) Costume; (B) Environment; (C) Graphics; (D) Textiles. Credit limited to 12 units in one section or a combination of sections. Letter grading by contract. Field trips included.

192. Internship (1-6)
Internship—3-18 hours. Prerequisite: completion of 94 units and consent of instructor. Supervised internship off and on campus, in areas of design including environmental, costume, textile, museum, display and interior design. Enrollment limited to 3 units per quarter or 6 units per IV session. (P/NP grading only.)

197T. Tutoring in Design (1-5)
Seminar—1 hour; studio or field experience. Prerequisite: graduate standing in Textile Arts and Costume Design or consent of instructor. Professional practice: interaction with a working professional in the student’s field of interest to apply theories and concepts to working practice. (S/U grading only)

222. Research Methods and Critical Writing for Design (4)
Seminar—3 hours; independent study. Prerequisite: course 221; graduate standing in Design or consent of instructor. Focused on research methods and critical writing related to design topics including case studies, original and secondary sources, critical reviews. Expectation of a paper meeting professional standards suitable for publication from each student at end of course. May be repeated once for credit.—I, II, III.

223. Professional Practice and Ethics in Design (4)
Seminar—3 hours; independent study. Prerequisite: courses 221, 222; graduate standing in Design or consent of instructor. Introduce students to issues of professional design practice: business ethics, contracts and business practices, social responsibility through case studies, guest lectures and field trips, and readings. Short written assignments and presentations will be required.—II, III.

224. Seminar in Design Research and Teaching (4)
Independent study—6 hours; extensive writing—4 hours; discussion—2 hours. Prerequisite: courses 221, 222, 223; concurrent academic appointment (TA) in courses 142A, 142B, 143, 144, 145; graduate standing in Design; consent of instructor. Student will work closely with instructor on a research and writing project related to subject matter of undergraduate history courses noted above with the goal of introducing student to advanced historical research processes and development of writing skills. May be repeated two times for credit.—I, II, III, (I, II, III)

298. Directed Group Study for Graduate Students (1-5)
Studio. Prerequisite: consent of instructor. (S/U grading only)

299. Individual Focused Study (1-12)
Prerequisite: graduate standing in Textile Arts and Costume Design or consent of instructor. Advanced study in studio practice on independent projects with faculty consultation. May be repeated for credit.

299D. Project Concentration (1-12)
Prerequisite: graduate standing in Textile Arts and Costume Design or consent of instructor. A minimum of 22 units must be taken in Project Concentration and Individual Focused Study. Students create a body of original work at a professional level, with written and visual documentation of process and concepts underlying the project, culminating in public presentation. (S/U grading only) —II, III.

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—I, II, III, (I, II, III)

Dietetics

See Clinical Nutrition, on page 185.

Dramatic Art

See Theatre and Dance, on page 494.

Earth Sciences

See Environmental and Resource Sciences, on page 278; Geology, on page 305; Hydrologic Sciences (A Graduate Group), on page 327; Hydrology, on page 329; Soil and Water Science, on page 481; and Soil Science, on page 479.
East Asian Languages and Cultures

[College of Letters and Science]

Ching-Chang Chang, Ph.D., Chairperson of the Department

Department Office: 522 Sproul Hall (530) 752-0830; http://chinese.ucdavis.edu; http://japanese.ucdavis.edu

Faculty

Robert Borgen, Ph.D., Professor [Japanese, History] 
Ching-Chang Chang, Ph.D., Professor [Japanese]
Xiaomei Chen, Ph.D., Professor [Chinese] 
Chengzhi Chu, Ph.D., Assistant Professor [Chinese] 
Mark Halperin, Ph.D., Associate Professor [Chinese] 
Joseph Sorensen, Ph.D., Assistant Professor [Japanese] 

Emeriti Faculty

Donald A. Gibbs, Ph.D., Professor Emeritus
Key H. Kim, Ph.D., Professor Emeritus
Benjamin E. Wallacker, Ph.D., Professor Emeritus

Affiliated Faculty

Kazue Chavez, Lecturer [Japanese]
David Fahy, Lecturer [Japanese]
Haruko Sakakibara, Lecturer [Japanese]
Ritsuko Shigeyama, Lecturer [Japanese]
Miyoko Uchida, Lecturer [Japanese]

The Major Program

The department offers a core language program in both Chinese and Japanese and courses in literature and culture. The core language program in Chinese has two tracks: one for students who have no background whatsoever and one for students with prior language background.

The Program. A student elects to major in either Chinese or Japanese. Practical language skills are taught using the most modern methods so that upon entering the upper division a student will have attained substantial fluency in the spoken language (hearing and speaking) and the written language (reading and writing). Upper division courses balance the need to further language skills with the need to understand and appreciate the cultural richness of China, Japan, and Chinese civilization. All students are encouraged to combine their study of Japan’s or China’s language and literature with courses in related fields, and to study abroad through the Education Abroad Program, the UC International Summer Session programs, or through internships.

Career Opportunities. UC Davis graduates have learned that a major in Chinese or Japanese is a genuine, earned distinction that facilitates entrance to graduate programs and professional schools. In addition, job opportunities abound in virtually all career paths, especially for those who have completed study abroad.

Chinese

A.B. Major Requirements: 

Preparatory Subject Matter................. 0-30

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<th>UNITS</th>
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<tr>
<td>10</td>
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Depth Subject Matter..................... 40

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<th>UNITS</th>
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<tr>
<td>24</td>
<td>Japanese 101, 102, 103, 111, 112</td>
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Minor Program Requirements:

Minors are offered in Chinese and in Japanese for students wishing to follow a formally recognized program of study in those languages and their literatures.

Chinese

Preparatory Subject Matter................. 0-30

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<td>10</td>
<td>Japanese 1, 2, 3, 4, 5, 6</td>
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Depth Subject Matter..................... 44

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<th>UNITS</th>
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Note: With prior approval of an undergraduate adviser, students already proficient in Chinese at the third-year level [courses 111-112-113] should take three other upper division Chinese courses instead. Four courses selected from Chinese 100A, 101, 102, 103, 104, 105, 108, 109A, 110, 115, 116, 120, 130, 131, 132, 140; one of the four courses must be from 101, 102, 103, 109C.......................... 16

Recommended: 

Japanese 101, 102, 103, 104, 105, 106; Anthropology 148A-148B; Art History 163A-163B, East Asian Studies 113; History 191A,F; Religious Studies 172; or other advanced literature and culture courses selected in consultation with the undergraduate adviser.

Total Units for the Chinese Major.....56-74

Japanese

A.B. Major Requirements: 

Preparatory Subject Matter................. 15-30

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<td>10</td>
<td>Japanese 1, 2, 3, 4, 5, 6</td>
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Recommended: 

Japanese 10, 15, 25, Chinese 10, 11, 50, Linguistics 1

Depth Subject Matter..................... 40

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<td>Japanese 101, 102, 103, 111, 112, 113 ................. 24</td>
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Minor Programs are offered in Chinese and in Japanese for students wishing to follow a formally recognized program of study in those languages and their literatures.

Chinese

Preparatory Subject Matter................. 0-30

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<td>5</td>
<td>Japanese 10, 20, 25, 50</td>
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All upper division courses and language courses and literature in translation courses, may be used to meet this requirement. One approved lower division course [Chinese 10, 11, 50; Japanese 10, 20, 25, 50] may also be used. In addition, students must demonstrate their language proficiency, normally through completion of Chinese 111 or Japanese 111. Only four units from 192, 197, 198, and 199 may be applied to the minor. For details, consult the undergraduate advisers.

Honors Program.

Candidates for high or highest honors in Chinese or Japanese must enroll in CHIN 199 or JPN 199 and complete a research project or a scholarly paper under the direction of a faculty member. The project will have a minimum duration of two quarters and carry a minimum of six units of credit. Additionally, entrance into the honors program requires completion of at least 135 units with a minimum GPA of 3.500 in courses counted toward the major. Interested students should consult with faculty in their field of interest in their junior year and undertake their project during the first two quarters of their senior year. Other arrangements must be authorized in advance by the department chair. Students who complete the honors thesis receive departmental citation, and if their overall GPA qualifies them, may be recommended by the faculty for honors, high honors or highest honors at graduation.

Education Abroad Program.

The university maintains study abroad programs in China, Japan, and Hong Kong, Taiwan. They offer excellent opportunities for students to polish their language skills and experience Asian cultures. Students are encouraged to participate. Appropriate courses taken abroad can be applied toward the major or the minor. For details, see the department’s undergraduate adviser and the Education Abroad Program office.

Related Courses. See East Asian Studies course list.

Prerequisite Credit. No student may repeat a course if that course is a prerequisite for a course that has already been completed with a grade of C- or better.

Placement. Chinese 1 and Japanese 1 are intended for beginners with no prior knowledge of those languages. Students who do have some knowledge but wish to improve their skills should meet with one of the advisers to discuss appropriate placement. Students must follow departmental guidelines for placement in all language courses and instructor approval is required for enrollment.

Backtracking. Satisfactory completion of a language course is evidence that a student’s language skills are beyond the level of those expected in its prerequisite courses. Accordingly, students who have completed a language course cannot go back and take its prerequisites. If the prerequisite courses are required for the major, students may substitute other courses. Students are not sure how this requirement applies to them should they speak to the undergraduate adviser.

Waived Language Courses. Students with exceptional language ability may waive required language course. If lower division courses have been waived, students will not have to take courses in their place. If upper division courses have been waived, students can use other appropriate courses to earn the units they need to complete the major. Consult the undergraduate adviser regarding selection of appropriate courses.

Courses in Chinese (CHN)

Lower Division Courses

1. Elementary Chinese (5)

| Lecture/discussion — 5 hours | Introduction to Chinese grammar and development of all language skills in a cultural context with emphasis on communication. [Students who have successfully completed Chinese 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student’s P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed] I—II. | [I] |
| Lecture — 5 hours | Prerequisite: placement exam required. Special nine week accelerated, intensive summer session course that combines the work of courses 1, 2, and 3. Introduction to Chinese grammar and development of all language skills in a cultural context with emphasis on communication. Not open for credit to students who have completed course 1, 2, or 3. —IV. | [IV] |

2. Accelerated Written Chinese I (5)

| Lecture — 5 hours | Prerequisite: ability to speak and understand oral Chinese (Mandarin) dialect. Designed for students who already have some degree of fluency in spoken Chinese, but who cannot read Chinese characters. Concentrates on developing reading ability and accelerates progress to upper division. Not open for credit to students who have completed course 8 (Former course 8) —I. | [I] |
Courses in Japanese (JPN)

Lower Division Courses

1. Elementary Japanese (5)
   Lecture/discussion — 5 hours. Introduction to spoken and written Japanese in cultural contexts, with emphasis on communication. (Students who have successfully completed Japanese 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student’s P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.)—I. (I)

1A. Accelerated Intensive Elementary Japanese (15)
   Lecture/discussion — 15 hours. Special 12 week accelerated, intensive summer session course that combines the work of courses 1, 2 and 3. Introduction to Japanese grammar and development of all language skills in a cultural context with emphasis on communication. Not open for credit to students who have completed course 1, 2, or 3.

1AS. Intensive Elementary Japanese (15)
   Lecture/discussion — 15 hours. Intensive course taught combining work of courses 1, 2, and 3. Introduction to Japanese grammar and development of all language skills in a cultural context with emphasis on communication. Offered in Japanese. Not open for credit to students who have taken course 1, 2, or 3. — IV. (IV)

2. Elementary Japanese (5)
   Lecture/discussion — 5 hours. Prerequisite: course 1 or the equivalent. Continuation of training in basic spoken and written skills. — II. (II)

3. Elementary Japanese (5)
   Lecture/discussion — 5 hours. Prerequisite: course 2 or the equivalent. Continuation of training in basic spoken and written skills. — III. (III)

4. Intermediate Japanese (5)
   Lecture/discussion — 5 hours. Prerequisite: course 3 or the equivalent. Intermediate-level training in spoken and written Japanese in cultural context, based on language skills developed in course 3. — I. (I)

5. Intermediate Japanese (5)
   Lecture/discussion — 5 hours. Prerequisite: course 4 or the equivalent. Intermediate-level training in spoken and written Japanese in cultural context, based on language skills developed in course 4. — II. (II)

6. Intermediate Japanese (5)
   Lecture/discussion — 5 hours. Prerequisite: successful completion (C— or better) of course 5 or the equivalent. Intermediate-level training in spoken and written Japanese in cultural context, based on language skills developed in course 5. — III. (III)

7. Intensive Intermediate Japanese (20)
   Lecture/discussion — 20 hours. Prerequisite: course 2. Special intensive course that combines the work of courses 3, 4, 5, and 6. Introduction to Japanese grammar and development of all language skills in a cultural context with emphasis on communication. Taught in Japanese. Not open for students who have taken course 3, 4, 5, or 6.—III.

10. Masterworks of Japanese Literature (in English) (4)
   Lecture—3 hours; discussion—1 hour. An introduction to Japanese literature: readings and discussion in English of important works from earliest times to the present. GE credit: ArtHum, Div. Wrt.—III. (III)

15S. Introduction to Japanese Culture (2)
   Lecture/discussion — 1.5 hours; term paper. Aspects of Japanese culture: literature, history, religion, art, language, and society. Conducted in English; taught in Japan.—III

25. Japanese Language and Culture (in English) (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Linguistics 1 or Anthropology 4 recommended. Classification and communication of experience in Japanese culture; principles of language use in Japanese society. Speech levels and honorific language, language and gender, minority languages, literacy. Role of Japanese in artificial intelligence and computer science. Offered in alternate years.—I. (I) Smith

50. Introduction to the Literature of China and Japan (3)
   Lecture—3 hours. Methods of literary analysis and their application to major works from the various genres of Chinese and Japanese literature (in translation), including film. East Asian cultural traditions will also be introduced. [Same course as Chinese 59] GE credit: ArtHum, Div. Wrt.—II. (II) Borgen

98. Directed Group Study (1-5)
   (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
   (P/NP grading only.)

Upper Division Courses

101. Japanese Literature in Translation: The Early Period (4)
   Lecture—3 hours; discussion—1 hour. Early Japanese literature from the Nara to the end of the Heian period through a broad survey of the major literary genres such as lyric poetry, court diaries, prose narratives, poetics, and classical Chinese writings. GE credit: ArtHum, Div. Wrt.—II. (II) Sorensen

102. Japanese Literature in Translation: The Middle Period (4)
   Lecture—3 hours; discussion—1 hour. The major literary genres from the twelfth century to the second half of the nineteenth century: the waka, renga, military chronicles, no drama, Buddhist literature, haiku, haibun, kabuki, bunraku, plays and Edo prose narratives. GE credit: ArtHum, Div. Wrt.—II. (II) Chang

104. Modern Japanese Literature: War and Revolution (3)
   Lecture/discussion—3 hours. Perspectives and sensibilities with which major modern Japanese writers have interpreted the traumatic and often poignant experiences of war and sociopolitical upheaval from the late nineteenth century to the 1970s. Lectures, discussions, and readings in English. Offered in alternate years. GE credit: ArtHum, Div. Wrt.—I. (I) Chang

105. Modern Japanese Literature: Hero and Anti-hero (4)
   Lecture/discussion—4 hours. The ways in which representative anti-hero and anti-hero protagonists in modern Japanese literature perceive, confront, and resolve a wide array of social, political, and moral problems of their times. Course taught in English. GE credit: ArtHum, Div. Wrt.—I. (I) Chang

106. Japanese Culture Through Film (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing. Aspects of Japanese culture such as love, the family, position of women, growing up, death, and the supernatural as portrayed in films by Kurosawas, Mizoguchi, Ichikawa, Ozu, and Itami. Lectures, discussion, and readings in English. Films with English subtitles. GE credit: ArtHum, Div. Wrt.—II. (II)

107. Modern Japanese Autobiographies (in English) (4)
   Lecture—3 hours; term paper/discussion—1 hour. Prerequisite: upper division standing. Exploring the modern and contemporary Japanese social and cultural landscape through critical analysis of modern Japanese autobiographies by prominent and other authors in the 19th and 20th centuries. Offered in alternate years. GE credit: ArtHum, Div. Wrt.—I. (I) Chang
108. Poetry of China and Japan (in English) (4) Lecture—3 hours; discussion—1 hour. A comparative approach to Chinese and Japanese poetry, examining poetic practice in the two cultures; includes a general outline of the two traditions, plus study of poetic forms, techniques, and distinct treatments of universal themes: love, nature, war, etc. Offered in alternate years. [Same course as Chinese 108.] GE credit: ArtHum, Div. Writ.—II. Borgen

109. Japanese Popular Culture (5) Lecture—3 hours; discussion—1 hour; film viewing—3 hours. Japanese popular culture, from its medieval/early modern precedents to contemporary incarnations. Emphasis on the major forms of twentieth-century Japanese media, including genre films, popular theater, TV manga (cartoons), animation and science fiction. GE credit: ArtHum, Div.–III. Kim

111. Modern Japanese: Reading and Discussion (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 6. Readings in modern Japanese short stories, newspaper articles, and essays; conversation practice based on these readings.—I. (I.)

112. Modern Japanese: Reading and Discussion (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 111. Continuation of course 111.—II. (II.)

113. Modern Japanese: Reading and Discussion (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 112. Continuation of course 112.—III. (III.)

114A. Spoken Japanese (2) Discussion—2 hours. Prerequisite: course 6 or the equivalent. Training in spoken Japanese for students with a basic working knowledge of the language. (P/NP grading only.)—I. (I.)

114B. Spoken Japanese (2) Discussion—2 hours. Prerequisite: course 114A or consent of instructor. Continuation of course 114A. Training in spoken Japanese for students with a basic working knowledge of the language. (P/NP grading only.)—II. (II.)

114C. Spoken Japanese (2) Discussion—2 hours. Prerequisite: course 114B or consent of instructor. Training in spoken Japanese for students with a basic working knowledge of the language. (P/NP grading only.)—III. (III.)

115. Japanese Composition (3) Lecture—3 hours; discussion—1 hour. Prerequisite: course 6 or consent of instructor. Development of skills in the techniques of writing Japanese. Practice in short essay writing, with an aim toward mastery of the vocabulary and sentence construction.—I. (I.)

117S. Intensive Modern Japanese: Reading and Discussion (17) Lecture/discussion—17 hours. Prerequisite: course 5. Intensive course taught combining the work of courses 1, 2 and 3. Intensive course combining the work of courses 6, 111, 112, and 113. Completes introduction to basic Japanese grammar. Develops more advanced reading, writing, and conversation skills in a cultural context. Taught in Japanese. Not open to students who have taken courses 6, 111, 112, or 113.—III. (III.)

131. Readings in Modern Japanese Literature: 1920-1945 (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 112 or the equivalent. Fourth-year level reading of representative works of modern Japanese literature including short stories, novellas, diaries, memoirs, poetry, and excerpts from novels and plays from 1920 through the militaristic era, to the end of the war years in 1945.—III. (III.) Chang

132. Readings in Modern Japanese Literature: 1945-1970 (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 113 or the equivalent. Continuation of course 131, but may be taken independently. Covers selected texts from the immediate post-war years beginning in 1945 down to 1970 and the post-war recovery.—III. (III.) Chang

133. Readings in Modern Japanese Literature: 1970 to Present (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 113 or the equivalent. Continuation of course 132, but may be taken independently. Covers selected texts from 1970 to the present. Offered in alternate years.—II. Chang

134. Readings in the Humanities: Traditional Culture (4) Lecture—3 hours; discussion—1 hour or term paper. Prerequisite: course 113. Fourth-year level reading of modern works by major specialists on traditional Japanese culture: history, religion, thought, art, international relations, and literary history and criticism. Focus is equally on developing reading skills and learning about Japanese culture.—II. (II.) Borgen, Sorensen

135. Readings in the Humanities: The Modern Period (4) Lecture—3 hours; term paper. Prerequisite: course 113. Fourth-year level reading of authentic modern writings on Japanese culture, history, philosophy, society, religion, politics, international relations, aesthetics, and comparative culture by prominent critics, commentators, and scholars.—III. (III.) Chang

136. Readings in Newspapers and Magazines (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 113 or the equivalent. Fourth-year level reading of newspaper and magazine reports, articles, and editorials on domestic and international affairs relating to contemporary Japan. Offered in alternate years.—I. (I.)

141. Introduction to Classical Japanese (4) Lecture/discussion—4 hours. Prerequisite: one advanced Japanese reading course such as Japanese 131, 132, or the equivalent reading knowledge of Japanese. The basic features of classical Japanese grammar through careful reading of selected literary texts such as Hojoki or Tsurezuregusa. Offered in alternate years.—I. (I.)

152. Traditional Japanese Drama (4) Lecture—3 hours; discussion—1 hour. Survey in English of Japanese drama, focusing on traditional forms: noh, kyogen, bunraku puppet theater, and kabuki, with some attention to modern theater. Texts of plays and secondary works on performance techniques and the composition of plays. GE Credit: ArtHum, Div. Writ.—I. (I.) Iwasaki

154. Japanese Literature on Film (4) Lecture—3 hours; discussion—1 hour. Survey of films based on works of Japanese literature, emphasizing on pre-modern and early modern texts. Introduction to major directors of Japan, with a focus on cinematic adaptation. Lectures and readings in English. Films in Japanese with English subtitles. Offered in alternate years. GE Credit: ArtHum, Div. Writ.—III. (III.) Sorensen

156. Japanese Literature on Film (4) Lecture—3 hours; discussion—1 hour. Survey of films based on works of Japanese literature, emphasizing on pre-modern and early modern texts. Introduction to major directors of Japan, with a focus on cinematic adaptation. Lectures and readings in English. Films in Japanese with English subtitles. Offered in alternate years. GE Credit: ArtHum, Div. Writ.—III. (III.) Sorensen

197T. Tutoring in Japanese (1-5) Tutoring—1.5-5 hours. Prerequisite: consent of Department chairperson. Leading of small voluntary discussion groups affiliated with one of the Program's regular courses. May be repeated for credit, but only 2 units may be applied to the minor. (P/NP grading only.)

198. Directed Group Study (1-5) (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5) (P/NP grading only.)

Graduate Courses

291. Seminar in Modern Japanese Literature: Major Writers (4) Seminar—4 hours. Prerequisite: any one of courses 131, 132, 133, 134, 135, or the equivalent. In-depth reading and critical analysis of major works by and critical literature on one or two prominent modern or contemporary writers such as Naomto Soseki, Mori Ogi, Shimazaki Toson, Akutagawa Ryunosuke, Tanizaki Junichiro, Oe Kenzaburo. Offered in alternate years.—II. Chang

299. Research (1-12) (S/U grading only.)

East Asian Studies

(College of Letters and Science)

Ching-Ying Chang, Ph.D., Professor
Program Director
Program Office, 107 Sproul Hall
(530) 752-4001; http://eastasian.ucdavis.edu

Committee in Charge
Katharine Burnett, Ph.D., Associate Professor
(Asian History)
Ching-Ying Chang, Ph.D., Professor
(East Asian Studies)
Mark Halperin, Ph.D., Associate Professor
(East Asian Languages and Cultures)
Kyu Hyun Kim, Ph.D., Associate Professor (History)
Sheldon Liu, Ph.D., Professor
(Comparative Literature)
Don Price, Ph.D., Professor (History)
Ethan Scheiner, Ph.D., Associate Professor
(Political Science)
Joseph Sorensen, Ph.D., Assistant Professor
(East Asian Languages and Cultures)

The Major Program

The East Asian Studies major gives the student an understanding of East Asia (especially China and Japan) through interdisciplinary studies that combined sustained work in an East Asian language with courses on East Asian countries.

The Program. The program offers core courses in East Asian history, humanities, social sciences, and languages. After taking the core courses in conjunction with two years of major study in either Chinese or Japanese language study, the student chooses additional courses focusing on a specific field of interest, such as anthropology or history. Since four quarters of language work are required, students normally should apply to the East Asian studies program no later than their sophomore year.

Programs, Internships, and Career Alternatives. One program of interest to East Asian Studies majors is the education abroad program, which gives students the opportunity to live and experience the culture of their focus country. At UC Davis, the Internship and Career Center helps students obtain legislative, legal, and business internships. Additionally, the UC Davis Washington Center arranges internships and runs a full-credit academic program in Washington D.C. with a full range of opportunities for East Asian Studies majors. East Asian Studies graduates are prepared for employment in government agencies (such as Foreign Service, state agencies, international or non-governmental (such as United Nations), foundations), journalism, teaching, counseling and companies having an interest in international business, trade, finance. The stringent language requirement of the major program enhances career prospects in jobs that demand knowledge of language and culture of the focus country.
A.B. Major Requirements:  

Preparatory Subject Matter ............... 41-42  
History 9A and 9B .......................... 8  
One course from Art History 1D, Chinese 10, 11, Comparative Literature 53A, Japanese 10, 25, Religious Studies 70, 75 .......... 3-4  
Two courses (or the equivalent) of Chinese or Japanese language study (Chinese 1-23-4-5-6; Japanese 1-23-4-5-6) .............. 30  

Depth Subject Matter .................. 36  
Must include at least 8 units of core courses from each of the following three categories.  
History: History 191A, 191B, 191C, 191D, 191E, 191F; 194A-194B or 194B-194C  
Social Science: Anthropology 148A, 148B, 149A, 149B; Economics 171; Geography 127; Political Science 148A, 148B; Sociology 147  
Humanities:  
Art History 163A, 163B, 163C, 164; Chinese 104, 106, 107, 109, 131, 132; Japanese 101, 102, 103; Religious Studies 172  
At least 12 additional units must be selected from the above courses, or from the following: Anthropology 110, 111, 112, 117, 119, 120, 122, 123, 124, 128; Chinese (any upper division course); Economics 115A, 115B, 116, 160A, 160B, 162; Geography 143; History 102G, 102H, 102N; Japanese (any upper division course); Linguistics 100; Political Science 127, 133, 138, 145, 148C; Sociology 110, 141, 170, 183 (or other appropriate courses, including individual and group study courses [198, 199, 199], as approved by the Committee in charge).  

Total Units for the Major ............... 77-78  

Recommended  
Students are strongly urged to take a substantial number of courses in Euro-American civilization as a basis for comparison for a deeper understanding of America’s relations with East Asia.  

Major Adviser. B. Bosser (History)  

Minor Program Requirements:  
Courses taken for the minor are expected to reflect a predominant interest in either China or Japan, but also to provide some exposure to the other of the two countries. All courses counting towards the East Asian Studies major, including individual and group study courses (198, 199), may be used to fulfill the requirements for the minor program, as long as they deal predominantly with China, Japan, or both.  

UNITS East Asian Studies .................... 22  
History 9B and 18 upper division units, of which at least 12 must be in courses focusing on China; or History 9A and 18 upper division units, of which at least 12 must be in courses focusing on Japan .......................... 22  

Courses in East Asian Studies. The following courses count toward the major and are open to students throughout the campus. See departmental listings for course descriptions.  

Anthropology  
148A. Culture and Political Economy in Contemporary China  
149B. Contemporary Japanese Society  

Art History  
1D. Asian Art  
163A. Chinese Art  
163B. Chinese Painting  
163C. Painting in the People’s Republic of China  
164. The Arts of Japan  

Chinese  
All courses  

Comparative Literature  
53A. Literature of China and Japan  
153. The Forms of Asian Literature  

Economics  
171. Economy of East Asia  

History  
9A. History of East Asian Civilization (China)  
9B. History of East Asian Civilization (Japan)  
102G. Undergraduate Proseminar: China to 1800  
102H. Undergraduate Proseminar: China since 1800  
102N. Undergraduate Proseminar: Japan  
191A. Classic Chinese  
191B. High Imperial China  
191C. Late Imperial China  
191D. Nineteenth-Century China  
191E. The Chinese Revolution  
191F. History of the People’s Republic of China, 1949 to the Present  
194A. Aristocratic and Feudal Japan through 16th Century  
194B. Early Modern Japan, 17th-19th Centuries  
194C. Modern Japan, 20th Centuries  
194D. Business and Labor in Modern Japan  
194E. Education and Technology in Modern Japan  
195B. History of Modern Korea  

Japanese  
All courses  

Political Science  
148A. Government and Politics in East Asia: China  
148B. Government and Politics in East Asia: Pacific Rim  
148C. Government and Politics in East Asia: Southeast Asia  

Religious Studies  
75. Chinese Philosophy: An Introduction  
170. Introduction to Buddhism  
172. Ch’an (Zen) Buddhism  

Sociology  
147. Sociological Perspectives on East Asia  
188. Social Stratification in China  

Courses in East Asian Studies (EAS)  

Lower Division Courses  
88. Korean Society: Late 19th Century to the Present (4)  
Lecture/discussion—4 hours. Modern Korean society (late 19th Century to contemporary period); emphasizing the perseverance and transformations of traditional social and cultural patterns. GE credit: ArtHum, Div, Wrt—II. Kim  

Upper Division Courses  
113. Cinema and Society in China (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: one course from History 10, 10C, 193, or consent of instructor. Knowledge of Chinese not required. Viewing and analysis of one Chinese film with English subtitles each week, followed by discussion and short essays. Cinematic techniques, social issues, and film topics from 1930s to today. Not open for credit to students who have completed Chinese 113. GE credit: ArtHum, Div, Wrt—III. III  

190. East Asian Studies Seminar (4)  
Seminar—3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Political, social, cultural, and economic issues in East Asia. Topic varies each year. May be repeated for credit if topic differs. Not offered every year.  

192. East Asian Studies Internship (1-12)  
Internship—3-36 hours; term paper. Prerequisite: upper division standing and consent of instructor. Work experience in the East Asian Studies field, with analytical term paper on a topic approved by the instructor. [P/NP grading only.]  

194A. Special Study for Honors Students (1-5)  
Independent study—1-5 hours. Prerequisite: open only to majors of senior standing who qualify for honors program. Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in East Asian Studies culture, society, or language. [P/NP grading only.]  

196A-196B. Honors Seminar (4-4)  
Seminar—2 hours; conference—2 hours. Prerequisite: a GPA of 3.500 in the major, senior standing, and consent of instructor. A two-quarter research project culminating in an Honors thesis. A grade of B or higher must be earned to qualify the student for honors distinction at graduation. (Deferred grading only, pending completion of sequence.)  

198. Directed Group Study (1-5)  
Prerequisite: consent of instructor. [P/NP grading only.]  

Ecological Management and Restoration  

[College of Agricultural and Environmental Sciences]  

Faculty. See Plant Sciences, on page 448.  

The Major Program  
This major is designed for students who are interested in understanding how to manage and restore wildland and rangeland plant communities. Courses are selected to provide an interdisciplinary background that encompasses ecology, applied plant biology, and the social sciences. Students will acquire a core understanding of managed ecosystems and how they function, interact with the natural environment, are connected with human society and social change, and are restored and managed.  

The Program. The curriculum provides depth in the ecological and botanical sciences directed toward an integrated understanding of how communities and ecosystems function and how this knowledge can assist in their management and restoration. Courses in environmental policy and law expose the students to the social drivers and constraints of ecosystem management. All students gain practical experience through practical field courses and a required internship. Students may also pursue an Honors thesis in their senior year.  

Career Alternatives. Graduates from this program are prepared to pursue a wide range of careers, including positions in ecological restoration and ecosystem management; rangeland and reserve management; environmental consulting; public, private, or non-profit agencies concerned with restoration and natural resource management; Cooperative Extension; teaching; information and communication services. Graduates are qualified to pursue advanced studies in fields such as ecology, agroecology, environmental studies, geography or weed science.  

B.S. Major Requirements:  

Written and Oral Expression.................. 0-8  

See College requirement.  

Preparatory Subject Matter ............... 52-61  
Biology Sciences Courses 1A, 1B, 1C............. 15  
Chemistry 2A, 2B ................................ 10  
Physics 1A, 1B or Physics 7A, 7B, 7C............. 6-12  

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer; 2009-2010 offering in parentheses  

Mathematics 16A, 16B or Mathematics 17A, 17B ....... 6-8
Plant Sciences 21, 21B ................................... 6-8
Plant Sciences 21 ..................................... 3
Plant Sciences 120 ..................................... 4
Soil Science 105 ....................................... 5
Plant Sciences 101 or Environmental Science and Policy 1 .......... 3-4

Breadth/General Education ................. 16-24
See General Education requirement.

Depth Subject Matter ......................... 63-78
Environmental Horticulture 160, 160L .......... 4
Plant Biology 106 or Soil Science 105 or 111 or 112 or 118 .......... 3-5
Two courses chosen from Environmental Science and Policy 135, Plant Biology 117, 131, 144, 147, Wildlife, Fish, and Conservation Biology 156, 157 .......... 6-8
Evolution and Ecology 100 or Plant Biology 102 or 108 or 116 ............. 4-5
Plant Biology 152 or Environmental Horticulture 150 .............. 3-4
Three courses chosen from Plant Sciences 130, 135, 150, Environmental Science and Policy 127, 155L, Wildlife, Fish, and Conservation Biology 154, 155 .......... 8-10
Plant Biology 176 ................................... 4
Geology 35 or Hydrology 143 .................... 3
Plant Biology, Environmental and Resource Horticulture 120 ........ 3-4
Plant Biology 158 or Soil Science 109 .............. 4-5
Hydrology 110 or 124 ............................. 4-5
Environmental and Resource Science 141 ............. 4
Plant Sciences 135 or Entomology 107 or Soil Science 108 or Plant Biology 141 .......... 3-5
Landscape Architecture 180F ..................... 3
Environmental Horticulture 102 or Plant Biology 111 or 157 or 158 ........ 4
Environmental Science and Policy 160 or 161 or 171 or 172 or 179 and 197L .......... 3-5
Internship; Plant Sciences 192 .... 2

Unrestricted Electives ......................... 9-49
Total Units for the Major ..................... 180

Major Adviser. T. P. Young

Advising Center for the major, including peer advising, is located in 1220 Plant and Environmental Sciences (530) 752-1715.

Ecology (A Graduate Group)

M.W. Schwartz, Ph.D., Chairperson of the Group

Group Office. 2148 Wickson Hall
(530) 752-6752, http://ecology.ucdavis.edu

Faculty
Daniel W. Anderson, Ph.D., Professor
Wildlife, Fish, and Conservation Biology
Robert L. Bettinger, Ph.D., Professor (Anthropology)
Candice Bledsoe, Ph.D., Professor
Wildlife, Fish, and Conservation Biology
Monique Barton-Mulder, Ph.D., Professor (Anthropology)
Louis W. Botsford, Ph.D., Professor
Wildlife, Fish, and Conservation Biology
Walter M. Boyce, Ph.D., Professor (Pathology, Microbiology, and Immunology)
Patrick H. Brawn, Ph.D. Professor (Plant Sciences)
Ahlen Bruhns, Ph.D., Professor (Human and Community Development)
Mary Cadensano, Ph.D., Assistant Professor (Plant Sciences)
Tim Caro, Ph.D., Professor
Wildlife, Fish, and Conservation Biology
Edward P. Casswell-Chen, Ph.D., Professor
(Nematology)
Ernst S. Chang, Ph.D., Professor
(Bodega Marine Laboratory)
Howard V. Cornell, Ph.D., Professor
(Environmental Science and Policy)
Richard G. Coss, Ph.D., Professor (Psychology)
Randy A. Dahlgren, Ph.D., Professor
(Wildlife, Fish, and Conservation Biology)
Deborah L. Elliott-Fisk, Ph.D., Professor
(Wildlife, Fish, and Conservation Biology)
Holli Ernest DVM Ph.D.
(VWM. Population Health and Reproduction)
Valerie Y. Evrini, Ph.D., Assistant Professor
(Plant Sciences)
Y. Hossein Farzin, Ph.D., Professor
(Agricultural and Resource Economics)
Howard Ferris, Ph.D., Professor (Nematology)
Albert Fischer, Ph.D., Associate Professor (Plant Sciences)
Theodore C. Fain, Ph.D., Professor (Plant Sciences)
Jane E. Foley, Ph.D., Associate Professor
(VWM. Wildlife, Fish, and Conservation Biology)
Brian Gaylord, Ph.D., Assistant Professor
(Evolution and Ecology)
Shu Geng, Ph.D., Professor (Plant Sciences)
Paula Gepts, Ph.D., Professor (Plant Sciences)
Charles R. Goldman, Ph.D., Professor
(Environmaxral and Science and Policy) Distinguished Graduate Mentoring Award
Steven E. Greig, Ph.D., Assistant Professor
(General Design)
Richard K. Grosberg, Ph.D., Professor
(Evolution and Ecology)
Susan L. Handy, Ph.D., Professor
(Entomology)
Alexander H. Harcourt, Ph.D., Professor
(Anthropology)
Susan Harrison, Ph.D., Professor
(Plant Science and Policy)
Alan Hastings, Ph.D., Professor
(Plant Science and Policy)
Tessa Hill, Ph.D., Assistant Professor (Geology)
Marcel Holyoak, Ph.D., Professor
(Environmaxral Science and Policy)
William Horwath, Ph.D., Professor
(Land, Air, and Water Resources)
Benjamin Z. Houlton, Ph.D., Assistant Professor
(Land, Air, and Water Resources)
Silas S. O. Hung, Ph.D., Professor (Animal Science)
Louise E. Jackson, Ph.D., Professor (Plant Sciences)
Marie A. Jasienski, Ph.D., Assistant Professor (Plant Sciences)
Richard Karban, Ph.D., Professor (Entomology)
Douglas A. Kelt, Ph.D., Professor
(Wildlife, Fish, and Conservation Biology)
Dietmar Kuehzt, Ph.D., Associate Professor (Animal Science)
Emilia A. Laca, Ph.D., Associate Professor (Plant Sciences)
John Largier, Ph.D., Professor
(Plant Science and Policy)
Sharon P. Lawlor, Ph.D., Associate Professor (Anthropology)
Edwin E. Lewis, Ph.D., Associate Professor (Nematology)
C. Y. Cynthia Lin, Ph.D. Assistant Professor (Agricultural and Resource Economics)
Mark Lubell, Ph.D., Associate Professor
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Jay R. Lund, Ph.D. Professor
(Civil and Environmental Engineering)
Andrew Marshall, Ph.D., Assistant Professor (Anthropology)
Richard M. McCollum, Ph.D. Assistant Professor (Anthropology)
Steven G. Morgan, Ph.D., Professor
(Bodega Marine Laboratory)
Peter B. Moyle, Ph.D., Professor
(Wildlife, Fish, and Conservation Biology)
Stevens A. Nadler, Ph.D., Professor (Nematology)
Gabrielle Nevitt, Ph.D., Professor
(Neurobiology, Psychology, Behavior)
Debbie A. Nystrom, Ph.D., Professor
(Civil and Environmental Engineering)
Benjamin S. Orlove, Ph.D., Professor
(Environmaxral Science and Policy)
Gail L. Patricelli, Ph.D., Assistant Professor
(Evolution and Ecology)
Kyaw Tha Paw U, Ph.D., Professor
(Land, Air, and Water Resources)
Richard E. Plante, Ph.D. Professor (Plant Sciences)
Dan Potter, Ph.D., Professor
(Plant Sciences)
James F. Quinn, Ph.D., Professor
(Environmaxral Science and Policy)
Marcel Rejmanek, Ph.D., Professor
(Evolution and Ecology)
Eliska Rejmankova, Ph.D., Professor
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(Land, Air, and Water Resources)
Peter J. Richerson, Ph.D., Professor
(Environmaxral Science and Policy)
David Rizzo, Ph.D., Professor
(Plant Pathology)
Jay A. Rosenblatt, Ph.D., Professor (Entomology)
Paul A. Sabatier, Ph.D., Professor
(Environmaxral Science and Policy)
James N. Sanchirico, Ph.D., Associate Professor
(Environmaxral Science and Policy)
Eric D. Sanford, Ph.D., Assistant Professor
(Evolution and Ecology)
Thomas W. Schoener, Ph.D., Professor
(Evolution and Ecology)
Sebastian Schreiber, Ph.D. Professor
(Evolution and Ecology)
Mark W. Schwartz, Ph.D., Professor
(Environmaxral Science and Policy)
S. G. Schladow, Ph.D., Professor
(Civil and Environmental Engineering)
Kate M. Scow, Ph.D., Professor
(Land, Air, and Water Resources)
Kenneth A. Shackel, Ph.D., Professor (Plant Sciences)
H. Bradley Shaffer, Ph.D., Professor
(Evolution and Ecology)
Arthur M. Shapiro, Ph.D., Professor
(Evolution and Ecology)
Andrew Sih, Ph.D., Professor
(Environmaxral Science and Policy)
Johan Stigsdotter, Ph.D., Professor
(Plant Sciences)
David R. Smart, Ph.D., Associate Professor
(Viticulture and Enology)
Jay Stachowicz, Ph.D., Associate Professor
(Evolution and Ecology)
Maureen Stanton, Ph.D. Professor
(Evolution and Ecology)
Sharon Y. Strauss, Ph.D., Professor
(Evolution and Ecology)
Donald Strong, Ph.D., Professor
(Evolution and Ecology)
Ron Tjoerdema, Ph.D., Professor
(Evolution and Ecology)
Catherine A. Toft, Ph.D., Professor
(Evolution and Ecology)
Thomas P. Tomich, Ph.D., Professor
(Environmaxral Science and Policy, Human and Community Development)
Susan L. Ustin, Ph.D., Professor
(Land, Air, and Water Resources)
Chris Van Kessel, Ph.D., Professor (Plant Sciences)
Dirk Van Vuren, Ph.D., Professor
(Wildlife, Fish, and Conservation Biology)
Geraard J. Vermeij, Ph.D., Professor (Geology)
Peter C. Wainwright, Ph.D., Professor
(Evolution and Ecology)
Wesley V. Weather, Ph.D., Professor
(Avian Sciences)
Susan L. Williams, Ph.D., Professor
(Evolution and Ecology)
Bruce Winterhalder, Ph.D. Professor (Anthropology)
Truman P. Young, Ph.D., Professor (Plant Sciences)
210. Advanced Topics in Human Ecology (4)

Lecture—2 hours; discussion—2 hours. Prerequisite: prerequisite: graduate standing. Course will cover the commonalities that human ecologists have as social scientists who specialize in problems relating human populations and environmental variables. General epistemological issues and theoretical scrutiny and review. Similarities and differences of human and biological ecology are examined. Offered in alternate years. —(II.) Richerson

211. Advanced Topics in Cultural Ecology (4)

Lecture/discussion—3 hours; term paper. Prerequisite: Environmental Science and Policy 133/Anthropology 133 and graduate standing in Ecology or Anthropology. Topics of current methodological importance in cultural ecology. Examination of general issues in cultural ecology through study of human response to and influence on climate. (Same course as Anthropology 211.) Offered in alternate years. —(I.) Orlove

212A. Environmental Policy Process (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course in public policy [e.g., Environmental Studies 160] or environmental law [e.g., Environmental Studies 161]; course in bureaucratic theory (e.g., Political Science 187 or Environmental Studies 166); course in statistics (e.g., Sociology 106 or Agricultural and Resource Economics 106); policy analysis (e.g., Environmental Studies 168A or the equivalent); Agricultural and Resource Economics 176. Methods and practices of policy analysis; philosophical and intellectual bases of policy analysis and the political role of policy analysis. (Same course as Environmental Science and Policy 212A.) —III. Sabatier

212B. Environmental Policy Evaluation (4)

Lecture—1 hour; discussion—1 hour; seminar—2 hours. Prerequisite: intermediate microeconomics (e.g., Economics 100); Statistics 108 or Agricultural and Resource Economics 106; policy analysis (e.g., Environmental Studies 168A or the equivalent); Agricultural and Resource Economics 176. Methods and practices of policy evaluation; philosophical and intellectual bases of policy analysis and the political role of policy analysis. (Same course as Environmental Science and Policy 212B.) Offered in alternate years.

213. Population, Environment, and Social Structure (4)

Seminar—3 hours; term paper. Prerequisite: at least one course in population or human ecology, or in environment and resources. Relationships among population dynamics, resource allocation, environmental problems, and social structure; focus on demographic content of global ecological models and simulations, ecological content of modern demographic theories, and debates about scarcity, inequality, and social conflict and change. Offered in alternate years. —III.

214. Marine Ecology: Concepts and Practice (3)

Lecture—1 hour; discussion—1.5 hours; fieldwork—1.5 hours. Prerequisite: graduate standing or one course in ecology, one course in evolution or genetics, consent of instructor; survey course in marine ecology recommended. Critical review and analysis of concepts and practices in modern marine ecology at the interface of several fields of study including oceanography, evolution, behavior, and physiology. Emphasis on critical thinking, problem solving, and hands-on study. Three field trips required. Offered in alternate years. —III. Morgan, Stachowicz

216. Ecology and Agriculture (3)

Lecture—3 hours. Prerequisite: Plant Biology 142 or consent of instructor. Ecological principles and relationships as applied to agriculture. Integration of ecological approaches into agricultural research to develop environmentally sound management practices. Topics include crop growth and biomass relationships among crops and pests, and crops systems.
ecology. Not open for credit to students who have completed Vegetable Crops 216 (Former course Vegetable Crops 215.)—II, III. (II, III.)

217. Conservation and Sustainable Development in Third World Nations (4)
Lecture/discussion—3 hours; fieldwork—2 hours. Prerequisite: at least one course from one of these three groups: (a) Environmental Studies 160, 161, 168A, 168B; (b) Environmental Studies 101, 133, International Agricultural Development 103, Geography 142, (c) Anthropology 126, 121, Geography 141, Sociology 144, 145A, 145B. Examination of the patterns of resource ownership, control and management in agricultural lands, extractive zones (fisheries, forests) of these lands, with emphasis on conservation and sustainability. Comparison of industrial democracies and poorer nations. (Same course as International Agricultural Development 217.) Offered in alternate years.—II. (II, III.)

219. System Ecology (3)
Lecture/discussion—2 hours. Prerequisite: Population Biology 208 or course 204 or Evolution and Ecology 104 or Environmental Science and Policy 121. Spatiotemporal Ecology. Spatiotemporal ecological theory focusing on population persistence and stability, predator-prey and host-parasitoid interactions, species coexistence and diversity maintenance, including effects of environmental variation, spatial and temporal scales, life histories, and non-linear dynamics. Topics vary. (Same course as Population Biology 220.) May be repeated once for credit. (S/U grading only.)—I, II, III. (I, II, III.)

222. Spatio-Temporal Ecology (3)
Lecture/discussion—2 hours. Prerequisite: Population Biology 208 or course 204 or Evolution and Ecology 104 or Environmental Science and Policy 121. Spatiotemporal Ecology. Spatiotemporal ecological theory focusing on population persistence and stability, predator-prey and host-parasitoid interactions, species coexistence and diversity maintenance, including effects of environmental variation, spatial and temporal scales, life histories, and non-linear dynamics. Topics vary. (Same course as Population Biology 220.) May be repeated once for credit. (S/U grading only.)—I, II, III. (I, II, III.)

225. Terrestrial Field Ecology (4)
Seminar—1 hour; field work—12 hours. Prerequisite: Introductory ecology and introductory statistics or consent of instructor. A field course conducted over spring break and four weekends at Bodega Bay, emphasizing student projects. Ecological hypothesis testing, data gathering, analysis, and written and oral presentation of results will be stressed. (Same course as Entomology 225) Population Biology 225.—I, II, III. (I, II, III.)

231. Mathematical Methods in Population Biology (3)
Lecture—3 hours. Prerequisite: Mathematics 16C or 21C or the equivalent. Mathematical methods used in population biology. Linear and nonlinear difference equation and differential equation models are studied, using stability analysis and qualitative methods. Partial differential equation models are introduced. Applications to population biology models are stressed. (Same course as Population Biology 231.—I, II, III.)

232. Theoretical Ecology (3)
Lecture—3 hours. Prerequisite: course 204 or the equivalent, and Mathematics 16C or 21C, or one of courses 106C, 121 or Evolution and Ecology 101, and a strong mathematics background (Mathematics 22A, 22B, 22C, or the equivalent). Examination of major conceptual and methodological issues in theoretical ecology. Model formulation and development will be emphasized. Topics will vary from year to year. May be repeated for credit. Offered in alternate years. (III.)

242. Ecological Genetics: Applied Genetics for Eology, Health, and Conservation of Natural Populations (3)
Lecture—2 hours; discussion—0.5 hours; laboratory—0.5 hours. Prerequisite: undergraduate genetics and ecology/conservation biology courses recommended. Introduction to the field of applied ecological genetics to include applications in conservation ecology, population genetics, population biology, wildlife health and disease ecology. Limited enrollment. (Same course as Population Health and Reproduction 242.)—I, II, III. (I, II, III.)

280. Current Anthropology Journal Editorial Workshop (4)
Workshop—1 hour; independent study—3 hours. Students must enroll for all three quarters. Reading and offering workshop critiques of manuscripts submitted for publication, and reading and discussion of other relevant work. Anthropology and human ecology. Track and edit published comments and authors’ replies that accompany major features. Participation in the development of new sections for the electronic edition, including a “news and views” section and a debate section. (Same course as Anthropology 280.) May be repeated for 12 units of credit with consent of instructor. (S/U grading only.)—I, II, III. (I, II, III.)

290. Special Problems Seminar (1-4)
Seminar—1-4 hours. Prerequisite: consent of instructor. Topics in biological, human, physical, and chemical ecology. Students are expected to present an oral seminar on a particular aspect of the general topic under consideration. (S/U grading only.)—I, II, III. (I, II, III.)

296. Topics in Ecology and Evolution (1)
Seminar—1 hour. Prerequisite: graduate standing. Seminars presented by visiting lecturers, UC Davis faculty, and graduate students. May be repeated for credit. (Same course as Population Biology 292.) (S/U grading only.)—I, II, III, (I, II, III.)

297. Tutoring in Ecology (1-4)
Lecture—1 hour; discussion—1 hour. Prerequisite: graduate standing in ecology; consent of instructor. Teaching ecology including conducting discussion groups for regular departmental courses under direct guidance of staff. May be repeated for credit. (S/U grading only.)

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
Prerequisite: graduate standing. (S/U grading only.)

Economics
(College of Letters and Science)

Gregory Clark, Ph.D., Chairperson of the Department

Department Office, 1113 Social Sciences and Humanities Building
(530) 752-0741; http://www.econ.ucdavis.edu/

Faculty
Paul Bergin, Ph.D., Associate Professor
Giacomoni Bonanno, Ph.D., Professor
Colin Cameron, Ph.D., Professor
Scott E. Carroll, Ph.D., Assistant Professor
Gregory Clark, Ph.D., Professor
Timothy W. Cogley, Ph.D., Professor
Mitali Das, Ph.D., Associate Professor
Robert C. Feenstra, Ph.D., Professor
I. Jay Frenkel, Ph.D., Associate Professor
Hillary Hoynes, Ph.D., Professor
Oscar Jordi, Ph.D., Associate Professor
Christopher R. Knittel, Ph.D., Associate Professor
Guido Kuersteiner, Ph.D., Associate Professor
Joonsuk Lee, Ph.D., Assistant Professor
Christopher M. Meissner, Ph.D., Associate Professor
Douglas Miller, Ph.D., Associate Professor
Klaus Nehrings, Ph.D., Professor
Alan L. Olmstead, Ph.D., Professor
Marianne E. Page, Ph.D., Associate Professor
Giovanni Peri, Ph.D., Associate Professor
Martine Quinzii, Ph.D., Professor
Katheryn N. Rust, Ph.D., Assistant Professor
Kevin D. Sawyer, Ph.D., Professor
Burkhard C. Schipper, Ph.D., Assistant Professor
Steven M. Sheffrin, Ph.D., Professor
Joaquim Silvestre, Ph.D., Professor
Ann Huff Stevens, Ph.D., Associate Professor
Deborah Swenson, Ph.D., Professor
Alan M. Taylor, Ph.D., Professor
Wing T. Woo, Ph.D., Professor

Emeriti Faculty
Andrzei Brzeski, Ph.D., Professor Emeritus
W. Eric Gustafson, Ph.D., Senior Lecturer Emeritus
Academic Senate Distinguished Teaching Award
Kevin D. Hoover, D.Phil., Professor Emeritus
Hiramitsu Kanoeda, Ph.D., Professor Emeritus
Peter H. Lindert, Ph.D., Professor Emeritus
Academic Senate Distinguished Teaching Award
Louis Makowski, Ph.D., Professor Emeritus
Thomas Mayer, Ph.D., Professor Emeritus
T. Y. Shen, Professor Emeritus
Elia H. Tuma, Ph.D., Professor Emeritus
Gary M. Walton, Ph.D., Professor Emeritus
Leon L. Wigge, Ph.D., Professor Emeritus

Affiliated Faculty
Emanuel A. Frenkel, Ph.D., Lecturer
Bagher Modjtabahzadeh, Ph.D., Lecturer

The Major Program
Economics is the study of how individuals, organizations, and societies choose among alternative uses of scarce resources and how these resources are turned into the things people want.

The Program
Economics majors complete an introductory course sequence in economics, in addition to several courses in quantitative methods. Intermediate theory and economic history are taken on the upper division level and then students are free to concentrate the remainder of their units in various areas of interest, including more courses in economic theory or history, international economics, labor, industry, alternative economic systems, economic development, public finance, econometrics, or mathematical economics.

Internships and Career Alternatives
Internships for economics majors have been arranged at banks, brokerages, other business enterprises, and governmental units. The internships must complement the student’s course work. A degree in economics is excellent preparation for students who want to go on to law school, business school, advanced work in economics, or graduate work in international relations. It is also a good background for careers in management and positions with the government.

A.B. Major Requirements:

UNITS
Preparatory Subject Matter........................................17-20
Economics 1A-1B..............................................8
Statistics 13, 32, or 102 ..................................3.4
Mathematics 16A-16B or 21A-21B........6-8

Depth Subject Matter.........................................44
Economics 105, 106 ...........................................8
Economics 102 .............................................16
One course from Economics 110A, 110B, 111A, 111B.........................4

Quarter Offered: I-Tall; II-Winter; III-Spring; IV-Summer; 2009-2010 offering in parentheses

General Education (GE) credit: ArtsHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Social-Cultural Diversity; Wrt—Writing Experience
Additional upper division Economics courses..........................12

Total Units for the Major.......................................................61–64

Recommended. Students considering graduate study in economics are strongly urged to take Mathematics 21A-21B and 22A.

The Economics Department suggests that Economics 100 and 101 be taken as soon as possible after the introductory courses.

Major Advisers. Contact Department office.

Minor Program Requirements:

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economics 100, 101, 102</td>
<td>8</td>
</tr>
<tr>
<td>Preparatory courses</td>
<td>8</td>
</tr>
</tbody>
</table>


Preparation. Economics 1A and 1B, Statistics 13, 32, or 102; Mathematics 16A and 16B or 21A and 21B. Mathematics 16A and 16B or 21A and 21B should be completed taking Economics 100 and 101. Students need to complete Economics 100 and 101 before taking the advanced courses. Course Limits. Except under extraordinary circumstances, not more than three economics courses may be taken in any one quarter. In special cases, the department will accept a limited number of related upper division courses from other departments in satisfaction of the economics upper division course requirements. Approval from a departmental adviser is required in all such cases.

Graduation with High or Highest Honors. To be eligible for departmental recommendation for High or Highest Honors in Economics at graduation, a student must take all upper division courses in Economics for a letter grade, earn at least a 3.500 grade point average in those courses, and complete at least eight units of course work that result in the submission of an Honors project. Contact the College of Letters and Science section of this catalog and contact the Department for more information.

Study Abroad. The economics department wishes to accommodate students who would like to complete their economics degree with a study abroad experience. Up to 20 units of upper division credit from foreign campuses (excluding Economics 100 and 101) may be used towards the completion of the degree. Students are advised to consult the College of Letters and Science section of this catalog and contact the Department for more information.

Graduate Study. Students who meet the admission requirements of Graduate Studies and the Department of Economics may pursue studies leading to the M.A. and Ph.D. degrees. Fields of emphasis for graduate work include: Econometrics, Monetary Economics, Economic Development, Economic History, International Economics, Labor Economics, Industrial Organization, Economic Systems, Public Finance, Mathematical Economics, and Quantitative Methods (Econometrics). For information on admission to graduate study, degree requirements, and financial aid, consult the Graduate Announcement of the Department of Economics. Graduate Advisers. Contact Department office. American History and Institutions. This University requirement can be satisfied by completion of Economics 111A, 111B; see also under University requirements.

Courses in Economics (ECN)

Lower Division Courses

10. Decision Making (4)

Lecture—2 hours; discussion—1 hour. Prerequisite: course 100 or 104; Mathematics 16A-16B or 21A-21B; Statistics 13 or 32, with grade of C or better in each course, or consent of the instructor. Description and normative analysis of individual decision making, with applications to personal, professional, financial, and public policy decisions. Emphasis on decision making under uncertainty and over time. Heuristics and biases in the psychology of decisions, overcoming decision traps.

110A. World Economic History Before the Industrial Revolution (4)

Lecture—2 hours; discussion—1 hour. Prerequisite: course 1A and 1B. Development and application of analytical models to explain the nature and functioning of economies before the Industrial Revolution. Examples will be drawn from a variety of societies, including England, China, Poland, and Pre-Columbian America. GE credit: SocSci. III (I) Nehring

110B. World Economic History Since the Industrial Revolution (4)

Lecture—2 hours; discussion—1 hour. Prerequisite: course 1A and 1B. Development and application of analytical models to explain the nature and functioning of economies since the Industrial Revolution. Examples will be drawn from a variety of societies, including England, China, Germany, and India. GE credit: SocSci. III (I) Nehring

111A. Economic History (4)

Lecture—2 hours; discussion—1 hour. Prerequisite: courses 1A-1B or consent of instructor. Survey of economic change in the United States from Colonial times to 1865; reference to other regions in the Western Hemisphere. GE credit: SocSci. II, III (I) Nehring

111B. Economic History (4)

Lecture—2 hours; discussion—1 hour. Prerequisite: courses 1A-1B, or consent of instructor. Survey of economic change in the United States from 1865 to the period World War II era. GE credit: SocSci. II, III (I) Nehring

115A. Economic Development (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A and 1B. Major macroeconomic issues of developing countries. Issues include problems in generating capital, conduct of monetary and fiscal policies, foreign aid and international institutions, and the issues of policy concerning international borrowing and external debt in developing countries. Same course as Agricultural and Resource Economics 115A. GE credit: SocSci. Div-I, II, III (I) Nehring

115B. Economic Development (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A and 1B. Major macroeconomic issues of developing countries. Issues include problems in generating capital, conduct of monetary and fiscal policies, foreign aid and international institutions, and the issues of policy concerning international borrowing and external debt in developing countries. Same course as Agricultural and Resource Economics 115B. GE credit: SocSci. Div-I, II, III (I) Nehring


Lecture—3 hours; discussion—1 hour. Prerequisite: course 100, Mathematics 16B and 21B. Economics analysis of the relative virtues of capitalism and socialism, including welfare and Marxist exploitation theory, the socialist calculation debate (Hayek and Lange), alternative capitalist systems (Japan, Germany, U.S.) and contemporary models of market socialism.

121A. Industrial Organization (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A-1B, 100, or consent of instructor. An appraisal of the role of competition and monopoly in the American economy; market structure, conduct, and economic performance of a variety of industries. GE credit: SocSci. II, III, IV (I, II, III)

121B. Industrial Organization (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A, 1B, 100, or consent of instructor. The study of antitrust and economic regulation. Emphasis on applying theoretical models to U.S. industries and case studies, including telecommunications, soft
ware, and electricity markets. Topics include natural monopoly, optimal and actual regulatory mecha-
nisms, privatization, mergers, predatory pricing, and monopolization.—II, III, (I, III)

122. Theory of Games and Strategic Behavior (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100, Mathematics 16A and 16B or 21A and 21B or consent of instructor. Introduction to game theory. Explanation of the behavior of rational indi-
viduals with interacting and often conflicting inter-
test. Non-cooperative and cooperative theory. Applications to economics, political science and other fields.—I, III, (I, III)

130. Public Microeconomics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100, or consent of instructor. Public expendi-
tures; tax reform. Applications to labor, financial, and housing markets. Policy implications.—II, III, (I, III)

131. Public Finance (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100. Economic burden of taxation; equity and efficiency considerations in tax design; structure and economic effects of the U.S. tax system (includ-
ing tax incidence, tax base, corporation income tax, and property tax); tax loopholes; recent develop-
ments; tax reform proposals.—I, II, III, (I, II, III)

132. Health Economics (4)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 100, or consent of instructor. The health care market, emphasizing the role and use of economics. Individual demand, provision of services by doctors and hospitals, health insurance, managed care and competition, the role of government access to health care.—I, II, (I, II, III)

134. Financial Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A, 1B, and 100; Mathematics 16A, Stat-
istics 13. General background and rationale of corpo-
ration finance; finance as resource allocation over time; decision making under uncertainty and the role of information; capital market and interest rate struc-
ture, financial decisions. Students who have com-
pleted Agricultural and Resource Economics 171A may not receive credit for this course.—I, II, III, (I, II, III)

135. Money, Banks and Financial Institutions (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 101; Statistics 13. Banks and the banking system. Uncertainty and asymmetric information in the lending process; efficiency of competitive equilib-
rium in lending markets. Regulation and the conduct of monetary policy.—I, II, III, (I, II, III)

136. Topics in Macroeconomic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 101. Advanced Topics in Macroeconomic theory. The course develops the theoretical and empirical analysis of a specific field of macroecono-
nics. Possible topics include, business cycle theo-
ries, monetary policy, dynamic equilibrium, infla-
tion, unemployment, and fiscal policy.—I, II, III, (I, II, III)

137. Macroeconomic Policy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 101. Theory and practice of macroeconomic policy, both monetary and fiscal.—III, (I, III)

140. Econometrics (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: course 100 and course 101; Mathematics 16A and 16B, and 21A and 21B; Statistics 13, course 102 or any upper division Statistics course. Introduction of problems of observation, estimation and hypothesis testing in econometrics through the study of theory and application of linear regres-
sion models, critical evaluation of selected examples of empirical research and exercises in applied eco-
nomics. Not open for credit to students who have completed Agricultural and Resource Economics 106.—II, (I, III)

145. Transportation Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100, Mathematics 16A, 16B, Statistics 13 or consent of instructor. Intended for advanced econom-
cal undergraduates. Fundamental problems of planning and financing transportation “infrastructure” (roads, ports, airports). The econom-
ics of the automobile industry, as well as the impact of government regulation and deregulation in the air-
lines and trucking industries.—II, (I, II)

151A. Economics of the Labor Market (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100. Theory of labor supply and demand; determination of employment in the labor market. Policy issues: labor force participation by married women; minimum wages and youth unemployment; effect of unions on wages.—I, II, (I, II)

151B. Economics of Human Resources (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 151A. Human resource analysis; introduction to human capital theory and economics of educa-
tion, the basic economic elements, including theories of labor market discrimination; income dis-
tribution; poverty. Policy issues; negative income tax; manpower training programs; incomes policy.—I, II, (I, II)

152. Economics of Finance (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or 104; course 102; Mathematics 16B or 21B, Statistics 13 or 22, with grade of C- or bet-
ter in each course of the instructor. Application of theor-
ical and empirical tools of economics to the education sector. Demand for Edu-
cation; Education Production and Market Structures in Education. Policy applications: class size reduc-
tion, school finance equalization, accountability, and school choice.—I, III, (II)

160A. International Microeconomics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100, or consent of instructor. International trade; impact of trade on the domestic and world economies; public policy toward external trade. Only two units of credit allowed to students who have completed course 162.—II, III, (I, II, III)

160B. International Macroeconomics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A, 1B, 100, 101, or consent of instructor. Macroeconomic theory of an open economy. Bal-
ance of payments and adjustment mechanisms, interna-
tional monetary economic issues, international financial institutions and their policies. Only two units of credit allowed to students who have com-
pleted course 162.—II, III, (I, II, III)

162. International Economic Relations (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A1B or consent of instructor. International trade and monetary relations, trade policy, exchange rate policy, policies toward international capital migration and investment. Emphasis on cur-
cency policy issues. Course intended especially for non-majors. Not open for credit to students who have completed course 162 or 160B. GE credit: SocSci.—I, II, III, (I, II, III)

171. Economics of the East Asia (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A1B or consent of instructor. Intensive reading, discussion and research on selected topics from the economies of the countries of East Asia. Consult department for course scheduling.—II, (III)

190. Topics in Economics (4)
Lecture/discussion—3 hours; discussion—1 hour. Prerequisite: course 100, or consent of instructor. Selected topics in economic analysis and public policy. Variable con-
tent. May be repeated for credit.—II, III, (I, III)

190X. Upper Division Seminar (1-4)
Seminar—1-4 hours. Prerequisites: courses 100 and 101, and consent of instructor. In-depth examina-
tion at an upper division level of a special topic in Economics. Emphasis on focused analytical work.

192W. Internship in the Davis- Washington Program (6-8)
Internship—2-5 hours. Prerequisite: junior or senior standing in Economics; completion of 84 units of credits with a minimum grade-point average of 3.00; admission to the Davis-Washington Pro-
gram. Internship in Washington, DC with associated research project. Students must arrange for a faculty sponsor before embarking on the internship. Maxi-
mum of 3 units will count toward satisfying Econom-
cal major requirements. (P/NP grading only)

194HA-194HB. Special Study for Honors Students (4-4)
Independent study—3 hours; seminar—1 hour. Pr-
erequisite: major in Economics with senior standing; consent of instructor and completion of 135 units with a minimum GPA of 3.500 in courses counted toward the major. A program of research culminat-
ing in the writing of a senior honors thesis under the direction of a faculty adviser. (Refer to grading only, pending completion of course.)

197T. Tutoring in Economics (1-5)
Tutorial—3-1.5 hours. Prerequisite: consent of instruc-
tor and chairperson. Undergraduates assist the instructor by tutoring students in one of the depart-
ment’s regularly scheduled courses. May be repeated for up to 10 units of credit. (P/NP grading only)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

Graduate Courses

200A. Microeconomic Theory (5)
Lecture—4 hours; discussion—4 hours. Prerequisite: graduate standing. Linear and non-linear optimiza-
tion theory applied to develop the theory of the profit-maximizing firm and the utility-maximizing con-
sumer. (Same course as Agricultural and Resource Economics 200A)—I, II, (I, II)

200B. Microeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 200A. Characteristics of market equilibrium under perfect competition, simple monopoly and monopsony. Emphasis on the price and wage- and welfare economics; the sources of market success and market failure. (Same course as Agricultural and Resource Economics 200B)—I, II, (I, II)

200C. Microeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 200B. Uncertainty and information econom-
is. Individual decision making under uncertainty. Introduction to game theory, with emphasis on appli-
cations to markets with firms that are imperfect com-
petitors or consumers that are imperfectly informed. (Same course as Agricultural and Resource Econom-
ics 200C)—I, II, (I, II)

200D. Macroeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 101, Mathematics 21A, 21B, and 21C. Macro static theory of income, employment, and prices.—I, II, (I, II)

200E. Macroeconomic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200B (may be taken concurrently) and 200D. Macrodynarnic theory of income, employ-
ment, and prices.—II, III, (I, II)

201A. History of Economic Thought (4)
Lecture—3 hours; discussion—1 hour. Economic thought from the classical Greece era to modern times. Offered in alternate years.

201B. History of Economic Thought II (4)
Lecture—3 hours; discussion—1 hour. Origins and emergence of modern economic analysis. Offered in alternate years.
203A. Advanced Economic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A, 200B, 200C. Advanced topics in general equilibrium theory and welfare economics: existence, determinateness and efficiency; intertemporal economics; uncertainty.—II. (II.) Quinzii

203B. Advanced Economic Theory: Game Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A, 200B, 200C. Covers the most recent developments in game theory, with the focus changing from year to year. Topics include refinements of Nash equilibrium, repeated games, evolution, social situations, bounded rationality, and bargaining theory.—II. (III.) Schipper

203C. Topics in Economic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A, 200B, 200C. Selected topics in contemporary microeconomic theory. May be repeated for credit with the consent of the Graduate Studies Committee.—I. (II.) Nehring

210A. Economic History (4)
Lecture/discussion—4 hours. Economic history of the eastern hemisphere in the modern period. Medieval Europe or other regions may be studied, depending on student interest.—I. (II.) Bark

210B. Economic History (4)
Lecture/discussion—4 hours. The United States from Colonial times to the present. Other areas of the western hemisphere may be studied, according to student interest.—II. (III.) Miller

210C. Economic History (4)
Seminar—4 hours. Prerequisite: a graduate course in economic history. Selected topics and issues, emphasis on current research. (Quarter offered to be flexible.)—II. (III.) Mehrotra

214. Development Economics (4)
Lecture—4 hours. Prerequisite: Agricultural and Resource Economics 100A, 100B, course 101; Agricultural and Resource Economics/Economics 204 and course 160A recommended. Review of the principal theoretical and empirical issues whose analysis has formed development economics. Analysis of economic development theories and development strategies and their application to specific policy issues in developing country contexts. (Same course as Agricultural and Resource Economics 214.)—II. (II.) Boucher

215A. Microevelopment Theory and Methods I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A or 204; course 240A recommended. Agricultural development theory, with a focus on microeconomics and household behavior with and without market imperfections and uncertainty. Analysis of rural land, labor, credit and insurance markets, institutions, and contracts. (Same course as Agricultural and Resource Economics 215A.)—I. (I.) Taylor

215B. Open Macroeconomics of Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural and Resource Economics/Economics 200A or 204, 200D or 205, and 214 or 215A. Models and policy approaches regarding trade, monetary and fiscal issues, capital flows and debt are discussed in the macroeconomic framework of an open developing country. The basic analytical focus is real exchange rate and its impact on sectoral allocation of resources. (Same course as Agricultural and Resource Economics 215B.)—II. (II.) Boucher

215C. Microdeelopment Theory and Methods II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 215A. Extension theory and microeconomic methods. Agricultural growth and technological change; poverty and income inequality; multi-sectoral, including village and regional models of competitiveness and equilibrium models and applications. (Same course as Agricultural and Resource Economics 215C.)—III. (III.) Rozelle

215D. Environment and Economic Development (4)
Lecture—4 hours; discussion—1 hour. Prerequisite: courses 200A, 204 or Agricultural and Resource Economics 275. Interdisciplinary course drawing on theoretical and empirical research on interactions between environment and economic development processes. Analysis of issues emerging at the interface of environmental and development economics. (Same course as Agricultural and Resource Economics 215D.)—II. (II.) Knoke

221A. The Theory of Industrial Organization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A, 200B, 200C. Game theory is used to analyze strategic interaction of firms in industries. Topics include models of competition, product differentiation, entry-deterring strategies, contractual arrangements, vertical control and antitrust issues.—I. (I.) Emanouil

221B. Empirical Analysis in Industrial Organization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 221A and 240B. Recent empirical work in industrial organization is examined. Includes empirical analysis of cartels, product differentiation, innovation and technological change, and imperfect competition in international markets.—II. (II.) Knittel

221C. Industrial Organization and Regulation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 221A and 240B. Optimal regulation of natural monopoly. Topics include regulatory mechanisms for single- and multi-output firms under symmetric and asymmetric information, optimality without regulation, the economic theory of regulation, and empirical studies of regulation and deregulation.—III. (III.) Lee

230A. Public Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200C. Measurement of deadweight loss and consumer surplus; optimal commodity and income taxation; tax incidence; policy issues in personal taxation, corporate taxation, and social insurance; the evaluation of effective tax rates.—II. (II.) Helms

230B. Public Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 230A, 240A, 240B. Effects of government policies on economic behavior; labor supply, program participation, investment, consumption and savings.—II. (II.) Miller

230C. Public Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200C and 240B. Advanced topics in economics of the public sector, with emphasis on current research. Topics may vary from year to year.—III. (III.) Haynes

235A. Alternative Approaches to Monetary Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200D (may be taken concurrently). Focuses on relation between changes in money supply and changes in nominal GDP. Also discusses the effect of changes in money supply on interest rates.—I. (I.) Salyer

235B. Monetary Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 235A. Emphasizes problems of finding an appropriate place for money in microeconomic/aggregate equilibrium models. Consideration given to meaning of money, its relation to inflation and the real economy and to its role in models of finance.—II. (II.) Jorda

235C. Monetary Policy (4)
Lecture—3 hours; discussion—1 hour. Organization of the Federal Reserve and Bank, the definition of policy goals and tools of monetary policy, alternative targets for monetary policy, impact of monetary policy, the problem of lags, alternative policies.—III. (III.) Cogley

239. Econometric Foundations (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course in undergraduate-level econometrics. The course will prepare students for econometric theory and empirical work by examining the statistical foundation of econometrics. Special attention is paid to problems specific to nonparametric data common to social sciences. Topics from matrix algebra are also covered. (Same course as Agricultural & Resource Economics 239.)—I. (I.) Green

240A. Econometric Methods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 133 and a course in linear algebra or the equivalent. Least squares, instrumental variables, and maximum likelihood estimation and inference for single equation linear regression models, linear restrictions; heteroscedasticity, autocorrelation, lagged dependent variables. (Same course as Agri-cultural and Resource Economics 240A.)—II. (II.) Davis

240B. Econometric Methods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 240A. Topics include asymptotic theory and instrumental variables, pooled time-series cross-section estimation, seemingly unrelated regression, classical hypothesis tests, identification and estimation of simultaneous equation models, cointegration, error-correction models, and qualitative and limited dependent variable models. (Same course as Agricultural and Resource Economics 240B.)—III. (III.) Havener

240C. Time Series Econometrics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 240B. Estimation and inference for nonlinear regression models for cross-section data; models for discrete data and for limited dependent variables; models for panel data; additional topics such as bootstrap and semiparametric regression. (Same course as Agricultural and Resource Economics 240C.)—II. (II.) Kuehne

240D. Cross-Section Econometrics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 240B. Probability theory, estimation, inference and forecasting of time series models; trends and non-standard asymptotic theory; vector time series methods and cointegration; time series models for higher order moments and transition data; state-space modeling and the Kalman filter. (Same course as Agricultural and Resource Economics 240D.)—I. (I.) Cameron

240E. Topics in Time Series Econometrics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 240A, 240B and 240C. Modern econometric techniques for time series data. Expand on topics covered in Economics 240A, 240B and 240C. Contents may vary from year to year. (Same course as Agricultural and Resource Economics 240E.)—III. (III.) Jorda

240F. Topics in Cross Section Econometrics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 240A, 240B and 240D. Modern econometric techniques for cross-section data. Expand on topics covered in Economics 240A, 240B and 240C. Contents may vary from year to year. (Same course as Agricultural and Resource Economics 240F.)—III. (III.) Cameron

250A. Labor Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 150A-150B or the equivalent. Philosophy, theory and history of American and foreign labor movements; union structure, organization and collective bargaining under changing labor market conditions; current labor market issues.—II. (II.) Stevens

250B. Labor Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 151A or consent of instructor; course 204 or 200A recommended. Microeconomic theory of labor supply and labor demand, estimation of labor supply and demand functions; human capital theory; labor market analysis.—III. (III.) Carroll
256. Applied Econometrics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural and Resource Economics 106 or Econometrics 140, or the equivalent. Application of statistical tools to economic and business analysis. Emphasis on regression analysis, problems of specification and model development. (Same course as Agricultural and Resource Economics 256.)—II. (II) Swenson

260A. International Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A or 204. Theory of trade determinants; foreign exchange rate systems; foreign exchange market; foreign exchange market behavior; balance of payments theory; foreign exchange rate; balance of payments; national monetary policies.—II. (II) Woo

260B. International Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200D and 200E. Modern theories and empirical analysis of foreign investment and its links to trade; theoretical and empirical analysis of the relationshi

270A. Economic Policy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A or 204. Theory of trade determinants; modern theories and empirical analysis of foreign investment and its links to trade; theoretical and empirical analysis of the relationshi

270B. Economics of Growth (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200D and 200E. Modern theories and empirics of economic growth beginning with the neoclassical theories up to current endogenous growth models. Emphasis on the relationship between macroeconomic management and long-term growth; the use of foreign capital in the generation of growth and its occasional misfires; the comparison of growth performance in East Asia and Latin America since WW2; the experiences of centrally-planned economies and transitions to market-based growth; and the transformation from an industrial economy to a knowledge economy.—II. (II) Russ

270C. Economics of Growth (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200D and 200E. Empirical analysis of growth patterns and growth models. Emphasis on the relationship between macroeconomic management and long-term growth; the use of foreign capital in the generation of growth and its occasional misfires; the comparison of growth performance in East Asia and Latin America since WW2; the experiences of centrally-planned economies and transitions to market-based growth; and the transformation from an industrial economy to a knowledge economy.—II. (II) Russ

280. Orientation to Economic Research (2)
Discussion—2 hours. Course tries to bridge the gap between students’ classwork and their subsequent research. It deals with topics such as the originsation of a research project, some mechanics of empirical research and hints on the submission of research papers. (S/U grading only.)

290. Topics in Economics (4)
Seminar—4 hours. Prerequisite: course 260A. Analysis of foreign investment and its links to trade; theories of the firm as they relate to firm’s export and investment decisions; and an introduction to the political economy of trade policies. II—II. (II) Swenson

291. Contemporary Economics Seminar (2)
Seminar—2 hours. Prerequisite: graduate standing in Economics. Seminar series on topics of current interest. May be repeated for credit. (S/U grading only.)—II. (II) (II)

298. Group Study (1-5)
Discussion—1-5 hours. Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

299. Individual Study (1-12)
Prerequisite: consent of instructor and graduate standing. (S/U grading only.)

299D. Dissertation Research (1-12)
(S/U grading only.)

Professional Course

397. Teaching of Economics (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing in economics. Teaching of economics: methods of instruction, organization of courses, examination and evaluation procedures. (S/U grading only.)—I. (I) Stevens

Education, School of

Harold G. Levine, Ph.D., Dean
Paul E. Heckman, Ph.D., Associate Dean
Joanne Galli-Banducci, Ed.D., Lecturer, Supervisor of Teacher Education
Sharon S. Dugdale, Ph.D., Professor
Harold G. Levine, Ph.D., Professor
Gloria M. Rodriguez, Ph.D., Assistant Professor
Karen A. Watson-Gegeo, Ph.D., Professor
Sandra M. Murray, Ph.D., Assistant Professor
Viki L. Montera, Ph.D., Lecturer
Karen A. Watson-Gegeo, Ph.D., Professor
Tobin T. White, Ph.D., Assistant Professor
I. Phillip Young, Ph.D., Professor

Emeriti Faculty
Donald G. Arnstein, Ph.D., Professor Emeritus
G. Phillip Cartwright, Ph.D., Professor Emeritus
Concha Delgado-Gaitan, Ph.D., Professor Emeritus
Richard A. Figueras, Ph.D., Professor Emeritus
Douglas L. Minnis, Ed.D., Lecturer Emeritus
Jonathan H. Sandover, Ph.D., Professor Emeritus
Julius M. Sassenrath, Ph.D., Professor Emeritus
Carlton J. Spring, Jr., Ph.D., Professor Emeritus
David R. Wampler, Ph.D. Lecturer Emeritus
George D. Yonge, Ph.D., Professor Emeritus

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Julie Orozco, Co-Director

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Renee Newton, Director

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California After School Network
Andee Press-Dawson, Director

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MaryAnn Mellor, Director of Student Services

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Minor in Education
Vicki L. Montera, Academic Coordinator

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Graduate Group in Education (Ph.D.)
Steven Z. Athanases, Graduate Group Chair

(530) 752-7259

Quarter Offered: I—Fall, II—Winter, III—Spring, IV—Summer; 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Social-Cultural Diversity; Wrt—Writing Experience
Courses in Education (EDU)

Lower Division Course

81. Learning in Science and Mathematics (2)
Lecture/discussion—2 hours; field work—2 hours. Exploration of how students learn and develop understanding in science and mathematics classrooms. Introduction to case studies and interview techniques and their use in K-6 classrooms to illuminate factors that affect student learning. Limited enrollment. [Same course as Geology 81] (P/NP grading only)—I, II, III. (I, II, III) Day, Passmore, Stevenson

92. Internship (1-3)
Internship—3-9 hours. Prerequisite: consent of instructor. Enrollment dependent on availability of intern placements. Internship as a teacher aide's or tutor in K-12 classrooms under the supervision of a faculty member. May be repeated for credit. (P/NP grading only)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only)

Upper Division Courses

100. Introduction to Schools (4)
Lecture—3 hours; field work—3 hours. Prerequisite: upper division standing. Study of occupational concerns of teachers. Skills for observing classrooms, activities, school organization and finance, school reform movement, observing, aiding, and tutoring in schools. —I, II, III. (I, II, III)

110. Educational Psychology: General (4)
Lecture/discussion—4 hours. Prerequisite: Psychology 1; upper division standing. Learning processes, cognitive development, individual differences, testing and evaluation. GE credit: SocSci, Wrt.—I, II, III. (I, II, III)

114. Quantitative Methods in Educational Research (4)
Lecture/discussion—4 hours. Prerequisite: two years of high school algebra. Problems and methods in data analysis. Design of research projects. Some consideration of procedures suited to digital computers. —I. (I)

115. Educating Children with Disabilities (2)
Lecture—2 hours. Prerequisite: upper division standing. Educational issues and processes involved in teaching children with disabilities. The course will focus on the structure of special education, with an emphasis on meeting the educational needs of children who are mainstreamed in regular classes. —I, II, III. (I, II, III)

119. The Use and Misuse of Standardized Tests (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 110 or consent of instructor. Principles underlying educational and psychological testing. Purposes of testing for individual achievement and evaluation of school programs. Interpretation and misinterpretations of outcomes. Analysis of SAT, GRE and other common tests. Experience in test administration and outcome interpretation. GE Credit: Wrt.—I, II, III. (I, II, III) Abedi

120. Philosophical and Social Foundations of Education (4)

122. Children, Learning and Material Culture (4)
Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: upper division standing or consent of instructor. How material artifacts shape what and how children learn in school, at home, and in the community. Artifacts examined include books, computers, household appliances, toys and games, entertainment media, collectibles, sports equipment, clothing, folk arts and crafts, and neighborhood space. Offered in alternate years. GE credit: SocSci, Div. Wrt.—(II) Wagner

130. Issues in Higher Education (4)
Discussion—3 hours; field work—3 hours. Prerequisite: upper division standing or consent of instructor. Analysis of current issues in higher education and of some practical implications of varying philosophical approaches to the role of the university. —III. (III) Gonzalez

151. Language Development in the Chicano Child (3)
Lecture/discussion—3 hours. Prerequisite: some knowledge of Spanish and linguistics recommended. Bilingualism, first and second language acquisition, bilingual education, language assessment, Chicano Spanish and the role of dialect varieties in the classroom. Not open for credit to students who have completed course 151T.—II, III. (II, III) Leonart-Fortes

151T. Language Development in the Chicano Child (3)
Lecture/discussion—3 hours. Prerequisite: some knowledge of Spanish and linguistics recommended. Bilingualism, first and second language acquisition, bilingual education, language assessment, Chicano Spanish and the role of dialect varieties in the classroom. Not open for credit to students who have completed course 151.—I.

152. Communication Skills for Bilingual Teachers (3)
Lecture—2 hours; field work—3 hours. Prerequisite: course 151; Spanish 2; 8A-BB. The development of communication skills of prospective educators with an emphasis on the study and use of standard Spanish and Southwest Spanish dialects in teaching science, mathematics, social science, music, art, and language arts to bilingual elementary school pupils. —III. (III)

153. Cultural Diversity and Education (2)
Lecture/discussion—2 hours. Prerequisite: upper division standing. Analysis of research on learning styles among culturally diverse students with review and evaluation of responsive curricula and classroom teaching techniques. The ethnographic interview as a research tool. Not open for credit to students who have completed course 153T.—II. (II)

153T. Cultural Diversity and Education (2)
Lecture/discussion—2 hours. Prerequisite: upper division standing. Analysis of research on learning styles among culturally diverse students with review and evaluation of responsive curricula and classroom teaching techniques. The ethnographic interview as a research tool. Not open for credit to students who have completed course 153.—I, II, III. (I, II, III) Leonart-Fortes, Rosa

160A. Introduction to Peer Counseling (2)
Lecture/discussion—2 hours. Prerequisite: upper division standing and consent of instructor. Introduction to peer counseling techniques and development of peer counseling skills. (P/NP grading only)—I, II, III. (I, II, III)

160B. Issues in Peer Counseling (2)
Lecture/discussion—2 hours. Prerequisite: upper division standing and consent of instructor; course 160A recommended. In-depth review and development of skills for specific counseling topics. May be repeated once for credit when topic differs. (P/NP grading only)—I, II, III. (I, II, III)

163. Guidance and Counseling (4)
Lecture—4 hours. Prerequisite: course 110 (may be taken concurrently). Nature and scope of pupil personnel services; basic methods of individual guidance; research in guidance; theory and practice of counseling psychology, with emphasis on educational and vocational adjustment. —III. (III)
173. Language Development (4)
Lecture—2 hours; discussion—1 hour. Prerequisite: Linguistics 103A, 103B. Theory and research on children’s acquisition of their native language, including the sound system, grammatical systems, and basic semantic categories. (Same course as Linguistics 173.)—III. Ichikoshi

180. Computers in Education (3)
Lecture—1 hour; seminar—1 hour; laboratory—3 hours. Prerequisite: upper division or graduate standing. Applications of computers in education as instructional, intellectual, and communication tools. Not open for credit to students who have completed course 180T, 181, or 182.

180T. Computers in Education (3)
Lecture—1 hour; seminar—1 hour; laboratory—3 hours. Prerequisite: upper division or graduate standing. Applications of computers in education as instructional, intellectual, and communication tools. Not open for credit to students who have completed course 180T, 181, or 182.—I, III. (III) Bellman, Marindale, Mendle, Pomery, White

181. Teaching in Science and Mathematics (2)
Lecture/discussion—2 hours; field work—2 hours. Prerequisite: Geology 81/ Education 81, previous experience in a K-12 classroom, or consent of instructor. Exploration of effective teaching practices based on examining how middle school students learn math and science. Selected readings, discussion and field experience in middle school classrooms. (Same course as Geology 181.) (P/NP grading only)—I, II, III, (II, III) Day. Passmore, Stevenson

182. Computer Project for Curricular Integration (1)
Seminar—1 hour. Prerequisite: Agricultural Systems and Environment 21 or equivalent microcomputer course, experience with instructional computing and consent of instructor. Design and implementation of a curricular unit to integrate computer technology into a K-12 classroom setting. A project-based seminar intended for students with substantial prior experience with instructional use of computers and related technologies. Not open for credit to students who have completed course 180 or 181.

192. Internship (1-3)
Internship—2-8 hours; discussion—1 hour. Prerequisite: upper division standing and consent of instructor. Internship as a tutor, teacher’s aide, or peer counselor in a school or educational counseling setting under the supervision of a faculty member. May be repeated for credit. (P/NP grading only.)

197T. Tutoring in Education (1-2)
Tutoring—1-2 hours. Prerequisite: upper division standing and consent of instructor. Leading of small voluntary discussion groups affiliated with the School’s upper division courses under the supervision of, and at the option of, the course instructor, who will work with the group to help students work in the student’s work. May be repeated once for credit for a total of 4 units. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only)

200. Educational Research (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: introduction to graduate standing in education or consent of instructor. Defining educational research questions, reviewing relevant literature, developing research designs, developing research instruments, selecting appropriate data analysis procedures, and writing research projects. A case problem will provide practice in designing and reporting research. —I. (I)

201. Qualitative Research in Education (4)
Seminar—2 hours; lecture—2 hours. Prerequisite: graduate standing or consent of instructor. Examines the design and conduct of educational research using non-numerical data (e.g., text, discourse, imagery and artifacts). Focuses on issues (e.g., validity, reliability, and non-numerical) and reporting genres (e.g., narrative accounts, case studies, and arguments).—II. (II) White, Villalva

202N. Computer Analysis of Qualitative Data (4)
Seminar—3 hours; laboratory—2 hours. Prerequisite: graduate standing or upper division standing with consent of instructor. Critical and practical understanding of how to use computer software programs to analyze qualitative data, and inferring from the analysis. Offered in alternate years.—III. (III) Abedi

203. Educational Testing and Evaluation (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing or consent of instructor. Introduces the theoretical assumptions underlying traditional test construction, as well as the basic statistical principles involved in the design, evaluation, and interpretation of standardized tests. Also discusses the debates surrounding the uses of different kinds of tests and evaluation tools.—III. (III) Abedi

204A. Quantitative Methods in Educational Research: Analysis of Correlational Designs (4)
Discussion—2 hours; laboratory/discussion—2 hours. Prerequisite: course 114 or the equivalent. Methods for analysis of correlational data in educational research, including correlation and regression, discriminant analysis, logistic regression, and canonical correlation. Emphasis on conceptual understanding of the techniques and use of statistical software. Offered in alternate years.—I. (I) Kuoleder

204B. Quantitative Methods in Educational Research: Experimental Designs (4)
Discussion—2 hours; discussion/laboratory—2 hours. Prerequisite: course 114 or the equivalent. Methods for analysis of experimental data in educational research. Topics include ANOVA, fixed v. random effects models, repeated measures ANOVA, analysis of covariance, MANOVA, chi square tests, small sample solutions to t and ANOVA.—I. (I) Abedi

205A. Ethnographic Research in Schools I: Current Theory and Practice (4)
Lecture—4 hours. Prerequisite: graduate standing. Current literature from anthropology and sociology related to schools. Emphasis on the organizational structure of institutions, and the analysis of face-to-face interaction. Will investigate the relationship between field-based research and theory development on the acquisition of knowledge in a specific social and cultural contexts.—I. (I) Watson-Gegeko

205B. Ethnographic Research in Schools II: Field-Based Research Approaches (4)
Discussion—4 hours. Prerequisite: graduate standing and course 205A. Student research projects in specific schools with cooperative critical analysis of the design, data collection, and written genre conventions.—I. (I) Watson-Gegeko

206A. Inquiry into Classroom Practice: Traditions and Approaches (2)
Lecture/discussion—2 hours; fieldwork. Prerequisite: consent of instructor; open to graduate teaching credential students. Introduction to traditions and approaches of teachers conducting research in their own classrooms: purposes, focal areas, methods of data collection and analysis, and written genre conventions.—I. (I, II)

206B. Inquiry into Classroom Practice: Application of Qualitative Research Approaches (4)
Lecture/discussion—3 hours; fieldwork—1 hour. Prerequisite: satisfactory completion of course 206A or consent of instructor; open to graduate teaching credential students. Analysis and application of teacher research through the development, implementation and evaluation of a short-term, research-based intervention. Particular attention to research that enhances learning of English language learners and under-performing students.—II. (II, III)

206C. Inquiry into Classroom Practice: Study Design (4)
Seminar—3 hour; fieldwork—1 hours. Prerequisite: satisfactory completion of course 206B or consent of instructor. Proposal development for classroom-based inquiry designed to address student learning needs. Mixed methods research design and preliminary data collection approaches. Design and application of baseline indicators for assessment of proposal development. Literature review; data collection in K-12 classrooms required. Open to Graduate MA Credential students only.—I. (I)

206D. Inquiry into Classroom Practice: Data Analysis and Research Reporting (4)
Seminar—2 hours; fieldwork—1 hour; extensive writing or discussion. Prerequisite: satisfactory completion of course 206C or consent of instructor. Support of the inquiry begun in course 206C through continuous collaborative critique and feedback resulting in the writing and presentation of a research study. Open to Graduate MA Credential students.—II. (II)

207. Concepts of the Curriculum (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: graduate standing or consent of instructor. Development of the skills of philosophical analysis and argument for the establishment of a point of view, in the consideration of curricular and related issues. Classical and contemporary approaches to subject matter and activity emphasizes, hidden curriculum, and moral education.—I. (I)

208. Presenting Educational Research in Written Reports (4)
Seminar—3 hours; extensive writing. Prerequisite: graduate standing or consent of instructor. Rhetorical and substantive challenges of presenting educational research through written reports; research rhetoric and genres; competing discourse conventions of educational research, policy, and practice; the social organization of publishing educational research. May be repeated once for credit. Offered in alternate years.

209. Image-based Field Research (4)
Lecture/discussion—3 hours; fieldwork—2 hours. Prerequisite: graduate standing or upper division standing with consent of instructor. Field sites for researchers to develop and practice understanding of video tape and still photography as resources for enhancing field research in schools and other social settings. Offered in alternate years.

210. The Psychology of School Learning (4)
Lecture/discussion—4 hours. Study of human learning theory and research related to learning in school. Classical approaches of scholars such as Ausubel, Bruner, Gagne, Piaget, and Flavell. Review of contemporary issues of constructivism, metacognition, problem solving, learning strategies, science and mathematics learning.—II. (II) Martin, White

211. Sociocultural and Situative Perspectives on Learning and Cognition (4)
Lecture/discussion—3 hours; extensive writing—1 hour. Prerequisite: graduate standing or consent of instructor. Sociocultural and situative theories of cognition and learning. Major ideas of L.S. Vygotsky, followed by modern perspectives: situated cognition, cognitive apprenticeship, situated learning, communities of practice, cultural activity theory, and distributed cognition. Implications of each theoretical perspective for educational practice. Offered in alternate years. (III) White

213. Individual Assessment (4)
Lecture—4 hours. Prerequisite: courses 114 and 219, admission to school psychology credential program. Theories of intellectual functioning and the measurement of cognitive abilities in school-aged children. Supervised practice in administration and
scoring of contemporary tests for children including the WISC-R, the WJ III, the Stanford-Binet, the McCarthy Scales of Children's Ability. Offered in alternate years.—III.

215. Research on Achievement Motivation in Education (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Analysis and critique of recent research on cognitive processes related to achievement motivation in school settings. Topics include self-determination theory, attribution theory, goal theory, intrinsic extrinsic motivation, learned helplessness. Psychological reactance, gender and culture, and research design.

216. School-Based Prevention Programs (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Promotion of health and mental health in schools. Topics include the theoretical base, prevention models, specific examples of programs and programs designed to prevent learning and adjustment problems, and evaluation issues. Offered in alternate years.—II. (I.)

217. Testing Minority Children (4)
Lecture—5 hours, fieldwork—3 hours. Prerequisite: admission to a sociocultural psychology program or to a M.A. bilingual education program or consent of instructor. Emphasizing tests and techniques that are appropriate for use with Hispanic students. The use of multicultural approaches. Review studies and guidelines on use of tests with minority children. Offered in alternate years.

218. Culture and Social Organization of Schools (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Culture and social organization of schools. Examines perspectives of social scientists, educational policy-makers, and school members and their implications for educational research, policy and practice.—I. (II.)

222. School Change and Educational Reform (4)
Lecture/discussion—2 hours; seminar—2 hours. Prerequisite: graduate standing in Education with course 120 or the equivalent. Analysis of models, processes, and case studies of school change and educational reform with respect to variable characteristics of schools and schooling, and unplanned change, the moral evaluation of school change, and the role of educational research.—II. (I.)

223. Social Coordination and Policy (4)
Seminar—4 hours. Prerequisite: graduate standing in Education or consent of instructor. Focuses on understanding the social and political context of education in the U.S. and California and how education policy is formed in the broader public arena. Develops skills in educational policy analysis.—Former course 237.—I. III.

225. Education Policy and Law (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing or consent of instructor. Examination of law as an instrument of social policy. Specific focus on the legalizatation of educational decision making, its causes, dimensions, and effects on administrative and teacher authority. (I.)

226. Culture and Social Organization of Higher Education (4)
Seminar—3 hours; field work—1 hour. Prerequisite: graduate standing or consent of instructor. Critical study of culture and social organization of higher education institutions policies and functions in the U.S., with some attention to other countries.—I. (I.)

231. Culture and Learning (4)
Seminar—4 hours. Prerequisite: graduate standing in Education with course 120 or the equivalent, or consent of instructor. Analysis of major theories of relationships between learning and the sociocultural context in which it takes place, issues related to the academic achievement of different language groups, and implications for research and pedagogical reform.

233. Anthropology of Education (4)
Seminar—3 hours; term paper. Prerequisite: one of the following courses: Anthropology 117, 127, 129, or 222, or course 231, 201A, or 201B, or consent of instructor. Uses concepts of anthropologists education in such settings as family, community, and formal institutions of schooling. Course goal is to raise questions about educational issues often taken for granted and provide a perspective from which problems may be analyzed. [P/NP grading only.]

235. Critical Pedagogy (4)
Seminar—4 hours. Prerequisite: Critical Theory 200A and graduate standing. A socio-cultural critique, from an interdisciplinary perspective, of educational reform and change. The critique will include an analysis of the influence of text content on the perpetuation of social power differences.

242. Research on Text Comprehension (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of issues in research on composition, history of composition studies, direction analysis techniques; product and process approaches, cognitive and social perspectives. Offered in alternate years.—II. (II.)

243. Research on the Teaching and Learning of Mathematics (4)
Seminar—3 hours; project—1 hour. Prerequisite: graduate standing. Critical study of selected issues of language, literacy, and culture as they relate to education. May be repeated twice for credit when topic differs.—II. (II.)

244. Topical Seminar in Language, Literacy and Culture (4)
Seminar—3 hours; project—1 hour. Prerequisite: graduate standing. Critical study of selected issues of language, literacy, and culture as they relate to education. May be repeated twice for credit when topic differs.—II. (II.)

245. Theory and Research in Early Literacy (4)
Seminar—3 hours; field work—1 hour. Prerequisite: graduate standing or consent of instructor. Analysis of children's initial processes in learning to read extending from the preschool years into second grade. Topics include emergent literacy, phonological awareness, reading, spelling, vocabulary, comprehension, second language reading, assessment, intervention, and instruction. Offered in alternate years.—II. Uchikoshi

246. Reading as a Social and Cultural Process (4)
Lecture—3 hours; field work—1 hour. Prerequisite: course 211 recommended or consent of instructor. Recent theoretical and empirical work on reading in social context. View of reading as an individual interactive process; reading as a social and cultural process; critical perspectives on reading; implications of contrasting theoretical perspectives for curriculum and instruction. Offered in alternate years.—I. Murphy

247. Research on Response to Culturally Diverse Literature, K-12 (4)
Lecture—3 hours; field work—1 hour. Prerequisite: Research on response to culturally diverse literature in classrooms and other K-12 settings. Topics include reader response theories, values in expanding the literary canon, problems of cultural authenticity, resistance to multicultural literature, and instruction for diverse texts and learners. Offered in alternate years.—II. Athanases

249. Discourse Analysis in Educational Settings (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing and at least one previous course in linguistics or sociolinguistics, or consent of instructor. Examines form and type in discourse (e.g., narration, conversation, routines), approaches to discourse analysis, and research on classroom discourse (lessons, teaching/learning interpersonal sequences). Final term paper: an analysis of dis- course data tape-recorded by student in a field setting.—II. (III.)

251. Research in Bilingual and Second Language Education (4)
Seminar—3 hours. Prerequisite: course 151; knowledge of a foreign language. Discussion and analysis of recent research in bilingual and second language education. Topics include: language acquisition in second language learners and bilinguals, second language teaching methods, language-use models in bilingual education, interaction analysis in bimodal/cross-cultural classrooms, use of the vernacular in classrooms.

252. Multicultural Teaching and Curriculum (3)
Seminar—2 hours; field work—3 hours. Prerequisite: graduate standing or consent of instructor. Cross-cultural research on socialization, motivation, language acquisition and cognition and its application to effective classroom strategies and curriculum development for minority students. Students will develop and implement multicultural curriculum as well as use ethnographic research techniques in an educational setting.

253. Language and Literacy in Linguistic Minorities (3)
Seminar—2 hours; field work—3 hours. Prerequisite: familiarity with another language and culture; graduate standing. Analysis and application of research on oral language development and literacy in language minority students, theoretical development, implementation, and evaluation of research-based language arts curriculum.—II. (III.)

255. Curriculum Development and Evaluation in Mathematics (4)
Seminar—4 hours. Prerequisite: graduate standing in Education with upper division course work in mathematics or consent of instructor. Analysis of curriculum issues and goals in mathematics education, including long-term trends, current educational influences, proposed changes, and evaluation issues. Selected curriculum projects will be examined.—II. Ambrose

256A. Research in Mathematics Education (4)
Seminar—4 hours. Prerequisite: graduate standing in Education with upper division course work in mathematics or consent of instructor. Current research issues and activities in mathematics education: status, trends, theories and hypotheses in various areas of mathematics education research. Course emphasizes research projects and design of studies. Offered in alternate years.—II. Ambrose, White

256B. Research in Mathematics Education (4)
Seminar—4 hours. Prerequisite: graduate standing in Education with upper division course work in mathematics, or consent of instructor. Current research issues and activities in mathematics education: status, trends, theories and hypotheses in various areas of mathematics education research. Course emphasizes research projects and design of studies. Offered in alternate years.—II. Ambrose, White

257. Computer Technology in Mathematics Education (4)
Seminar—4 hours. Prerequisite: graduate standing in Education with mathematics course work, or consent of instructor. The roles of calculators, computers, and graphing calculators in mathematics education will be addressed, with emphasis on the impact of these technologies on curriculum reform. Selected efforts to integrate technology into mathematics instruction will be examined. Offered in alternate years.—II. White

260. The Modern History of Science Education (4)
Seminar—4 hours. Prerequisite: graduate standing in Education with upper division coursework in science, or consent of instructor. History of curricular...
issues and goals in science education from the late 19th century forward, including long-term trends, current trends and changes, and evaluation issues. National science standards and curriculum projects. Offered in alternate years. — II. Passmore

262A. Research Topics in Science Education I (4) Seminar—4 hours. Prerequisite: graduate standing in Education with upper division coursework in science or consent of instructor. Research process and product in science education; review of critical science education issues; evolution of trends, theories and hypotheses in various areas of science education research. Survey of current major research in science education. Passmore.

262B. Research Topics in Science Education II (4) Seminar—4 hours. Prerequisite: course 262A and graduate standing in Education with upper division coursework in science or consent of instructor. Research, theory and practice in the supervision of candidates in university classrooms. Teaching strategies. Ways to decide on the assignment of learning theory to effective instruction; interdisciplinary teaching and active learning approaches; teaching major themes across social science content areas; teaching potentially controversial social science topics; teaching democratic civic values, student assessment and evaluation. — II. (II.) Mendle.

322A. Pedagogical Preparation for Secondary Social Science I (3) Lecture/discussion—1 hour; discussion—2 hours. Prerequisite: course 222A. Interdisciplinary teaching methods and curriculum approaches for secondary social science teaching. Introduction to teaching methods and curriculum approaches to teaching major themes across social science content areas; teaching potentially controversial social science topics; teaching democratic civic values, student assessment and evaluation. — II. (II.) Rosa.


324A. Methods and Technology in Secondary Mathematics I (4) Lecture/discussion—4 hours. Prerequisite: admission into a teacher education program or consent of instructor. Introduction to methods and curriculum for teaching mathematics at the secondary level. Intro-
diction to applications of computer technology as instructional, intellectual, and communication tools for mathematics teachers. — I. I. Bellman

324B. Methods and Technology in Secondary Mathematics II (4)
Lecture/discussion—4 hours. Prerequisite: admission into a teacher education program or consent of instructor. Expansion of methods and curriculum for teaching mathematics at the secondary level. Inter-
medate applications of computer technology as instructional, intellectual, and communication tools in mathematics teaching. — II. I. Bellman

325. Research and Methods in Secondary English Language Arts (4)
Discussion—4 hours. Prerequisite: admission to graduate standing or credential program in Education or consent of instructor. Research on teaching and learning in the language arts. Principles, pro-
ductions and materials for improving the writing, reading and oral language of secondary students, with special attention to students from culturally and lin-
guistically diverse populations. — I. I. Holmes

326. Teaching Language Minority Students in Secondary Schools: Methods and Research Seminar—3 hours, field work—3 hours. Prerequisite: graduate standing in Education or consent of instruc-
tor. Research on principles, procedures and curricula for teaching discipline-specific concepts to language-
minority students in secondary schools. Second-lang-
guage acquisition principles and instructional strate-
gies. 327A. Teaching Methods for Secondary Foreign Languages/Spanish, Part I (3) Lecture—3 hours. Prerequisite: acceptance into a teacher education program or consent of instructor. Introduction to methods for teaching Spanish as a foreign and a heritage language in secondary schools. State and National Standards. Theories on second language acquisition. Lesson plans. Effective teaching strategies and class management. Open to Graduate Teaching Credential students. — I. I. Dubcovsky

327B. Teaching Methods for Secondary Foreign Language/Spanish, Part II (3) Lecture—3 hours. Prerequisite: course 327A or consent of instructor. Continuation to methods for teach-
ing Spanish as a foreign and a heritage language in secondary schools. Research and practice on for-
398. Group Study (1-5) [S/U grading only.

399. Individual Study (1-5) [S/U grading only.

Education (A Graduate Group)

Steven Athanases, Chairperson of the Group
Group Office, 2060 Academic Senate
(530) 752-7259; Fax: (530) 754-6672; mmreid@ucdavis.edu

Faculty
Jamal Abedi, Ph.D., Professor (Education) Rebecca C. Ambrose, Ph.D., Assistant Professor (Education) Steven Athanases, Ph.D., Associate Professor (Education) Heidi Ballard, Ph.D., Assistant Professor (Education) Robert Bayley, Ph.D., Professor (Linguistics) Brenda Bryant, Ph.D., Professor (Human Development) Scott E. Carrell, Ph.D., Assistant Professor (Economics) Pamela Castori, Ph.D., Science Education Specialist (Center for Biophotonics) Cynthia C. Ching, Ph.D., Associate Professor (Education)

Karen Watson-Gegeo, Ph.D., Professor (Education) Distinguished Graduate Mentoring Award

Graduate Study, The Graduate Group in Educa-
tion offers programs of study and research leading to the Ph.D. degree. Students may concentrate in educational psychology, language, literacy and culture; mathematics education; school organization and educational policy; and science and agriculture education. Students may also combine these fields of study with designated emphasis areas such as critical theory, second language acquisition, and women’s studies. Detailed information regarding graduate study may be obtained by writing the Graduate Coordinator or at http://education.ucdavis.edu/programs/PhDoverview.html.

Preparation. Students should have earned a Bache-
lor’s or M.A. degree or the equivalent in a disci-
pline relevant to their proposed emphasis program. For example, students applying for the mathematics education emphasis should have earned the B.A. or M.A. or M.A.T. degree in mathematics or mathemat-
es education; students applying to the educational psychology program should have a B.A. or M.A. in psychology or educational psychology.

Graduate Advisers. Michal Kurlaender, Jamil Abedi, Jon Wagner
Graduate Coordinator. Mary M. Reid
Courses. See School for courses.

Education Abroad Center
Charles Lesher, Ph.D., Education Abroad Center Convening Director
Education Abroad Center
207 Third Street, Suite 130
(530) 297-4633; Fax (530) 297-4695; eacuc@ucdavis.edu; http://eac.ucdavis.edu

The opportunity to study abroad is one of the richest educational experiences a student can have. When students return from study abroad in places like Italy or Hong Kong, they describe their time abroad as an experience that changed their lives. Study abroad to see the world, to study their aca-
demic interests in a global context, to learn a lan-
guage, to prepare for a job in the global economy and to add distinction to an application for graduate or professional school.

The Education Abroad Center (EAC) can help stu-
dents decide which program is best for them, whether to study abroad for a summer, quarter, semester or full year and when to go abroad (fresh-
man through senior years). The EAC Coordinators also participate in freshman seminars, offer financial aid workshops and can advise on programs that have internship opportunities. The EAC also adminis-
ters the Global and International Studies (GIS) minor, which is sponsored by the Humanities Program in the College of Letters and Science.

The EAC is home to the University of California Edu-
cation Abroad Program (EAP), to UC Davis Quarter Abroad and to UC Davis Study Abroad. The EAC coordinates the Non-UC Study Abroad (NUCSA) leave program for students who are interested in par-
ticipating in non-UC study abroad programs for transfer credit. Finally, the EAC advises and provides student services for international EAP Reciprocity stu-
dents.
UC Education Abroad Program (EAP)
Charles Lesher, Ph.D., Faculty Director
Education Abroad Center
207 Third Street, Suite 220
(530) 297-4633; Fax (530) 297-4695;
http://eac.ucdavis.edu

The UC Education Abroad Program (EAP) is one of the premiere study abroad programs in the nation. EAP offers international study programs in association with nearly 140 host universities and institutions in some 32 countries around the world. Participating students remain registered at UC Davis while studying abroad and receive full academic credit for their work. EAP students maintain their financial aid and scholarship eligibility while abroad. EAP has study abroad opportunities for undergraduates at all class levels as well as for qualified graduate students who have completed at least one full year of graduate work and have the support of their graduate program and graduate dean.

EAP offers year, semester, quarter, and summer programs for all majors. Over 50% of the programs are offered in English, while several programs allow students to learn a language while experiencing the culture first hand. Some programs include the possibility of internship and field research. In most cases, students attend courses taught by the faculty of the host institution.

UC faculty members serve as directors at most Study Centers abroad, providing in-country academic advising for their programs. Full UC credit is granted for courses satisfactorily completed, and courses and grades are recorded on official UC transcripts. With careful planning, most EAP students make significant progress toward their UC degrees, even though students who study abroad for a full year. With approval of their major or college advisers, students may earn credit toward their major, minor, and general education requirements.

Graduation Requirements. All prospective applicants, particularly students who intend to study abroad during their senior year, should carefully plan their course programs for Davis and abroad in order to satisfy unit, college, and major/minor requirements for their degree. Although units and grade points earned in the EAP are incorporated into the University transcript and GPA, departments and majors retain the right to determine which EAP courses will be accepted in satisfaction of major and minor requirements. All degree candidates must meet the University residence requirement. Recognizing the special value of study abroad, the faculty have approved two exceptions to the usual residence requirement for students participating in the Education Abroad Program:

• Students planning to graduate immediately upon completion of participation in the EAP may satisfy the University residence requirement by completing at least 35 of their final 45 units on the Davis Campus preceding entry into the EAP.

• Students who have not finished all of their degree requirements following completion of their participation in the EAP may satisfy the University residence requirement by completing at least 35 units, including at least 12 units after returning from the EAP, on the Davis campus within the final 90 units earned toward the degree. With this option, as many as 55 units taken abroad may be applied toward the unit requirement for graduation. Students should consult with their college Dean’s office early during the EAP planning process for information on the university’s residence requirement. Students may satisfy GE requirements while on EAP, but should consult with the Education Abroad Center and their college Dean’s office prior to departure for information on the certification process. Students may participate in EAP provided that (1) they will not exceed 225 units prior to their departure and (2) that all their degree requirements have been fulfilled either before they leave campus or during their time of EAP. Participants may only return to campus from EAP to complete any outstanding degree requirements provided that they can do so within 225 units.

Participants in programs that conclude in May or June who satisfy all degree requirements while abroad and expect to graduate upon completion of the year abroad should file for candidacy to receive their degree in September; candidacy filing dates are established by the Office of the University Registrar. In most cases, transcripts from abroad may not be received in time to be posted on the student’s Davis transcript for EAP returnees to be included on the June degree list. Such returning students may register to participate in the June commencement ceremony; however, their graduation date will be in September. Participants in programs that conclude in November or December should file for candidacy to receive their degree in March. Such returning students may be eligible to register to participate in the December or subsequent June commencement ceremony. Their graduation date will be in March.

UC Davis Faculty-Led Programs Abroad
UC Davis Quarter Abroad and UC Davis Summer Abroad offer faculty-led study-abroad programs that provide students with unique opportunities to travel and study in over 25 countries. Participants remain registered UC Davis students while abroad and receive UC Davis units for their academic work. Open to students from any major, these programs allow students to choose courses from a wide range of specializations.

Programs range from four-week summer offerings to quarter-long options. All programs allow students to experience the host country’s unique culture through co-curricular activities, such as day-trips to surrounding areas, museum tours, and theater visits. Financial aid and scholarships apply. Students may participate in the UC Davis Summer Abroad as early as their freshman year, or as late as their senior year. Applicants must have a 2.000 GPA, be in good academic and disciplinary standing, and must fulfill any prerequisites specific to the program courses.

Some courses completed through Quarter Abroad or Summer Abroad can apply specifically towards the Global and International Studies minor. The minor is designed for students who want to create an emphasis on a global topic, including regional, historical, political, ethnic or other issues.

In preparation for Quarter Abroad and/or Summer Abroad, students are urged to take Education Abroad Program 90X or 190X.

UC Davis Quarter Abroad
Yvette Flores, Faculty Director
207 Third Street, Suite 120
(530) 297-4633; Fax (530) 297-4695;
quarterabroad@ucdavis.edu;
http://quarterabroad.ucdavis.edu

Academic Focus. Students can earn 12-22 quarter units through two courses taken abroad. The UC Davis faculty leader teaches at least one of the courses of the program, while the rest are led by adjunct faculty of the host country. Students may be able to apply earned units towards major, minor, language, or general education requirements. In addition to language courses or other core courses, select programs also allow students the opportunity to earn units through an internship component.

UC Davis Summer Abroad
Eric Schroader, Faculty Director
207 Third Street, Suite 220
(530) 757-8308; Fax (530) 297-7142;
summerabroad@ucdavis.edu;
http://summerabroad.ucdavis.edu

Academic Focus. Students earn 8 quarter units through two courses taken abroad. All courses are taught by UC Davis faculty with supplement lectures provided by local experts. Planned group activities and field trips enhance classroom instruction. Students may be able to apply earned units towards their major, minor, or general education requirements. Programs allow students to complete coursework in English in a wide variety of non-English-speaking locations.

Courses in Education Abroad Program (EAP)

Lower Division Course
90X. International Education Seminar (1) Seminar—1 hour. Prerequisite: open to lower division applicants for EAP or UC Davis study abroad and international internship programs. Seminar examines the academic, cultural, and personal issues of study abroad, including academic programs abroad, country-specific history and culture, cross-cultural experiences, culture shock, racial and gender issues. May be repeated for credit (P/NP grading only)—I, III, (I, III)

Upper Division Courses
190X. International Education Seminar (1) Seminar—1 hour. Prerequisite: open to upper division applicants for EAP or UC Davis study abroad and international internship programs. Seminar examines the academic, cultural, and personal issues of study abroad, including academic programs abroad, country-specific history and culture, cross-cultural experiences, culture shock, racial and gender issues. May be repeated for credit (P/NP grading only)—I, III, (I, III)

192. Internship in Education Abroad (1-4) Internship—3–12 hours. Prerequisite: participation in a study abroad program. Internship related to education abroad. May take place at or away from the university. May be repeated for up to 12 units of credit. (P/NP grading only)—I, II, III, IV (I, II, III, IV)

Endocrinology (A Graduate Group)

Judith Turgeon, Ph.D., Chairperson of the Group
Group Office. 3301 Tupper Hall,
Human Physiology, (530) 752-3230

Faculty
Mary Adams, Ph.D., Professor (Animal Science)
Mary Lynn Barkley, Ph.D., Associate Professor, Emeritus (Neurobiology, Physiology, and Behavior)
Chris Calvert, Ph.D., Professor (Animal Science)
Ernest S. Chang, Ph.D., Professor Emeritus
Bodega Marine Laboratory
Bruce Hammock, Ph.D., Professor (Entomology)
Robert Hansen, Ph.D., Professor Emeritus (Molecular Biosciences)
Charles Hjelmeland, Ph.D., Professor (Ophthalmology)
Bill L. Lasley, Ph.D., Professor Emeritus (Public Health and Reproduction)
Stanley Meizel, Ph.D., Professor Emeritus (Cell Biology and Human Anatomy)
James R. Mill, Ph.D., Associate Professor (Animal Science)
Marty Privalsky, Ph.D., Professor (Microbiology)
Jan F. Roser, Ph.D., Professor (Animal Science)
Judith Stern, S.D.C., Professor Emeritus (Nutrition)
Dennis M. Styne, M.D., Professor (Pediatrics)
Judith L. Turgeon, Ph.D., Professor (Internal Medicine)
Dana L. Walsh, Ph.D., Professor Emeritus (Biological Chemistry)
Dorothy E. Woolley, Ph.D., Professor Emeritus (Neurobiology, Physiology, and Behavior)
Endocrinology and Metabolism

Courses in Endocrinology (EDO)

Graduate Courses

218. Mammalian Endocrinology and Homeostasis (4)
Lecture—4 hours. Prerequisite: Biological Sciences 102 and 103, Neurobiology, Physiology, and Behavior 101, and consent of instructor. Biochemical, physiological, and regulatory properties of the mammalian endocrine system, at the molecular, cellular, and systemic level. Signal transduction mechanisms and hormonal actions. Principles that regulate homeostasis, especially in organ–organ interrelationships, metabolism and minerals, fluids and electrolytes. Reproductive endocrinology. — III. (III.) Turgeon

220. Endocrinology Literature Critique (1)
Discussion—1 hour. Prerequisite: consent of instructor. Critical reading and evaluation of current original publications in endocrinology. Selected papers will be presented and discussed in detail by faculty and students. May be repeated for credit. [S/U grading only.]—I, II, (II.) Turgeon

240. Biochemical Endocrinology (3)
Lecture—3 hours. Prerequisite: graduate standing or consent of instructor. Examination of recent advances in biochemical endocrinology and molecular and cellular biology of endocrine systems with emphasis on processes of hormone and receptor synthesis, second messenger phenomena, and hormonal control of gene expression. — III. (III.) Adams

298. Group Study (1-5)
Prerequisite: consent of instructor.

299. Research (1-12)
[S/U grading only.]

Endocrinology and Metabolism

See Internal Medicine (IMD), on page 384.

Engineering

[College of Engineering]

Enrique J. Lavernia, Ph.D., Dean
Bruce R. White, Ph.D., Associate Dean—Academic Personnel and Planning
Karen A. McDonald, Ph.D., Associate Dean—Research and Graduate Studies
Bruce Hartsook, Associate Dean—Undergraduate Studies

College Office. 1050 Kemper Hall
(S30) 752-1979; http://engineering.ucdavis.edu/

Undergraduate Study

The college has eight departments: Applied Science Engineering, Biological and Agricultural Engineering, Biomedical Engineering, Chemical Engineering and Materials Science, Civil and Environmental Engineering, Computer Science Engineering, Electrical and Computer Engineering, Mechanical and Aeronautical Engineering.

Graduate Study

Graduate degrees (M.S., M. Engr., Ph.D., D. Engr.) are offered in the following engineering disciplines:

Applied Science
Biological Systems Engineering
Biomedical Engineering
Chemical Engineering
Civil and Environmental Engineering
Computer Science

Electrical and Computer Engineering

Materials Science and Engineering
Mechanical and Aeronautical Engineering
Transportation Technology and Policy

For additional information, refer to the Graduate office (530) 752-0592; see also Graduate Studies, on page 104.

The Major Programs

11. Issues in Engineering (1)
Lecture—1 hour. Prerequisite: Participation in the MESA Engineering Program or consent of instructor. Designed to broaden student’s understanding of the engineering profession, its methods, principles, design and development process, career opportunities, and professional resources. — I. (I.) Ford

17. Circuits I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 228 (may be taken concurrently); Physics 9C. Basic electric circuit analysis techniques, including electrical quantities and elements, resistive circuits, transient and steady-state responses of RC circuits, sinusoidal excitation and phasors, and complex frequency and network functions. — I, III. (I, III.)

35. Statics (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Physics 9A; Mathematics 210D (may be taken concurrently). Civil and Environmental Engineering 19 or Engineering 6 recommended. Force systems and equilibrium conditions with emphasis on engineering problems. — I, II, III. (I, II, III.)

45. Properties of Materials (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 16C or 21C and Chemistry 2A. Introductory course on the properties of engineering materials and their relation to the internal structure of materials. GE credit: Wrt. — I, II, III. (I, II, III.)

45H. Honors Properties of Materials (1)
Discussion—1 hour. Prerequisite: enrollment in the Materials Science and Engineering Honors Program; concurrent enrollment in course 45 required. Examination of special materials science and engineering topics through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations. Open only to students in the Materials Science and Engineering Honors program. — II. (II.)

98. Directed Group Study (1-4)
Restricted to College of Engineering students only. [P/NP grading only.] May be repeated for credit up to 3 times.

Upper Division Courses

100. Electronic Circuits and Systems (3)
Lecture—3 hours; laboratory—1 hour; discussion—1 hour. Prerequisite: course 17. Introduction to analog and digital circuit and system design through hands-on laboratory design projects. Students who have completed Electrical and Computer Engineering 100 may receive only 1.5 units of credit. — II, III. (II, III.)

102. Dynamics (4)
Lecture—4 hours. Prerequisite: course 35, Mathematics 228; open to College of Engineering students only. Kinematics and kinetics of particles, of systems of particles, and of rigid bodies applied to engineering problems. Only 2 units of credit allowed to students who have previously taken Engineering 36. — I, II, III. (I, II, III.)

103. Fluid Mechanics (4)
Lecture—4 hours. Prerequisite: course 102 [may be taken concurrently]. Open to majors in hydrology or the College of Engineering. Fluid properties, fluid statics, continuity and linear momentum equations for control volumes, flow of incompressible fluids in pipes, dimensional analysis and boundary-layer flows. Not open for credit to students who have completed Chemical Engineering 150A. — I, II, III. (I, II, III.)

104. Mechanics of Materials (4)

104L. Mechanics of Materials Laboratory (1)
Lecture—2 hours. Prerequisite: course 104. Experiments which illustrate the basic principles and verify the analysis procedures used in the mechanics.
of materials are performed using the basic tools and techniques of experimental stress analysis. —II, III, (III, III)

105. Thermodynamics (4)
   Lecture—4 hours. Prerequisite: Mathematics 228 and Physics 9B. Open to Engineering majors only. Fundamentals of thermodynamics: heat and energy, work, properties of pure substances, First and Second Law for closed and open systems, reversibility, entropy, thermodynamic temperature scales. Applications of thermodynamics to engineering systems. —III, (III, III)

106. Engineering Economics (3)
   Lecture—3 hours. Prerequisite: upper division standing in Engineering. The analysis of problems in engineering economy, the selection of alternatives; replacement decisions, Compounding, tax, origins and cost of capital, economic life, and risk and uncertainty are applied to methods of selecting most economic alternatives. —II, III, (II, III)

111. Electric Power Equipment (3)
   Lecture—2 hours; laboratory—3 hours. Prerequisite: course 17. Principles of AC and DC electric motors and generators, their control systems and power sources. Selection of electric power equipment components based on their construction features and performance characteristics. —I, II, (III)

121. Fluid Power Actuators and Systems (4)
   Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 100, 102, 104 and either 103 or Biological Systems Engineering 103. Hydraulic and pneumatic systems with emphasis on analysis and control of actuators. Design of hydraulic and pneumatic systems, specifications and sizing of components, and selection of electro-hydraulics/electro-pneumatics, servo valves, and closed loop systems to solve basic control problems. —II, III

122. Introduction to Mechanical Vibrations (4)
   Lecture—4 hours. Prerequisite: course 102. Free and forced vibrations in lumped-parameter systems with and without damping; vibrations in coupled systems; electro-mechanical analogs; use of energy conservation principles. —I, II, (Frank)

160. Environmental Physics and Society (3)
   Lecture—3 hours. Prerequisite: Physics 9D, SC, or 10 or 1B and Mathematics 16B or the equivalent. Impact of humankind on the environment will be discussed from the point of view of the physical sciences. Calculations based on physical principles will be made, and the resulting policy implications will be examined. (II) Lecture, 25, Laboratory under Science 225. Students may receive only one unit of credit towards the Technical Electives requirement.) (Same course as Physics 160) (GE credit: SciEng or SocSci.-I, II, (II)

180. Engineering Analysis (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: course 21D, 228, and course 6 or Mechanical Engineering 5. Solutions of systems of linear and nonlinear algebraic equations; approximation methods; solutions of ordinary differential equations; initial and boundary value problems; solutions of partial differential equations of Elliptic, parabolic, and hyperbolic types; Eigen value problems. —I, II, Hafez

190. Professional Responsibilities of Engineers (3)
   Lecture—3 hours; laboratory—1 hour. Prerequisite: upper division standing. Organization of the engineering profession; introduction to contracts, specifications, business law, patents, and liability; discussion of professional and ethical issues; oral presentation on the interactions between engineering and society. —II, III, (II, III)

198. Directed Group Study (1-5)
   May be repeated for credit up to 3 times. (P/NP grading only.)

Graduate Course

250. Technology Management (3)

Engineering: Applied Science

(College of Engineering)

Ann E. Orel, Ph.D., Chairperson of the Department
Hector A. Baldis, Ph.D., Vice Chairperson of the Department

Department Office. Engineering III (530) 752-0360; http://www.dee.ucdavis.edu

Faculty

Hector A. Baldis, Ph.D., Professor
Stephen P. Crompton, Ph.D., Professor
Yong Duan, Ph.D., Associate Professor
Francis Gygi, Ph.D., Professor
David Q. Hwang, Ph.D., Professor
Niels G. Jensen, Ph.D., Professor
Brian H. Kolner, Ph.D., Professor (Applied Science, Electrical and Computer Engineering)
Denise M. Krol, Ph.D., Professor
Nen-Neng Yu, Ph.D., Professor
Nelson Max, Ph.D., Professor (Applied Science, Computer Science)
William McCurdy, Ph.D., Professor (Applied Science, Electrical and Computer Engineering)
Greg Miller, Ph.D., Professor
Ann E. Orel, Ph.D., Professor
Ahu N. Parikh, Ph.D., Associate Professor
David M. Rocke, Ph.D., Professor (Applied Science, Electrical and Computer Engineering)
Frank Rodrigue, Ph.D., Professor
Rao Vemuri, Ph.D., Professor
(Applied Science, Computer Science)
Yin Yeh, Ph.D., Professor

Emeriti Faculty

Berni J. Alder, Ph.D., Professor Emeritus
Meeza M. Blattner, Ph.D., Professor Emeritus
Stewart D. Bloom, Ph.D., Professor Emeritus
Richard Christopher, Ph.D., Professor Emeritus
Paul P. Craig, Ph.D., Professor Emeritus
Richard R. Freeman, Ph.D., Professor Emeritus
John S. De Groot, Ph.D., Professor Emeritus
Jonathan P. Heritage, Ph.D., Professor (Applied Science, Electrical and Computer Engineering)
William G. Hoaer, Ph.D., Professor Emeritus
John Killeen, Ph.D., Professor Emeritus
Richard F. Pues, Ph.D., Professor Emeritus
Wilson K. Talling, Ph.D., Professor Emeritus

Affiliated Faculty

Rod Balhorn, Ph.D., Adjunct Professor
Andrew Canning, Ph.D., Adjunct Professor
James S. Felton, Ph.D., Adjunct Professor

The Major Program

The Department of Applied Science administers two programs: Optical Science and Engineering and Computational Applied Science.

Mission Statement. The mission of the Department of Applied Science is to foster the use of fundamental mathematical and scientific knowledge to improve the quality of life. We provide the profession and academia with outstanding Computational Applied Science and Optical Science and Engineering graduates who are interested both engineering practice and fundamental knowledge.

We challenge students to develop attributes that lead to professional growth throughout their careers: a sense of community, ethical responsibility, an expectation for lifelong learning and continuing education, the ability to think independently and perform creatively and effectively in teams, and the ability to communicate effectively both orally and in written media.

Upon graduation, we challenge our students to understand the fundamentals and the application of mathematics and sciences, to have an ability to design, conduct, and understand experiments, as well as to analyze and interpret data; to have a proficiency in the design of components and systems to meet desired performance specifications; an ability to function effectively on multi-disciplinary teams; a proficiency in the use of techniques, skills, and modern engineering tools to identify, formulate, and solve scientific and engineering problems; an understanding of professional and ethical responsibility; a proficiency in oral and written communication; the broad education necessary to understand the impact of engineering solutions in a global and societal context; an ability to engage in graduate education and lifelong learning; and a knowledge of contemporary issues that have an impact on society and the profession.

Computational Applied Science

Major Program

The Computational Applied Science program is not accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology, Inc.

Computational Applied Science (CAS) encompasses the interplay between the mathematics of models, arising from physical science and engineering, and the numerical techniques for their computational implementation and subsequent analysis. With a comprehensive background in mathematics and physical sciences, the major has, as its specific objective, to enable students in the major to construct practical numerical solutions to problems in science and engineering. A strong component of the program is the development, analysis, and integration of numerical algorithms and an appreciation for the interplay between numerical simulation, theoretical models, and experiment. Students who complete the Computational Applied Science program will receive a Bachelor of Science degree in Computational Applied Science.

Objectives. The objective of the Computational Applied Science major program is to provide a basic education in the fundamental principles of computational applied science combined with key courses in mathematics, engineering, and science. This will enable an integrated understanding of all components leading to practical and efficient computational solutions to problems. The major prepares students for careers in computational applied science professions as well as for graduate study in related fields.

Lower Division Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Science Engineering 2 ...........................................</td>
<td>4</td>
</tr>
<tr>
<td>Mathematics 21A-21B-21C/21D ...........................................</td>
<td>16</td>
</tr>
<tr>
<td>Mathematics 22A-22AL-22B ..............................................</td>
<td>7</td>
</tr>
<tr>
<td>Physics 9A-9B-9C-9D .....................................................</td>
<td>19</td>
</tr>
<tr>
<td>Chemistry 2A ....................................................................</td>
<td>5</td>
</tr>
<tr>
<td>Engineering 17A-17B-17C ..................................................</td>
<td>8</td>
</tr>
<tr>
<td>Computer Science Engineering 30 and 40 ..................................</td>
<td>4</td>
</tr>
<tr>
<td>Computer Science Engineering 20 or 50 or Electrical Engineering 70.</td>
<td>4</td>
</tr>
<tr>
<td>English 3 or University Writing Program 1 or Comparative Literature 1, 2, 3, 4, or Native American Studies 5 ..........</td>
<td>4</td>
</tr>
<tr>
<td>Communication 1 or 2 .....................................................</td>
<td>4</td>
</tr>
<tr>
<td>Civil Engineering 19 ................................................................</td>
<td>4</td>
</tr>
<tr>
<td>General Education electives ...............................................</td>
<td>12</td>
</tr>
<tr>
<td>Minimum Lower Division Units .............................................</td>
<td>91</td>
</tr>
</tbody>
</table>

Upper Division Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>UNITS</th>
</tr>
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</table>
### Optical Science and Engineering

The Optical Science and Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; (410) 347-7700. Optical Science and Engineering encompasses the physical phenomena and technologies associated with the generation, transmission, manipulation, detection, and applications of light. The Optical Science and Engineering curriculum prepares students to design, analyze, and fabricate effective optical systems. Much of today’s high-technology infrastructure is based upon optics and its applications, the most prominent being optical digital information transmission. Optical systems play a central role in nearly every aspect of modern life, from health care and the life sciences, remote optical sensing, lighting, cameras, space, and national defense. Students who complete the Optical Science and Engineering curriculum will receive a Bachelor of Science degree in Optical Science and Engineering.

#### Objectives

Our fundamental program objective is to educate students in the basics required for optical science and engineering: mathematics, sciences, and engineering. We educate students in the fundamentals of the science, analysis, and design of optical systems.

#### The Optical Science and Engineering Major Program

<table>
<thead>
<tr>
<th>Lower Division Required Courses</th>
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</thead>
<tbody>
<tr>
<td><strong>UNITS</strong></td>
</tr>
<tr>
<td>Applied Science Engineering 1</td>
</tr>
<tr>
<td>Mathematics 212A-212C-212D</td>
</tr>
<tr>
<td>Mathematics 222A-222B</td>
</tr>
<tr>
<td>Physics 9A-9B-9C-D</td>
</tr>
<tr>
<td>Chemistry 2A</td>
</tr>
<tr>
<td>Civil Engineering 19 or Computer Science Engineering 30</td>
</tr>
<tr>
<td>Engineering 17</td>
</tr>
<tr>
<td>Engineering 45</td>
</tr>
<tr>
<td>English 3 or University Writing Program 1</td>
</tr>
<tr>
<td>Comparative Literature 1, 2, 3, 4, or 5</td>
</tr>
<tr>
<td>Native American Studies 3</td>
</tr>
<tr>
<td>Communication electives</td>
</tr>
<tr>
<td>General Education electives</td>
</tr>
<tr>
<td><strong>Total Lower Division Units</strong></td>
</tr>
</tbody>
</table>

#### Upper Division Required Courses

- **Electrical and Computer Engineering 130A, 130B, and 135**
- **Physics 104A**
- **Physics 112 or Chemistry 110C**
- **Chemistry 110A**
- **Applied Science Engineering 137 or Engineering 190**
- **Electrical and Computer Engineering 100, 106, 133, 136, 140A, 140B, 150A, 150B**
- **Technical electives**
- **General Education electives**
- **Minimum Upper Division Units**
- **Minimum Upper Division Units Required for Major**

#### The Graduate Program

M.S. and Ph.D. in Applied Science

Designated Ph.D. emphasis available in Biophotonics

http://www.das.ucdavis.edu

Graduate students in Applied Science at UC Davis use mathematics and physics to discover new knowledge at the dynamic intersections of engineering, mathematical, physical and biological sciences. Our mission is to advance the leading edge of research and create tools to serve industry, government and society.

We offer unusually rich research opportunities, with a high level of support for graduate students and demonstrated excellence in career prospects following graduation. Nanotechnology and biophotonics are particular areas of interest.

A major strength of the department is its access to the scientists and facilities of the Lawrence Livermore National Laboratory where many of our faculty have joint appointments. Nearly all the students use the laboratory for their thesis research, while the laboratory’s facilities are some of the nation’s best in atomic and molecular physics, computational physics, fusion technology, laser physics and nonlinear optics, materials science and condensed matter physics, plasma physics and scientific computing. Generous financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid.

#### Research Highlights

- Applied Biosciences & Biotechnology
- Atomic, Molecular and Laser Physics
- Optical Sciences
- Computational Science & Engineering
- Materials Science & Condensed Matter Physics
- Plasma Science & Fusion Engineering
- Computer Visualization and Communications

#### Research Facilities

- Lawrence Livermore National Laboratory
- Lawrence Berkeley National Laboratory
- Los Alamos National Laboratory
- High-Power Microwave Source and Plasma Interaction Laboratory

#### Courses in Engineering

**Applied Science—Davis (EAD)**

**Lower Division Courses**

1. **Optical Science and Engineering (4)**
   - Lecture—3 hours; discussion—1 hour. Discussion and demonstrations of optical science and engineering principles and applications. Discussion of the opportunities and professional practice in the field including ethics and responsibilities. —I. (I.) Baldis, Kramer, Orel

2. **Introduction to Applied Computational Science and Engineering (4)**
   - Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 21C (may be taken concurrently), Physics 9A (may be taken concurrently), Computer Science Engineering 30. Role of mathematics in modeling physical, biological, and engineering phenomena. Pitfalls in computation. Limitations of models, numerical implementations, and quality assessment of computational data. Interactions among mathematics, algorithms, computer hardware and software, and selected scientific and engineering applications. —II. (III.)

**90C. Research Group Conference for Lower Division Students (1)**
   - Discussion—1 hour. Prerequisite: lower division standing; consent of instructor. May be repeated for credit. (P/NP grading only) —I, II, III, (I, II, III)

**98. Directed Group Study (1-5)**
   - Prerequisite: consent of instructor and lower division standing. (P/NP grading only)

**99. Special Study for Lower Division Students (1-5)**
   - Prerequisite: consent of instructor. (P/NP grading only)

**Upper Division Courses**

108A. **Optics I (4)**

108B. **Optics II (4)**
   - Lecture—3 hours; laboratory—3 hours. Prerequisite: course 108A. Introduction to wave theory of optics, including Maxwell’s equations and boundary condition, reflection and transmission coefficients, interference, diffraction, polarization, thin film and ultra thin film optics, and radiation from extended distributions of oscillating electric dipoles. Applications of wave optics. Not open for credit to students who have completed Physics 108 and 108L.—II. (I.) Baldis, Kohler

108L. **Optics Laboratory (4)**
   - Discussion—1 hour; laboratory—6 hours; extensive problem solving—3 hours. Prerequisite: courses 108A, 108B. Practical applications of principles of geometrical and physical optics. Experimental properties of materials, imaging, lens fabrication, interferometry, polarization, photometry, diffraction and propagation. Small course fee for materials.—III. (II.) Kohler

115. **Numerical Solution of Engineering and Scientific Problems (4)**
   - Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 6 or Computer Science Engineering 30, and Mathematics 228. Computer problem solving, including error analysis, roots of equations, systems of equations, interpolation and data fitting, integration, initial value, boundary value, and eigenvalue
116. Computer Solution of Physical Problems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 2, 116, Physics 104A. Numerical techniques for simula-
tion and modeling of nonlinear deterministic sys-
tems. Examples from fluid, continuum, molecular
mechanics, low-dimensional nonlinear systems.
Emphasis on error and stability through adaptive
techniques, methods of evaluation of relationships
between physical systems, the model equations, num-
erical implementation. Jensen, McCurdy, Miller, Orel, Rocke

117A. Simulation and Modeling of
Deterministic Dynamical Systems (5)
Lecture—3 hours; laboratory—3 hours; extensive
textbook solved—2 hours. Prerequisite: course 2, 116, Physics 104A. Numerical techniques for simu-
tation and modeling of nonlinear deterministic sys-
tems. Examples from fluid, continuum, molecular
mechanics, low-dimensional nonlinear systems. Em-
phasis on error and stability through adaptive
methods, evaluation of relationships between physi-
cal systems, the model equations, numerical im-
plementation. Jensen, McCurdy, Miller, Orel, Rocke

117B. Simulation and Modeling of
Statistical Systems (5)
Lecture—3 hours; laboratory—3 hours; extensive
textbook solved—2 hours. Prerequisite: course 2, 116, Physics 104A. Numerical techniques for simu-
tation and modeling of nonlinear deterministic sys-
tems. Examples from fluid, continuum, molecular
mechanics, low-dimensional nonlinear systems. Em-
phasis on error and stability through adaptive
methods, evaluation of relationships between physi-
cal systems, the model equations, numerical im-
plementation. Jensen, McCurdy, Miller, Orel, Rocke

117C. Topics in Simulation and
Modeling (5)
Lecture—3 hours; laboratory—3 hours; extensive
textbook solved—2 hours. Prerequisite: course 117B. Topics may include Monte Carlo techniques, Algol
grithms for efficient scientific computing on modern
high-performance computers; influence on algo-
grithms of distributed computing, memory manage-
ment, networked information flow; managing
relationships among computer architecture, soft-
ware, and algorithms. (II.) Miller, Orel, Laub, McCurdy, Rodrique

119. Applied Computational Linear Algebra (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 115 and Physics 104A. Introduction to com-
putational linear algebra with emphasis on applica-
tions in engineering systems; matrix factoriza-
tions; mathematical software for fundamental algo-
grithms. (I.) Jensen, Laub

161A. Optical Design (4)
Lecture—3 hours; lecture/laboratory—2 hours. Pre-
requisite: course 108A, 161A (completed during the
previous quarter); senior level standing. Design of a
complete optical system, construction, testing, and cal-
boration. The knowledge and skills acquired in earlier
course work are used for designing that includes engineering
and systematic constraints. Knowledge and skills acquired in 161A are essen-
tial. (Deferred grading only, pending completion of sequence.)—I. (II.) Stalits

165. Statistical and Quantum Optics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite:
Chemistry 110A; Electrical and Computer Engineer-
ing 130B. Waves and photons; photon number and
fluctuations; field and number correlations; at-
omic photon interactions; line broadening; Einstein coeffi-
cients; strong field interactions; photon bunching
and anti-bunching; photodetector counting distribu-
tions for classical and coherent light; squeezed states.
Yeh

166. Lasers and Nonlinear Optics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite:
course 165. Optical gain and amplification, laser
threshold conditions, laser pumping requirements and
techniques, laser resonator cavity design, specific laser systems, short pulse genera-
tion, Q-switching, modellocking, principles of nonlin-
er optics, second harmonic generation, optical
parametric amplification, electro-optic effect. (II. Krol, Yeh

167. Fourier Optics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
Physics 104A and Electrical and Computer Engi-
ering 130B. Introduction to Fourier transforms; dif-
ferential equations, 2D Fourier transforms, scalar
diffraction theory, Fresnel and Fraunhofer diffraction,
coherent and incoherent optical systems, spatial fre-
quency analysis, analog optical processing, spatial
information processing, spatial light modulators, film, holography, charac-
ter recognition, and image restoration. (II.) Miller, Orel, Laub

169. Optical Properties of Materials (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 108B, Engineering 45, and Chemistry 110A.
Relation between structure, composition, and optical
properties of laser materials, nonlinear optical mate-
rials, photorefractive, fiber optics, semiconductors,
liquid crystals, and thin films. (III. Krol, Parkish

170. Optical Spectroscopy: Concepts and
Instruments (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
Chemistry 110A and course 166. Fundamentals of
absorption and emission, spectrometers, interferome-
ters, light sources and detectors, UV, Visible, and IR
spectroscopy, fluorescence spectroscopy, Raman and Brillouin
spectroscopy, laser spectroscopy. (III.) Miller, Orel, Laub, Yeh

172. Optical Methods for Biological
Research (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 108B, Biological Sciences 2A, and Chemis-
ty 110A. Optical techniques for resolving signifi-
cant research problems in biology. Examples include
the sequence, structure, and movement of DNA;
ultraviolet absorption and reflectance; detection;
protein-protein interactions and supramolecular
organization. (III. Krol, Parkish

190C. Research Group Conference for
Advanced Undergraduates (1)
Discussion—1 hour. Prerequisite: advanced stand-
ing; consent of instructor. Weekly conference on
research problems, progress and techniques in applied
sciences. May be repeated for credit. (P/NP grading only.)—I, II, III. (II, III)

192. Internship (1-5)
Internship—3.36 hours. Internship: consent of
instructor; upper division standing; approval of
project prior to the internship. Supervised work ex-
perience in Optical Science Engineering or Com-
putational Applied Science. May be repeated for credit.
(P/NP grading only.)—I, II, III, (II, III)

198. Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

199. Special Study for Advanced
Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

Graduate Courses

205A. Mathematical Methods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
Mathematics 228 or equivalent. Complex variables,
three of convergence, evaluation of definite inte-
gral, factorial function (gamma function), solution of
second-order ODEs, Fourier analysis. (I.) Miller, Orel, Rodrique

205B. Mathematical Methods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 205A. Laplace transforms, Delta sequences, Direct solution of PDEs,
Green’s functions for PDEs. (II.) Miller, Orel, Rodrique

205C. Mathematical Methods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
Mathematics 22A and 22B or equivalent. Spherical
harmonics, Bessel functions, special functions, finite
and infinite vector spaces. (I.) Miller, Orel, Rodrique

209. Linear Modeling Techniques (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
Mathematics 167 or the equivalent strongly recom-
manded. Matrix theory and linear algebra with emphasis
on applications in engineered systems; geometrical aspects of linear algebra; matrix factor-
izations; analysis and design techniques for discrete-
and continuous-time lumped parameter models. (I.) Miller, Orel, Rodrique

210A. Numerical Methods in Applied
Science (4)
Lecture—3 hours; lecture/discussion—1 hour. Prere-
quisite: facility with a programming language; C
or C++ strongly recommended. Numerical methods
developed from an applied mathematics perspec-
tive: Analysis and control of numerical error, interpo-
lation, integration, noniterative solution of linear
systems, iterative methods for root finding and mini-
mization. (II.) Miller, Orel, Rodrique

210B. Numerical Methods in Applied
Science (4)
Lecture—3 hours; lecture/discussion—1 hour. Prere-
quisite: facility with a programming language; C
or C++ strongly recommended. Numerical methods
developed from an applied mathematics perspec-
tive: Iterative methods for linear systems, numerical
solutions for ODE initial value problem, numerical
solutions, eigenvalues and eigenvectors. (III.) Miller, Orel, Rodrique

210C. Numerical Methods in Applied
Science (3)
Lecture—3 hours. Prerequisite: course 210B. Com-
putational methods in various fields including: fluid
mechanics, kinetic theory, solid mechanics, quantum
mechanics. (I.) Rodriguez, Vemuri

211A. Numerical Solution of Partial
Differential Equations I (3)
Lecture—3 hours. Prerequisite: course 210A, 210B.
Fundamentals of parallel computers, grid genera-
tion, domain decomposition, Poisson’s equation,
elliptic PDEs, Galerkin methods, numerical linear
algebra, iterative acceleration. (I.) Rodriguez, Vemuri, Orel, Miller

211B. Numerical Solution of Partial
Differential Equations II (3)
Lecture—3 hours. Prerequisite: course 211A. Para-
obolic PDEs, stability, preconditioned time differenc-
ing, hyperbolic PDEs, modified differential equation,
advective-diffusion equations, wave equation, Burg-
gers’ equation, conservation laws. Iterative equations. (II.) Miller, Orel, Miller

211C. Numerical Solution of Partial
Differential Equations III (3)
Lecture—3 hours. Prerequisite: course 211B. Conser-
vation laws, fluid equations, turbulence, elasticity
equations, electromagnetism, transport equations. (III.) Miller, Orel, Rodrique

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer. 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; DivI—Social-Cultural Diversity; WrtW—Writing Experience
213A. Computer Graphics (3)
Lecture—3 hours. Prerequisite: consent of instructor. Development of algorithms for perspective line drawings of three-dimensional objects, as defined by polygons or bicubic patches. — (II) Max

217A. Applied Computational Science (3)
Lecture—3 hours. Prerequisite: course 210A, Mathemat-ics 229A (may be taken concurrently). Applied modular programming in low level language (C or fortran). Direct implementations and integrated applications of algorithms applied to computational science problems, which are exemplified through projects. Emphasis on the practical use and implementation of theory taught in course 210A. — I. Rodrigue, Miller, Orel, Jensen

217B. Applied Computational Science (2)
Lecture—3 hours. Prerequisite: course 210B or the equivalent (may be taken concurrently). Applied modular programming in low level language (C or fortran). Direct implementations of the theory taught in course 210B and integrated applications of algorithms for computational science problems, exemplified through projects including partial differential equations; initial/boundary value problems. — II. Rodrigue, Miller, Orel, Jensen

218. Signal Processing (3)

219. Wavelets and Their Applications (3)
Lecture—3 hours. Prerequisite: Electrical and Computer Engineering 150A, Mathematics 167. Fourier transforms and digital filters; sampling theorem and analog-to-digital conversion, multirate signal processing, wavelet transforms and filter banks, fast algorithms: FFT, DWT, and pyramid; data compression with wavelets; spectral factorization; designing application-specific wavelets. Offered in alternate years. — (II) Vemuri

220A. Artificial Neural Nets-I (3)

220B. Artificial Neural Nets-II (3)

221. Genetic Algorithms and Optimization (3)
Lecture—3 hours. Prerequisite: Mathematics 145 or the equivalent. The ability to program in one of the modern programming languages. Introduction to genetic algorithms. Fundamental theory, schema processing, genetic operators, applications to function optimization, scheduling, VLSI circuit layout. Implementation on parallel computers; genetic programming; evolutionary algorithms. — (Ill) Vemuri

225. Computational Structures for Signal and Image Processing and Graphics (3)
Lecture—3 hours. Prerequisite: Computer Science Engineering 40; course 210A. Tools for research in digital media. Relevant computer architectures, algorithms and languages for signal processing, image processing and graphics. Hardware and software issues in parallelism. Programming in SISAL. Parallel C and Parallel Fortran. Parallel algorithms using SISAL on parallel computers. Offered in alternate years. — (II) Kolner, Hwang

226. Practical Data Communications in Digital Media (3)
Lecture—3 hours. Prerequisite: Computer Science Engineering 152. Tools for research in digital media. Constituents, protocols, algorithms and architectures suitable in modern networked environment. Transmission of digital data over voice-grade channels, telecommunications networks for data transport, broadband multimedia communications, ATM, and Broadband ISDN. Offered in alternate years. — (II) Vemuri

228A-228B-228C. Properties of Matter (3-3-3)
Lecture—3 hours. Prerequisite: Mathematics 228 and Physics 112B. Microscopic and macroscopic descriptions of matter; thermodynamics and kinetics; constitutive, electrical, mechanical and thermal properties. — I, II, III. (II, III) Luhmann, Yeh, Baldis, McCurdy

229. Computational Molecular Modeling (4)
Lecture—3 hours; project. Prerequisite: course 210A and 228A or consent of instructor. Theory and computer implementations of algorithms in computational statistical mechanicals. Temporal integrators, molecular dynamics, force fields, constrained dynamics, Monte Carlo techniques, fluctuation-dissipation theorem, and parallel vs. serial computing. — II. (I) Jensen

230. Topics in Computational Fluid Dynamics (3)
Lecture—3 hours. Prerequisite: course 210A, 210B or consent of instructor. A hands-on approach to numerical methods for compressible fluid flow. Readings and discussions of solution strategies complemented with programming exercises and projects to give first hand experience with performance and accuracy of several computational methods; from upward differencing to Godunov methods. — III. (III) Miller

231A. Applied Quantum Mechanics (3)
Lecture—3 hours. Discussion—1 hour. Prerequisite: courses 205ABC (may be taken concurrently). Classical properties of matter; introduction to quantum mechanics by the correspondence principle. Solvable bound state/continuum problems in 1D: well, barrier, and harmonic oscillator. Solvable problems in 3D: HO, well, and hydrogen atom. Matrix theory: Schrodinger, Heisenberg, and interaction picture. — II. (II) Orel, Krol, Yeh

231B. Applied Quantum Mechanics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 231A. Approximate methods in quantum mechanics, perturbation methods, variational methods, time dependent perturbation theory, scattering, and radiation. — III. (III) Orel, Krol, Yeh

233A-233B-233C. Theory and Applications of Solid-State Physics (3-3-3)
Lecture—3 hours. Prerequisite: course 230C or the equivalent. Structure and properties of crystals, the theory of dielectrics, metals and alloys; magnetism, superconductivity, and semiconductors. Applications to various solid-state devices. — I-II-III. (I-I-I) Orel

234A. Applied Electromagnetics I (3)
Lecture—3 hours. Prerequisite: Electrical and Computer Engineering 130B or the equivalent. Electrostatics, Gauss's law, potentials, field boundary problems, multiple pole expansions, dielectric and magnetic, polarization, capacitance, energy, torque, forces, eigenfunction expansions. Magnetostrictic, Bio-Savart law, Ampere's law, vector potential, gauge transformations, magnetization, inductance, constitutive relations. — II. (II) Kolner, Hwang

234B. Applied Electromagnetics II (3)

234C. Applied Electromagnetics III (3)
Lecture—3 hours. Prerequisite: course 234B. Dynamics of relativistic particles; collisions between charged particles, energy loss, and scattering; radiation by moving particles; bremsstrahlung, method of virtual quanta, radiative beta processes; multipole fields, radiation damping, self fields of a particle, scattering and absorption of radiation. — I. (I) Kolner, Hwang

262A. Atomic and Molecular Interactions (3)
Lecture—3 hours. Prerequisite: Physics 215A-215B-215C or the equivalent. Atomic structure and spectra. Offered in alternate years. — (II) Orel

262B. Atomic and Molecular Interactions (3)
Lecture—3 hours. Prerequisite: Physics 215A-215B-215C. Molecular structure and spectra. Offered in alternate years. — (II) Orel

262C. Atomic and Molecular Interactions (3)
Lecture—3 hours. Prerequisite: course 262B. Classical and quantum mechanical collision theory of electron and heavy particle scattering. Offered in alternate years. — (II) Orel

263A. Quantum Statistics of Light (3)
Lecture—3 hours. Prerequisite: Physics 200B/200C and Physics 215A-215B-215C or the equivalent. Classical susceptibilities, quantization of light/matter interactions, resonance phenomena, second quantization of electromagnetic fields, number representation and operations. — II. (II) Orel, McCurdy

263B. Quantum Theory of Optics (3)

264A. Classical Optics I (3)
Lecture—3 hours. Prerequisite: course 108B and Electrical and Computer Engineering 130B or Physics 110B. Crystal optics; anisotropic wave propagation, dispersion relations, phase and group velocity surfaces. Polarization, Stokes parameters, Poincare sphere. Optical crystallography; interference figures, optical activity, crystal symmetry and point groups. Piezeoelectricity, electro-optic, magneto-optic effects. Geometrical optics, geometrical optics, Lagrange's integral invariant, Fermat's principle. — I. (I) Kolner

264B. Classical Optics II (3)

264C. Classical Optics III (3)

265A. Laser Physics I (3)
Lecture—3 hours. Prerequisite: Physics 200C and Physics 215B-215C or the equivalent. Classical theory of lasers. Classical electron oscillator, atomic susceptibility, line broadening mechanisms, rate equations, stimulated transitions, radiative/nonradi- ative relaxations, multilevel systems, population inversion, saturation, oscillation, Schawlow-Townes limit, paramaxial wave propagation, dispersion, pulse compression, resonators, mode locking, Q-switching, mode locking. — I. (I) Kolner
283D. Physics and Technology of Microwave Vacuum Electron Beam Devices IV (4)
Lecture—4 hours. Prerequisite: 285C. Computational models of vacuum electron beam devices. Offered in alternate years. —(III.) Luhmann

289A-K. Special Topics in Applied Science (1-5)
Lecture, laboratory, or combination. Prerequisite: consent of instructor. Special topics in the following areas: (A) Atomic and Moleculare Physics; (B) Chemical Physics, (C) Digital Media; (D) Materials Science; (F) Imaging Science and Photonics; (G) Nonlinear Optics; (H) Plasma Physics; (I) Quantum Electronics; (J) Solid State; (K) Microwave and Millimeter Wave Technology. May be repeated for credit up to a total of 5 units per segment when topic varies. —I, II, III, I, I, III.

290. Seminar (1-2)
Seminar—1-2 hours. (S/U grading only.)

290C. Graduate Research Group Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. May be repeated for credit. (S/U grading only.)

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Course in Biophotonics (BPT)
Graduate Course

290. Biophotonics Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Presentation of current research in the area of biophotonics by experts in the field followed by group discussions. May be repeated up to three times for credit. (S/U grading only.)—I, II, III, I, I, II, III, I, I, III, I, I, II, III.

III (5)
Ruihong Zhang, Ph.D., Professor
Wesley W. Wallender, Ph.D., Professor

WINTER QUARTER (Jan. 3-Feb. 18)

285D. Physics and Technology of Microwave Vacuum Electron Beam Devices IV (4)
Lecture—4 hours. Prerequisite: 285C. Computational models of vacuum electron beam devices. Offered in alternate years. —(III.) Luhmann

289A-K. Special Topics in Applied Science (1-5)
Lecture, laboratory, or combination. Prerequisite: consent of instructor. Special topics in the following areas: (A) Atomic and Moleculare Physics; (B) Chemical Physics, (C) Digital Media; (D) Materials Science; (F) Imaging Science and Photonics; (G) Nonlinear Optics; (H) Plasma Physics; (I) Quantum Electronics; (J) Solid State; (K) Microwave and Millimeter Wave Technology. May be repeated for credit up to a total of 5 units per segment when topic varies. —I, II, III, I, I, III.

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Engineering: Biological and Agricultural

[College of Engineering]
Michael J. Delwiche, Ph.D., Chairperson of the Department
Department Office
2030 Bannier Hall
(530) 752-0102
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Faculty
Michael J. Delwiche, Ph.D., Professor
Julia Fan, Ph.D., Assistant Professor
Fadi A. Fathallah, Ph.D., Associate Professor
D. Ken Giles, Ph.D., Professor
Mark E. Grismer, Ph.D., Professor

Land, Air, and Water Resources
Bruce R. Harbaugh, Ph.D., Professor
Bryan M. Jenkins, Ph.D., Professor

Food Science and Technology
John M. Krochta, M.S., Associate Professor
Miguel A. Marilite, Ph.D., Professor
Kathryn McCarthy, Ph.D., Professor
Michael J. McCarthy, Ph.D., Professor

Food Science and Technology
Ning Pan, Ph.D., Professor

Textiles and Clothing
Raul H. Piedrahita, Ph.D., Professor
Richard E. Plant, Ph.D., Professor

Plant Sciences
Uriet Rosa, Ph.D., Associate Professor

R. Paul Singh, Ph.D., Professor
David C. Slaughter, Ph.D., Professor
Shriniwasa K. Upadhyaya, Ph.D., Professor
Jean S. Vandenbussche, Ph.D., Associate Professor

Wesley W. Wallender, Ph.D., Professor

Land, Air, and Water Resources
Ruifang Zhang, Ph.D., Professor

Emeriti Faculty
Norman B. Ackesson, M.S., Professor Emeritus
Robert H. Burgy, M.S., Professor Emeritus
William J. Chancellor, Ph.D., Professor Emeritus
Pictaw (Paul) Chen, Ph.D., Professor Emeritus
Roger E. Garrett, Ph.D., Professor Emeritus
John R. Goss, M.S., Professor Emeritus
David J. Hills, Ph.D., Professor Emeritus
S. Milton Henderson, M.S., Sc.D., Professor Emeritus
Roger E. Garrett, Ph.D., Professor Emeritus
R. Larry Merson, Ph.D., Professor Emeritus
John A. Miles, Ph.D., Professor Emeritus
Stanton R. Morrison, Ph.D., Professor Emeritus
James W. Rumsey, M.S., Senior Lecturer Emeritus
Thomas A. Rumsey, Ph.D., Professor Emeritus
Verne H. Scott, Ph.D., Professor Emeritus
Henry E. Studer, M.S., Professor Emeritus
Wesley E. Yates, M.S., Professor Emeritus

Affiliated Faculty
Daniel Downey, Ph.D., Assistant Research Engineer
Wesley W. Wallender, Ph.D., Adjunct Professor
Zhangr, Ph.D., Professor Emeritus
Herbert B. Scher, Ph.D., Research Engineer
James F. Thompson, M.S., Extension Specialist

Mission. The Department of Biological and Agricultural Engineering is dedicated to the advancement of engineering for biological systems. Specifically, our goals are to advance the science, teach the principles and application, and disseminate the knowledge of engineering needed to efficiently produce, distribute, and process biological products, such as food, feed, and fiber, while conserving natural resources, preserving environmental quality, and ensuring the health and safety of people.

Objectives. We educate students in the fundamentals of mathematics, physical and biological sciences, and engineering, balanced with the application of principles to practical problems. We teach students to develop skills for solving engineering problems in biological systems through use of appropriate analysis, synthesis, and design engineering techniques. We prepare students for entry into engineering practice and graduate education, as well as engagement in lifelong learning. We foster the ability of our students to collaborate and communicate effectively, and provide an awareness of the importance of economics, professional responsibility, and the environment.

The Biological Systems Engineering Major Program

Biological Systems Engineering is an engineering major that uses biology as its main scientific base. In the new age of biology and biotechnology, engineers are needed to work side by side with life scientists to bring laboratory developments into commercial production. Industries in plant and animal production, bioenergy, bioprocessing, biotechnology, food processing, agriculture, and forestry all need engineers with strong training in biology. Concern for the use and preservation of environmental resources creates many engineering opportunities as society strives to maintain a balance within the biosphere. In the freshman and sophomore years, the Biological Systems Engineering major requires sequences of courses standard in all engineering programs, including mathematics, physics, chemistry, engineering science, and humanities. In addition, the Biological Systems Engineering major also requires courses in the biological sciences. In the junior and senior years, core courses are taken to develop the breadth of engineering knowledge needed to efficiently produce, distribute, and process biological products, such as food, feed, and fiber, while conserving natural resources, preserving environmental quality, and ensuring the health and safety of people.

Biological Systems Engineering Program

The Biological Systems Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700.

Lower Division Required Courses

UNITS
Mathematics 21A-21B-21C-21D.............16
Mathematics 22A (22A*) 22B ............6 or 7

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer, 2009-2010 offering in parentheses

Integration of an Engineering major requires courses that focus on the area of interest. Depending on your area of interest, you may select elective courses from seven specializations:

- Agricultural Engineering
- Aquacultural Engineering
- Bioenergy Engineering
- Biomechanics/Premedicine/Preveterinary Medicine
- Biotechnical Engineering
- Ecological Systems Engineering
- Food Engineering
- Forest Engineering

You may also develop your own specialization in consultation with your adviser. The upper division requirements are listed following the areas of specialization.

### Areas of Specialization

#### Agricultural Engineering

Students specializing in agricultural engineering integrate analysis and design with applied biology to solve problems in producing, transporting, and processing agricultural products leading to food, fiber, energy, and pharmaceuticals. Agricultural engineers design machinery, processes, and systems for productive plant and animal culture, including managing nutrients and waste while minimizing adverse environmental effects. The recommended electives provide students with the fundamental principles of agricultural production and a broad background in engineering. Agricultural engineers are employed as practicing professionals and managers with agricultural producers, equipment manufacturers, food processors, consulting engineering firms, startup companies, and government agencies.

**Recommended biological science electives:**

- **Plant Emphasis**
  - Plant Biology 111
  - Soil Science 100
  - Select one course from Agricultural Management and Rangeland Resources 110A, Entomology 100, Plant Sciences 114, Environmental Horticulture 102

- **Animal Emphasis**
  - Neurobiology, Physiology, and Behavior 101
  - Soil Science 100
  - Select one course from Avian Sciences 100, Animal Science 143, 144, 146

**Recommended engineering electives:**

- Biological Systems Engineering 114, 122, 145
- Civil and Environmental Engineering 141, 141L
- Engineering 180


**Aquacultural Engineering.** Aquacultural engineers design, build, and manage equipment and systems for the production of aquatic plants and animals. Aquacultural engineers must have a solid understanding of biology and processes related to water quality to work with the wide variety of systems used for aquaculture production. Systems range from sophisticated indoor operations with water treatment and recirculation to low-input earthen ponds. Employment opportunities for aquacultural engineers include engineering consulting companies and government agencies. The aquaculture industry is expanding rapidly in various areas around the world, creating international employment opportunities for aquacultural engineers.

**Recommended biological science electives:**

- Animal Science 118, 131, 136
- Wildlife, Fish, and Conservation Biology 120, 121

**Recommended engineering electives:**

- Civil and Environmental Engineering 140, 140L, 141L, 148A, 148B

Suggested adviser: R. Piedrahita

**Bioenergy.** Specialization in bioenergy is for students interested in the production of energy from renewable biological resources. The area of bioenergy requires discovery, development and dissemination of new mechanisms and processes for the sustainable production and use of biological materials from plants and microbes. To obtain training in the area, the core engineering and biology courses in the Biological Systems Engineering major are coupled with electives in environmental chemistry, thermal and power systems, life-cycle analysis, plant molecular biology, and plant production. Biological engineers specializing in bioenergy will be needed in the future to work within industrial, government, and academic settings to expand the current sources of energy available in the U.S. and around the world.

**Recommended biological science electives:**

- Biological Sciences 101, 103
- Microbiology 102
- Plant Biology 113
- Plant Sciences 103, 142

**Recommended engineering electives:**

- Biological Systems Engineering 132, 160
- Civil and Environmental Engineering 143, 148A, 149, 150, 153
- Mechanical Engineering 161, 162, 163

Suggested advisers: J. Fan, B. Hartsough, B. Jenkins, J. VanderGheynst, R. Zhang

**Biomechanics/Pre-Medicine/Pre-Veterinary Medicine.** This specialization is for students interested in the biomechanics of humans and animals, with emphasis on the physical, chemical, and biological factors affecting motion and function. Combined training in electronics, material properties, and ergonomics allows graduates to work in industry on the design, evaluation, and application of medical devices and systems as well as worker health and safety. Some students use the specialization as preparation for medical or veterinary school with the assurance of a marketable degree in engineering in case the postgraduate plans change. The Biomechanics specialization is also excellent preparation for graduate work in biomedical engineering. Students interested in medical or veterinary school should consult with advisers the appropriate school to plan for successful admission, including necessary summer experience.

**Recommended Biological Science Electives:**

- Biological Sciences 102
- Neurobiology and Physiology 101
- Exercise Biology 103
- Cell Biology and Human Anatomy 101

**Recommended Engineering Electives:**

- Biological Systems Engineering 128, 175
- Biomedical Engineering 109, 116, 118, 126

Additional courses for medical or veterinary school application:

- Chemistry 2C, 118C (medical)
- Biological Sciences 101
- Microbiology 102, 102L
- Molecular and Cell Biology 150, 150L

Suggested Advisers: M. Delwiche, F. Fatollahi, J. VanderGheynst

**Biotechnical Engineering.** This specialization is for students interested in the biotechnology industries. Core engineering courses are combined with training in genetics, biochemistry, microbiology, and molecular biology. Modern laboratory techniques in biochemistry are also included in the specialization to provide hands-on skills. Biotechnology is an area of industrial growth in the U.S. and will increasingly need engineers to transfer laboratory developments to large scale production. Present industrial activities include the production of genetically altered plants, plant materials and food products, production and packaging of biocatalysts for plant pests and diseases; microbial production of biological products; tissue culture; and bioremediation.

**Recommended biological science electives:**

- Biological Sciences 101, 102, 103
- Microbiology 102
- Molecular and Cellular Biology 120L
- Plant Biology 113

**Recommended engineering electives:**

- Biological Systems Engineering 132, 160, 175
- Chemical Engineering 161B, 161C, 161L
- Engineering 180


**Ecological Systems Engineering.** Specialists in ecological systems engineering are concerned with the design, development, and management of ecosystems. Typical applications include the rehabilitation of disturbed ecosystems, the design of mitigation areas, the incorporation of ecologically sustainable features into land developments, and the design and management of public and private landscapes. An understanding of ecology and the interaction of ecological communities, coupled with knowledge of engineering design and economics, is stressed in this specialization. Employment opportunities include environmental consulting firms, government regulatory agencies, and agencies involved in wildland resource management.

**Recommended biological science electives:**

- Entomology 100
- Environmental Science and Policy 100
- Microbiology 120
- Soil Science 100, 111
- Select one course from Atmospheric Science 133, Plant Biology 121, Environmental Toxicology 101 or 112A

**Recommended engineering electives:**

- Biological Systems Engineering 115, 135, 145
- Civil and Environmental Engineering 148A or 149

**Recommended courses:**

- Applied Biological Systems Technology 180
- Environmental and Resource Science 100
- Landscape Architecture 1 (no technical elective credit will be granted for this course in any engineering major)


**Food Engineering.** The food industry is the largest industrial sector of the U.S. economy. Food engineers conceive, design, and operate food processes, equipment, and plants for efficient food production...
Graduate students in Biological Systems Engineering focus on finding economically and environmentally sustainable solutions to some of the most important global issues of our time—health, safety, and environmental quality. We enjoy the strategic advantage of being located in California, the national leader in agricultural production and crop diversity, and a key center for bio-technology. With the unique status of belonging to both the College of Engineering and the College of Agricultural and Environmental Sciences, collaboration is the rule. We interact with colleagues in both engineering and biological sciences to create multidisciplinary approaches to our teaching and research. Students benefit from this dynamic environment that connects the strengths of nationally ranked engineering, agricultural, and environmental programs.

Financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid.

### Research Highlights:
- Bioenvironmental Engineering/Renewable Energy Systems
- Food Safety
- Biosensors and Pathogen Detection
- Bioprocess Engineering
- Biostatistics
- Agricultural Ergonomics, Health and Safety
- Aquacultural Engineering
- Ecological Systems Engineering
- Food Engineering and Seed Hybridization
- Forest and Fiber Engineering
- Postharvest Engineering
- Soil and Water Engineering
- Machine Systems and Precision Agriculture

### Research Facilities and Partnerships:
- Agricultural Ergonomics Research Center
- GIS Visualization Lab
- Bodega Marine Lab
- Western Center for Agricultural Equipment
- California Biomass Collaborative

### Complete Information on departmental Web site.

### Courses in Engineering: Biological Systems (EBS)

#### Lower Division Courses

1. **Foundations of Biological Systems Engineering (5)**

   - Lecture—2 hours; laboratory—6 hours; project.
   - Open only to students in Biological Systems Engineering. Introduction to engineering and the engineering design process with examples drawn from fields of biological, agricultural and food engineering. Relationship of engineering principles to biological systems. Small group design projects and presentations, use of engineering software, and fabrication of designs. —I. | J. Piedrahita, Jenkins

2. **Properties of Materials in Biological Systems (4)**

   - Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A; Physics 9C (may be taken concurrently). Properties of typical biological materials; composition and structure with emphasis on the effects of physical and biological processing on design of engineered systems; interactions of biological materials with typical engineering materials. GE credit: SciEng — II. | R. Rosa, Slaughter

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### Upper Division Required Courses

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<th>Course Code</th>
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<td>123</td>
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### Upper Division Required Courses 

- **Chemistry 85 or 118B** (recommended for Aquacultural, Bioenergy, Biotechnical, Food, and Biomechanics/Premedicine/Preventive Medicine Engineering specialties) or Civil and Environmental Engineering 10 (recommended for Agricultural, Ecological, and Forest Engineering specialties) ............... 4 or 3

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### Upper Division Required Courses 

- **Biological Sciences 28 and 2C or Food Science and Technology 100A, 104, 131, and Biological Sciences 102** (recommended for Food Engineering specialization) ............... 10 or 14
- **Engineering 102, 105, 106** ............... 14
- **Engineering 104** (recommended for Agricultural, Biomechanics/Premedicine/Preventive Medicine, Ecological and Forest Engineering specialties) or Chemical Engineering 111A (recommended for Aquacultural, Biotechnical and Bioenergy Engineering specializations) ......... 4 or 3

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### Upper Division Required Courses 

- **Biological Systems Engineering courses not otherwise required, with the exception of Biological Systems Engineering courses 189-199** ............... 4 or 3
- **Statistics 100** ............... 4
- **Engineering electives** — Select a minimum of 4 units. All upper-division courses offered by the College of Engineering may be taken as engineering electives with the exception of the following: Civil and Environmental Engineering 123, Computer Science Engineering 188, Engineering 103, 160, all courses numbered 190-197 and 199 (except Engineering 190, which may be taken for 2 units of engineering elective credit) ............... 4
- **Biological science electives** — Select a minimum of 5 or 9 units (for a combined lower and upper division total of 24 units of biological sciences). Of the 24 units, at least nine must be upper division. All upper-division courses in the College of Biological Sciences (with the exception of Biological Sciences 132, Evolution and Ecology 175, Exercise Biology 102, 112, 115, 118 through 149, Microbiology 100 and all courses numbered 190-199) may be used as biological science electives. The following courses may also be taken as biological science electives: Applied Biological Systems Technology 161; Animal Science 118, 143, 144, 146, Agricultural Management and Rangeland Resources 110A; Atmospheric Science 133, Avian Sciences 100; Cell Biology and Human Anatomy 101, 1011; Entomology 100; Environmental Horticulture 102, Environmental Science Policy and Management 120, 182, 185 (offered at UC Berkeley); Environmental Science and Policy 100, 110, 155, Environmental Toxicology 101, 112A, 131; Food Science and Technology 102A, 104A, 119, 120, 121, 128, 159; Infectious Diseases 141; Soil Science 100; Wildlife, Fish, and Conservation Biology 121. Students may choose other upper division courses with substantial biological content offered by the College of Agricultural and Environmental Sciences; consultation with a faculty adviser and approval by petition is required ............... 5 or 9

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### Upper Division Required Courses 

- **Minimum Upper Division Units** ....... 87

- **Only 3 units of credit for Civil and Environmental Engineering 10 for students who completed Biological Systems Engineering 1.**

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### Upper Division Required Courses 

- **Minimum Units Required for Major** ....... 180

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### Upper Division Required Courses 

- **The Graduate Program**

  Integrated B.S. /M.S., M.S., M.E., E.Eng., and Ph.D. in Biological Systems Engineering

  Designated Ph.D. emphasis available in Biotechnology


  (530) 752-1451

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### Quarter Offered:

- Fall
- Winter
- Spring
- Summer

2009-2010 offering in parentheses

### General Education (GE) credit:

- **ArtHum—Arts and Humanities**
- **SciEng—Science and Engineering**
- **SocSci—Social Sciences**
- **Div—Social-Cultural Diversity**
- **Wrt—Writing Experience**
90C. Research Group Conference in Biological Systems Engineering (1) Discussion—1 hour. Prerequisite: lower division standing in Biological Systems Engineering or Food Engineering; consent of instructor. Research group conference. May be repeated for credit. [P/NP grading only.]—II, III, IV

92. Internship in Biological Systems Engineering (1-5) Internship. Prerequisite: lower division standing; project approval prior to period of internship. Supervised work experience in biological systems engineering. May be repeated for credit. [P/NP grading only.]

99. Special Study for Lower Division Students (1-5) [P/NP grading only.]

Upper Division Courses

103. Fluid Mechanics Fundamentals (4) Lecture—4 hours. Prerequisite: Physics 9B. Fluid mechanics: basic principles, kinematics, velocity fields for one-dimensional incompressible flow and boundary layers, turbulent flow time averaging, potential flow, dimensional analysis, and macroscopic fluid behavior. An overview of practical problems. [Same course as Hydrologic Science 103N.]—I (I) Wallender

114. Principles of Field Machinery Design (3) Lecture—2 hours; laboratory—3 hours. Prerequisite: Engineering 102, 104. Traction and stability of vehicles with wheels or tracks. Operating principles of field machines and basic mechanisms used in their design.—III (III) Rosa

115. Forest Engineering (3) Lecture—3 hours. Prerequisite: Engineering 104, Biological Sciences 1C. Applications of engineering principles to problems in forestry including those in forest resource management, harvesting, residue utilization, and transportation.—III (III) Hartsough

120. Power Systems Design (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 17, 102, 103, 105. Design and performance of power devices and systems including combinations of generators and motors, fluid power systems, fuels, and emerging technologies. Selection of units for power matching and optimum performance.—II (II) Sastry


130. Modeling of Dynamic Processes in Biological Systems (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 75, Engineering 6 or Computer Science Engineering 30, Mathematics 228. Techniques for modeling processes requiring energy and mass balance, rate equations, and equations of state. Computer problem solution of models. Example models include package design, evaporation, respiration heating, thermal processing of foods, and plant growth.—II (II) K. McCourt

132. Unit Operations in Biological and Food Engineering (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: course 130, course 125 and Engineering 103 (may be taken concurrently). Mechanical unit operation processes which involve non-Newtonian flow, size reduction and mixing. Thermal operations related to drying, sterilization, freezing, and refrigeration. Mass transport operations applied to mixing, vaporization, adsorption, and absorption processes.—III (III) VanderGheynst, Singh

135. Bioenvironmental Engineering (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 1, 25, 130. Biological responses to environmental conditions. Principles and engineering design of environmental control systems. Overview of environmental pollution problems and legal restrictions for biological systems. Treatment of environmental quality assessment techniques, and environmental pollution control technologies.—I (I) Jenkins, Zhang


145. Irrigation and Drainage Systems (4) Lecture—4 hours. Prerequisite: Engineering 103 or Hydrologic Science 103. Engineering and scientific principles applied to the design of surface, sprinkler and micro irrigation systems and drainage systems within economic, biological, and environmental constraints. Interaction between irrigation and drainage. [Same course as Hydrologic Science 145.]—II (II) Grismer, Wallender

147. Runoff, Erosion and Water Quality Management in the Tahoe Basin (3) Lecture/laboratory—30 hours; fieldwork—15 hours; discussion—10 hours, term paper. Prerequisite: Physics 7B or 9B, Mathematics 16C or 21C, Civil and Environmental Engineering 142 or Hydrologic Science 141 or Environmental and Resource Sciences 100. Five days of instruction in Tahoe City. Practical hydraulic concepts and water quality management from Tahoe Basin slopes. Development of hillslope and riparian restoration concepts, modeling and applications from physical science perspectives including precipitation-runoff relationships, sediment transport, and detention ponds. [Same course as Hydrologic Science 147.]—Grimer

160. Biotechnical Systems Engineering (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: course 75, Biological Sciences 80, Microbiology 102. Microbial and enzyme kinetics. Biomass conversion. Production and recovery of biochemicals from plants and animals. Delivery and detection of microorganisms for bioremediation and biological control.—II, III (II, III) VanderGheynst

165. Bioinstrumentation and Control (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100. Instrumentation and control for biological products and systems. Measurement system concepts, instrumentation and transducers for sensing physical and biological parameters, data acquisition and control.—I, II, III (I, II, III) Delwiche, Slaughter

170A. Engineering Design and Professional Responsibilities (3) Lecture—2 hours; laboratory—3 hours. Prerequisite: course 1, Engineering 102, 104. Engineering design including professional responsibilities. Emphasis on project and component data sources, specifications, human factors, biological materials, safety systems, and professionalism. Detailed design proposals will be developed for courses 170B and 170BL.—I (I) Giles, Zhang

170B. Engineering Projects: Design (2) Discussion—2 hours. Prerequisite: course 170A, course 170B required concurrently. Individual or group projects involving the design of devices, structures, or systems to solve specific engineering problems in biological systems. Project for study is jointly selected by student and instructor.—II, III, IV (II, III, IV) Giles, Zhang

170BL. Engineering Projects: Design Evaluation (1) Laboratory—6 hours. Prerequisite: required to enroll in course 170C concurrently. Individual or group projects involving the fabrication, assembly and testing of components, devices, structures, or systems designed to solve specific engineering problems in biological systems.—III (III)

175. Rheology of Biological Materials (3) Lecture—3 hours. Prerequisite: Engineering 103 or Chemical Engineering 150A. Fluid and solid rheology, viscoelastic behavior of foods and other biological materials, and application of rheological properties to food and biological systems (i.e., pipe-line design, extrusion, mixing, coating).—II (II) McCarthy

189A-G. Special Topics in Biological Systems Engineering (1-5) Variable—3-15 hours. Prerequisite: upper division standing in engineering; consent of instructor. Special topics in: (A) Agricultural Engineering; (B) Aquacultural Engineering; (C) Biomedical Engineering; (D) Biotechnical Engineering; (E) Ecological Systems Engineering; (F) Food Engineering; and (G) Forest Engineering. May be repeated for credit when topic differs.—I, II, III (I, II, III)

190C. Research Group Conference in Biological Systems Engineering (1) Discussion—1 hour. Prerequisite: upper division standing in Biological Systems Engineering or Food Engineering; consent of instructor. Research group conference. May be repeated for credit. [P/NP grading only.]

192. Internship in Biological Systems Engineering (1-5) Internship. Prerequisite: upper division standing; approval of project prior to period of internship. Supervised work experience in biological systems engineering. May be repeated for credit. [P/NP grading only.]

197T. Tutoring in Biological Systems Engineering (1-5) Tutorial—3-15 hours. Prerequisite: upper division standing. Tutoring individual students, leading small voluntary discussion groups, or assisting the instructor in laboratories affiliated with one of the department’s regular courses. May be repeated for credit if topic differs. [P/NP grading only.]

198. Directed Group Study (1-5) Prerequisite: consent of instructor. [P/NP grading only.]

199. Special Study for Advanced Undergraduates (1-5) [P/NP grading only.]

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Social-Cultural Diversity; Wrt—Writing Experience.

Quarter Offered: Fall—Fall, Winter—Winter, Spring—Spring, IV, Summer 2009-2010 offering in parenthesis.
Graduate Courses

200. Research Methods in Biological Systems Engineering (2)
Lecture—2 hours. Prerequisite: graduate standing. Planning, execution and reporting of research projects. Literature review techniques and proposal preparation. Record keeping and patents. Uncertainty analysis in experiments and computations. Graphical analysis. Oral and written presentation of research results, manuscript preparation, submission and review. (I.) Zhang, Giles

205. Continuum Mechanics of Natural Systems (4)
Lecture/discussion—4 hours. Prerequisite: Mathematics 21D and 228, Physics 98. Continuum mechanics of static and dynamic air, water, earth and biological systems using hydraulic, heat and electrical conductivity, diffusivity, dispersion, strain; stress; deformation gradient; velocity gradient; stretch and spin tensors. (Same course as Hydrologic Science 205.)—III. Wallender

215. Soil-Machine Relations in Tillage and Traction (3)
Lecture—3 hours. Prerequisite: course 114. Mechanics of interactions between agricultural soils and tillage and traction devices; determination of relevant physical properties of soils; analyses of stress and strains in soil due to machine-applied loads; experimental and analytical methods for synthesizing characteristics of overall systems. Offered in alternate years. —II. Upadhyaya

216. Energy Systems (3)

218. Solar Thermal Engineering (3)

220. Pilot Plant Operations in Aquacultural Engineering (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: Civil Engineering 243A-243B or Applied Biological Systems Technology 161, 163. Topics in water treatment as they apply to aquaculture operations. Laboratory study of unit operations in aquaculture. Offered in alternate years. —II. Fathallah

228. Occupational Musculoskeletal Disorders (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: graduate standing and consent of instructor. Epidemiology and etiology of occupational musculoskeletal disorders (MSDs) with focus on low back and upper extremities disorders; anatomical and biomechanical functions of lower back and upper extremities; MSDs risk factors assessment and control; research opportunities related to MSDs. —II. III. Fathallah

231. Mass Transfer in Food and Biological Systems (3)
Lecture/discussion—3 hours. Prerequisite: graduate standing. Application of mass transfer principles to food and biological systems. Study of mass transfer affecting food quality and shelf life. Analysis of mass transfer in polymer films used for packaging and aging foods and controlling release of biologically active compounds. Offered in alternate years. —II. Krocha

233. Analysis of Processing Operations: Drying and Evaporation (3)
Lecture—3 hours. Prerequisite: course in food or process engineering, familiarity with FORTRAN. Diffusion theory in drying of solids. Analysis of fixed-bed and continuous-flow dryers. Steady-state and dynamic models for prediction performance evaporators: multiple effects, mechanical and thermal recompensation, control systems. Offered in alternate years. —II.

234. Fundamentals of Analysis of Unit Operations in Food and Biological Engineering (3)
Lecture—3 hours. Prerequisite: course 132. Analysis and design of food processing operations. Steady state and dynamic heat and mass transfer models for operations involving phase change such as freezing and drying. Separation processes including membrane processes in food and fermentation systems. —III. Singh

237. Thermal Process Design (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course in heat transfer. Heat transfer and biological basis for design of heat sterilization of foods and other biological materials in containers or in bulk. Offered in alternate years. —II. M. McCarthy

239. Magnetic Resonance Imaging in Biological Systems (3)
Lecture—3 hours. Prerequisite: graduate standing. Theory and applications of magnetic resonance imaging to biological Black model of magnetic resonance. Applications to be studied are drying of fruits, flow of food suspensions, diffusion of moisture, and structure of foods. Offered in alternate years. —II. Grimer

240. Infiltration and Drainage (3)
Lecture—3 hours. Prerequisite: Soil Science 107, Engineering 103. Aspects of multi-phase flow in soils and their application to infiltration and immiscible displacement problems. Gas phase transport and entrainment during infiltration, and oil-water gas displacement will be considered. Offered in alternate years. —II. Grimr

241. Sprinkle and Trickle Irrigation Systems (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 145/Hydrologic Science 115. Computerized design of sprinkle and trickle irrigation systems. Consideration of emitter mechanics, distribution functions and water yield functions. Offered in alternate years. —III.

242. Hydraulics of Surface Irrigation (3)
Lecture—3 hours. Prerequisite: course 145, Hydrologic Science 115. Theory and analysis of models of surface-irrigation systems for prediction of the ultimate disposition of water flowing onto a field. Quantity of runoff and distribution of infiltrated water over field length as a function of slope, roughness, infiltration and inflow rates. Offered in alternate years. —III. Wallender

243. Water Resource Planning and Management (3)
Lecture—3 hours. Prerequisite: Hydrologic Science 141 or the equivalent. Applications of deterministic and stochastic mathematical programming techniques to water resource planning, analysis, design, and management including water allocation, capacity expansion, and reservoir operation. Conjointive use of surface water and groundwater. Water quality management. Irrigation planning and operation models. (Same course as Hydrologic Science 243.) Offered in alternate years. —I. Marinho

245. Waste Management for Biological Production Systems (3)
Lecture—3 hours. Prerequisite: graduate standing or consent of instructor. Application of solid and liquid wastes from animal, crop, and food production systems. Study of methods and system design for handling, treatment, and disposal/utilization of these materials. —II. Zhang

260. Analog Instrumentation (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100. Introduction to general characteristics: generalized instrument models, calibration, and frequency response. Signal conditioning: operational amplifier circuits, filtering, and noise. Transducers: motion, force, pressure, flow, temperature, and photometric. Offered in alternate years. —II. Delwiche

262. Computer Interfacing and Control (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100, course 165. Procedural and object-oriented programming languages and digital signal conversion, data acquisition and computer control. Offered in alternate years. —III. Delwiche

265. Design and Analysis of Engineering Experiments (5)
Lecture—3 hours; lecture-discussion—2 hours. Prerequisite: Statistics 100, Agricultural Systems and Environment 120, or an introductory course in statistics. Simple linear, multiple, and polynomial regression, correlation, residuals, model selection, one-way ANOVA, fixed and random effect models, sample size, multiple comparisons, randomized block, repeated measures, and analysis of variance. Experimental design, data analysis, and lab-experiment procedures. Offered in alternate years. —I. VandeBroucke

267. Renewable Bioprocessing (3)
Lecture—3 hours. Prerequisite: course 160, Biological Sciences 101 or Microbiology 102. Applications of biotechnology and bioprocess engineering toward the use of agricultural and renewable feedstocks for the production of biocatalysts. Design and modeling of microbial- and plant-based production systems including associated fermentation, extraction, and purification processes. Offered in alternate years. —I. VandeBroucke

270. Modeling and Analysis of Biological and Physical Systems (3)
Lecture—3 hours. Prerequisite: familiarity with a programming language. Mathematical modeling of biological systems: model development; analytical and numerical solutions. Case studies from various specializations within biological and agricultural engineering. Offered in alternate years. —III. Upadhyaya

275. Physical Properties of Biological Materials (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: consent of instructor. Selected topics on physical properties, such as mechanical, acoustical, rheological, and aerodynamic properties, as related to the design of harvesting, handling, sorting, and processing equipment. Techniques for measuring and recording physical properties of biological materials. Offered in alternate years. —III. Slaughter, Rosa

289A-K. Selected Topics in Biological Systems Engineering (1-5)
Variable—1-3 hours. Prerequisite: consent of instructor. Special topics in: (A) Animal Systems Engineering; (B) Aquacultural Engineering; (C) Biological Engineering; (D) Energy Systems; (E) Environmental Quality; (F) Food Engineering; (G) Forest Engineering; (H) Irrigation and Drainage; (I) Plant factors, data and harvest; (J) Postharvest Engineering; (K) Sensors and Actuators. May be repeated for credit when topic differs. —I, II, III. (I, II, III)

290. Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing. Weekly seminars on recent advances and selected topics in biological systems engineering. Course theme will change from quarter to quarter. May be repeated for credit. (S/U grading only)

290C. Graduate Research Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. Research problems, progress and techniques in biological systems engineering. May be repeated for credit. (S/U grading only)

298. Group Study (1-5)

299. Research (1-12)
(S/U grading only)
Professional Course

390. Supervised Teaching in Biological and Agricultural Engineering (1-3)
Laboratory—3 hours; tutorial—5-9 hours. Prerequisites: graduate standing; consent of instructor. Teaching and teaching students in undergraduate courses offered in the Department of Biological and Agricultural Engineering. Weekly conferences with instructor; evolution of teaching; preparing for and conducting demonstrations, laboratories and discussions. Preparing and grading exams. May be repeated for a total of 6 units. (S/U grading only)—I, II, III; (I, II, III)

Engineering: Biomedical

[College of Engineering]
Simon Cherry, Chairperson of the Department

Department Office. 2033 Genome and Biomedical Sciences Facility; (530) 752-1033; http://www.bme.ucdavis.edu

Faculty

Craig Abbey, Ph.D., Adjunct Assistant Professor
Craigmiller, Ph.D., Professor (Biomedical Engineering, Mathematics, and Genome Center: Bioinformatics)
John Boone, Ph.D., Professor (Biomedical Engineering, Medical Imaging, and Research Studies)
Simon Cherry, Ph.D., Professor
FitzRay Curry, Ph.D., Professor (Biomedical Engineering, and Medicine: Physiology and Membranes)
Katherine Ferrara, Ph.D., Professor
Volkmar Heinrich, Ph.D., Assistant Professor
Tonya Kuhl, Ph.D., Professor (Biomedical Engineering: and Chemical Engineering & Materials Sciences)
J. Kent Leach, Ph.D., Assistant Professor
Angelique Louie, Ph.D., Associate Professor
Laura Marcu, Ph.D., Biomedical Engineer
Tingrui Pan, Ph.D., Assistant Professor
Anthony Passerini, Ph.D., Assistant Professor
Jinyi Qi, Ph.D., Associate Professor
Subhash Raychaudhuri, Ph.D., Assistant Professor
Alexander Rezvini, Ph.D., Assistant Professor
Leonar Saiz, Ph.D., Assistant Professor
Michael Savageau, Ph.D., Professor
Scott Simon, Ph.D., Professor
Julie Sutcliffe, Ph.D., Assistant Professor
[Biomedical Engineering and Research Assistant Engineer CMG]
Soichiro Yamada, Ph.D., Assistant Professor
Yohei Yokabayashi, Ph.D., Assistant Professor

The Biomedical Engineering Major

Modern Biomedical Engineering is a diverse and interdisciplinary area of study that integrates knowledge drawn from engineering and the biomedical sciences. Biomedical Engineers work in systems ranging from medical imaging to the design of artificial organs. Some major recent research advances in Biomedical Engineering include the left ventricular assist device (LVAD), artificial joints, kidney dialysis, bioengineered skin, diaphragm, computed tomography (CT), and flexible endoscopes. Students who choose Biomedical Engineering are interested in being of service to human health but do not routinely interact directly with patients. The mission of the BS Degree Program in the Department of Biomedical Engineering is to provide a solid foundation in both engineering and the life sciences, and provide sufficient flexibility in the upper division requirements to encourage students to explore specializations within Biomedical Engineering.

The program produces highly qualified, interdisciplinary engineers who are well-prepared to pursue graduate or professional degrees or careers in industry, hospitals, academic research institutes, teaching, national laboratories, or government regulatory agencies. The Bureau of Labor Statistics projects that employment growth for Biomedical Engineering will be much faster than the average for all occupations through 2014. As a recently established program, the Biomedical Engineering program is not currently accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The program will pursue accreditation with ABET in the next accreditation cycle.

Objectives

Our teaching is designed to impart a strong foundation in mathematics, life and physical sciences, and engineering, as well as knowledge of contemporary issues at the forefront of biomedical engineering research. Students completing the program will demonstrate their ability to conduct measurements on and interpret results from experiments involving living systems; design experiments, systems, devices, components, and processes to meet real-world challenges for solutions to problems in biomedical research and development; identify, formulate and solve engineering problems applied to questions in medicine and biology; work effectively in groups and communicate through oral and written means; use computer-based and graphical forms; have an understanding of the impact of engineering solutions in a global and societal context and a commitment to professionalism and ethical responsibility; be instilled with a sense of need for lifelong learning; use the techniques, skills, and modern engineering tools necessary for engineering practice and for successful pursuit of post- baccalaureate studies.

For information about the graduate degree options, see the Biomedical Engineering (A Graduate Group), on page 170.

Biomedical Engineering Program

Lower Division Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics 21A-21B-21C-21D</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Physics 9A-9B-9C</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Chemistry 2A-2B-2C, 8A-8B or 118A-118B</td>
<td>21</td>
<td></td>
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<tr>
<td>Engineering 6, 17, 8</td>
<td>28</td>
<td></td>
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<tr>
<td>University Writing Program 1, or English 3, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5</td>
<td>4</td>
<td></td>
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<tr>
<td>Communications 4, 11</td>
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<tr>
<td>Biological Sciences 2A</td>
<td>4</td>
<td></td>
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<tr>
<td>Biomedical Engineer 1, 20</td>
<td>5</td>
<td></td>
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</tbody>
</table>

Minimum Lower Division Units...91

* May not count in lower-division program and towards Engineering and Physical Science electives

Upper Division Requirements:

Upper Division Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering 100 or Electrical and Computer Engineering 100</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Engineering 147, 190</td>
<td>7</td>
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<tr>
<td>Biomedical Engineering 116</td>
<td>3</td>
<td></td>
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<tr>
<td>Neurobiology Physiology Behavior 101</td>
<td>5</td>
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</tr>
<tr>
<td>Biomedical Engineering 105, 106, 107, 108, 109, 110, 110B, 111</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Sciences electives...8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To be chosen according to specialization. Any graded upper division course in the Biological Sciences and Physics including Biological Sciences 2B, 2C, Biomedical Engineering 161A, 161S, 161L and Physics 9D, excluding courses for social sciences and topical breadth credit. Engineering electives...20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Minimum Upper Division Units...16

Minimum Units Required for Major .....180

Additional upper division elective policies:

- 2 units from Chemistry 118AB may be applied toward Sciences electives if 118AB are also used to satisfy lower division subject credit.
- 2 units from Electrical and Computer Engineering 100 may be applied toward Engineering elective if Electrical and Computer Engineering 100 is taken to satisfy upper division subject credit.
- 4 units of Biomedical Engineering 199 may be counted toward Engineering Sciences elective with approval of Biomedical Engineering undergraduate committee.

Sciences electives and Engineering Electives are to be selected in consultation with a staff or faculty adviser.

Areas of Specialization

Because Biomedical Engineering is defined so broadly, a degree in Biomedical Engineering can mean many different things. Specializing in a subfield of engineering can help to provide more in-depth expertise in a focus area. You have the option to specialize in a subfield of Biomedical Engineering through judicious selection of your upper division electives in consultation with a staff or faculty adviser. One of the strengths of the UC Davis program is this flexibility to design your own emphasis. Biomedical Engineering includes a number of diverse areas of study:

Biostatistics

Development of devices used in diagnosis and treatment of disease or in biomedical research. This area applies electronics principles and techniques and can involve computer hardware design.

Biostatistics

Biomedical and Tissue Engineering

The study of living materials or the development of implantable synthetic materials. In this field Biomedical Engineers design materials that are biocompatible or bioactive for use in the human body. This area draws heavily from knowledge in the chemical and biological sciences.

Biomechanics

A broad subfield that includes orthopedic/rehabilitation engineering (design of wheelchairs, prosthetics etc) and the study of mechanical forces produced by biological systems. For example, biomechanics allows a better understanding of the fluid dynamics of blood flow and forces acting on tissue in the human arterial system, to allow design of better cardiovascular interventions. This field involves more intensive study of mechanics, dynamics and thermodynamics.

Medical Imaging

The visualization of living tissues for diagnosis of disease. An imaging course work beginning from developing instruments for imaging, to creating algorithms for three-dimensional reconstruction of imaging data, to generating new contrast agents for enhancing image quality. Depending upon the area of medical imaging of interest, this field can require more in-depth study in electronics, signal processing, chemistry or computer programming.
Systems Engineering
Study of basic biological and physiological processes using engineering principles. Techniques and principles from engineering are applied to understand biological systems at a fundamental level. For example, stresses and strains are studied in cells to better understand how they propel themselves through aqueous solutions. The study of biochemical processes allows engineers to mathematically describe chemical reactions occurring in cells in order to predict abnormalities that may lead to development of disease.

Premedical students
If you intend to apply to medical school you will need to fulfill all additional coursework to meet admissions requirements for the various medical school programs. These courses will be in addition to the listed curricular requirements.

Courses in Biomedical Engineering (BIM)

Lower Division Courses

1. Introduction to Biomedical Engineering (1)
Lecture—1 hour. Introduction to the field of biomedical engineering. Examples taken from the various areas of specialization within the discipline. Areas include cellular and molecular engineering; biomedical imaging; biofluids and transport; musculoskeletal biomechanics and bioinstrumentation. (P/NP grading only.)—I. (I.)

20. Fundamentals of Bioengineering (4)
Lecture—4 hours. Prerequisite: Physics 9B, Mathematics 21D. Basic principles of mass, energy and momentum conservation equations applied to solve problems in the biological and medical sciences.—III. (III.) Yamada

99. Special Study for Undergraduates (1-5)
(P/NP grading only.)

Upper Division Courses

102. Quantitative Cell Biology (4)
Lecture/discussion—4 hours. Prerequisite: Biological Sciences 2A, Physics 9B, Mathematics 22B, Chemistry 88B. Use of engineering principles to understand fundamental cell biology. Emphasis on physical concepts underlying cellular processes including protein trafficking, cell motility, cell division and cell adhesion. Current topics including cell biology of cancer and stem cells will be discussed. Only two units of credit for students who have previously taken Biological Sciences 104 or Molecular and Cellular Biology 143.—I. (I.)

106. Biortransport Phenomena (4)
Lecture—4 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101 or equivalent, Physics 9B, Mathematics 22B. Principles of heat and mass transfer with applications to biomedical systems; emphasis on mass transfer across cell membranes and the design and analysis of artificial human organs, and basic fluid transport.—II. (II.)

105. Probability, Random Variables, and Statistics for Biomedical Engineers (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21D; upper division. Concepts of probability, random variables and processes, and statistical analysis with applications to engineering problems in biomedical sciences. Contents include discrete and continuous random variables, probability distributions and models, hypothesis testing, statistical inference and stochastic processes. Emphasis on BME applications. Limited to upper division standing.—I. (I.)

107. Mathematical Methods for Biological Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 22A and 22B. Restricted to upper division engineering. Essential mathematical and numerical techniques for engineering problems in medicine and biology. Contents include matrix algebra, linear transforms, ordinary and partial differential equations, probability and stochastic processes, and an introduction to Monte Carlo and molecular dynamics simulation. (I.) Gia Candau; (P/NP grading only.)

108. Biomedical Signals and Control (4)
Lecture—4 hours. Prerequisite: Mathematics 22B; Engineering 100 (may be taken concurrently). Restricted to upper division Engineering students. Systems and control theory applied to biomedical engineering problems. Time-domain and frequency-domain analyses of signals and systems, convolution, Laplace and Fourier transforms, transfer function, dynamic systems, and feedback control of first and second order processes, and design of feedback control systems for biomedical applications. No credit for students who have taken Computer Engineering 150A. 2 units of credit for students who have taken Mechanical Engineering 171.—III. (III.) Qi

109. Biomaterials (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 106. Mechanical and chemical properties of metallic, ceramic and polymeric implant materials. Properties of bones, joints, and blood vessels. Cellular response to implants, including inflammation, blood coagulation, and wound and fracture healing. Biocompatibility and physical and cardiovascular materials.—III. (III.) Revzin

110A-110B. Capstone Biomedical Engineering Design (2-2)
Laboratory—3 hours; lecture/discussion—1 hour. Prerequisite: courses 107 and 108. Application of bioengineering theory and experimental analysis culminating in the design of a unique solution to a problem. The design may be geared towards current applications in clinical, biochemical, biotechnology, or medical technology. (Deferred grading only, pending completion of sequence.)—II. (II.)

111. Biomedical Instrumentation Laboratory (4)
Lecture—4 hours; laboratory—6 hours. Prerequisite: courses 107 and 108; Statistics 120, 131A, or equivalent; Engineering 100; Neurology, Physiology, & Behavior 101. Basic biomedical signals and sensors. Topics include analog and digital recordings using electronic, hydrodynamic, and optical sensors, and measurements made at cellular, tissue and whole organism level. Limited to upper division Biomedical Engineering majors.—II. (II.) Mar, Pan

116. Research and Design Methods for Biomedical Engineers (5)
Lecture—2 hours; practice—3 hours; extensive writing. Prerequisite: Biological Sciences 1A, Mathematics 22B. Physical and engineering research and design process as applied to biomedical devices and therapeutics. Small group design projects and presentations in interdisciplinary topics relating biomedicine, biology and medicine. GE Credit: Wrt.—I.(I.) Louie

117. Analysis of Molecular and Cellular Networks (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1A and Mathematics 22B. Network themes in biology, emphasizing metabolic, genetic, and developmental networks. Mathematical and computational methods for analysis of such networks. Elucidation of design principles in natural networks. Engineering and ethical issues in the design of synthetic networks.—III. (III.) Savageau

126. Tissue Mechanics (3)
Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: Physics 8D or/and Engineer ing 45 and/or consent of instructor. Structural and mechanical properties of biological tissues, including bone, cartilage, ligaments, tendons, nerves, and skeletal muscle. Emphasis on course as Exercise Science 126.—II. (II.)

140. Protein Engineering (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1A and Chemistry 88B. Restricted to upper division engineering or engineering students. Introduction to protein structure and function. Modern methods for designing, producing, and characterizing novel proteins and peptides. Design strategies, computer modeling, heterogeneous expression, in vitro mutagenesis. Protein crystallography, spectroscopic and calorimetric methods for characterizing and other techniques.—I. (I.) Sutcliffe-Goulden

141. Cell and Tissue Mechanics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 9C, Engineering 35, Neurobiology, Physiology, & Behavior 101. Mechanical properties that govern blood flow in the microcirculation. Concepts in blood rheology and cell and tissue viscoelasticity, biophysical aspects of cell migration, adhesion, and motility.—III. (III.)

142. Biomedical Imaging: Basic Principles and Practice (4)
Lecture—3 hours; term paper. Prerequisite: Physics 9D and Mathematics 22B. Basic physics, engineering principles, and applications of biomedical imaging techniques including x-ray imaging, computed tomography, magnetic resonance imaging, ultrasound and nuclear imaging.—I. (I.)

151. Mechanics of DNA (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A and Mathematics 22B. Structural, mechanical and dynamic properties of DNA. Topics include DNA structures and their mechanical properties, in vivo topological constraints, DNA mechanical and thermodynamic equilibria, DNA dynamics, and their roles in normal and pathological biological processes. Offered in alternate years.—III. Benham

161A. Biomedical Engineering (1)
Laboratory/discussion—6 hours. Prerequisite: course 161A; upper division Biomedical Engineering major. Introduction to the basic techniques in biomedical engineering. Laboratory and discussion sessions will cover basic techniques in DNA cloning, bacterial cell culture, protein expression, and data analysis. GE Credit: SciEng.—I. (I.)

161L. Biomedical Engineering Laboratory (2)
Laboratory/discussion—6 hours. Prerequisite: course 161A; upper division Biomedical Engineering major. Introduction to the basic techniques in biomedical engineering. Laboratory and discussion sessions will cover basic techniques in DNA cloning, bacterial cell culture, protein expression, and data analysis. GE Credit: SciEng.—I. (I.)

161B. Biomedical Engineering: Brief Course (1)
Lecture—1 hour. Prerequisite: Biological Sciences 1A; Chemistry 88B; course 161L concurrently. Basic concepts and techniques of biomedical engineering such as recombinant DNA technology, and molecular diagnostics. Only three units of credit for students who have completed course 1615.—I. (I.)

1615. Biomedical Engineering: Brief Course (1)
Lecture—1 hour. Prerequisite: Biological Sciences 1A; Chemistry 88B, course 161L concurrently. Basic concepts and techniques of biomedical engineering such as recombinant DNA technology, and molecular diagnostics. Only three units of credit for students who have completed Biomedical Engineering 161A. Not offered every year.—IV. (IV.)

162. Quantitative Concepts in Biomedical Engineering (4)
Lecture—4 hours. Prerequisite: Mathematics 22B and Physics 9D. Introduction to fundamental physical mechanisms governing structure and function of biomacromolecules. Emphasis on a quantitative understanding of the nano- to micropile biomechanics of interactions between and within individual molecules as well as their ensembles, in natural and artificial membranes. Offered in alternate years.—II. Heinrich

167. Biomedical Fluid Mechanics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 106 (may be taken concurrently) or Engineering 103. Basic biofluid mechanics, Navier-Stokes equations of motion, circulation, respiration and specialized applications including miscellaneous topics such as boundary layer flow. Not open for credit to students who have completed Mechanical Engineering 167C.—I. (I.)

173. Cell and Tissue Engineering (4)
Laboratory/discussion—4 hours. Prerequisite: course 109. Engineering principles to direct cell and tissue behavior and form novel carbon-cells, controlled delivery of macromolecules, transport within
and around biomaterials, biomechanics, design, tissue design criteria and outcomes assessment.—I. (II) Leach

189C. Topics in Biomedical Engineering (1-5)
Prerequisite: consent of instructor. Topics in Biomedical Engineering. (A) Cellular and Molecular Engineering (B) Biomechanics (C) Biomedical Engineering. May be repeated if topic differs. Not offered every year.

190A. Upper Division Seminar in Biomedical Engineering (1-5)
Seminar—1 hour. Prerequisite: upper division standing. In depth examination of research topics in a small group setting. Question and answer session with faculty members. May be repeated for credit. (P/NP grading only)—II. (III) Louie

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. May be repeated up to three times for credit. (P/NP grading only)—I, II, III. (I, II, III)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

202. Cell and Molecular Biology for Engineers (4)
Lecture/discussion—4 hours. Prerequisite: Biological Sciences 104 or Cellular Biology 121. Preparation for research and critical review in the field of cell and molecular biology for biomedical or applied science engineers. Emphasis on bio-physical and biomechanics concepts intrinsic to specific topics including receptor-ligand dynamics in cell signaling and function, cell motility, DNA replication and RNA processing, cellular energetics and protein sorting. Modern topics in bioinformatics and proteomics.—II.

204. Physiology for Bioengineers (5)
Lecture—4 hours. Prerequisite: Biological Sciences 1A or equivalent; graduate standing or consent of instructor. Basic human physiology of the nervous, muscular, cardiovascular, respiratory, and renal systems and their interactions; emphasis on the physical and engineering principles governing these systems, including control and transport processes, fluid dynamics, and electrochemistry. —I. (II) Benham

209. Scientific Integrity for Biomedical Engineers (2)
Lecture—1 hour; discussion—1 hour. Scientific integrity and ethics for biomedical engineers, with emphasis and discussion on mentoring, authorship and peer review, use of humans and animals in biomedical research, conflict of interest, intellectual property, genetics technology and scientific record keeping. Biomedical Engineering majors only. (S/U grading only)—I—III.

210. Introduction to Biomaterials (4)
Lecture—4 hours. Prerequisite: Engineering 45 or consent of instructor. Mechanical and atomic properties of metallic, ceramic, and polymeric implant materials of metallic, ceramic, and polymeric implant materials; corrosion, degradation, and failure of implants; inflammation, wound and fracture healing, blood coagulation; properties of bones, joints, and blood vessels; biocompatibility of orthopaedic and cardiovascular materials. Offered in alternate years. (S/U grading only)—I—III.

211. Design of Polymeric Biomaterials and Biological Interfaces (4)
Lecture—4 hours. Prerequisite: Engineering 45 or consent of instructor; upper division undergraduates or graduate students. Design, selection and application of polymeric biomaterials. Integration of the principles of polymer science, surface science, materials science and biology. —I. (II) Keziv

212. Biomedical Heat and Mass Transport Processes (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 165, Biological Systems Engineering 125, Chemical Engineering 153 or the equivalent. Application of principles of heat and mass transfer to biomedical systems related to heat exchange between biological systems and the environment, mass transfer across cell membranes and the design and analysis of artificial human organs. (Same course as Mechanical and Aeronautical Engineering 212.) Offered in alternate years.—II. (III) Aldridge

213. Principles and Applications of Biological Sensors (4)
Lecture—4 hours. Prerequisite: Chemistry 2C. Biological sensors based on principles of electrochemistry, optical and affinity detection. Methods for integration of sensing elements (e.g. enzymes) into biosensors and miniaturization of biosensors. —I. (II) Ravzin

214. Blood Cell Biomechanics (4)
Lecture—4 hours. Prerequisite: Engineering 102. Mechanical properties that govern blood flow in the microcirculation and cell adhesion and mobility. Constitutive equations of vascular tissue and blood rheology and viscoelasticity. Red and white blood cell mechanics. Remodeling of blood vessels in disease and engineering of blood vessels and cells. —I. Simon

215. Biomedical Fluid Mechanics and Transport Phenomena (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 or Chemical Engineering 150B or Civil and Environmental Engineering 141. Application of fluid mechanics and transport to biomedical systems. Flow in normal physiological function and pathological conditions. Topics include circulatory and respiratory fluid dynamics, and cellular processes, transport in the arterial wall and in tumors, and tissue engineering. (Same course as Mechanical and Aeronautical Engineering 215.)—II. (III) Barakat

216. Advanced Topics in Cellular Engineering (4)
Lecture—4 hours. Prerequisite: course 214 or consent of instructor. Advanced research strategies and technologies used in the study of immune function and inflammation. Static and dynamic measurement of stress, strain, and molecular scale forces in blood and vascular cells, as well as genetic approaches to the study of disease. —II. (III) Simon

217. Mechanobiology in Health and Disease (4)
Lecture/discussion—4 hours. Prerequisite: course 106 or equivalent (e.g. Engineering 103). Applied sciences governing these systems, including control and transport processes, fluid dynamics, and transport phenomena in diseased states. —II. (III) Passeri

218. Micromechanics (4)
Lecture/discussion—4 hours. Introduction to the theory of physical and chemical principles at the microscale. Scale effects, surface tension, micromechanics, micromechanical properties, intermolecular interactions and micro tribology. —I. (I) Pan

223. Multibody Dynamics (4)
Lecture—4 hours. Prerequisite: Engineering 102. Coupled rigid-body dynamics; reference frames; vector differentiation; configuration and motion constraints; holonomicity; generalized speeds; partial velocities, mass, inertia tensor/theorems; angular momentum; generalized forces; comparing Newton/Euler, Lagrange’s, Kane’s methods; computer-aided equation derivation; orientation; Euler, Rodrigues parameters. (Same course as Mechanical and Aeronautical Engineering 223.)—II. (II) Eke, Hubbard

225. Spatial Kinematics and Robotics (2)
Lecture—3 hours; laboratory—3 hours. Prerequisite: C Language and course 222. Spatial kinematics, screw theory, spatial mechanisms analysis and synthesis, robot kinematics and dynamics, robot workspace, path planning, robot programming, real-time architecture and software implementation. (Same course as Mechanical and Aeronautical Engineering 225.) Offered in alternate years.—II. Cheng

227. Research Techniques in Biomechanics (4)
Lecture—2 hours; laboratory—4 hours; term paper/discussion—1 hour. Prerequisite: consent of instructor, Mathematics 22B; Exercise Science 115 recommended. Experimental techniques for biomechanical analysis of human movement are examined. Techniques evaluated include data acquisition and analysis by computer, force platform analysis, strength assessment, planar and three-dimensional videography, data reduction and smoothing, and biomechanical modeling. (Same course as Mechanica and Aeronautical Engineering 227/Exercise Science 227.)—III. (III) Williams, Hawkins

228. Skeletal Muscle Mechanics: Form, Function, Adaptability (4)
Lecture—4 hours. Prerequisite: basic background in biology, physiology, and engineering. Engineering 35 and 45, Mathematics 21D; Neurobiology, Physiology, and Behavior 101 recommended. Basic structure and function of skeletal muscle examined at the microscopic and macroscopic level. Muscle adaptation in response to aging, disease, injury, exercise, and disuse. Analytic models of muscle function are discussed. (Same course as Exercise Science 228.)—II. (II) Hwang

231. Musculo-Skeletal System Biomechanics (4)
Lecture—4 hours. Prerequisite: Engineering 102. Mechanics of skeletal muscle and mechanical models of muscle, solution of the dynamics problem, theoretical and experimental methods of kinematic and kinetic analysis, computation of intersegmental load and muscle forces, applications to gait analysis and sports biomechanics. (Same course as Mechanical and Aeronautical Engineering 231.)—III. (III) Hull

232. Skeletal Tissue Mechanics (3)
Lecture—3 hours; laboratory—1 hour. Prerequisite: Engineering 104B. Overview of the mechanical properties of the various tissues in the musculoskeletal system, the relationship of these properties to anatomic and histologic structure, and the changes in these properties caused by aging and disease. The tissues covered include bone, cartilage, and synovial fluid, ligament and tendon. (Same course as Mechanical and Aeronautical Engineering 232.)—III. (III) Martin

239. Advanced Finite Elements and Optimization (4)
Lecture—4 hours. Prerequisite: Engineering 180 or Applied Science 115 or Mathematics 128C. Introduction to advanced finite elements and design optimization methods, with application to modeling of complex mechanical, aerospace and biomedical systems. Application of states of the art in finite elements in optimum design of components under realistic loading conditions and constraints. Offered in alternate years. (Same course as Mechanical Engineering 239.)—II. (II) Sarigul-klign

240. Computational Methods in Nonlinear Mechanics (4)
Lecture—4 hours. Prerequisite: Applied Science Engineering 115 or Mathematics 128B or Engineering 180. Deformation of solids and the motion of fluids treated with state-of-the-art computational methods. Numerical treatment of nonlinear dynamics; classification of coupled problems; applications of finite element methods to mechanical, aeronautical and biomedical problems in alternate years. (Same course as Mechanical and Aeronautical Engineering 240.)—II. Sarigul-klign

241. Introduction to Magnetic Resonance Imaging (3)
Lecture—3 hours. Prerequisite: Physics 9D, Mathematics 228. Equipment, methods, medical applications of MRI. Lectures review basic, advanced pulse sequences, image reconstruction, display and tech-
ology and how these are applied clinically. Lecture complements a more technical course. (Core 246 can be taken concurrently.—I.) 1. Buonocore

242. Introduction to Biomedical Imaging (4)
Lecture—4 hours. Prerequisite: Physics 9D and Electrical and Computer Engineering 106 or consent of instructor. Basic physics and engineering principles of imaging technologies on forming and characterizing radiation projection and interactions with the body and detectors. Major imaging systems: radiography, computed tomography, magnetic resonance, ultrasonography, and optical microscopy.—I. Insana, Boone, Seibert

243. Radiation Detectors for Biomedical Applications (4)
Lecture-discussion—4 hours. Prerequisite: Physics 9D, Mathematics 21D, 22B. Radiation detectors and sensors used for biomedical applications. Emphasis on radiation interactions, detection, measurement and use of radiation sensors for imaging. Operating principles of gas, semiconductors, and scintillation detectors.—II. (II.) Cherry

246. Magnetic Resonance Technology (3)
Lecture—3 hours. Prerequisite: Physics 9D, Mathematics 22B. Course covers MRI technology at an advanced level, focusing on imaging fundamentals. Emphasis on mathematical descriptions and problem solving. Topics include spin dynamics, signal generation, image reconstruction, pulse sequences, biophysical basis of T1, T2, T1* and T2* relaxations, and signal-to-noise, image artifacts.—I. (I.) Buonocore

247. Current Concepts in Magnetic Resonance Imaging I (3)
Lecture—3 hours. Prerequisite: course 241 or 246 and consent of instructor. Modern pulse sequences, pulse sequence options, and biomedical/industrial applications; velocity encoded phase imaging and angiography, echo planar imaging, spiral imaging, computer simulation of MR, last spin echo, other topics.—II. (II.) Buonocore

248. Current Concepts in Magnetic Resonance Imaging II (3)
Lecture—3 hours. Prerequisite: course 247 or consent of instructor. Continuation of lecture coverage of modern pulse sequences, pulse sequence options, and biomedical/industrial applications: Control of tissue contrast by magnetization refocusing and spoiling, RF pulse design, diffusion and perfusion imaging, image artifact reduction methods, others.—III. (III.) Buonocore

250. Mathematical Methods of Biomedical Imaging (4)
Lecture—4 hours. Prerequisite: graduate standing or consent of instructor. Advanced mathematical techniques with emphasis on imaging systems. Matrices and vector spaces, Fourier analysis, integral transforms, signal representation, probability and random processes.—I. (I.) Insana

251. Medical Image Analysis (4)
Lecture—4 hours. Prerequisite: Electrical and Computer Engineering 106. Techniques for the performance of medical imaging systems. Principles of digital image formation and processing. Measurements that summarize diagnostic image quality and the performance of human observers viewing those images. Emphasis on the formation and characteristics of ideal observer and other mathematical observers that may be used to predict performance from system design features.—II. Insana

252. Computational Methods in Biomedical Imaging I (4)
Lecture—4 hours. Prerequisite: course 108, Mathematics 22B, Electrical and Computer Engineering 106. Analytic tomographic reconstruction from projections in 2D and 3D, model-based image reconstruction methods, maximum likelihood and Bayesian methods, applications to CT, PET, and SPECT.—II. (II.) Qi

270. Biochemical Systems Theory (4)
Lecture—4 hours. Prerequisite: course 202 concurrently or consent of instructor. Systems biology at the biochemical level. Mathematical and computational methods emphasizing nonlinear representation, dynamics, robustness, and optimization. Case studies of signal-transduction cascades, metabolic network and regulatory mechanisms. Focus on formulating and analyzing fundamental questions concerning network function, design, and evolution.—I. (I.) Savageau

271. Gene Circuit Theory (4)
Lecture—4 hours. Prerequisite: course 270 or 202 and consent of instructor. Analysis, design, and construction of gene circuits. Modeling strategies, elements of design, and methods for studying variations in design. Case studies involving prokaryotic gene circuits to illustrate general principles and methods of circuit design, construction of circuits for engineering objectives.—II. (II.) Savageau

272. Tissue Engineering (3)
Lecture/discussion—3 hours. Prerequisite: Biological Sciences 104, Molecular and Cellular Biology 121. Based on morphogenetic signals, responding stem cells and extracellular matrix scaffolding. Design and development of tissues for functional restoration of organs damaged/bad due to cancer, disease and trauma. Fundamentals of morphogenetic signals, responding stem cells and extracellular matrix scaffolding.—II. (II.) Reddi

273. Integrative Tissue Engineering and Technologies (4)
Lecture/discussion—4 hours. Prerequisite: courses 202 and 204 or similar; graduate standing; course 272 strongly encouraged, although not a prerequisite. Engineering principles to direct cell and tissue behavior and formation. Contents include controlled delivery of macromolecules, transport within and around biomaterials, examination of mechanical forces of engineered constructs, and current experimental techniques used in the field.—III. (III.) Leach

281. Acquisition and Analysis of Biomedical Signals (4)
Lecture—3 hours, laboratory—2 hours. Prerequisite: Engineering Aeron 100, Statistics 130A. Digital acquisition of electrical signals; sampling; empirical modeling; Fourier analysis, random processes, spectral analysis, and correlation applied to biomedical signals.—I. (I.) Leach

282. Biomedical Signal Processing (4)
Lecture—4 hours. Prerequisite: Electrical and Computer Engineering 150A, 150B. Characterization and analysis of continuous- and discrete-time signals from linear systems. Examples drawn from physiology and psychology illustrate the use of Laplace, Z, and Fourier transforms to model biological and bioengineered systems and instruments. Filter design and stochastic signal modeling. Genomic signal processing.—II. Insana

284. Mathematical Methods for Biomedical Engineers (4)
Lecture/discussion—4 hours. Prerequisite: Mathematics 22B, Statistics 130A, or consent of instructor; upper division biomedical engineering majors, and graduate students in sciences and engineering; priority given to Biomedical Engineering graduate students. Theoretical applications of linear systems, ordinary and partial differential equations, and probability theory and random processes that describe biological systems and instruments that measure them. Students will be introduced to numerical solutions of differential equations in MATLAB.—II. (II.) Raychaudhuri

285. Computational Modeling in Biology and Immunology (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing or consent of instructor. Essential computational modeling techniques in biology and immunology. Emphasis on applications of Monte Carlo methods in studying immune recognition and response. Introduction to Brownian dynamics and Molecular dynamics simulations as applied in molecular level diffusion and interactions.—II. (II.) Raychaudhuri

286. Nuclear Imaging in Medicine and Biology (4)
Lecture/discussion—4 hours. Prerequisite: course 243 or consent of instructor. Radiative decay, interaction of radiation with matter, radionuclide production, radiation detection, digital autoradiography, gamma camera imaging, single photon emission computed tomography, positron emission tomography and applications of these techniques in biology and medicine.—III. (III.) Cherry

287. Concepts in Molecular Imaging (4)
Lecture—2 hours, lecture/discussion—2 hours, term paper. Prerequisite: Chemistry 2C, Mathematics 21C, Physics 9D, consent of instructor. Current techniques and tools for molecular imaging. Emphasis on learning to apply principles from the physical sciences to image biology and medicine. —III. (III.) Louie, Sutcliffe-Goulden

289A-E. Selected Topics in Biomedical Engineering (1-5)
Variable Prerequisite: consent of instructor. Selected topics in (A) Instrumentation and Signal Processing; (B) Biomedical Imaging; (C) Biofluids and Transport; (D) Orthopedic Biomechanics; (E) Analysis of Human Movement. May be repeated for credit.—I, II, III, (I, II, III)

290. Seminar (1)
Seminar—1 hour. Seminar in biomedical engineering. (S/U grading only)

290C. Graduate Research Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. Individual and/or group presentations: research problems, progress, and techniques in biomedical engineering research. May be repeated for credit. (S/U grading only)—I, II, III, (I, II, III)

299. Research (1-12)
(S/U grading only)

Professional Course

390. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—I, II, III, (I, II, III)

Engineering: Chemical Engineering and Materials Science

[College of Engineering]
Robert L. Powell, Ph.D., Chairperson of the Department (530) 752-5132; Fax (530) 754-6350
Department Office, 3118 Bainer Hall (530) 752-0400; Fax (530) 752-1031; http://www.chems.ucdavis.edu

Faculty
Mark D. Asta, Ph.D., Professor [Materials Science and Engineering, Computational Science and Engineering]
David E. Block, Ph.D., Associate Professor [Chemical Engineering, Viticulture and Enology]
Roger B. Boulton, Ph.D., Professor and Endowed Chair [Chemical Engineering, Viticulture and Enology]
Stephanie R. Dungan, Ph.D., Professor [Chemical Engineering, Food Science and Technology]
Nael Elfarra, Ph.D., Assistant Professor
Roland Faller, Ph.D., Associate Professor
Bruce C. Gates, Ph.D., Distinguished Professor
Jeffery C. Gibeling, Ph.D., Professor
Joanna R. Groza, Ph.D., Professor
Brian G. Higgins, Ph.D., Professor
David G. Howitt, Ph.D., Professor
Alan P. Jackman, Ph.D., Professor
Sangtae Kim, Ph.D., Assistant Professor
Tonya L. Kuhl, Ph.D., Professor
Enrique J. Lavernia, Ph.D., Professor
Marjorie I. Lang, Ph.D., Professor
Karen A. McDonald, Ph.D., Professor
Adam Moule, Ph.D., Assistant Professor
Antonin Sacher, Ph.D., Distinguished Professor, Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer; 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Social-Cultural Diversity; Wrt=Writing Experience

Engineering: Chemical Engineering and Materials Science

235
and Scholarly Achievement, Distinguished Graduate Mentorship Award
Zulhair A. Al-Ghazali, Ph.D., Distinguished Professor
Alexandra Nazovsky, Ph.D., Distinguished Professor and Endowed Chair (Materials Science and Engineering; Chemistry; land, air, and water resources)
Ahmet N. Palazoglu, Ph.D., Professor
Ronald J. Phillips, Ph.D., Professor
Robert L. Powless, Ph.D., Professor
Subhash H. Risbud, Ph.D., Distinguished Professor

*Academic Senate Distinguished Teaching Award—Graduate/Professional*
Dewey D.Y. Ryu, Ph.D., Professor
Julie M. Schoenung, Ph.D., Professor
Sabyasachi Sen, Ph.D., Associate Professor
James F. Shckellford, Ph.D., Professor

Academic Senate Distinguished Teaching Award—Yayoi Takamura, Ph.D., Assistant Professor
Klaus Van Bentheim, Ph.D., Assistant Professor

Emeriti Faculty
Richard L. Bell, Ph.D., Professor Emeritus
Alan P. Jackman, Ph.D., Professor Emeritus
Benjamin J. McCoy, Ph.D., Professor Emeritus
Howard L. Needleman, Ph.D., Professor Emeritus
J. M. Smith, Sc.D., Professor Emeritus
Stephen Whitehead, Ph.D., Professor Emeritus

*Academic Senate Distinguished Teaching Award—S. Haig Zerion, Ph.D., D.Sc., Professor Emeritus*

The Department of Chemical Engineering and Materials Science offers five undergraduate programs: Chemical Engineering, Biochemical Engineering, Chemical Engineering/Materials Science and Engineering, Electrical Engineering/Materials Science and Engineering, and Materials Science and Engineering.

**Mission Statement.** To advance, through teaching and research programs, the frontiers of chemical engineering, biochemical engineering, and materials science and engineering; to educate students with a sense of professionalism and community; and to serve the public of California through outreach efforts.

**Chemical Engineering Program**
Chemical engineers apply the principles of chemistry and engineering to produce useful commodities, ranging from fuels to polymers. Chemical engineers are increasingly concerned with chemical and engineering processes related to the environment and food production. They work in diverse areas ranging from integrated circuits to integrated waste management. Preparation for a career in chemical engineering requires an understanding of both engineering and chemical principles to develop proficiency in conceiving, designing, and operating new processes.

The chemical engineering curriculum has been planned to provide a sound knowledge of engineering and chemical sciences so that you may achieve competence in addressing current and future technical problems.

**Objectives.** The objectives of the program in Chemical Engineering are to educate students in the fundamentals of chemical engineering, balanced with the application of these principles to practical problems; to train them as independent, critical thinkers who work in teams effectively in teams; to foster a sense of community, ethical responsibility, and professionalism; to prepare them for careers in industry, government, and academia; to illustrate the necessity of integrating education and self-learning; and to help students to learn to communicate proficiently in written and oral form.

The Chemical Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; (410) 347-7700.

**Lower Division Required Courses**

| Mathematics 22A-22B | .......................... 6 |
| Physics 9A-9B | | 15 |
| Chemistry 2A, 2B, 2C or Chemistry 2AH | | 15 |
| Chemistry 128A, 128B, 129A | | 8 |
| Chemical Engineering and Materials Science 5, 6 | | 6 |
| Chemical Engineering 51 | | 4 |
| Chemical Engineering 80 | | 1 |
| English or University Writing Program | 1, or Comparative Literature 1, 2, 3, 4, or Native American Studies 3 | | 4 |
| General Education Areas of Specialization | | 12 |

Minimum Lower Division Units .......................... 91

**Options for Junior and Senior Years**

The focus in your junior year is on fundamentals, such as thermal-dynamics, fluid mechanics, energy transfer, and mass transfer phenomena. In the senior year, you draw together these fundamentals and apply them in a sense of process design, and process dynamics and control. The program includes ten units of technical electives, and six units of chemical engineering and materials science electives that allow you to strengthen specific areas in chemical engineering, explore new areas, or pursue new areas of specialization.

**Areas of Specialization**
The most popular areas of specialization, together with lists of suggested technical electives, are identified and discussed in the following listing. Talk to the instructors of the courses listed regarding possible prerequisites before enrolling.

**Suggested Technical Electives**

**Advanced Materials Processing:**

**Applied Chemistry:**
Chemistry 110C, 115, 128C, 129B, 129C, 130, 131, 150; Fiber and Polymer Science 100, 110, 150

**Applied Mathematics:**

**Computers and Automation:**
Artificial Intelligence and Computer Graphics: Computer Science and Engineering 170, 175

**Numerical Analysis and Optimization:**
Applied Science Engineering 115, 116; Mathematics 128B, 128C, 128D

**Environmental Engineering and Materials Science**

**Automatic Control:**
Biological and Agricultural Engineering 165; Electrical and Computer Engineering 150B, 157B; Biological and Agricultural Engineering 165; Mechanical Engineering 172

**Environmental Engineering—Air Environment:**
Civil and Environmental Engineering 149; Atmospheric Science 121A, 121B, 158

**Environmental Engineering—Water:**
Civil and Environmental Engineering 140; 140L, 140B; Materials Science and Engineering 101, 112A, 112B, 131

**Environmental Engineering—Water/Water Environment:**
Civil and Environmental Engineering 160, 161, 161A; Civil and Environmental Engineering 140; 140L, 140B; Materials Science and Engineering 101, 112A, 112B, 112C, 112D, 112E; Soil Science 102, 102, 107, 117, 118, 119

**Food Process Engineering:**
Biological Systems Engineering 132; Food Science and Technology 100A, 104, 104D; Food Science and Technology 100B

**Management and Marketing:**
Engineering 190; Management 250, 251; Agricultural Economics 113, 130, 136; Statistics 103

**Polymer Science:**
Chemistry 108, 128C, 129B, 129C, 129E; Polymer and Polymer Science 150C; Materials Science and Engineering 147

**Pre-Biomedical Engineering:**
Anatomy, Physiology and Cell Biology 100; Biological Sciences 1A, 1B, 1C, 101, 102, 103, 104; Molecular and Cellular Biology 140L, 141, 142; Neurobiology; Physiology, and Behavior 101, 112, 113, 114

**Pre-Medical:**
Anatomy, Physiology and Cell Biology 100; Chemistry 128C, 129B, 129C; and six biology or biochemistry courses, such as Biological Sciences 18, 1C, 101, 103, 104; Microbiology 102; Animal and Cellular Biology 140L, 141, 142, 150; Neurobiology, Physiology, and Behavior 101, 112, 113, 114

**Chemical Engineering Upper Division Required Courses**

Chemical Engineering 140, 141, 142, 143, 146, 152A, 152B, 155A, 155B, 157, 158A, 158B, 158C .......................... 52
Chemistry 110A, 110B .................................. 8
Biological Sciences 102 .................................. 3

**Chemical Engineering and Materials Science Electives...** ............................................... 6

**Choose from the following:**

**Total Elective** ........................................ 10

**General Education electives** ..........................

**Minimum Upper Division Units ....... 91**

**Minimum Units Required for Major ....... 182**

**Honors Program.** An Honors Program is available to qualified students in the Chemical Engineering, Biochemical Engineering, and Materials Science and Engineering majors. The Honors Program is also available to the dual majors: Chemical Engineering/Materials Science, and Electronic Materials Engineering, and Mechanical Engineering/Materials Science and Engineering. The Chemical Engineering and Materials Science Honors Program is a four-year program designed to challenge the most talented students in these majors. Students invited to participate will work together to conduct original research in their freshman year and will enroll in various one-unit honors courses. In the upper division, students will complete either an honors thesis or a project that might involve local industry (Chemical engineering 194 HA, HB, HC). Students must maintain a grade point average of 3.500 to continue in the program. Successful completion of the Honors Program will be acknowledged on the student's transcript.

**Chemical Engineering/Materials Science and Engineering Program**
The Chemical Engineering/Materials Science and Engineering Program is a combined major that offers unique interdisciplinary courses requiring chemical engineering and materials science students to work together. Chemical engineers apply the principles of chemistry and engineering to produce useful commodities, ranging from antibiotics to zirconium. Materials science and engineering is directed toward an understanding of the structure, properties, and behavior of materials. The development of new materials and the understanding of chemical processes demand a thorough knowledge of basic engineering and scientific principles, including crystal structure, elastic and plastic behavior, thermodynamics, phase equilibria and reaction rates, and physical and chemical behavior of engineering materials. The Chemical
Engineering/Materials Science program provides the background for activities in research, processing, and development of materials. The curriculum is based on a common core of courses basic to engineering; courses taken during your first two years provide a strong foundation in fundamental engineering concepts.

The Chemical Engineering/Materials Science and Engineering program is not accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; (410) 347-7700.

Lower Division Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics 21A-21B-21C-21D</td>
<td>16</td>
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<tr>
<td>Mathematics 22A-22B</td>
<td>6</td>
</tr>
<tr>
<td>Physics 9A-9B-9C</td>
<td>15</td>
</tr>
<tr>
<td>Chemistry 2A, 2B, 2C or Chemistry 2AH, 2B, 2CH</td>
<td>15</td>
</tr>
<tr>
<td>Chemistry 128A, 128B, 129A</td>
<td>8</td>
</tr>
<tr>
<td>Chemical Engineering and Materials Science 5, 6</td>
<td>12</td>
</tr>
<tr>
<td>Chemical Engineering 51</td>
<td>4</td>
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<tr>
<td>Chemical Engineering 80</td>
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<tr>
<td>Engineering AS</td>
<td>1</td>
</tr>
<tr>
<td>English 3 or University Writing Program 1</td>
<td>1</td>
</tr>
<tr>
<td>Comparative Literature 1, 2, 3, or 4</td>
<td>4</td>
</tr>
<tr>
<td>Native American Studies 5</td>
<td>4</td>
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<tr>
<td>General Education electives</td>
<td>6</td>
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</tbody>
</table>

Total Lower Division Units = 91

Upper Division Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Engineering 140, 141, 142, 143, 146, 152A, 152B, 153A, 158A, 158B</td>
<td>52</td>
</tr>
<tr>
<td>Chemistry 110A</td>
<td>8</td>
</tr>
<tr>
<td>Biological Sciences 102</td>
<td>3</td>
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<tr>
<td>Statistics 100</td>
<td>1</td>
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<tr>
<td>Materials Science and Engineering 160, 161, 162L</td>
<td>8</td>
</tr>
<tr>
<td>and a minimum of 8 units of course work to be chosen from Materials Science and Engineering 147, 172, 172L, 174, 174L 180, 181, 182, 188A</td>
<td>22</td>
</tr>
<tr>
<td>General Education electives</td>
<td>12</td>
</tr>
</tbody>
</table>

Minimum Upper Division Units = 97

Minimum Units Required for Major = 188

Honors Program.

An Honors Program is available to qualified students in the Chemical Engineering, Biochemical Engineering, and Materials Science and Engineering majors. The Honors Program is also available to the dual majors: Chemical Engineering/Materials Science and Electrical Engineering. The Chemical Engineering/Materials Science Honors Program is a four-year program designed to challenge the most talented students in these majors. Students invited to participate will take a one-unit honors seminar in their Freshman year and will enroll in various one-unit honors courses in the upper division. The curriculum is designed to challenge the most talented students in these majors. Students must maintain a grade point average of 3.500 to continue in the program. Successful completion of the Honors Program will be acknowledged on the student’s transcript.

Biochemical Engineering Program

As the biotechnology industry expands and matures, there is increasing need for engineers who can produce products from the research stage to large scale manufacturing. As they fill this need, engineers must also understand the production, purification, and regulatory issues surrounding biopharmaceutical manufacturing.

Biochemical engineers—with their strong foundations in chemistry, biological sciences, and chemical process engineering—are in a unique position to tackle these problems. Biochemical engineers apply the principles of cell and molecular biology, biochemistry, and engineering to develop, design, scale up, optimize, and operate processes that use living cells, organisms, or biological molecules for the production and purification of products such as monoclonal antibodies, vaccines, therapeutic proteins, antibiotics, and industrial enzymes; for health and/or environmental protection (such as diagnostic kits, microarrays, biosensors); or for environmental improvement (such as bioremediation).

An understanding of genetics is also becoming increasingly important in the industries that traditionally employ chemical engineers, such as the materials, chemicals, food, energy, fuels, and semiconductor processing industries.

Objectives.

We educate students in the fundamentals of chemical engineering, balanced with the application of these principles to practical problems; educate students as independent, critical thinkers who can also function effectively in a team; educate students with a sense of community, ethical responsibility, and professionalism; educate students for careers in industry, government, and academia; teach students the necessity for continuing education and self-learning; and foster proficiency in written and oral communications.

The Biochemical Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; (410) 347-7700.

Lower Division Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>Mathematics 21A-21B-21C-21D</td>
<td>16</td>
</tr>
<tr>
<td>Mathematics 22A-22B</td>
<td>6</td>
</tr>
<tr>
<td>Physics 9A-9B-9C</td>
<td>15</td>
</tr>
<tr>
<td>Chemistry 2A, 2B, 2C or Chemistry 2AH, 2B, 2CH</td>
<td>15</td>
</tr>
<tr>
<td>Chemistry 128A, 128B, 129A</td>
<td>8</td>
</tr>
<tr>
<td>Biological Sciences 2</td>
<td>8</td>
</tr>
<tr>
<td>Chemical Engineering and Materials Science 5, 6</td>
<td>12</td>
</tr>
<tr>
<td>Chemistry 110A</td>
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</tr>
<tr>
<td>Biological Sciences 102</td>
<td>3</td>
</tr>
<tr>
<td>Statistics 100</td>
<td>1</td>
</tr>
<tr>
<td>Materials Science and Engineering 160, 161, 162L</td>
<td>8</td>
</tr>
<tr>
<td>and a minimum of 8 units of course work to be chosen from Materials Science and Engineering 147, 172, 172L, 174, 174L 180, 181, 182, 188A</td>
<td>22</td>
</tr>
<tr>
<td>General Education electives</td>
<td>12</td>
</tr>
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</table>

Total Lower Division Units = 91

Upper Division Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>UNITS</th>
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<tbody>
<tr>
<td>Chemical Engineering 140, 141, 142, 143, 146, 152A, 152B, 153A, 158A, 158B, 159C</td>
<td>60</td>
</tr>
<tr>
<td>Biological Sciences 102</td>
<td>3</td>
</tr>
<tr>
<td>General Education electives</td>
<td>12</td>
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</tbody>
</table>

Materials Science and Engineering

Materials Science and Engineering is directed toward an understanding of the structure, properties, and behavior of materials. Society demands new and improved materials with unique functionalities for superior to common metals, polymers, and ceramics. New materials are needed for high-speed transportation systems, surgical and dental implants, new generations of power plants, and for state-of-the-art electronic devices in computer and communication technology.

Both the development of new materials and the understanding of present-day materials demand a thorough understanding of basic engineering principles, chemical principles, including crystal structure, elastic and plastic behavior, thermodynamics, phase equilibria and reaction rates, and physical and chemical behavior of engineering materials.

Materials engineers study phenomena found in many different engineering operations, from fracture behavior in automobiles to fatigue behavior in aircraft frames; from corrosion behavior in petro-chemical refineries to radiation-induced damage in nuclear power plants; and from the fabrication of steel to the design of semiconductors. Materials engineers are also increasingly involved in developing the new materials needed to maintain high-performance materials in existing and proposed energy conversion schemes and will play a central role in the development of new technologies based on composites and high-temperature superconductors.

The undergraduate materials science and engineering program provides the background for activities in research, processing, and the design of materials. The curriculum is based on a common core of courses basic to engineering science during your first two years provide a strong foundation in fundamental engineering concepts.

There are several combined majors with Materials Science and Engineering: Chemical Engineering/Materials Science; Electrical Engineering/Materials Science and Engineering; Mechanical Engineering/Materials Science and Engineering.

Objectives. We educate students in the fundamentals of materials science and engineering, balanced with the application of these principles to practical problems; educate students as independent, critical thinkers who can also function effectively in a team; educate students with a sense of community, ethical responsibility, and professionalism; educate students for careers in industry, government, and academia; teach students the necessity for continuing education.
The Electrical Engineering/Materials Science and Engineering Program is a combined major, including portions of the Electrical Engineering curriculum in the Department of Electrical and Computer Engineering and the Materials Science curriculum in the Department of Chemical Engineering and Materials Science. In the past decade, the fields of solid-state electronics, opto-electronics, magnetics, and superconductors have developed to the point that demand for new materials now outpaces the pace of discovery in these fields. Materials scientists with an electronics background are key to continued progress in these areas. The Electrical Engineering/Materials Science and Engineering Program offers students with the background necessary to pursue careers in electrical engineering or materials science or to go on to graduate study.

Objectives. The Electrical Engineering/Materials Science and Engineering program has adopted the following objectives in keeping with the long-term interests of our students and the industries of Northern California and the nation. Foundation-To provide our graduates with a solid foundation in engineering science, including mathematics, physical science, and the fundamentals of electrical engineering and materials science and engineering. This foundation is necessary to succeed in more advanced engineering courses and to be able to continue learning throughout a career. Breadth-To provide our graduates with sufficient breadth in electrical engineering and materials science and engineering. This breadth is required for students to understand tradeoffs that cross disciplines, for them to contribute effectively to multidisciplinary projects and for them to make an informed decision about their area of study. Depth-To provide our graduates with sufficient depth in a specific area of electrical engineering and materials science and engineering. This depth is necessary for solving complex real-world engineering problems and to prepare to contribute to a specific discipline within electrical engineering and materials science and engineering. Ethics-To provide our graduates with a basic understanding of, and ability to handle correctly, ethical problems that may arise during their careers. To provide them with an understanding of their obligations to society at large. The Electronic Materials Engineering Program is accredited by the Electrical Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; (410) 347-7700.

**Minimum Upper Division Units ..... 99**

**Upper Division Required Courses**

**Electrical Engineering/Materials Science and Engineering Program**

**Engineering Program is a combined major, including portions of the Electrical Engineering curriculum in the Department of Electrical and Computer Engineering and the Materials Science curriculum in the Department of Chemical Engineering and Materials Science. In the past decade, the fields of solid-state electronics, opto-electronics, magnetics, and superconductors have developed to the point that demand for new materials now outpaces the pace of discovery in these fields. Materials scientists with an electronics background are key to continued progress in these areas. The Electrical Engineering/Materials Science and Engineering Program offers students with the background necessary to pursue careers in electrical engineering or materials science or to go on to graduate study.**

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**Upper Division Required Courses**

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**The Electrical Engineering/Materials Science and Engineering Program is a combined major, including portions of the Electrical Engineering curriculum in the Department of Electrical and Computer Engineering and the Materials Science curriculum in the Department of Chemical Engineering and Materials Science. In the past decade, the fields of solid-state electronics, opto-electronics, magnetics, and superconductors have developed to the point that demand for new materials now outpaces the pace of discovery in these fields. Materials scientists with an electronics background are key to continued progress in these areas. The Electrical Engineering/Materials Science and Engineering Program offers students with the background necessary to pursue careers in electrical engineering or materials science or to go on to graduate study.**

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• Process Design and Control
• Analytical Techniques in Electron Microscopy
• Solid Oxide Fuel Cells
• Properties of Glasses and Ceramics
• Thermochemistry/Calorimetry and Kinetics of Materials Synthesis
• Colloid, Polymer and Surface Science
• Green Engineering

Research Facilities:
• Northern California Nanotechnology Center
• Center for Nanomaterials in the Environment, Agriculture and Technology

Complete Information on our Web site.

The Graduate Program in Materials Science and Engineering
M.S. and Ph.D. in Materials Science and Engineering
Designated Ph.D. emphasis available in Biotechnolog
Designated Ph.D. emphasis available in Biophoton

http://www.cchem.ucdavis.edu

Our graduate students in materials science benefit from the combined faculty expertise and laboratory facilities of two dynamic disciplines: chemical engineering and materials science. A coordinated and highly multidisciplinary approach in this blended department translates into broader preparation for all of our students.

Materials science focuses on the synthesis, processing, characterization, structural and property relations of new and existing materials. Both chemical engineering and materials science focus on integrating product and product design into the environment. The interdisciplinary activities of department faculty receive strong external funding in materials science research as well.

We embrace diversity in our programs; approximately 50% of our graduate students are women, while overall, the College of Engineering has been rated among the top ten schools nationwide for the number of female faculty. We are able to recruit and engage highly qualified students overall.

We promote an environment that nurtures and promotes collegial interaction between graduate students and faculty in an environment where graduate students are viewed as junior faculty. The department is committed to providing ample dissertation/thesis advising and financial support for students focusing on major progress towards their advanced degree objectives.

Generous financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid.

Research Highlights:
• Biomimetic Thin Films
• Molecular Modeling
• Synthesis of Advanced Materials
• Biomaterials
• Forensics
• Analytical Techniques in Electron Microscopy
• Solid Oxide Fuel Cells
• Properties of Glasses and Ceramics
• Computational Materials Science
• Thermochemistry/Calorimetry and Kinetics of Materials Synthesis
• Properties and Processing of Nanomaterials
• Colloid, Polymer and Surface Science
• Fracture and Fatigue of Solids and Superplasticity in Metals and Ceramics
• Industrial Ecology and Pollution Prevention

Research Facilities and Partnerships:
• Center for Northern California Nanotechnology
• Center for Nanomaterials in the Environment, Agriculture and Technology

Complete Information on our Web site.

Courses in Engineering: Chemical and Materials Science (ECM)
Courses in Chemical and Materials Science Engineering (ECM) are listed immediately following; courses in Chemical Engineering (BME) are listed immediately following; courses in Materials Science and Engineering (EMS) follow.

Lower Division Courses
5. Analysis in Biochemical, Chemical and Materials Engineering (2)
Lecture/discussion—2 hours. Prerequisite: Chemistry 25 (may be taken concurrently), Mathematics 21B (may be taken concurrently). Analysis of systems of interest to chemical engineers and materials scientists. Applications of differential and integral calculus. Dimensional analysis. —II. (II. III.)

6. Computational Methods for Bio/Chemical/Materials Engineers (4)
Lecture/discussion—4 hours. Prerequisite: Mathematics 21C and course 5. Programming methods for solving problems in chemical and materials engineering using Mathematica. Programming styles, data structures, working with lists, functions and rules. Applications drawn from material balances, statistical mechanics, numerical methods, and biomaterials. Introduction to object oriented programming using Java. —III. (III. III.)

6H. Honors Materials Science Computer Applications (1)
Discussion—1 hour. Prerequisite: enrollment in the Materials Science and Engineering Honors Program; concurrent enrollment in Engineering 6 required. Examination of materials science computer applications through traditional readings, discussions, collaborative work, or special activities which may include projects or computer simulations. Open only to students in the Materials Science and Engineering Honors program. —II. (III.)

9H. Honors Solid-State Materials Science (1)
Discussion—1 hour. Prerequisite: enrollment in the Materials Science and Engineering Honors Program; concurrent enrollment in Physics 90 required. Examination of solid-state materials science and modern physics topics through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations. Open only to students in the Materials Science and Engineering Honors program. —II. (III.)

90X. Honors Discussion Section (1)
Discussion—1 hour. Prerequisite: open only to students enrolled in the Chemical Engineering or Biochemical Engineering Honors programs. Examination of special topics covered in selected lower-division courses through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations. May be repeated for credit when topic differs. —II. (III.)

948H. Honors Seminar (1)
Seminar—1 hour. Prerequisite: open only to students enrolled in the Chemical Engineering or Biochemical Engineering Honors programs. Examination of selected current topics in chemical or biochemical engineering through readings, discussions, collaborative work or special activities which may include projects, laboratory experiences or computer simulations. —II. (III.)

Upper Division Courses
188H. Honors Materials Design (1)
Discussion—1 hour. Prerequisite: enrollment in the Materials Science and Engineering Honors Program. Examination of special topics covered in the materials design course through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations. —II. (III.)

188H. Honors Materials Design (1)
Discussion—1 hour. Prerequisite: enrollment in the Materials Science and Engineering Honors Program. Examination of special topics covered in the materials design course through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations. —II. (III.)

190H. Honors Discussion Section (1)
Discussion—1 hour. Prerequisite: open only to students enrolled in the Chemical Engineering or Biochemical Engineering Honors programs. Examination of special topics covered in selected upper division courses through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations. May be repeated for credit when topic differs. —II. (III.)

194HA. Special Study for Honors Students (1-5)
Prerequisite: course 194HA; open only to students enrolled in the Chemical Engineering or Biochemical Engineering Honors programs. Guided independent study of a selected topic in Chemical Engineering or Biochemical Engineering. Preparation for course 194HB. —I, II, III. (I, II, III.)

194HB. Special Study for Honors Students (1-5)
Prerequisite: course 194HA; open only to students enrolled in the Chemical Engineering or Biochemical Engineering Honors programs. Guided independent study of a selected topic in Chemical Engineering or Biochemical Engineering leading to the presentation of an honors project or thesis, under the supervision of a faculty adviser. —I, II, III. (I, II, III.)

Graduate Courses
261. Molecular Modelling of Soft and Biological Matter (1)
Lecture/discussion—4 hours. Prerequisite: Materials Science and Engineering 247 or Engineering: Chemical 252 or equivalent course in advanced thermodynamics/statistical mechanics. Modern molecular simulation techniques with a focus on soft matter like polymers, biologically relevant systems, and glasses. Offered in alternate years. —II. Fall

268. Process Monitoring and Data Analysis (3)
Lecture—3 hours. Prerequisite: senior or graduate standing in engineering or physical sciences or consent of instructor. Analytical approaches to the proper management of experimental and process system data, ranging from univariate and multivariate statistical methods to neural networks, wavelets and Markov models. Offered in alternate years. —III. Palazoglu

280. Seminar in Ethics for Scientists (2)
Seminar—2 hours. Prerequisite: graduate standing in any department of Science or Engineering. Studies of topical and historical issues in the ethics of science, possibly including issues such as proper authorship, peer review, fraud, plagiarism, responsible collaboration, and conflict of interest. Limited enrollment. (Same course as Chemistry 280 and Physics 280.) (S/U grading only).—II. (III.)
281. Green Engineering: Theory and Practice (3)
Lecture/discussion—3 hours. Prerequisite: graduate standing in Engineering or consent of instructor. Methods of evaluating alternative technologies, processes, materials, chemicals, and/or products relative to pollution, waste, toxic substance use, and sustainability. Topics include environmental regulations, recycling, life-cycle assessment, economic analysis, design for the environment, green chemistry and toxicology. Offered in alternate years. —II. Schoening

290. Chemical Engineering & Materials Science Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Topics of current interest in Chemical Engineering and Materials Science Engineering. The subjects covered will vary from year to year and will be announced at the beginning of each quarter. May be repeated for credit. [S/U grading only.]—I, II, III, (II, III, III).

Courses in Engineering: Chemical (ECH)

Lower Division Courses

51. Material Balances (4)
Lecture—4 hours. Prerequisite: Mathematics 21D. Application of the principle of conservation of mass to single and multicomponent systems in chemical process calculations. Studies of batch, semi-batch, and continuous processes involving mass transfer and change of phase, stoichiometry and chemical reaction. Not open for credit to students who have completed course 151.—II. (II)

80. Chemical Engineering Profession (1)
Lecture—4 hours. Professional opportunities and professional responsibilities of chemical engineers. Opportunities and needs for post-baccalaureate education. Relationship of chemical engineering to other fields. —III. (III)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor and lower division standing. [P/NF grading only.]—I, II, III, (II, III, III).

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. [P/NF grading only.]

Upper Division Courses

140. Mathematical Methods in Biochemical and Chemical Engineering (4)
Lecture/discussion—4 hours. Prerequisite: Mathematics 22B. Mathematical methods for solving problems in chemical and biochemical engineering, with emphasis on transport phenomena. Fourier series and separations, Sturm-Liouville eigenvalue problems. Similarity transformations. Tensor analysis. Finite difference methods for solving time-dependent diffusion problems. Not open for credit to students who have completed course 115.—II. (II)

141. Fluid Mechanics for Biochemical and Chemical Engineers (4)
Lecture/discussion—4 hours. Prerequisite: Course 140. Principles and applications of fluid mechanics in chemical and biochemical engineering. Hydrodynamics. The stress tensor and Newton’s law of viscosity. Derivation of the Navier-Stokes equations from Euler’s laws of mechanics. One-dimensional laminar and turbulent flows. Macrosopic momentum and mechanical energy balances. Boundary layer theory. Low Reynolds number flow. Not open for credit to students who have completed course 1508.—II. (II)

142. Heat Transfer for Biochemical and Chemical Engineers (4)
Lecture/discussion—4 hours. Prerequisite: course 51 with a C or better, course 141. Conduction, convection, and radiation of thermal energy in applications to chemical and biochemical engineering. Derivation of thermal and mechanical energy equations. Thermal boundary layers. Macroscopic balances. Applications: heat transfer in tubes, channels, and integrated circuits, and analysis of heat exchangers. Not open for credit to students who have completed course 153.—III. (III)

143. Mass Transfer for Biochemical and Chemical Engineers (4)
Lecture/discussion—4 hours. Prerequisite: course 51 with a C or better, course 141. Derivation of species conservation equation, binary diffusional and diffusive mass transfer. Fick’s law and the Stefan-Maxwell constitutive equations. Mass transfer coefficients. Multicomponent mass transfer across gas/liquid interfaces. Applications to heterogeneous chemical reactions, and membrane separations.—III. (III)

144. Rheology and Polymer Processing (3)
Lecture/Discussion—3 hours. Prerequisite: Course 141. Deformation in steady shear, unstable shear, and elongational flows. Linear and nonlinear viscoelastic constitutive models. The principle of material indifference and admissibility of constitutive equations. Introduction of polymer processing. Not open for credit to students who have completed course 150.—III. (III)

146. Chemical Kinetics and Reaction Engineering (4)
Lecture—5 hours. Prerequisite: Course 143 and 152B. Application of principles of kinetics, heat, and mass transfer to the analysis and design of chemical reaction systems. Not open for credit to students who have completed course 156B.—II. (II)

152A. Chemical Engineering Thermodynamics (3)
Lecture—3 hours. Prerequisite: course 51. Application of principles of thermodynamics to chemical processes. Not open for credit to students who have completed Engineering 105 or 105A.—II. (II)

152B. Chemical Engineering Thermodynamics (4)
Lecture/discussion—4 hour. Prerequisite: course 152A. Continuation of course 152A. Not open for credit to students who have completed Engineering 105.—III. (III)

155A. Chemical Engineering Laboratory (4)
Laboratory—6 hours; discussion—1 hour; term paper. Prerequisite: courses 142, 143, and 152A (may be taken concurrently); satisfaction of the upper division English composition requirement. Open only to majors in Chemical Engineering. Chemical Engineers may substitute Biochemical Engineering, Biomedical Engineering, and Biological Systems Engineering. Laboratory experiments in transport phenomena, chemical kinetics, and thermodynamics. GE credit: Wrt.—III, IV, (II, III)

155B. Chemical Engineering Laboratory (4)
Laboratory—6 hours; discussion—1 hour; extensive writing—1 hour. Prerequisite: courses 143 (may be taken concurrently), 155A; satisfaction of the upper division English composition requirement. Open only to majors in Chemical Engineering, Chemical Engineering/Materials Science, Biochemical Engineering, Biomedical Engineering, Food Engineering, and Biosystems Engineering. Continuation of course 155A. Laboratory experiments in transport phenomena, chemical kinetics, and thermodynamics. GE credit: Wrt.—III, IV, (II, III)

157. Process Dynamics and Control (4)
Lecture/discussion—4 hours. Prerequisite: course 140. Fundamentals of dynamics and modeling of chemical processes. Design and analysis of feedback control of chemical processes.—I. (I)

158A. Process Design and Analysis I (4)
Lecture—4 hours; discussion—1 hour. Prerequisite: courses 142 and 143. Process and product creation and design. Cost accounting and estimation. Profitability analysis techniques. Optimization of process flow sheets.—I. (I)

158B. Process Design and Analysis II (4)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 158A. Hierarchy and rigorous design of chemical process equipment. Synthesis of reactor and separation networks, heat and power integration.—II. (II)

158C. Plant Design Project (4)
Laboratory/discussion—2 hours; project. Prerequisite: course 158B or 161C. Conceptual design of chemical and biochemical processes. Design, costing and profitability analysis of complete plants. Use of computer-aided design techniques.—III. (III)

160. Fundamentals of Biomanufacturing (3)
Lecture—3 hours. Prerequisite: course 102, Biological Sciences 102 or Animal Biology 102. Principles of large scale bioreactor production of metabolites, enzymes, and recombinant proteins including the development, commercialization and fermentation/bioreactor design, monitoring and operation, product recovery and purification, and biomanufacturing economics. Not open for credit to students who have completed either course 161A or both 161A and 161B; only two units of credit to students who have completed either course 161A or 161B.—McDonald

161A. Biochemical Engineering Fundamentals (4)
Lecture/discussion—4 hours. Prerequisite: Chemistry 128A, Mathematics 22B, Microbiology 102 or consent of instructor. Biometrics, microbioreactor design and operation, transport phenomena in microbial, plant, and animal cell cultures.—II. (II)

161B. Bioprocessing (4)
Lecture/discussion—4 hours. Prerequisite: course 143. Product recovery and purification of biocatalysts. Cell disruption, centrifugation, filtration, membrane separations, extraction, and chromatographic separation.—II. (II)

161C. Biotechnology Facility Design and Regulatory Compliance (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 161A, 161B (may be taken concurrently). Design of biotechnology manufacturing facilities. Fermentation and purification equipment, and utility systems. Introduction to current good manufacturing practices, regulatory compliance, and documentation.—II. (II) Block

161L. Bioprocess Engineering Laboratory (4)
Laboratory—9 hours; discussion—1 hour; term paper. Prerequisite: course 161A and 161B, or Viticulture and Enology 186, or Biological Sciences 103 and Molecular and Cellular Biology 120L. Restricted to chemical/biochemical engineering majors during pass I. Laboratory experiments in the operation and analysis of bioreactors; determination of oxygen mass transfer coefficients in bioreactors and an exchange chromatography. GE credit: Wrt.—III. (III)

166. Catalysis (3)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 146 (may be taken concurrently) or consent of instructor. Principles of catalysis based on an integration of principles of physical, organic, and inorganic chemistry and chemical kinetics and chemical reaction engineering. Catalysis in solution; catalysis by enzymes; catalysis in swellable polymers; catalysis in microscopical cages (zeolites); catalysis on surfaces.—II. (II) Gates

170. Introduction to Colloid and Surface Phenomena (3)
Lecture—3 hours. Prerequisite: Chemistry 110A. Introduction to the behavior of surfaces and disperse systems. The fundamentals will be applied to the solution of practical problems in colloid science. The course should be of value to engineers, chemists, biologists, soil scientists, and related disciplines.—III. (III) Stroee

190C. Research Group Conferences (1)
Discussion—1 hour. Prerequisite: upper division standing in Chemical Engineering; consent of instructor. Research group conferences (May be repeated for credit. [P/NF grading only.]—I, II, III, (II, III, III)

190X. Upper Division Seminar (1)
Seminar—1 hour. Prerequisite: upper division standing. In-depth examination of a special topic in a small group setting.
198. Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

206. Biochemical Engineering (3)
Lecture—3 hours. Prerequisite: Microbiology 102 and 122, Biological Sciences 101, 102, 103, Molecular and Cellular Biology 120L, 200A; Food Science and Technology 205 recommended, or consent of instructor. Interaction of chemical engineering, microbiology, and molecular biology. Mathematical representations of microbial systems. Kinetics of growth, death, and metabolism. Continuous fermentation, agitation, mass transfer, and scale-up in fermentation systems, product recovery, and economy technology. Offered in alternate years. —II. Ryu

226. Enzyme Engineering (3)
Lecture—3 hours. Prerequisite: Microbiology 102 and 122, Biological Sciences 101, 102, 103, Molecular and Cellular Biology 120L, 200A; consent of instructor. Application of basic biochemical and engineering principles of practical enzymatic processes. Lectures cover large scale production and purification of immobilized enzyme systems, enzyme reactor design and optimization, and new applications of enzymes in genetic engineering related biotechnology. Offered in alternate years. —II. Ryu

246. Advanced Biochemical Engineering (2)
Lecture—2 hours. Prerequisite: course 206 or consent of instructor. Advances in the field of biotechnology including genetic engineering, enzyme engineering, fermentation science, and renewable resources development. The important results of original research will be evaluated for understanding of the fundamental principles and for potential practical application. —II. (L.)

252. Statistical Thermodynamics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 152B, Engineering 105B, or the equivalent. A treatment of the statistical basis of thermodynamics; introduction to statistical mechanics; discussion of the laws of thermodynamics; application of thermodynamic relationships to phase and chemical reaction equilibrium; introduction to molecular simulation; and the evolution of thermodynamic properties from molecular simulations. —I. (L.)

253A. Advanced Fluid Mechanics (4)

253B. Advanced Heat Transport (4)
Lecture—4 hours. Prerequisites: courses 142 and 259 or the equivalent. Fundamental energy postulates and derivation of microscopic and macroscopic energy equations. Mechanisms of conductive, convective, and radiation transfer in isotropic and anisotropic materials solution problems using Greens functions and perturbation theory. —II. (L.)

253C. Advanced Mass Transfer (4)
Lecture—4 hours. Prerequisites: courses 143 and 259 or the equivalent. Kinetics and basic conservation principles for multiphase systems. Constitutive equations for momentum, heat and mass transfer, applications to binary and ternary systems. Details of diffusion with reaction, and the effects of concentration. —I. (L.)

254. Colloid and Surface Phenomena (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing in science or engineering or consent of instructor. Thermodynamics and rate processes at interfaces. Aspects of the fundamental processes will be applied to determine the collective properties of thin films and membranes, self-assembled systems, liquid crystals and colloidal systems. Experimental techniques in surface analysis. —III. (III.) Stroeve, Longo

256. Chemical Kinetics and Reaction Engineering (4)
Lecture—4 hours. Prerequisite: courses 146 or the equivalent. Analysis of the performance of chemical reactors and reactors based on the principles of chemical kinetics and transport phenomena. Consideration of noncatalytic/catalytic reactions in single fluid phases and emphasis on reactions in microphase mixtures, especially gas-solid reactors. —II. (L.)

259. Advanced Engineering Mathematics (4)
Lecture—4 hours. Prerequisite: Mathematics 210L, 22A, 22B. Applications of methods of applied mathematics to the analytical and numerical solution of linear and nonlinear ordinary and partial differential equations arising in the study of transport phenomena. —I. (L.)

262. Transport Phenomena in Multiphase Systems (3)
Lecture/discussion—3 hours. Prerequisite: course 253C. Heat, mass and momentum transfer in multiphase, multicomponent systems with special emphasis on transport processes in porous media. Derivation of the averaging theorem and application of the method of volume averaging to multiphase, reacting systems. —II. (L.)

263. Rheology and Mechanics of Non-Newtonian Fluids (3)
Lecture—3 hours. Prerequisites: courses 253A and 259 or consent of instructor. Mechanics of polymer solutions and suspensions, especially the development of properly invariant constitutive equations. Topics include: viscometry, linear and nonlinear viscoelasticity, continuum mechanics, kinetic theory, polymer. Offered in alternate years. —II. Powell

265. Emulsions, Microemulsions and Bilayers (3)
Lecture—3 hours. Prerequisite: an undergraduate course in physical chemistry. Thermodynamic and mechanical descriptions of surfactant-laden interfaces. Forces between and within interfaces. Physics of micelle and microemulsion formation. Structure and stability of emulsions. Properties of phospholipid bilayers, with emphasis on vesicles. —II. (L.) Dungan

267. Advanced Process Control (3)
Lecture—3 hours. Prerequisite: course 157 or the equivalent. Advanced course in analysis and synthesis of linear multivariable systems. Emphasis on frequency domain approaches and applications to chemical processes. Topics include singular value analysis, internal model control, robust controller design methods as well as self-tuning control techniques. Offered in alternate years. —III. (L.)

289A-L. Special Topics in Chemical Engineering (1-5)

290. Seminar (1)
Seminar—1 hour. (S/U grading only.)

290C. Graduate Research Group Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. Research projects and techniques in chemical engineering. May be repeated for credit. (S/U grading only.) —II, III, (L.)

294. Current Progress in Biotechnology (1)
Lecture—1 hour. Prerequisite: graduate standing. Seminars presented by guest lectures on subjects of their own research activities. May be repeated for credit. (Same course as Molecular and Cellular Biology 294.) —I, II, III, (L.)

295. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Professional Course

300. Teaching of Chemical Engineering (1)
Discussion—1 hour. Prerequisite: qualifications and acceptance as teaching assistant or associate-in-charge in chemical engineering. Participation as a teaching assistant or associate-in-charge in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports. May be repeated twice for credit. (S/U grading only.) —II, III, (L., II, III)

Courses in Materials Science and Engineering (EMS)

Upper Division Courses

147. Principles of Polymer Materials Science (3)
Lecture—3 hours. Prerequisite: chemistry through organic or Engineering 45. Review of thermodynamics principles and polymer science. Basic principles of polymer science presented including polymer structure and synthesis, polymerization mechanisms, polymer classes, properties, and reactions; polymer morphology, rheology, and characterization; polymer processing. (Same course as Fiber and Polymer Science 100.) —II. (L.)

160. Thermodynamics of Materials Processes and Phase Stability (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45. Review of thermodynamic principles of interest to materials scientists and engineers. Application of thermodynamics to material processing, phase stability, corrosion and oxidation reactions, and environmental issues. Specific examples from metallic and nonmetallic materials will be used. Only 1 unit of credit allowed to students who have completed course 130. Only 3 units of credit allowed to students who have completed course 144. Not open for credit to students who have completed both courses 130 and 144. —I, II.

Lecture—4 hours. Prerequisite: Engineering 45. Description of the structure of engineering materials on the atomic scale by exploring the fundamentals of crystallography. The importance of this structure to materials’ properties. Description of experimental determination using x-ray diffraction techniques. Only 2 units of credit allowed to students who have completed course 132. Only 3 units of credit allowed to students who have completed course 142. Only 1 unit of credit allowed to students who have completed both courses 132 and 142. —II.

162L. Structure and Characterization of Materials Laboratory (2)
Laboratory—3 hours; discussion—1 hour. Prerequisite: course 162 (concurrent enrollment recommended). Experimental investigations of structure of solid materials are combined with techniques for characterization of materials. Laboratory exercises emphasize methods used to study structure of solids at the atomic and microstructural levels. Methods focus on optical, x-ray and electron techniques. Only 2 units of credit allowed to students who have completed course 134L. Not open for credit to students who have completed course 132L. GE credit. Wrt. —II.

164. Rate Processes in Materials Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 and course 160. Basic kinetic laws and the principles governing phase transformations. Applications in diffusion, oxidation, nucleation, growth, and spinodal transformations. Only 1 unit of credit allowed to students who have completed
course 134. Only 3 units of credit allowed to stu-
dents who have completed course 144. Not open for 
credit to students who have completed both 
courses 134 and 144.—III.

172. Electronic, Optical and Magnetic Properties of 
Materials (4) 
Lecture—3 hours; discussion—1 hour. Prerequisite: 
Engineering 45, upper division standing in engineer-
ing, physics, chemistry, or geology. Electronic, opti-
cal, and magnetic properties of materials as related to 
structure and processing of solid state materials. 
Physical principles underlying the properties of 
metals, semiconductors, ceramics, and amor-
phous solids and the applications of these materials in 
engineering.

172L. Electronic, Optical and Magnetic 
Properties Laboratory (2) 
Laboratory—3 hours; lecture/laboratory—1 hour. 
Prerequisite: course 172 [concurrent enrollment rec-
ommended]. Experimental investigation of elec-
tronic, optical and magnetic properties of 
engineering materials, emphasizing the fundamen-
tal relationship between microstructure and 
properties as well as the influence of rate processes on the 
evo-
lution of the microstructure and properties. GE credit: 
Wrt.—II.

174. Mechanical Behavior of Materials (4) 
Lecture—3 hours; discussion—1 hour. Prerequisite: 
Engineering 45 and course 162. The microscopic and 
macroscopic aspects of the mechanical behav-
ior of engineering materials, with emphasis on 
recent development in materials characterization by 
nondestructive testing. The fundamental aspects of 
plasticity in engineering materials, strengthening 
mechanisms and mechanical failure modes of mate-
rials systems. Only 1 unit of credit allowed to stu-
dents who have completed course 138. Only 3 units 
of credit allowed to students who have completed 
course 142. Not open for credit to students who 
have completed both courses 138 and 142. GE credit: 
Wrt.—II.

174L. Mechanical Behavior Laboratory (2) 
Laboratory—3 hours; lecture/laboratory—1 hour. 
Prerequisite: course 174 [concurrent enrollment rec-
ommended]. Experimental investigation of mechan-
ical behavior of engineering materials. Laboratory 
exercises emphasize the fundamental relationship 
between microstructure and mechanical properties, 
and the evolution of the microstructure as a conse-
quence of rate process. Not open for credit to stu-
dents who have completed course 138L. GE credit: 
Wrt.—II.

180. Materials in Engineering Design (4) 
Lecture—3 hours; lecture/discussion—1 hour. 
Prerequisite: Engineering 45 and upper division stand-
ing in Engineering 138L. Application of microstructure of 
materials selection for engineering applications. Dis-
cussion of the relationship between design parame-
ters and materials properties. Emphasis on the 
influence of processing and fabrication on the prop-
erties of metals, ceramics, polymers and composites 
as related to the overall design process. Not open for 
credit to students who have completed course 140. 
[Former course 140.] GE credit: Wrt.—II.

181. Materials Processing (4) 
Lecture—3 hours; lecture/discussion—1 hour. 
Prerequisite: Engineering 45, upper division standing in 
engineering, physics, chemistry, or geology. Princi-
ples of heat treatment, heat treatment as a tool for 
structure and properties of the materials used in 
engineering, phase changes, diffusion, recrystalliza-
tion kinetics and metal forming processes. Offered 
in alternate years.—II. Browning

182. Failure Analysis (4) 
Lecture—3 hours; laboratory—3 hours. Prerequisite: 
Engineering 45, upper division standing in science 
or engineering, and consent of instructor. Effects of 
temperature, mechanical deformation and 
corrosion on the properties of materials. Forensics 
and methodologies for investigating failures of mate-
rials including optical microscopy, x-ray analysis 
and scanning electron microscopy. Investigation of prac-
tical problems. Only 1 unit of credit to students who 
have completed course 148. Only 3 units of credit to 
students who have completed course 142 or course 
144. Not open for credit to students who have 
completed both courses 142 and 148 or both courses 
144 and 148. GE credit: Wrt.—II.

188A-188B. Materials Design Project (2-2) 
Lecture—1 hour; laboratory—1 hour. Prerequi-
site: course 160, 162, 164, 172, 174. A capstone 
design project designed to reinforce the student’s 
understanding of the interrelationships between 
the microstructure and the properties of materials. 
Covers topics such as crystallography, 
thermodynamics, materials science, and 
mechanical engineering. Offered in alternate years. 
Prerequisite: course 138. GE credit: Wrt.—II.
282. Glass: Science and Technology (3) Lecture—2 hours; extensive writing—1 hour. Prerequisites: graduate standing in Chemistry, Physics or Earth Sciences. Relation of macrosscopic properties of glasses and glass-forming liquids to atomic-level structures, including principles of formation, relaxation, transport phenomena, nucleation, crystallization and phase separation in glasses. Offered in alternate years. —III. Sen.


290C. Graduate Research Conference (1) Discussion—1 hour. Prerequisite: consent of instructor. Individual and/or group conference on problems, progress, and techniques in materials science and engineering research. May be repeated for credit. —I, II, III. (I, II, III.)


296. Group Study (1-5) Prerequisite: consent of instructor. S/U grading only.

Professional Course

390. The Teaching of Materials Science (1) Discussion—1 hour. Prerequisite: meet qualifications for teaching assistant and/or associate-in in materials science and engineering. Participation as a teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports. May be repeated twice for credit. —I, II, III. (I, II, III.)

Engineering: Civil and Environmental

[College of Engineering]

Jeannie L. Darby, Ph.D., Chairperson of the Department (530) 752-0586. Department Office, 2001 Engineering III (530) 752-0586; http://cee.engineering.ucdavis.edu

Faculty

John Bolander, Ph.D., Professor
Fabian A. Bombardelli, Ph.D., Assistant Professor
Ross W. Boulanger, Ph.D., Professor
Y. H. (Rob) Choi, Ph.D., Professor
Christopher D. Cappia, Ph.D., Assistant Professor
Lijuan Chen, Adjunct Assistant Professor
Yannis F. Dalalas, Ph.D., Professor
Jeannie L. Darby, Ph.D., Professor
Academic Senate Distiguished Teaching Award 2012
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Yueyue Fan, Ph.D., Assistant Professor
Timothy R. Ginn, Ph.D., Professor
John T. Harvey, Ph.D., Professor
Soris Jeremic, Ph.D., Assistant Professor
Amir Kavvash, Ph.D., Assistant Professor
Michael J. Lichten, Ph.D., Professor
Sashi K. Kunnath, Ph.D., Professor
Bruce L. Kutter, Ph.D., Professor
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Jay R. Lund, Ph.D., Professor
Miguel A. Marridit, Ph.D., Professor
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G. Schadow, Ph.D., Professor
Daniel Sperring, Ph.D., Professor
Academic Senate Distiguished Teaching Award 2004
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N. Sukumar, Ph.D., Assistant Professor
Anthony S. Wexler, Ph.D., Professor
Academic Senate Distiguished Teaching Award 2001
Stefan Wuerz, Ph.D., Professor
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Bassam A. Young, Ph.D., Professor
H. Michael Zhang, Ph.D., Professor
Emeriti Faculty

Takashi Asano, Professor Emeritus
Don O. Brush, Ph.D., Professor Emeritus
Robert H. Burgoy, M.S., Professor Emeritus
Daniel Y. Chang, Ph.D., Professor Emeritus
James A. Chestney, Ph.D., Professor Emeritus
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Academic Senate Distiguished Teaching Award 2001
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Ian P. King, Ph.D., Professor Emeritus
Bruce E. Liroch, Ph.D., Professor Emeritus
Gerald T. Orlab, Ph.D., Professor Emeritus
Ott Gunabe, Ph.D., Professor Emeritus
Melvin R. Ramsey, Ph.D., Professor Emeritus
Karl M. Rosmard, Ph.D., Professor Emeritus
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Academic Senate Distiguished Teaching Award 1999
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Michael A. Taylor, Ph.D., Professor Emeritus
Georgia Tchobanoglous, Ph.D., Professor Emeritus
Affiliated Faculty

Norman A. Abrahamson, Ph.D., Adjunct Professor
Britt A. Halms, Ph.D., Adjunct Associate Professor
Ryuchi Kitamura, Ph.D., Adjunct Professor
Brian Maroney, D. Engr., Adjunct Assistant Professor
David Schoellhammer, Ph.D., Adjunct Associate Professor
The Civil and Environmental Engineering Programs

Mission. The Department of Civil and Environmental Engineering integrates research, education, and professional service in areas related to civil infrastructure and the environment. We provide the profession and academia with outstanding graduates who advance both engineering practice and fundamental knowledge.

Program Educational Objectives. Fundamentals: To educate students in the fundamental principles needed for civil and environmental engineering: mathematics, basic sciences, and engineering sciences. Application: To educate students in the application of fundamental principles for solving civil and environmental engineering problems; provide proficiency in at least four of the environmental, geotechnical, structural, transportation, and water resource areas; and expose students to current research. Professionalism: To imbue students with attributes that lead to professional growth throughout their careers: a sense of professional responsibility; an awareness of business practices; a recognition of the need for lifelong learning, continuing education, and participation in professional societies; a preparedness for the college graduate education; an appreciation for diversity in the civil engineering profession; the ability to think independently and perform effectively in multidisciplinary teams; and the ability to communicate effectively. Service to State and Profession: To provide an educational program that serves the needs of the state and profession; recruit and retain a diverse student population that is representative of the state, comprises students for entry into undergraduate education abroad program. The department encourages interested students to selectively participate in groups through the Education Abroad Program, then consult with the undergraduate staff adviser in Civil Engineering about their individual course plan. Often, students are in their junior or senior year of study when they participate in this option.

Civil Engineering Program

The Civil Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; [410] 347-7700.

Lower Division Required Courses

UNITS

Mathematics 21A-21B-21C-21D.....................16
Mathematics 22A-22B.................................6
Physics 9A-9B-9C and choice of Physics 9D,
Chemistry 2C, Biological Science 2A or
Geology 50-S0*.............................19
Chemistry 2A-2B or 2A-2BH......................10
Civil and Environmental Engineering 3 .........4
(Civil and Environmental Engineering 3 is designed for freshmen students and is not open to upper division students. Students who do not take this course will substitute 4 units of additional engineering coursework. Non-engineering units approved by the Technical Elective list** may be substituted if within the unit maximum.)

One course from Civil and Environmental Engineering 19, Environmental Science Engineering 30, or
Engineering 23, 35, 45 ................................11
Civil and Environmental Engineering 10 .......4
English 3 or University Writing Program 1, or
Comparative Literature 1, 2, 3, or 4, or
Native American Studies 5 .........................4
Communication 1 or 3 ...............................4
General Education education electives........4
Minimum Lower Division Units...........94

*Units in excess of the requirement from Chemistry, Biological Sciences, Physics, or Geology courses may be toward the technical elective requirement. Please consult with the departmental staff adviser.

**Departmental technical elective listing available from staff advisor. Maximum of four units from this list may count toward degree requirements.

Upper Division Requirements: Areas of Specialization

Undergraduates may emphasize one or more of the following areas of specialization, or generalize across all areas. You are urged to consult a departmental adviser when developing a coherent individual program. Additional information on areas of specialization and potential faculty advisers can be obtained from the College of Engineering Bulletin and the departmental Website.

Environmental Engineering. The focus of this area is on the management and improvement of air, land, and water quality in the face of increasing population and expanding industrialization. Examples of environmental engineering problems include innovative analysis and design of air, water, waste-water, and solid waste treatment systems; mathematical modeling of natural and engineered systems; sampling, analysis, and transport and transforma-
tion of natural and anthropogenic pollutants; and modeling of air pollutant emissions.

Suggested technical electives:


Geotechnical Engineering. This area deals with civil infrastructure and environmental problems that require quantifying the behavior of geologic materials (e.g., soils and rocks). Examples of geotechnical engineering problems include foundations for buildings and bridges, earthwork (e.g., dams, tunnels, highways), earthquake hazards (e.g., ground motions, liquefaction, soil-structure interaction), and geo-environmental problems (groundwater flow, subsurface contamination, transport and remediation).

Suggested technical electives:
- Civil and Environmental Engineering 131, 132, 135, 137, 139, 140, 144, 171, 171L, 173, 175, 179; Engineering 180; Geology 17, 50, 50L, 134, 161; Hydrologic Science 146; Mathematics 128A, 128B, 128C.

Suggested Advisers: R. W. Boulanger, Y. F. Dafalias, J.T. Delong, J. T. Harvey, B. Jeremic, B. L. Kutter

Structural Engineering and Structural Mechanics. The focus of this area is the conception, design, analysis, construction, and life-cycle management of all types of infrastructure, including buildings, bridges, dams, ports, highways, and industrial facilities. Structural materials include metals, reinforced concrete, timber, and advanced composites. The behavior of structures to adverse environmental conditions. Structural mechanics emphasizes theoretical and computational tools that may be used in structural engineering.

Suggested technical electives:
- Civil and Environmental Engineering 130, 131, 132, 135, 137, 139, 140, 144, 171, 171L, 173, 175, 179; Engineering 182, 180; Materials Science and Engineering 128A, 128B, 128C.


Transportation Planning and Engineering. This area deals with the movement of people and goods in a manner consistent with society’s environmental (e.g., quality) and socio-economic goals (e.g., equity and mobility).

Transportation engineering applies engineering, economic, and behavioral science principles to the planning, analysis, design, and operation of transportation systems such as highways and public transit. Transportation planning involves the formulation and analysis of transportation policy, program, and project alternatives in consideration of social, legal, economic, and technological feasibilities.


Water Resources Engineering. This area includes hydrology, hydraulics, fluid mechanics, and water resources systems planning and design. Hydrology deals with quantifying and understanding all aspects of the hydrologic cycle, including the relationships between precipitation, runoff, ground-water, and surface water. Water quality and contaminant transport is studied under hydrologic conditions. Hydraulics and fluid mechanics deal with flows in pipes, open-channel water-distribution systems, and natural systems, such as lakes and reservoirs. Water resources systems planning and design deals with the comprehensive development of water resources to meet the multiple needs of industry, agriculture, municipalities, recreation, and other activities.

Suggested technical electives: Agricultural and Resource Economics 176; Atmospheric Science 121A; Biological and Agricultural Engineering 145; Civil and Environmental Engineering 141, 141L, 142, 144, 145, 148B, 153, 155; Environmental Science and Policy 150A, 151; Hydrologic Science 110.


Civil Engineering

Upper Division Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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<tbody>
<tr>
<td>Engineering 102, 103, 104, 104L, 105, 106</td>
<td>20</td>
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<tr>
<td>Applied Science Engineering 115</td>
<td>4</td>
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<td>Civil and Environmental Engineering 114</td>
<td>4</td>
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<tr>
<td>Engineering 122, 180; Materials Science</td>
<td>4</td>
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<td>and Engineering 174; Mathematics 128A,</td>
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<td>128B, 128C</td>
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<td>Suggested Advisers: R. W. Boulanger, Y. F.</td>
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<td>Dafalias, J.T. Delong, J. T. Harvey, B.</td>
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<td>Jeremic, B. L. Kutter</td>
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Minimum Upper Division Units: 101

Civil Engineering/Materials Science and Engineering

Upper Division Required Courses

| Engineering 100, 102, 103, 104, 104L,      | 23    |
| Applied Science Engineering 115           | 4     |
| Civil and Environmental Engineering 114   | 4     |
| One course from Applied Science Engineering 116, 135, 141, 141L, 148A, 171, 171L | 21 |
| Three courses from Civil and Environmental Engineering 132, 136, 143, 145, 148B, 150, 155, 162, 173 | 17 |
| One course from Civil and Environmental Engineering 136, 145, 148B, 150, 162, 173 | 11 |
| Materials Science and Engineering 160, 162, 162L, 164, 174 | 14 |

Minimum Units Required for Major: 194

The Minor in Construction Engineering and Management

To pre-apply to this minor program offered by Civil and Environmental Engineering, find full details regarding admission and completion in the Application Form available from the department Web site or the curricular advisor in 2045 Engineering III.

Minor Program Requirements:
- Prerequisite courses must be completed prior to enrollment in coursework taken for minor.

UNITS

Construction Engineering and Management: 24


Twelve units from Civil and Environmental Engineering 179, Agricultural and Resource Economics 112, 155, 171A, 171B, 181A, 188A, 188B | 12 |

Eleven units from Civil and Environmental Engineering 141 and 141L | 18 |

Environmental, Civil and Environmental Engineering 148A or 149 | 4 |

Geotechnical: Civil and Environmental Engineering 171 and 171 Lab and at least one from courses 173, 173L, 179 | 4 |

Structural: Civil and Environmental Engineering 135 and at least one from courses 130, 131, 132, 136, 137, 138, 139, 179 | 4 |

Transportation: Civil and Environmental Engineering 161 or 163 and at least one from courses 162, 165, 179 | 4 |

Water Resources: Civil and Environmental Engineering 141 and 141 Lab and at least one from courses 142, 144, 145, 146, 155 | 4 |

Environmental, Civil and Environmental Engineering 148A or 149 | 4 |

Total: 194 units

Graduate Education electives: 24

Civil Engineering/Materials Science and Engineering 116, 135, 141, 141L, 148A, 171, 171L | 21 |

Twelve units from Civil and Environmental Engineering 179, Agricultural and Resource Economics 112, 155, 171A, 171B, 181A, 188A, 188B | 12 |

Eleven units from Civil and Environmental Engineering 141 and 141L | 18 |

Total: 194 units

Minimum Units Required for Major: 194

The Graduate Program

M.S., M. Engr., Ph. D. Engr. Professional Certificate

Designated Ph.D. emphasis available in Biotechnological http://cee.engr.ucdavis.edu

With over 30 faculty, over $12 million in annual research expenditures and over 220 graduate students, the department of Civil and Environmental Engineering integrates research, education and professional service in creating civil infrastructure and the environment. Graduate students benefit from close working relationships with professors who are the leading international experts in their field. They are supported in their research by robust funding, and they have access to state-of-the-art research centers. For example, one of the experimental laboratories that constitutes NEES, the Network for Earthquake Engineering Systems, (nee@ucdavis.edu), has the largest centrifuge of its kind in the nation and gives researchers access to their peers at other unique centers via high-speed networks. Since 1990, researchers at the J. Amadoro Hydraulics Laboratory [JAIHL] have served the state of California by solving ecological, biological, environmental and hydraulic engineering problems. Our graduates go on to serve the profession and...
academia by advancing the leading edge of fundamental knowledge, as well as engineering practice. Generous financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid. About 75% of the graduate students in our program are either fully or partially supported.

Research Highlights:
- Environmental Engineering
- Structural Engineering and Structural Mechanics
- Geotechnical Engineering
- Water Resources Engineering
- Hydraulics and Fluid Mechanics
- Hydrology
- Systems Planning and Design
- Transportation Engineering
- Transportation Planning and Design
- Alternative Fuel Transportation Infrastructure
- Environmental Planning and Management

Research Facilities and Partnerships:
- NSF NEES Geotechnical Centrifuge
- Institute of Transportation Studies
- J. Amorco Hydrofluics Laboratory (IAHFL)
- Center for Environmental and Water Resources Engineering
- Tahoe Environmental Research Center

Complete Information on our Web site.

Courses in Engineering: Civil and Environmental (ECI)

Lower Division Courses

3. Introduction to Civil and Environmental Engineering Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: trigonometry; restricted to lower division students.

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor; lower division standing. (P/NP grading only)

Upper Division Courses

114. Probabilistic Systems Analysis for Civil Engineers (4)
Lecture—4 hours. Prerequisite: Mathematics 21C. Probabilistic concepts and models in engineering. Statistical analysis of engineering experimental and field data. Introduction to stochastic processes and models of engineering systems. Not open for credit to students who have completed Statistics 120. —I, II, (I, II) Makhitarian

119. Parallel Processing for Engineering Applications (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: C programming or consent of instructor. Fundamental skills in parallel computing for engineering applications; emphasis on structured parallel programming for distributed memory parallel clusters. Not open for credit to students who have completed course 119B. Offered in alternate years. —III. (III) Kleeman, Jerome

123. Urban Systems and Sustainability (4)
Lecture—4 hours. Prerequisite: upper division standing. Systems-level approach to how to evaluate and then modify sustainability of urban systems based on interaction with environment. Topics include: definition/metrics of urban sustainability; system analyses of urban systems; enabling technology, policies, legislation; measures and modification of ecological footprints. GE Credit. SocSci, Div. Wri. —I. (I) Loge, Niemeier

130. Structural Analysis (4)

131. Matrix Structural Analysis (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 6 and 104; restricted to Engineering majors only. Matrix formulation and computer analysis of statically indeterminate structures. Stiffness and flexibility formulations for elastic structures. Finite element methods for elasticity and bending problems. —I. (I) Bolander

132. Structural Design: Metallic Elements (4)
Lecture—4 hours. Prerequisite: Engineering 104. Design of metallic beams, columns, and other members for various loading conditions; design of connections between members; member performance within structural systems. —II. (II) Kanivc

135. Structural Design: Concrete Elements (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 104; restricted to majors in Civil Engineering, Civil Engineering/Materials Science and Engineering, or Materials Science and Engineering only. Strength design procedures for columns, rectangular beams, I-beams and beams of general cross-section. Building code requirements for bending, shear, axial load, combined stresses and bond. Introduction to prestressed concrete. —I, II, III (I, II, III) Chai

136. Building Design: Wood, Steel, and Concrete Applications (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 130 or 131; course 135; course 132 recommended. Horizontal and lateral load paths; dead and live loading; earthquake and wind forces. Approximate building framing, wood engineering for buildings. Steel, concrete and wood building design. —III. (III)

137. Construction Principles (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: upper division standing in Engineering. Engineering 104 recommended. With civil engineering construction and design applications, including project scope, schedule, resources, cost, quality, risk, and control. Construction industry overview. Interactions between planning, design, construction, operations. Construction operations analysis. Contract issues, Project management software, field trips, guest lectures. —III. (III) Harvey

138. Earthquake Loads on Structures (4)
Lecture—4 hours. Prerequisite: Engineering 102, course 130 or 131. Determination of loads on structures due to earthquakes. Methods of estimating equivalent static lateral forces; response spectrum and time history analysis. Concepts of mass, damping and stiffness for typical structures. Design for inelastic behavior. Numerical solutions and Code requirements. —II. (II)

139. Advanced Structural Mechanics (3)
Lecture—3 hours. Prerequisite: Engineering 104 or the equivalent. Review of stress, strain, equilibrium, compatibility, and elastic material behavior. Plane stress and plane strain problems in elasticity theory; stress function. Theories for straight, tapered, composite, and curved beams. Beams on elastic foundations. Introduction to plates, curved membranes, and cables. —III. (III) Dafalias

140. Environmental Analysis of Aqueous Systems (3)
Lecture—3 hours. Prerequisite: Chemistry 2B; course 148A recommended. Introduction to chemical principles underlying current practices in sampling and analysis of water and wastewater. —I. (I) Young

140L. Environmental Analysis of Aqueous Systems Laboratory (1)
Laboratory—3 hours. Prerequisite: Chemistry 2B or the equivalent; course 140 may be taken concurrently. Restricted to Civil Engineering undergraduate and graduate students. Introduction to “wet chemical” and instrumental techniques commonly used in the examination of water and wastewater and associated data analysis.

141. Engineering Hydraulics (3)
Lecture—3 hours. Prerequisite: Engineering 103. Nature of flow of a real fluid; flow in pipes, open channel flow; turbomachinery; fluid forces on objects: boundary layers, lift and drag. —I, III. (I, III) Schladow

141L. Engineering Hydraulics Laboratory (1)
Laboratory—3 hours. Prerequisite: course 141 (may be taken concurrently). Open to Engineering students only. Laboratory experiments and demonstrations on flow measurement, sluice gates, hydraulic jump, flow characteristics, and centrifugal pumps. —I, III. (I, III) Schladow

142. Engineering Hydrology (4)
Lecture—4 hours. Prerequisite: courses 141 (may be taken concurrently); course 114 recommended. The hydrologic cycle. Evapotranspiration, interception, depression storage and infiltration. Streamflow analysis and modeling. Flood routing through channels and reservoirs. Frequency analysis of hydrologic variables. Precipitation analysis for hydrologic design. Hydrologic design. —I. (I) Kavvas

143. Green Engineering Design and Sustainability (4)
Lecture—4 hours. Prerequisite: upper division standing; restricted to Civil Engineering and Civil Engineering/Materials Science and Engineering majors only. Application of concepts, goals, and metrics of sustainability, green engineering, and industrial ecology to the design of engineered systems. Life-cycle analyses, waste audit and environmental management systems, economics of pollution prevention and sustainability, and substitute materials for products and processes. —I. (I) Loge

144. Groundwater Systems Design (4)
Lecture—4 hours. Prerequisite: course 141. Groundwater occurrence, distribution, and movement. Groundwater flow systems; radial flow to wells and aquifer testing; aquifer management; groundwater contamination; solute transport by groundwater; fate and transport of subsurface contaminants. Groundwater supply and transport modeling. —I. (I) Grimm
145. Hydraulic Structure Design (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours.
Prerequisite: course 141 and 141L; course 142 recommended. Fundamental principles and practical aspects of the design of hydraulic structures including water storage, conveyance, and pumping systems. Emphasis on use of industry-standard computer software for hydraulic design.—III. (III.) Young

146. Water Resources Simulation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103; Applied Science Engineering 113, consent of instructor. Computer simulation techniques in the analysis, design and operation of surface water systems; modeling concepts and practices with application to surface runoff, water quality in rivers and streams and dispersion of contaminants in water bodies. GE credit: Wrt.—II. (II.) Bombardelli

148A. Water Quality Management (4)

148B. Water Quality Management Systems Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 148A. Application of the principles of fluid mechanics to the analysis and design of flow measuring devices, design of pumping station systems, water distribution systems, wastewater collection systems, water and wastewater treatment plant head-loss analysis, and bioremediation systems.—III. (III.) Darby

149. Air Pollution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21D, 228, Chemistry 28, Atmospheric Science 121A or Engineering 103. Physical and technical aspects of air pollution. Emphasis on geo-physical processes and air pollution meteorology as well as physical and chemical properties of pollutants. (Same course as Atmospheric Science 149)—I. (I.) Cappa

150. Air Pollution Control System Design (4)
Lecture—2 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: Engineering 103, 105, 106, course 149. Design and evaluation of air pollution control devices and systems.—II. (II.) Cappa

153. Deterministic Optimization and Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 132A, 23A, computer programming course; Applied Science Engineering 115 recommended. Operations research. Optimization techniques such as linear programming, dynamic programming, and non-linear programming. Applications in water, transportation, environmental, infrastructure systems, and other civil engineering disciplines through computer-based course projects.—I. (I.) For

155. Water Resources Engineering Planning (4)
Lecture—4 hours. Prerequisite: Engineering 106 or Economics 1A, course 114, 142; course 153 recommended. Basic water engineering planning concepts; role of engineering, economic, environmental and social information and analysis; institutional, political and legal aspects. Case studies and computer models illustrate the planning of water resources systems. GE credit: Wrt.—III. (III.) Lund

161. Transportation System Operations (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 6 (or the equivalent) and 102. Principles of transportation operations, traffic character-istics and methods of measurement; models of transportation operations and congestion applied to urban streets and freeways.—I. (I.) Zhang

162. Transportation System Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 161 or 141L; course 142 recommended. Fundamental principles and practical aspects of the design of transportation planning and system design. Generalized design param-eters; group problem solving.—III. (III.)

165. Energy and Environmental Aspects of Transportation (4)
Lecture—3 hours; extensive writing. Prerequisite: Economics 1A and course 162. Engineering, eco-nomic, and systems planning concepts. Analysis and evaluation of energy, air quality and selected envi-ronmental attributes of transportation technologies. Strategies for reducing pollution and petroleum con-sumption in light of institutional and political con-traints. Evaluation of vehicle emission models. (Same course as Environmental Science and Policy 163.) Offered in alternate years. GE credit: Wrt.—I. Spering

165. Transportation Policy (3)
Lecture—3 hours. Prerequisite: Economics 1A and Engineering 106 recommended. Transportation and associated environmental problems confronting urban areas, and prospective technological and institutional solutions. Draws upon concepts and methods from economics, engineering, political science and environmental studies. Offered in alternate years. GE credit: SocSci, Wrt.—I. Spering

171. Soil Mechanics (4)
Lecture—4 hours. Prerequisite: Engineering 103 and 104 (may be taken concurrently); course 171L must be taken concurrently. Restricted to Civil Engineering and Civil Engineering/Materials Science and Engi-neering majors only. Soil formations, mass-volume relationships, soil classification, effective stress, soil-water-void relationships, compaction, segregation, capillarity, compressibility, consolidation, strength, states of stress and failure, lateral earth pressures, and slope stability.—I, II, III. (I, III.) Kutter

171L. Soil Mechanics Laboratory (1)
Lecture—3 hours. Prerequisite: course 171 must be taken concurrently. Laboratory studies utilizing standard testing methods to determine physical, mechanical and hydraulic properties of soil and demonstration of basic principles of soil behavior.—I, II, III. (I, III.) Kutter

173. Foundation Design (4)
Lecture—4 hours. Prerequisite courses 135 (may be taken concurrently) and 171. Soil exploration and determination of soil properties for design; consoli-dation and elastic settlements of foundations; bearing capacity of soil, lateral earth pressures and retaining wall design; pile foundations; excavations and dewatering.—II. (II.) Boulanger

175. Geotechnical Earthquake Engineering (4)
Lecture—4 hours. Prerequisite: course 171 and 171L. Earthquake sources and ground motions. Cyclic behavior of soils; triggering, consequences, and mitigation of effects of liquefaction. NEES (Net-work for Earthquake Engineering Simulation) equip-ment and techniques for studying earthquake engineering with focus on liquefaction problems.—II. (II.) Kutter

179. Pavement Engineering (4)
Lecture—3 hours; discussion/lecture—3 hours. Prerequisite: Engineering 104. Pavement types (rigid, flexible, unsurfaced, rail), their applications (roads, airfields, ports, roads, railroad, and railway) and distress mechanisms. Mate-rials, traffic and environment characterization. Empirical and mechanical-empirical design procedures. Maintenance, rehabilitation and reconstruc-tion; construction quality; asphalt concrete mix design.—I. (I.) Harvey

189A-J. Selected Topics in Civil Engineering (1-5)
Prerequisite: consent of instructor. Directed group study of selected topics in separate sections in (A) Environmental Engineering; (B) Hydraulic Engineering; (C) Engineering Planning; (D) Geotechnical Engineering; (E) Structural Engi-neering; (F) Transportation Engineering; (I) Water Resources Engineering; (J) Water Resources Plan-ning. May be repeated for credit when the topic is different.—I, II, III, (I, II, III.)

190C. Research Group Conferences in Civil and Environmental Engineering (1) Discussion—1 hour. Prerequisite: upper division standing in Civil and Environmental Engineering, consent of instructor. Research group conferences. May be repeated for credit. (P/NP grading only)—I, II, III, (I, II, III.)

192. Internship in Engineering (1-5)
Internship. Prerequisite: upper division standing; approval of project prior to the period of the intern-ship. Supervised work experience in civil engineer-ing. May be repeated for credit. (P/NP grading only)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: senior standing in engineering and at least a B average. (P/NP grading only)

Graduate Courses

202. Introduction to Theory of Elasticity (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 104. Fundamental equations of elastic-ity in three dimensions; plane stress and plane strain; flexure and torsion of bars of various shapes. Intro-duction to variational and approximate methods.—I. (I.) Rashid

203. Inelastic Behavior of Solids (3)
Lecture—3 hours. Prerequisite: course 201. Funda-mentals of theories of plasticity, viscoelasticity and viscoplasticity for solids. Micromechanics, constitutive modelling for engineering materials, e.g., metals, polymers, soils, etc., and microscopic motivation. Offered in alternate years.—II. Dafalias

205. Continuum Mechanics (3)
Lecture—3 hours. Prerequisite: course 201. Tensor formulation of the field equations for continuum mechanics, including large deformation effects. Invariance and symmetry requirements. Introduction to nonlinear thermoelasticity and thermodynamics. Solution of three-dimensional problems. Selected top-ics. Offered in alternate years.—II. Dafalias

206. Fracture Mechanics (4)
Lecture—4 hours. Prerequisite: course 201; Engi-neering 104. Linear and nonlinear fracture me-chanics, stress analysis, energy concepts, brittle fracture criteria, path independent integrals, Dugdale-Baren-blatt model, general cohesive zone models, ductile fracture criteria, crack tip fields for stationary and propagating cracks, fatigue. Application of numeri-cal methods for fracture mechanics. Offered in alter-nate years.—II. (II.) Rashid

211. Advanced Matrix Structural Analysis (4)
Lecture—4 hours. Prerequisite: course 131. Analysis of complex frameworks by the displacement method; treatment of tapered beams, curved beams, and beams on elastic foundations; partially rigid connect-ions; geometric and material nonlinearities; buck-ling; flexibility-based formulations; FEM-software for nonlinear analysis of structures.—I. (I.) Kunnath

212A. Finite Element Procedures in Applied Mechanics (4)
Lecture—4 hours. Prerequisite: Applied Science Engineering 115, or Mathematics 128A and Mathe-matics 128B (may be taken concurrently). Weighted residual and Rayleigh-Ritz techniques; variational formulation and development of discrete equa-tions using finite element approximations. Application to one- and two-dimensional problems (heat conduction).—II. (II.) Sukumar
212B. Finite Elements: Application to Linear and Non-Linear Structural Mechanics (4)
Lecture—4 hours. Prerequisite: course 212A. Application to linear and nonlinear structural mechanics problems. Linear elasticity, weak form, and finite element approximation. Incomparable mesh problems. Non-linear problems with material nonlinearity. —Ill. (III) Sukumar

213. Analysis of Structures Subjected to Dynamic Loads (4)
Lecture—4 hours. Prerequisite: courses 138 and 211. Analysis of structures subjected to earthquake, wind and blast loading, distributed, consistent and lumped mass techniques; computer implementation; nonlinear elements, failure, safety factors and time domain analysis; seismic protection of structures; numerical methods in linear and nonlinear structural dynamics. —Ill. (III) Kunnath

221. Theory of Plates and Introduction to Shells (3)
Lecture—3 hours. Prerequisite: course 201 (may be taken concurrently). Development of classical and refined plate theories. Application to isotropic, orthotropic, and composite plates. Solutions for rectangular and circular plates. Membrane theory for axisymmetric shells and bending of circular shells.

232. Advanced Topics in Concrete Structures (4)
Lecture—4 hours. Prerequisite: course 130, 135, 138 and graduate standing. Ductility of reinforced concrete; strength of two-way slabs; modified compression field theory. —I. (I) Cha

233. Advanced Design of Steel Structures (4)
Lecture—4 hours. Prerequisite: courses 130 or 131, 132. Review of Load and Resistance Factor Design (LRFD); steel plate girder design; plastic design of indeterminate structures; moment frames and bracing systems; connection design; seismic design of steel structures; vibration of flooring systems; steel-concrete composite design. —Ill. (III) Kanivade

234. Prestressed Concrete (4)
Lecture—4 hours. Prerequisite: courses 130 or 131, 135. Survey of methods and applications; prestressing materials and systems; prestress losses; flexural design; design for shear and torsion; deflection control and control and continuous beams and indeterminate structures; floor systems; partial prestressing; design of compression members; strut and tie models. Offered in alternate years. —II. Bolander

235. Cement Composites (4)
Lecture—3 hours, laboratory—3 hours. Prerequisite: Engineering 104. Applications of cement composites; materials selection and proportioning; compaction and composite properties; hydration reactions and microstructure development; mechanisms of failure; nondestructive test methods; fiber reinforcement; concrete durability; novel reinforcing materials; ferrocement; repair and retrofit technologies; applications to structural design. Offered in alternate years. —II. Bolander

236. Design of Fiber Reinforced Polymer Composite Structures (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 153 and 154 recommended. Open to graduate students only. Bridge types, behavior and construction characteristics; design philosophy, details according to Caltrans and American Association of State Highway and Transportation Officials codes, principles; seismic design and retrofit of concrete bridges; modern bridges using advanced fiber reinforced polymer composites; fieldtrip required. —II. (II) Cheng

238. Performance-Based Seismic Engineering (4)
Lecture—4 hours. Prerequisite: Courses 138 and 213. Modern seismic design; performance-based seismic design; seismic hazard; seismic demands: linear and nonlinear procedures; performance assessment; probabilistic procedure; review of FEMA-350, FEMA-356, ATC-40 and other performance-based guidelines. —Ill. (III) Kunnath

240. Water Quality (4)
Lecture—4 hours. Prerequisite: courses 141 and 142. Qualitative and quantitative aspects of water. Hydrologic cycle of quality. Hydromechanics in relation to quality of surface and groundwaters; transport and fate of waterborne pollutants. Heat budget for surface waters; predictive methods; introduction to water quality modeling. —II. (II) Schladow

241. Air Quality Modeling (4)
Lecture—4 hours. Prerequisite: Applied Science Engineering 115, course 119A, 149, 150, one from course 242 or 247, or the equivalent, graduate standing. Modeling of urban and regional air quality problems including gas-phase chemical reactions, aqueous-phase chemical reactions, phase partitioning, and numerical solution schemes. Offered in alternate years. —I. Kleeman

242. Air Quality (4)
Lecture—4 hours. Prerequisite: Engineering 105, course 141, 149 or the equivalent. Factors determining air quality for pollutants. Physical and chemical fundamentals of atmospheric transport and reaction. Introduction to dispersion modeling. Offered in alternate years. —III. (III) Klemm

243A. Water and Waste Treatment (4)
Lecture—4 hours. Prerequisite: course 148A or the equivalent. Characteristics of water and airborne wastes; treatment processes and process kinetics; treatment system design. —I. (I) Young

243B. Water and Waste Treatment (4)
Lecture—4 hours. Prerequisite: course 243A. Continuation of course 243A. Aeration, thickening, biological processes, design of biological treatment systems. —II. (II) Lange

245A. Applied Environmental Chemistry: Inorganic (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 105, Chemistry 28 or the equivalent, course 140, Chemistry 2C or 107A recommended. Chemistry of natural and polluted waters. Topics include chemical, kinetic and equilibrium principles, redox reactions, gas solution and solid-solution equilibria, thermodynamics, carbonate systems, coordination chemistry and chemical phenomena. Offered in alternate years. —III. (III) Young

245B. Applied Environmental Chemistry: Organic (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 128A, 128B, 128C, or the equivalent; Chemistry 2C or 107A recommended. Transport and transformation of organic chemicals in the environment. Topics include application of thermodynamics to predict solubility and activity coefficients, distribution of organic chemicals between the aqueous phase and air, solvent, or solid phases; chemical, photochemical and biological transformation reactions. Offered in alternate years. —III. (III) Young

246. Pilot Plant Laboratory (4)
Lecture—1 hour; discussion—1 hour; laboratory—6 hours. Prerequisite: course 243A, 243B (may be taken concurrently) or consent of instructor, graduate standing. Laboratory investigation of physical, chemical, and biological processes for water and waste-water treatment. —II. (II) Darby

247. Aerosols (4)
Lecture—4 hours. Prerequisite: Engineering 103, 103 course 119A and some particles including particle formation, modification, and removal processes. Offered in alternate years. —I. Kleeman

247L. Aerosols Laboratory (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 247. Methods and characterization of aerosols. Detailed topics may include flow rate measurement, aerosol generation, aerosol collection, ions measurement, metals measurement, and carbon measurement. May be repeated once for credit. —II. (II) Kleeman

248. Biofilm Processes (4)
Lecture—4 hours. Prerequisite: Soil Science 111 or 211 or course 243B or consent of instructor; calculus and basic cellular biology recommended. Natural and engineered biofilms, including biofilm occurrence and development, spatial structure, microbial processes, fundamental and applied research tools, biofilm biochemical uses, and detrimental effects. —III. (III) Wurtzel

249. Probabilistic Design and Optimization (4)
Lecture—4 hours. Prerequisite: courses 114 and 153 and Engineering 106, or equivalent. Design by optimization for probabilistic systems, decision theory, the value of information, probabilistic linear programming, probabilistic dynamic programming, non-linear probabilistic optimization, actions in civil engineering design, project evaluation, and risk management. Offered in alternate years. —II. Lund

250. Civil Infrastructure System Optimization and Identification (4)
Lecture—4 hours. Prerequisite: Engineering 21C, 22A, programming course; Applied Science Engineering 115 and mathematical modeling course recommended. Applied mathematics with a focus on modeling, identifying, and controlling dynamic, stochastic, and underdetermined systems. Applications in transportation networks, water resource planning, and other civil infrastructure systems. Offered in alternate years. —III. (III) Fan

251. Transportation Demand Analysis (4)
Lecture—4 hours. Prerequisite: course 114 or the equivalent. Procedures used in urban travel demand forecasting. Principles and assumptions of model components; trip generation, trip distribution, model split; new methods of estimating travel demand. Computer exercises using empirical data to calibrate models and forecast travel demand. —I. (I) Niemeier

252. Sustainable Transportation Technology and Policy (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 165. Role of technical fixes and demand management in creating a sustainable transportation system. Emphasis on transport, transit choice models, alternative fuels, electric propulsion, and IVHS. Analysis of market demand and travel behavior, environmental impacts, economics and politics. Same course as Environmental Policy 252. Offered in alternate years. —III. Sappington

253. Dynamic Programming and Multistage Decision Processes (4)
Lecture—4 hours. Prerequisite: Mathematics 21C, 22A, programming course; Applied Science Engineering 115 recommended. Operations research. Optimization techniques with a focus on dynamic programming in treating deterministic, stochastic, and adaptive multistage decision processes. Brief review of linear programming and non-linear programming. Applications in transportation networks and other civil infrastructure systems. —III. (III) Fan

254. Discrete Choice Analysis of Travel Demand (4)
Lecture—4 hours. Prerequisite: course 114. Behavioral and statistical principles underlying the formulation and estimation of discrete choice models. Practical application of discrete choice models. Applications to characterization of choice behavior, hypothesis testing, and forecasting. Emphasis on computer exercises using real-world data sets. —III. (III) Mohlin

256. Urban Traffic Management and Control (4)
Lecture—4 hours. Prerequisite: course 114. Basic concepts, models, and methods related to the branch of traffic science that deals with the move-
257. Flow in Transportation Networks (4) Lecture—4 hours. Prerequisite: course 153, 161 or 256 recommended. Elements of graph theory, a survey of pertinent optimization techniques, extremal principles in network flow problems, deterministic equilibrium assignment, stochastic equilibrium assignment, extensions of equilibrium assignments and dynamic transportation network assignment. —(III.) Schladowsky

258. Transportation Planning in Developing Countries (3) Lecture—3 hours. Prerequisite: course 160 or consent of instructor. Investigation of the role that transportation investments and policies play in the development of regions and countries. Emphasis is on identifying appropriate technologies, policies, and planning methods for designing transportation systems in regions of differing socioeconomic, geographic, and institutional settings. Offered in alternate years. —(III.) Sperling

259. Asphalt and Asphalt Mixes (4) Lecture—4 hours. Prerequisite: course 179 or consent of instructor. Asphalts and asphalt mix types and their use in civil engineering structures, with primary emphasis on pavements, asphalt, aggregate properties and effects on mix properties. Design, construction, preventive maintenance, rehabilitation and research. Offered in alternate years. —(II.) Harvey

260. Sediment Transport (4) Lecture—4 hours. Prerequisite: course 141 or equivalent. Sediment transport in hydrologic systems. Process-oriented course which will emphasize how sediment moves and the physical processes that affect sediment transport. Field trip. Offered in alternate years. —I. Schoellhorn

264A. Transport, Mixing and Water Quality in Rivers and Lakes (4) Lecture—4 hours. Prerequisite: course 141 and 240. Principal causes of mixing and transport in rivers, lakes and reservoirs, and their impacts on water quality. Case studies of specific lakes and rivers. Offered in alternate years. —III. Schladow

264B. Transport, Mixing and Water Quality in Estuaries and Wetlands (4) Lecture—4 hours. Prerequisite: courses 141 and 240. Principal causes of mixing and transport in estuaries and wetlands, and their impacts on water quality. Topics include advection/diffusion; tides; transverse mixing, longitudinal dispersion; sediment transport; nutrient cycling; computer modeling of estuaries. Case studies of specific systems. Offered in alternate years. —III. Schladow


266. Applied Stochastic Methods in Engineering (4) Lecture—4 hours. Prerequisite: course 114 or Mathematics 131 or Statistics 130A or 131A; Mathematics 118A (may be taken concurrently). Stochastic processes classification; Gaussian random fields; stochastic calculus in Euclidean space; Ito and Stratonovich stochastic differential equations; Kolmogorov equation; stochastic differential equations with random coefficients. Offered in alternate years. —I. Kavvas

267. Water Resources Management (3) Lecture—3 hours. Prerequisite: courses 114, 141 and 142; course 153 recommended. Engineering, institutional, economic, and social basis for managing local and regional resources. Examples in the context of California’s water development and management. Uses of computer modeling to improve water management. —I. (II.) Lund

268. Infrastructure Economics (3) Lecture—3 hours. Prerequisite: Economics 1A, Engineering 1A. Emphasis on the role of economics applied to infrastructure engineering planning, operations, maintenance, and management problems; microeconomic and macroeconomic theories; benefit-cost analysis; effects of uncertainty; optimization economics; non-classical economics; public finance. Offered in alternate years. —(II.) Lund

269. Transportation-Air Quality: Theory and Practice (4) Lecture—3 hours laboratory—3 hours. Prerequisite: course 149 or the equivalent. Health and regulatory aspects of airborne pollutants. Principles of modeling vehicle emissions. Conformity issues and the regulatory framework. Regional and micro-scale modeling. Offered in alternate years. —(III.) Niemeier

270. Advanced Water Resources Management (3) Lecture—3 hours. Prerequisite: courses 153 and 267 or their equivalent. Theoretical and practical aspects of papers related to planning theory, system maintenance, regionalization, multi-objective methods, risk analysis, institutional issues, pricing model application, economic analysis, and other topics. Offered in alternate years. —III. Lund


272C. Multiphase Reactive Transport (4) Lecture—4 hours. Prerequisite: courses 142, 144, 148A. Multicomponent reactive transport including multiple phases. Adveective/dispersive transport, chemical equilibria, and mass transport kinematics. Natural chemical/microbiological processes including sorption, complexation, biodgradation, and diffusive mass transport. Eulerian and Lagrangian averaging methods. Applications to contaminant remediation problems in river and subsurface hydrology. Offered in alternate years. —(III.) Ginn

273. Water Resource Systems Engineering (3) Lecture—3 hours. Prerequisite: courses 114 and 153 or the equivalent. Planning, design, and management of water resource systems. Application of deterministic and stochastic optimization techniques. Water allocation, capacity expansion, and design and operation of reservoir systems. Surface water and groundwater management. Offered in alternate years. —(II.) Marra


277. Computational River Mechanics I (4) Lecture—4 hours. Prerequisite: Applied Science Engineering 115, course 114 (both may be taken concurrently). Unsteady open channel flows, computation of water surface profiles, shallow water equations, St. Venant equations, methods of characteristics, finite difference methods, stability and accuracy of explicit and implicit schemes, flood routing in simple and compound channels, advection of plumes. Not open for credit to students who have completed course 277. —(II.) Yoonis

278. Computational River Mechanics II (4) Lecture—4 hours. Prerequisite: course 277A. Open channel flows, physical aspects of river mechanics, formulation of depth-averaged equations, boundary conditions, coordinate transformation and grid generation, finite-difference solution techniques, applications to two-dimensional momentum and pollutant transport in rivers. Offered in alternate years. —(III.) Yoonis

277C. Turbulence and Mixing Processes (4) Lecture—4 hours. Prerequisite: graduate standing. Nature of turbulent flows, conservation equations, momentum, heat and mass transport in free and wall-bounded flows. Turbulence, roughness effects, turbulence modeling and simulation. Offered in alternate years. —(III.) Yoonis


280A. Nonlinear Finite Elements for Elastic-Plastic Problems (4) Lecture—4 hours. Prerequisite: consent of instructor. State of the art finite element methods and tools for elasplastic problems, including computational techniques based on the finite element method and the theory of elastoplasticity. Offered in alternate years. —(III.) Jeremic

280B. Nonlinear Dynamic Finite Elements (4) Lecture—4 hours. Prerequisite: consent of instructor. State of the art computational methods and tools for analyzing linear and nonlinear dynamics problems. Offered in alternate years. —III. Jeremic


281B. Advanced Soil Mechanics (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: course 281A. Site investigation methods: CPT, SPT, pressuremeter, vane, seismic investigation, electrical properties. Slope stability, including seepage pressures and earthquake effects. Slope stabilization and reinforcement methods. Centrifuge modeling. —II. (I.) Delang

282. Pavement Design and Rehabilitation (4) Lecture—4 hours. Prerequisite: course 179 or consent of instructor. Advanced pavement design and structural/functional condition evaluation for concrete and asphalt pavements. Advanced design and rehabilitation facilities: new facilities, rehabilitation, reconstruction. Mechanistic-empirical procedures, material characteristics, climate and traffic characterization. Use of current design methods: recent developments and research. Offered in alternate years. —II. Harvey
283. Physico-Chemical Influences and In Situ Evaluation of Soil Behavior (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 171. Analysis of the mechanical behavior of soils from consideration of clay mineralogy, colloidal phenomena, ion-exchange. Soil-water-electrolyte characteristics and considerations. Laboratory includes methods of characterization of soils, quantification of soil structure, and rotating cylinder tests to evaluate soil erosion. —I. (I.) Kutter

284. Theoretical Geomechanics (4)
Lecture—4 hours. Prerequisite: course 171. Elasticity, plasticity, micromechanics, coupled behavior and large deformations for geomechanics. Prediction of stress-strain-volume change behavior of geomaterials. Monotonic and cyclic loading, anisotropy, bifurcation of deformation. —II. (II.) Kutter

286. Advanced Foundation Design (4)
Lecture—4 hours. Prerequisite: course 273. Design and analysis of pile and pier foundations, including seismic effects; deep excavation systems, tie-back, nailing, and anchor systems; caisson loads, dams on buried conduits; ground modification techniques; and other related topics. —III. (III.) Delang

287. Geotechnical Earthquake Engineering (4)
Lecture—4 hours. Prerequisite: courses 138 and 281A. Characteristics and estimation of earthquake ground motions; wave propagation and local site response; liquefaction potential and remediation; residual strength and stability considerations; ground deformations; dynamic soil-structure interaction. —III. (III.)

288. Earth and Rockfill Dams (4)
Lecture—4 hours. Prerequisite: courses 281A and 281B (may be taken concurrently). Site selection; design considerations; layout; seismic effects including considerations of fault movements; construction; environmental considerations, instrumentation; maintenance remediation and retrofit of existing dams. Offered in alternate years. —III. (III.)

289A-I. Selected Topics in Civil Engineering
Lecture, laboratory, or combination. Prerequisite: consent of instructor. Directed group study of special topics with separate sections in (A) Environmental Engineering; (B) Hydraulics and Hydrologic Engineering; (C) Engineering Planning; (D) Geotechnical Engineering; (E) Structural Engineering; (F) Structural Mechanics; (G) Transportation Engineering; (H) Transportation Planning; (I) Water Resources Engineering; (J) Water Resources Planning. May be repeated for credit. —I, II, III, I, II, III

290. Seminar (1)
Seminar—1 hour. Discussion of current graduate research, and guest lectures on recent advances. Oral presentation of student individual study. Course required of graduate degree candidates. (S/U grading only.)—I, II, III, I, II, III

290C. Graduate Research Group Conference
Discussion—1 hour. Research problems, progress, and techniques in civil engineering. May be repeated for credit. (S/U grading only.)—I, II, III, I, II, III

296. Topics in Water and Environmental Engineering
Lecture—2 hours. Seminar presented by visiting lecturers, UC Davis faculty and, graduate students. May be repeated for credit. (S/U grading only.)—I, II, III, I, II, III

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only)

299. Research (1-12)
(S/U grading only)

Professional Course

290. The Teaching of Civil Engineering (1)
Discussion—1 hour. Prerequisite: meet qualifications for teaching assistant and/or associate-in in Civil Engineering. Participation as teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, writing assignments, use of laboratory equipment, and grading laboratory reports. May be repeated for total of 9 units. (S/U grading only.)—I, II, III, I, II, III

Engineering: Computer Science

(College of Engineering)
Prasant Mohapatra, Ph.D., Chairperson of the Department

Department Office. 2063 Kemper Hall (530) 752-7004; http://www.cs.ucdavis.edu

Faculty
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Matthew Bishop, Ph.D., Professor
Hao Chen, Ph.D., Assistant Professor
Ian Davidson, Ph.D., Assistant Professor
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Matthew K. Farrens, Ph.D., Professor
Vladimir Filkov, Ph.D., Assistant Professor
Matthew Franklin, Ph.D., Professor
Michael Gertz, Ph.D., Associate Professor
Dipak Ghosal, Ph.D., Professor
Daniel Gusfield, Ph.D., Professor
Benard Hamann, Ph.D., Professor
Kenneth I. Joy, Ph.D., Professor
Patrice Koehl, Ph.D., Associate Professor
Academic Senate Distinguished Teaching Award
Patrice Koehl, Ph.D., Associate Professor
Karl Levitt, Ph.D., Professor
Xin Liu, Ph.D., Assistant Professor
Bertram Ludaescher, Ph.D., Associate Professor
Kwan-Liu Ma, Ph.D., Professor
Charles U. Martel, Ph.D., Professor
Norman S. Minton, Ph.D., Professor
Nelson Max, Ph.D., Professor
Prasant Mohapatra, Ph.D., Professor
Biswanath Mukherjee, Ph.D., Professor
Distinguished Graduate Mentoring Award
Michael Neff, Ph.D., Assistant Professor
Ronald A. Olsson, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Raju Pandey, Ph.D., Associate Professor
Phillip Rogaway, Ph.D., Professor
Zhendong Su, Ph.D., Assistant Professor
S. Felix Wu, Ph.D., Associate Professor

Emeriti Faculty
Lawrence T. Kou, Ph.D., Professor Emeritus
Peter Linz, Ph.D., Professor Emeritus
Manfred G. Ruschitzka, Ph.D., Professor Emeritus
Richard F. Walters, Ph.D., Professor Emeritus
Academic Senate Distinguished Teaching Award

Affiliated Faculty
Sean Davis, M.S., Lecturer
The Computer Science and Engineering Major Program

The Department of Computer Science administers two curricula: Computer Science and Engineering in the College of Engineering, and Computer Science in the College of Letters and Science. It also administers the B.S. in Computer Science. For information on the Computer Science curriculum and minor, see Computer Science, on page 196.

The field of Computer Science and Engineering encompasses the organization, design, analysis, theory, programming, and application of digital computers and computing systems. It develops versatile engineers with backgrounds spanning a broad computer hardware/software spectrum.

The Computer Science and Engineering major provides students with a broad background in mathematics, physics, chemistry, and electronic circuits and systems, all supporting the computer hardware and computer software courses that constitute the focus of the curriculum.

A feature of this curriculum is the hardware/software interaction in today's computer systems design, a theme reflected in the balance between computer hardware and computer software aspects in the course requirements. The knowledge of hardware/software interaction is also reflected in the orientation of the courses themselves. The Computer Science and Engineering major also requires additional general education electives, helping to develop the verbal skills and intellectual breadth demanded by today's employers.

The Computer Science and Engineering program prepares students to do further work in hardware, software, or electronics, either in industry or postgraduate study.

Mission. The University of California, Davis, is first and foremost, an institution of learning and teaching, committed to serving the needs of society. The Department of Computer Science contributes to the mission of the University. In its undergraduate and graduate education programs we seek to educate students in the fundamental principles of computer science and the skills needed to solve complex technological problems in modern society, the breadth of course work provides a framework for life-long learning and an appreciation for multidisciplinary activities. Second, through its research programs, the department contributes to the development and progress of computer science, and software and information technology, to provide innovative, creative solutions for societal needs. Finally, the department disseminates its research—to enhance collaborations with the public sector, further interdisciplinary interests that benefit society, and educate the public—through publications, public service, and professional activities.

Department Objectives. Teaching—To provide undergraduate students with a thorough understanding of the key principles and practices of computing, which include a strong theoretical background in mathematics, basic science, and computer fundamentals and an ability to apply this knowledge to practical problems. To provide students with sufficient breadth to work creatively and productively in multidisciplinary work teams in the breadth, in its broadest context, will form the basis for an appreciation and interest in life-long learning. To provide students with the ability to design and conduct experiments, and to collect and analyze data in core, as well as more specialized, areas of computer science. To provide students with breadth in the humanities and social sciences so they learn to communicate effectively, understand professional and ethical issues in society, and appreciate the interrelatedness of computing and society. To educate graduate students to be our next generation of teachers or leaders in industry, or to pursue meaningful, creative research in industry, government, or academia. Research—To develop and maintain research programs that produce fundamental scientific advances, as well as useful technological innovations, while simultaneously training the next generation of researchers and leaders in the field of computer science.

Objectives. To train graduates to practice computer science and engineering in a broad range of industries; to prepare interested graduates for graduate education or other professional degrees; to give students an understanding of computer hardware and software systems, and how the two interact in both theoretical and experimental approaches to problem solving; to ready graduates for lifelong learning; and to encourage graduates to contribute to their profession and society.

Integrated Degree Program. An integrated B.S./M.S. plan in Computer Science allows Davis students in Computer Science, Computer Science Engineering, or Computer Engineering to complete a master's degree in Computer Science in one year. Formal course work for the master's degree is reduced by 6 units for students. Students can begin graduate studies immediately after completing their
250 Engineering: Computer Science

B.S. degree. More information is available in the graduate section of the College of Engineering Bulletin, or at http://www.cs.ucdavis.edu/graduate/b-s-ms.html.

Computer Science and Engineering Program

The Computer Science and Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; (410) 347-7700.

Lower Division Required Courses

UNITS
Mathematics 21A 21B 21C 21D 16
Mathematics 22A 22B 22C 22D 6
Physics 9A-96 9C-9D 19
Chemistry 2A 2B 12
Engineering 20, 30, 40, 60 16
Computer Science Engineering 50 or
Electrical and Computer Engineering 70 4
Electrical Engineering 17
English 3 or University Writing Program 1, or
Comparative Literature 1, 2, 3, or 4, or
Native American Studies 3 4
Communication 1 4
General Education electives 12

Minimum Lower Division Units .... 90

Upper Division Requirements:

Upper Division Required Courses

Computer Science Engineering 3
Electrical and Computer Engineering 100 and 180A 10
Mathematics 135A Civil Engineering
114, or Statistics 131A 4
Computer Science Engineering 120A or
122A 12
Computer Science Engineering 122A, 154A, 154B, and Electrical and Computer Engineering 172 16
Computer Science Engineering 140A, 150, and 160 16
Computer electives—a minimum of 4 courses
and a minimum of 15 units chosen from
Computer Science Engineering 120B, 122B, 130, 140B, 142, 145, 152B, 152C, 153, 156, 158, 163, 165A, 165B, 170, 175, 177, 178; one course (minimum 3 units from one single course) from approved
192 or 199 or Electrical and Computer Engineering 194; Electrical and Computer Engineering 180B 13
General Education electives 21
Unrestricted electives 5

Minimum Upper Division Units .... 90

Minimum Units Required for Major..... 180

† Completion of both Computer Science Engineering 120 and 122A will satisfy the
computer science theory requirement and a
computer elective requirement.

Courses in Engineering: Computer Science (ECS)

Lower Division Courses

10. Basic Concepts of Computing (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: two years of high school algebra. Introduction to
categories of computing. Methods and algorithms for
solving problems by use of a digital computer. Not
open for credit to students who have completed
Amenta, Ludaeschter, Gertz

15. Introduction to Computers (4)
Lecture—3 hours; laboratory—3 hours. Computer
uses in modern society. Emphasis on uses in non-sci-
cific disciplines. Includes word processing, spread-
sheets, web-page creation, elementary
programming, basic computer organization, the
uses of computers in modern society. Not intended
for computer science majors. Not open for
credit to students who have completed course 30.

20. Discrete Mathematics for Computer
Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
Mathematics 21A. Discrete structures and applica-
tions in computer science. Prerequisite: Mathemat-
cal methods in computer science, particularly induc-
tion. Introduction to propositional logic, logic circuit
design, combinatorics, recursion and solution of
recurrence relations, analysis of algorithms, graph
theory and trees, finite state machines. Not open for
credit to students who have completed course 100—I, II, III, III (I, II, III, III). Bai, Gusfield, Koehl, Max, Rogaway.

30. Introduction to Programming and
Problem Solving (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
Mathematics 16A or 21A (may be taken concur-
rently); prior experience with basic programming
concepts strongly recommended. Introduction to com-
puter languages and algorithm design, and debug-
ging. Elements of good programming style;
Programming in high level languages. Use of basic UNIX

40. Introduction to Software Development and
Object-Oriented Programming (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 30 or the equivalent with a grade of C- or
better. Elements of program design, style, documen-
tation, efficiency. Methods for debugging and verifi-
cation. Operating system tools. Principles and use of object-oriented programming;
Basic data structures and their use—I, II, III, III (I, II, III).

50. Computer Organization and Machine-
Dependent Programming (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 40. Comparative study of different hardware
architectures via programming in the assembly lan-
guages of various machines. Role of system software
in producing an abstract machine. Only one unit of
credit allowed for students who have taken
Farrens, Matloff

60. Data Structures and Programming (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
courses 20, 40 [C++ and UNIX]; grade of C- or
better in each course. Design and analysis of data
structures for a variety of applications. Trees, heaps,
searching, sorting, hashing, graphs. Extensive pro-
gramming. Not open for credit to students who have
Chen, Joy, Rogaway

89A-L. Special Topics in Computer Science (1-5)
Lecture, laboratory or combination. Prerequisite:
consent of instructor. Special topics in [A] Computer
Science Theory; [B] Architecture; [C] Programming
Languages and Compilers; [D] Operating Systems;
[E] Software Engineering; [F] Databases; [G] Artifi-
cial Intelligence; [H] Computer Graphics; [I] Net-
works; [J] Computer-Aided Design; [K] Scientific
Computing; [L] Computer Science. May be repeated for
credit when the topic is different—I, II, III, III (I, II, III).

92. Internship in Computer Science (1-5)
Internship. Prerequisite: lower division standing;
project approval prior to period of internship. Super-
vised work experience in computer science. May be
repeated for credit. (P/NP grading only)

98. Directed Group Study (1-5)
(P/NP grading only)

99. Special Study for Lower Division
Students (1-4)
(P/NP grading only)

Upper Division Courses

120. Introduction to the Theory of
Computation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 20; Mathematics 108 recommended. Funda-
mental ideas in the theory of computation, including
formal languages, computability and complexity.

122A. Algorithm Design and Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
courses 20, 60. Complexity of algorithms, bounds on
complexity, algorithms for searching, sorting, pat-
tern matching, graph matching and satisfiability
problems, randomized algorithms, introduction to

122B. Algorithm Design and Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 122A. Theory and practice of hard prob-
lems, and problems with complex algorithm solu-
tions. NP-completeness, approximation algorithms,
randomized algorithms, dynamic programming and
branch and bound. Students do theoretical analysis,
implementation and practical evaluations. Examples from
parallel, string, graph, and geometric algo-
rithms—Li.

124. Theory and Practice of Bioinformatics (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite:
course 10 or 30 or Engineering 6; Statistics 12 or
13 or 120 or 100 or 131A or 131B; Biological Science 1A or Molecular and Cellular
Biolog 10. Fundamental biological, mathematical and
algorithmic models underlying bioinformatics; sequence
analysis, database search; gene prediction,
molecule structure comparison and prediction,
phlogenetic trees, high throughput biology, massive
data sets; applications in molecular biology and
computational biology; introduction to common bioinforma-
tics tools—I, II, III (I, II, III). Fikov, Gusfield

129. Computational Structural
Bioinformatics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 6, 10 or 100; Statistics 12 or 120 or 131B or
132 or 100 or 131A or 131B; Biological Science 1A or
Molecular and Cellular Biology 10. Fundamental biological, chemical and
algorithmic models underlying computational structural biology;
protein, gene and molecule structure; compari-
son of protein structures; protein structure predic-
tion; molecular simulations; databases and online
services in computational structural biology.—I. (I, II, III)

130. Scientific Computation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 30 or Engineering 6; Mathematics 22A.
Matrix-vector approach using MATLAB for
floating point algebra, numerical linear
algebra, numerical integration, matrix computations,
nonlin-
ear equations and optimization. Parallel computing for
matrix multiplication and the Cholesky factoriza-
tion.—I, II, III (I, II, III). Bai

132. Probability and Statistical Modeling
for Computer Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
courses 50 or Engineering Electrical and Computer
Engineering 70—I. (I, II) Kogcr, Go 23, Mathew.

140A. Programming Languages (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 50 or Electrical Computer Engineering 70;
courses 140A. Syntax, semantics of
programming languages. Introduction to programming language fea-
tures including variables, data types, data
abstraction, object-orientation, scope, parameter
dependencies, exception handling. Comparative study of
several high level programming languages—I, II, III (I, II, III, III). Olsson, Pandey, Su

140B. Programming Languages (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 140A. Continuation of programming lan-
guage principles. Further study of programming lan-
guage paradigms such as functional and logic;
additional programming language paradigms such as
concurrent (parallel), dataflow, and constraint;
key implementation issues for those paradigms; and program-ning language semantics.—I. (I.) Olsson, Pandey

142. Compilers (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 20, 140A; course 120 recommended. Principles and techniques of lexical analysis, parsing, semantic analysis and code generation. Implementation of compilers. —II. (II.) Pandey, Su

145. Scripting Languages And Their Applications (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: programming skill at the level of course 60. Goals and philosophy of scripting languages, with Perl and Python as prime examples. Applications include networking, threaded programming, and graphical user interfaces (GUI’s). Offered in alternate years. —III. Matloff

150. Operating Systems and System Programming (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40; course 154A or Electrical and Computer Engineering 70; course 154B or Electrical and Computer Engineering 170; course 150 or Electrical and Computer Engineer-154B. Computer Architecture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 154A or Electrical and Computer Engineer-155. Computer Science for Non-Majors (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: programming skill at the level of course 30; Mathe-156. Discrete-Event Simulation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: programming skill at the level of course 60; calculus-based course in probability theory, such as Statistics 120A or 135A, or Statistics 135A or 135B. Engineering Civil and Environmental 114. Design of discrete-event simulation software. Random number generators. Event, process and activity-scanning approaches. Deterministic and stochastic algorithms for event lists. Statistical output analysis. Applications to com-puter systems and networks; reliable systems; trans-portation; business management. —I. (I.) Matloff

157. Computer Networks for Non-Majors (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 152A, 150. TCP/IP protocol suite, network layer protocols, transport layer protocols, transport layer interfaces, sockets, UNIX network program-ming, computer networking applications, remote procedure calls and network management. —I, II, III, (I, II, III) Mukherjee, Ghosal, Matloff, Mahapatra, Mukherjee

158. Programming on Parallel Architectures (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150; course 154B recommended. Techniques for software development using the shared-memory and message-passing paradigms, on parallel archi-tectures and multiprocessors. Performance, memory, and synchronization. —III. (III.) Ghosal, Liu, Matloff, Mahapatra, Mukherjee

159. Design Projects in Communication Networks (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 152A or Electrical and Computer Engineer-ing 173A. Advanced topics and design projects in communication networks. Example topics include wireless networks, multimedia networking, network design and management, traffic analysis and model-ling, network simulations and performance analysis. Offered in alternate years. (Same course as Electri-cal and Computer Engineering 173B.) —I, II, III, (I, II, III) Chauh, Liu, van der Schaar, Mukherjee

153. Computer Security (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 150, 155. Principles, mechanisms, and implementa-tion of computer security and data protec-tion. Policy, encryption and authentication, access control, and integrity models and mecha-nisms. Network security systems; program-ming and vulnerabilities analysis. Study of an existing operating system. Not open for credit to stu-dents who have completed course 155. —II, III, (II, III) Bishop, Chen

154A. Computer Architecture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 50 or Electrical and Computer Engineering 70; and course 110. Introduction to digital design. Interfacing of devices for I/O, memory and memory management. Input/output programming, via wait loops, hardware interrupts and calls to operating system services. Hardware support for operating sys-tems software. Only one unit of credit allowed for students who have taken Electrical and Computer Engineering 170. —II, (II) Woln, III, (II, III) Farrens

165B. Database Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 154A. Advanced database systems: object-oriented and object-relational database systems; dis tributed and multidatabase systems; advanced data base applications: Web-based database access, data warehouses. —III. (III) Chen, Ladeascher

166. Scientific Data Management (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: programming skills at course level 40; Mathematics 21C. Relational databases, SQL, non-standard data bases, XML, scientific workflows, interoperability, data analysis tools, metadata. —I. (I.) Gertz, Ludeascher

170. Introduction to Artificial Intelligence (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 140A. Design and implementation of intelli-gent computer systems. Knowledge representation and organization. Memory and inference. Problem solving. Natural language processing. —II. (II.) Davidson, Levitt

175. Computer Graphics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 60; Mathematics 22A. Principles of computer graphics. Current graphics-related applications to enve-ronmental operations in two-and three-dimensional space, transformational geometry, clipping, graphics system design, standard graphics systems, individual proj-ects. —I, II, III, (I, II, III) Amenta, Levitt, Chen, Hassen, Joy, Mani, Max

177. Introduction to Visualization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 175. Graphics techniques for generating images of various types of measured or computer-simulated data. Typical applications of these graph-ics techniques include study of air flows around car bodies, medical data, and molecular structures. —II. (II) Joy, Hamann, Ma

178. Introduction to Geometric Modeling (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 175. Interactive graphics techniques for defining and manipulating geometrical shapes used in computer animation, applications for their graph-ics system or for a small group experience. —I. (I,) Joy, Hamman, Max

188. Ethics and the Information Age (3)

189A-L. Special Topics in Computer Science (1-5)
Lecture, laboratory or combination. Prerequisite: consent of instructor. Special topics in (A) Computer Science Theory; (B) Architecture; (C) Programming Languages and Compilers; (D) Operating Systems; (E) Software Engineering; (F) Data Bases; (G) Artifi-cial Intelligence; (H) Computer Graphics; (I) Net-works; (J) Computer-Aided Design; (K) Scientific Computing; (L) Computer Science. May be repeated for credit when topic differs. —I, II, III, (II, III, III)

190C. Research Group Conferences in Computer Science (1)
Discussion—1 hour. Prerequisite: upper division standing in Computer Science and Engineering; con-sent of instructor. Research group conferences. May be repeated for credit. (P/NP grading only.) —I, II, III, (II, III, III)

190X. Senior Seminar (2)
Seminar—2 hours. Prerequisite: senior standing. Examination of a special topic in a small group set-ting.

192. Internship in Computer Science (1-5)
Internship. Prerequisite: completion of a minimum of 84 units; project approval prior to period of intern-ship. Supervised work experience in computer sci-ence. May be repeated for credit. (P/NP grading only.)
224. String Algorithms and Applications in Computational Biology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 222A. Algorithms that operate on strings. Pattern matching, sets of patterns, regular expression pattern matching, suffix trees and applications, inexact string matching, cryptograpic sequence alignment, applications to DNA sequencing and protein database searching. Offered in alternate years.—I. Ill. Gufeld, Filkov

225. Graph Theory (3)
Lecture—3 hours. Prerequisite: graduate standing in electrical engineering or computer science or consent of instructor. Fundamental concepts. Vector spaces and graphs. Planar graphs: Whitney’s and Kuratowski’s theorems; planar graphs, connectedness, and up-and-down orderings. Applications to computer graphics, concentrating on problems in three-dimensions. Offered in alternate years.—III. Franklin

226. Computational Geometry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 175, 222A. Mathematics of unstructured data. Algorithmic topics such as Voronoi diagrams, octrees, and arrangements. Applications in computer graphics, concentrating on problems in three-dimensions. Offered in alternate years.—III. Amenta, Max

227. Modern Cryptography (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 220 or 222A. Modern cryptography as a discipline emphasizing formal definitions and proofs of security. One-way functions, pseudorandomness, encryption, digital signatures, zero-knowledge, secure protocols.—II. (II.) Rogaway

228. Cryptography for E-Commerce (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 222A. Cryptographic primitives and protocols of importance to e-commerce, present and future, including content distribution mechanisms, payment mechanisms, pricing mechanisms, anonymity and privacy mechanisms, fair exchange mechanisms. Offered in alternate years.—II. Franklin

229. Advanced Computational Structural Bioinformatics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 120, 122A. Time and space complexity classes. Reductions, completeness, and the role of randomness. Logic and undecidability.—III. Rogaway

222A. Design and Analysis of Algorithms (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 222A. Statistics 131A recommended. Techniques for designing efficient algorithms, analyzing their complexity and applying these algorithms to a broad range of applications. Methods for recognizing and dealing with difficult problems.—I., II., (II.) Amenta, Franklin, Gufeldt, Mantel, Rogaway

222B. Advanced Design and Analysis of Algorithms (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 222A. Statistics 131A recommended. Techniques for designing efficient algorithms, analyzing their complexity and applying these algorithms to a broad range of applications. Methods for recognizing and dealing with difficult problems.—I., II., (II.) Amenta, Franklin, Gufeldt, Mantel, Rogaway

230. Applied Numerical Linear Algebra (4)
Laboratory/discussion—3 hours; discussion—1 hour. Prerequisite: course 130 or Engineering Applied Science 167. Numerical linear algebra (NLA) with emphasis on applications in engineered systems; matrix factorizations; perturbation and rounding error analysis of fundamental NLA algorithms. Offered in alternate years.—(I.) Bai

231. Large-Scale Scientific Computation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 130. Algorithms and techniques for large-scale scientific computing. Design and analysis of algorithms for high performance computing, iterative methods, discrete approximation, fast Fourier transform, Poisson solvers, particle methods, spectral graph partitioning and its applications. Offered in alternate years.—II. Bai

234. Computational Functional Genomics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 124, graduate level course in Computer Science or Life Sciences. Bioinformatics methods for analysis and inference of functional relationships among genes using large-scale genomic data, including methods for integration of gene expression, promoter sequence, TF-DNA binding and other data, and approaches in modeling of biological networks.—II. (II.) Filkov

235A. Computer and Information Security (4)
Lecture—3 hours; project. Prerequisite: course 150; course 152A recommended. Modern topics in computer security, including: protection, access control, operating systems security, network security, applied cryptography, cryptographically secure programming practices, safe languages, mobile code, malware, privacy and anonymity, and case studies from real-world systems. Not open for credit to students who have taken course 255.—(I.) Chen

235B. Foundations of Computer and Information Security (4)
Lecture—3 hours; project. Prerequisite: course 235A; courses 120, 150 recommended. Theoretical foundations of methods used to protect data and computer and communication systems. Access control matrix and undecidability of security; policies; Bell-LaPadula, Biba, Chinese Wall models, non-interference and non-deducibility; information flow and the confinement problem. Not open for credit to students who have taken course 235.—II. (II.) Bishop

236. Computer Security: Intrusion Detection Based Approach (4)
Lecture—3 hours; discussion—1 hour. Prerequisites: courses 140A, 142. Advanced topics in programming languages, including formal syntax and semantics, the relation between formal semantics and verification, an introduction to the lambda calculus. Additional topics will include language design principles, alternative programming languages, in-depth semantic theory and models of language implementation.—II. (II.) Pandey

240. Programming Languages (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 240. Lexical analysis, parsing, storage management, symbol table design, semantic analysis and code generation. LR, LALR grammars. Compiler-compilers.—III. (III.) Pandey

243. Code Generation and Optimization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 201A or Engineering Electrical and Computer 270. Compiler optimizations for performance, code size and power reduction. Topics include control- and data-flow analysis, redundancy elimination, loop and cache optimizations, register allocation, local and global instruction scheduling, and modulo scheduling.—II. (II.) Wilken

244. Principles of Concurrent Programming (4)
Lecture—3 hours; laboratory—3 hours. Prerequisites: courses 20, 150. Fundamental concepts and applications of concurrent programs; concurrent program verification and derivation; synchronization mechanisms in programming languages; distributed programming techniques; case studies of languages.—I., (I.) Olsson, Pandey, Su

247. Concurrent Programming Languages (4)
Lecture—3 hours; laboratory—3 hours. Prerequisites: courses 140A, 150. Language design parameters. Models of parallel machines. Load balancing. Scalability, Portability. Efficiency measures. Design and implementation techniques for several classes of concurrent programming languages (such as object-oriented, functional, logic, and constraint programming languages).—I. (I.) Pandey, Su

251. Operating Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150. Models, design, implementation, performance evaluation in operating systems. Algorithms, internal architectures for single processor OS and
256. Distributed Database Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 152B. Concepts of distributed database sys-
tems and architectures, distributed database design, distributed query processing and optimization, trans-
action management and concurrency control, hetero-
geneous and autonomous database systems. —III. (III) Geritz, Ludaescher

266. Spatial Databases (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 165A. Concepts, models, and architec-
tures for spatial databases, querying, data integ-
ity, query processing, spatio-temporal data management, mov-
ing objects, spatial data mining. Offered in alternate years. —(II) Geritz, Ludaescher

267. Wide-Area Distributed Information Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 152B or 165A. Wide-area distributed infor-
systems, data broadcast, multicast, publish/sub-
scribe, service differentiation, information retrieval, Web caching. Offered in alternate years. —III. Askoy

268. Scientific Data And Workflow Management (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 165A. Scientific data integration, metadata, knowledge representation, ontologies, scientific workflow design and management. Offered in alter-
ate years. —II. Mukherjee

270. Artificial Intelligence (3)
Lecture—3 hours. Prerequisite: courses 140A, 172. Concepts and techniques underlying the design and imple-
mentation of models of human performance on intelli-
gence tasks, and the study of knowledge rep-
resentation models, including belief networks and con-
nectionist models. —III. (III) Hamann, Joy, Max

271. Machine Learning and Discovery (4)
Lecture—3 hours; project—1 hour. Prerequisite: course 170. Artificial intelligence techniques for know-
ledge acquisition by computers. Fundamental prob-
lem in machine learning and discovery. Sys-
tems that learn from examples, analogies, and
solved problems. Systems that discover numerical
laws and qualitative relationships. Projects center-
ing on implementation and evaluation. —III. Levitt, Vemuri

272. Information Visualization (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 163 or 175 recommended. Advanced topics in
information visualization. Effective display methods, color design and selection, interac-
tion and models and techniques, focus-context tech-
niques, distortion methods, large graph visualization
systems, visualization and data mining, and evalua-
tion methods. —II. (II) Ma

273. Applied Vision Computing (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. Visual computing paradigms, current visualization technologies, principles of 3D graphics, user inter-
face design, and exploratory visualization. Offered in alternate years. —I. Hamann, Joy, Ma, Max

274. Automated Deduction (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 125 or Philosophy 112 or familiarity with
first-order logic; knowledge of an iterative and func-
tional programming language. Methods of prov-
ing correctness of programs with respect to formal
specifications, with attention to those suited for
empirical automated deduction. Logic background,
symbolic execution, techniques suited to iterative
programming, methods from denotational semantics, termination, dynamic logic and proofs of concurrent
programs. —I. (I) Levitt

262. Formal Specification (3)
Lecture—3 hours. Prerequisite: course 261. Formal
specification of modules, and its relationship to top-
down programming and verification.
Abstract data types; together with methods for spec-
ifying them. Implementations and proofs of implemen-
tation. Using specifications to reason about
programs. Parameterized types. Constructing good
formal specifications. Offered in alternate years. —II. Levitt

275A. Advanced Computer Graphics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 175 or 177 or 178. Advanced topics in com-
puter graphics. Hidden surface models, rendering of
various surface types, subdivision methods, shading
algorithms, modeling techniques. —II. (II) Joy, Ma, Max

275B. Advanced Computer Graphics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite:
course 175 or 177 or 178. Advanced topics on com-
puter graphics and geometric modeling. Topics
taken from advanced research papers in computer
graphics, image synthesis, visualization and geometric mod-
deling. Discussion of current computer graphic
research. Offered in alternate years. —II. Joy, Hamann, Max

276. Advanced Volume Visualization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 177. Applications of volume visualization,
temecula and future applications. —I. Joy, Hamann, Ma, Max

277. Advanced Visualization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 177. Visualization of 3D data, including scene
fields, vector fields, and medical data. —III. (III) Hamann, Joy

278. Computer-Aided Geometric Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite:
course 175 or 177 or 178. Mathematical tech-
niques for the definition and manipulation of curves
and surfaces. Coon’s patches, Bezier curves and sur-
facies. B-spline curves and surfaces, beta-splines,
box-splines. Integration into various computer graphic
rendering models, and application to object motion
necessary to produce computer ani-
mation, modeling of articulated objects made from
jointed segments, and of deformable objects. Stu-
dents will complete a final animation project.
Offered in alternate years. —III. Hamann, Joy, Max, Ma

280. Virtual Reality Technology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 175. Fundamentals and principles of Virtual
Reality (VR) technology. Potential and limits for its
useful application. Developing a complete virtual
reality application. Offered in alternate years. —II. (II) Joy

289A-M. Special Topics in Computer Science (1-5)
Lecture, laboratory, or combination. Prerequisite:
consent of instructor. Special topics in (A) Computer
Languages and Compilers; (D) Operating Systems;
(E) Software Engineering; (F) Data Bases; (G) Artifi-
cial Intelligence; (H) Computer Graphics; (I) Net-
wor(s) (J) Computer-Aided Design; (K) Scientific
Computing; (L) Computer Science; (M) Security. May
be repeated for credit when topic differs. —I, II, III, IV, V

290. Seminar in Computer Science (1)
Seminar—1 hour. Participating seminar, discussion and presentation of current research and development
in computer science. (S/U grading only.) —I, II, III, IV, V

290C. Graduate Research Group Conference II
Discussion—1 hour. Research problems, progress and techniques in computer science. May be
repeated for credit. (S/U grading only.) —I, II, III, IV, V

293A. Research in Computer Science (1)
Lecture—1 hour. Prerequisite: graduate standing in
computer science. Study of research topics in com-
puter science. Ph.D. level research methodologies
(experimental; applied or theoretical; dissertation skills
necessary to successfully find/solve significant
research problems. Finding and successful interact-
ing with a research advisor. Ethical issues in
research/collaborative work. (S/U grading only.) —I,
II, III

Quarter Offered: I—Fall, II—Winter, III—Spring, IV—Summer, 2009-2010 offering in parentheses
Engineering: Electrical and Computer Engineering

Richard A. Kiehl, Ph.D., Chairperson of the Department

Kendall, Ph.D., Vice Chairperson for Undergraduate Studies

Khaled Abdel-Ghaffar, Ph.D., Vice Chairperson for Graduate Studies

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Tsu-Chung Chang, Ph.D., Professor
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Jean-Yves Givry, Ph.D., Professor
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Zhi Ding, Ph.D., Professor
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Ronald F. Scott, Ph.D., Professor Emeritus
Shih-Ho Wang, Ph.D., Professor Emeritus

Affiliated Faculty

Ivor Brodie, Ph.D., Adjunct Professor
Shu Lin, Ph.D., Adjunct Professor
Katsunori Okamoto, Ph.D., Adjunct Professor
Diego Yankelovich, Ph.D., Adjunct Associate Professor

The Electrical and Computer Engineering Major Programs

The department administers two curricula in the College of Engineering: (1) the Electrical Engineering curriculum and (2) the Computer Engineering curriculum.

The Electrical Engineering and the Computer Engineering curricula are both accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Integrated Degree Program (IDP). The IDP leads to both the Bachelor of Science and the Master of Science degrees. The program provides a student the opportunity to obtain a broad and deep technical background. The IDP program in the Department of Electrical and Computer Engineering is available only to students who have a specific area of emphasis that refers to the Electrical Engineering portion of the Electrical Engineering, Computer Engineering, or Electrical Engineering/Materials Science curricula. Applicants in their junior year must apply for the IDP by March 31. For more information on the IDP, see http://www.ece.ucdavis.edu.

Mission. Under its land grant status, the University of California has a mission to provide the state with the trained workforce it needs and to advance knowledge and research in directions that contribute to the general welfare of the state and the nation. The Department of Electrical and Computer Engineering contributes to the mission of the University in three ways: First, its undergraduate and graduate education programs seek to provide students with an understanding of the fundamental principles of electrical and computer engineering, the skills needed to solve the complex technological problems of modern society and the ability to continue to learn and develop throughout their careers. Second, through its research programs, the department contributes to the development and progress of electronics, communications, and computer technology. Finally, the department helps transfer research results to industry through publication, public service and professional activities.

Objectives. Teaching—To provide undergraduate students with sufficient breadth to allow them to participate in teams, continue their own education after graduation and to contribute to a focus area intelligently.

Engineering: Electrical and Computer Engineering

in a narrower discipline to allow them to develop the ability to solve complex engineering problems; to educate the students in the graduate program to be leaders in industry or to do meaningful research in industry, government or academia. Research—To develop and maintain research programs that produce useful technological advances while simultaneously training the next generation of researchers and leaders; and to update and/or shift the foci of these programs frequently in response to the needs of our constituency and the world, to provide a stimulating environment that encourages our graduate students to develop their abilities as far as possible.

Electrical Engineering Program

The Electrical Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; (410) 347-7700.

Electrical Engineering involves the design, analysis, and effective use of electrical systems including electronic computers. Electrical systems and computers play a central role in nearly all aspects of modern life, including communication, medicine, education, environmental protection, space exploration, defense, and home entertainment.

Students who complete the Electrical Engineering curriculum will obtain a Bachelor of Science in Electrical Engineering, one of the engineering degrees recognized in all fifty states as eligible for registration as a Professional Engineer.

Objectives. The Electrical Engineering program has adopted the following objectives to serve the long-term interests of our students and the industries of Northern California and the nation. Foundation—To provide our graduates with a solid foundation in engineering science, including mathematics, physical science, and the fundamentals of electrical engineering. This foundation is necessary to succeed in more advanced engineering courses and to be able to continue learning throughout a career. Breadth—To provide our graduates the sufficient breadth in electrical engineering in order to understand engineering tradeoffs that cross disciplines, to contribute effectively to multidisciplinary projects and to make an informed decision about their area of specialization. Depth—To provide our graduates with sufficient depth in a specific area of electrical engineering necessary to solve complex real-world engineering problems and to contribute to a specific discipline within electrical engineering. Ethics—To provide our graduates with a basic understanding of, and ability to handle correctly, ethical problems that may arise during their careers. To provide them with an understanding of their obligations to society at large.

Lower Division Required Courses

UNITS

Mathematics 21A 21B 21C 21D ........................................ 16
Mathematics 22A 22B ........................................ 6
Physics 9A 9B 9C 9D ........................................ 19
Chemistry 2A ........................................ 5
Computer Science Engineering 30 40 .......................... 8
Engineering 6 ........................................ 4
Electrical and Computer Engineering 1 ................................ 1
Electrical and Computer Engineering 70 .......................... 4
Enginering 17 .......................... 4
English 3 or University Writing Program 1, or Comparative Literature 1 2 3 4 or 5
Native American Studies 5 ...................... 4
Communication 1 or 3 ........................................ 4
General Education electives ...................... 12
Unrestricted electives ........................................ 3

Minimum Lower Division Units ....... 90

Upper Division Requirements:
Electrical Engineering Curriculum

The Electrical Engineering curriculum prepares students for careers in electrical engineering or for graduate studies by providing a solid background in mathematics, physical sciences, and traditional electrical engineering subjects of (1) physical electronics, (2) electromagnetics, (3) analog electronics, (4) digital electronics, and (5) communication controls and

Quarter Offered: I–Fall, II–Winter, III–Spring, IV–Summer 2009-2010 offering in parentheses

General Education (GE) credit: Arts and Humanities, Sciences and Engineering, Social Sciences, Div=Social Cultural Diversity, Wrt=Writing Experience
signal processing. Through the proper choice of 36 units of flexible design and technical electives, you may focus on any of the five specialty areas or distribute the 36 units of electives among these areas.

**Areas of Specialization**

Physical Electronics: solid-state devices, circuits and fabrication and the theory courses supporting those subjects.

Recommended elective courses:
- Core electives: Electrical and Computer Engineering 130B, 140B
- Design Electives with Lab: Electrical and Computer Engineering 114, 118, or 132A, 132B or 135. Select remaining upper-division design electives from Electrical and Computer Engineering 110B, 146A, 146B
- Technical electives: Electrical and Computer Engineering 112, 180B
- Suggested Advisers: J.P. Collinge, C.E. Hunt, S. Islam

Electromagnetics: microwave circuits and systems, and fiber optical systems.

Recommended elective courses:
- Core electives: Electrical and Computer Engineering 130B, 140B
- Technical electives: Select from Electrical and Computer Engineering 112, 114, and 133
- Suggested Advisers: O.R. Branner, A. Knoesen, A. Pham, B. Yoo

Analog Electronics: transistor- and system-level analog circuit design.

Recommended elective courses:
- Core electives: Electrical and Computer Engineering 140B, 150B
- Technical electives: Select from Electrical and Computer Engineering 130B, 146A, 194A-194B

Digital Electronics: transistor- and system-level digital circuit design.

Recommended elective courses:
- Core electives: Electrical and Computer Engineering 140B, 150B
- Design Electives with Lab: Electrical and Computer Engineering 118 and 180B or 151 or 165 or 172 or 183 or 194A-194B-194C or 195A-195B
- Select remaining upper-division design electives from Electrical and Computer Engineering 110B, 116, 170 or 171
- Technical electives: Select from Electrical and Computer Engineering 130B and 112 or 146A or 157A or 160 or 210
- Suggested Advisers: R. Amritharajah, K.W. Current, P.J. Hurst, S.H. Lewis

Communication Controls and Signal Processing: digital communication, robotics, classical controls and computer communications; wireless and cellular digital communication systems, signal and image processing, and computer vision.

Recommended elective courses:
- Core electives: Electrical and Computer Engineering, 150B, 180B
- Design Electives with Lab: Electrical and Computer Engineering 151, 157A and 157B or 165
- Select remaining upper-division design electives from Electrical and Computer Engineering 110B, 180A, 196

**Upper Division Required Courses**

Electrical and Computer Engineering 100, 110A, 130A, 140A, 150A, 161, 180A, 196

- Engineering 160, 190 or Computer Science Engineering 188...
- Upper-division electives...
- Chose at least seven courses for a minimum of 28 units from the following:
  - At least one design project course** with: Design Project "Design Project" in the title, including Electrical and Computer Engineering 194A-194B-194C, 195A-195B
  - The remaining design elective may be chosen from the lists above or from the following:
    - Technical electives**...
    - General Education electives...
    - Restricted electives...
  - Minimum Upper Division Units...

**Minimum Units Required for Major**: 180

- A maximum of one course appearing on both the core elective list and the design elective list may be counted in both categories.
- One course appearing on both the design laboratory elective list and the design project list may be counted toward both the laboratory requirement and the project requirement.
- After completion of the upper-division elective requirements (seven core and design courses) any units in excess of 27 may be counted toward the technical elective requirement.
- ECS 157 may not be counted toward the technical elective requirement.

**Computer Engineering Program**

The Computer Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, (410) 347-7700. The program in Computer Engineering provides the student with a broad and well-integrated background in the concepts and methodologies that are needed for the analysis, design, development, organization, theory, programming, and applications of information processing systems. Although such systems are diverse, they involve a far wider range of disciplines than merely computation. The Computer Engineering program is correspondingly broad. The program presents the essential material in digital electronics, digital logic, discrete mathematics, computer programming, data structures, and other topics. Students who complete the Computer Engineering curriculum receive a Bachelor of Science in Computer Engineering.

**Objectives.** The Computer Engineering program has adopted the following objectives to serve the long-term interests of the industries of Northern California and the nation. Foundation—To provide our graduates with a solid foundation in engineering science, including mathematics, physical science, and the fundamentals of computer engineering. This foundation is necessary to succeed in more advanced engineering courses and to be able to continue learning throughout their careers. Breadth—To provide our graduates with sufficient breadth in computer engineering. This breadth is required for students to understand engineering tradeoffs that cross disciplines, to contribute effectively to multi-disciplinary projects and to make an informed decision about their area of specialization. Depth—To provide our graduates with sufficient depth in a specific area of computer engineering necessary to solve complex real-world engineering problems and to prepare to contribute to a specific discipline within computer engineering. Ethics—to provide our graduates with a basic understanding of their obligations and responsibilities.

**Lower Division Required Courses**

**UNITS**

- Mathematics 21A 21B 21C 21D .................................. 16
- Mathematics 22A 22B .................................. 6
- Physics 9A 9B 9C 9D .................................. 19
- Chemistry 2A .................................. 5
- Computer Science 10 20 30 40 60 60 .......................... 16
- Engineering 6 .................................. 4
- Electrical and Computer Engineering 1 1
- Electrical and Computer Engineering 70 70
- Computer Science Engineering 50 .......................... 4
- Engineering 17 .................................. 4
- English 3 or University Writing Program 1, or Comparative Literature 1, 2, 3, or 4
- Native American Studies 5 .................................. 4
- Communication 1 or 3 .................................. 4
- General Education electives .................................. 12
- Total Lower Division Units .................................. 95

**Upper Division Requirements:**

The Computer Engineering curriculum prepares students for careers in computer engineering or for graduate studies by providing a solid background in mathematics, physical sciences, and the traditional computer engineering subjects: electronics, computer hardware, and computer software. Here electronics refers to the five Electrical Engineering specialty areas: (1) physical electronics, (2) electromagnetics, (3) analog electronics, (4) digital electronics, and (5) communications, control, and signal processing. The 63 upper-division units in electronics, computer hardware and computer software consist of 13 units in electronics courses, 18 units in computer hardware courses, and 12 units in computer software courses. The remaining 20 units consist of 11 units of design and technical electives and 9 units of technical electives. By carefully selecting these 20 design and technical electives, students can focus on one or more of the five specialization areas, or change their specialization at any time during their program.

**Areas of Specialization**

- Computer Systems and Software: computer architecture, design, networking, and operating system software.

Recommended elective courses:

**Quarter Offered:** I–Fall, II–Winter, III–Spring, IV–Summer; 2009-2010 offering in parentheses
Digital systems: design of computers and digital systems at various levels, including processor, functional unit circuit, and VLSI layout.

Recommended elective courses:
Remaining Upper-Division Design Electives: Electrical and Computer Engineering 110B, 118
Suggested Advisers: V. Akella, B. Baas, H. Al-Azzad, A. Ghiasi, G. Redinbo

Upper Division Required Courses
Electrical and Computer Engineering 100, 110A, 140A, 161, 170*, 172, 180A, 180B, 196
Computer Science Engineering 122A, 150
Engineering 110, 190, 196, Computer Science Engineering 188

Upper-Division Elective Courses:
10 At least one design project course


Computer Engineering

Lower Division Courses
1. Introduction to Electrical and Computer Engineering (1)
Lecture—1 hour. Overview of Electrical and Computer Engineering programs and advising; setting and attaining goals; ethics; introduction to major topics in ECE; prerequisites and grading only. I, II, III.

70. Computer Structure and Assembly Language (4)
Lecture—3 hours; workshop—1 hour. Prerequisite: Computer Science Engineering 30. Computer architecture; machine language; assembly language; macro and conditional macros; subroutine/parameter passing, input/output programming, interrupt and trap, direct-memory-access; absolute and relocatable code; reentrant coding; program development in an operating system. Only one unit of credit to students who have completed Computer Science Engineering 50. I, II, III.

90C. Research Group Conference in Electrical and Computer Engineering (1)
Discussion—1 hour. Prerequisite: consent of instructor; lower division standing. Research group conferences. May be repeated for credit. P/NP grading only. I, II, III.

90X. Lower Division Seminar (1-4)
Seminar—1-4 hours. Prerequisite: consent of instructor. Examination of a special topic in a small group setting. May be repeated for credit.

92. Internship in Electrical and Computer Engineering (1-5)
Internship—3-15 hours. Prerequisite: lower division standing; project approval prior to period of internship. Supervised work experience in Electrical and Computer Engineering. May be repeated for credit. P/NP grading only.

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. P/NP grading only.

99. Special Study for Lower Division Students (1-5)
P/NP grading only.

Upper Division Courses
100. Circuits II (5)
Laboratory—3 hours, lecture—3 hours, discussion—1 hour. Prerequisite: Engineering 17. Theory, application, and design of analog circuits. Methods of analysis including frequency response, SPICE simulation, and Laplace transform. Operational amplifiers and design of active filters. Only 2-350 units of credit to students who have completed Engineering 100. Restricted to the following majors: Electrical Engineering, Computer Engineering, Computer Science & Engineering, Electrical Engineering/Materials Science, Optical Science & Engineering, Biomedical Engineering, Electrical Engineering Graduate Students. I, II, III.

110A. Electronic Circuits I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100, 140A (may be taken concurrently). Operation of bipolar and field-effect transistors. Use and modeling of nonlinear and linear active devices. Study and design of fundamental active devices in linear and analog circuits. Introduction to the design of transistors amplifiers and logic gates. I, II, III.

110B. Electronic Circuits II (4)

112. Communication Electronics (4)
Lecture—3 hours, laboratory—3 hours. Prerequisite: courses 110B and 150A. Electronic circuits for analog and digital communication, including oscillators, mixers, tuned amplifiers, modulators, demodulators, and phase-locked loops. Circuits for amplitude modulation (AM) and frequency modulation (FM) are emphasized. I, II, III.

114. Analytical Integrated Circuits (3)

116. VLSI Design (4)
Lecture—3 hours, laboratory—3 hours. Prerequisite: courses 110A and 180A. CMOS devices, layout, circuits, and functional units; VLSI fabrication and design methodologies. I, II, III.

118. Digital Integrated Circuits (3)
Lecture—2 hours, laboratory—3 hours. Prerequisite: courses 110B and 180A. Analysis and design of digital integrated circuits. Emphasis on MOS logic circuit families. Logic gate construction, voltage transfer characteristics, and propagation delay. Register stages, multiplexers, addressing, and control. I, II, III.

130A. Electromagnetics I (4)

130B. Introductory Electromagnetics II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 130A. Plane wave propagation in lossy media, reflections, guided waves, simple modulated waves and dispersion, and basic antennas. I, II, III.

132A. RF and Microwave in Wireless Communication (5)
Lecture—3 hours, laboratory—3 hours; discussion—1 hour. Prerequisite: course 110B, 130B, 140B. The study of Radio Frequency and Microwave theory and practice for design of wireless electronic systems. Transmission lines, microwave integrated circuits, circuit analysis of electromagnetic energy transfer systems, the scattering matrix. I, II, III.

132B. RF and Microwave in Wireless Communication (5)
Lecture—3 hours, laboratory—3 hours; discussion—1 hour. Prerequisite: course 132A. Passive RF and microwave device analysis, design, fabrication, and testing for wireless applications. RF and microwave
filter and coupler design. Introductory analysis and design of RF and microwave transistor amplifiers.—II. (II.)

132C. RF Amplifiers, Oscillators and Mixers (5)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 129B. Microwave amplifier theory and design, including transistor circuit models, stability considerations, noise models and low noise design. Theory and design of microwave transistor oscillators and mixers.—III. (III.)

135. Electromagnetic Radiation and Antenna Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisites: course 130B. Properties of electromagnetic radiation; analysis and design of antennas: ideal cylindrical, small loop, aperture, and arrays; antenna field measurements.—I. (I.)

135. Optical Communications I: Fibers (4)
Lecture—3 hours; project—1 hour. Prerequisite: course 130B. Principles of optical communication systems. Planar dielectric waveguides. Optical fibers: single-mode, multimode, step and graded index. Attenuation and dispersion in optical fibers. Optical sources (LEDs and lasers) and receivers. Design of digital optical transmission systems.—II. (II.)

136. Opto-Electronics and Fiber Optics Laboratory (3)
Lecture—1 hour; discussion—1 hour; laboratory—3 hours. Prerequisites: courses 135 and 150A. Characteristic and applications of state-of-the-art optoelectronic components (semiconductor detectors, optical modulators and optical fibers), and fiber optic communication systems.—III. (III.)

140A. Principles of Device Physics I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 17, Physics 9D. Semiconductor device fundamentals, equilibrium and non-equilibrium statistical mechanics, conductivity, diffusion, density of states, electrons and holes, p-n junctions, Schottky junctions, and junction field effect transistors.—I. (I, II)

140B. Principles of Device Physics II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 140A. Electrical properties, design, and models for Bipolar and MOS devices.—III. (III.)

146A. Integrated Circuits Fabrication (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 140B. Basic fabrication processes for Metal Oxide Semiconductor (MOS) integrated circuits. Laboratory assignments covering oxidation, photolithography, impurity diffusion, metallization, wet chemical etching, and characterization work together in producing metalgate PMOS test chips which will undergo parametric and functional testing.—I. (I.)

146B. Advanced Integrated Circuits Fabrication (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 146A. Restricted to Electrical, Computer, and Electrical/Materials Science majors and Electrical Engineering graduate students. Non-majors accommodated when space available. Fabrication processes for CMOS VLSI. Laboratory projects examine deposition of thin films, ion implantation, process simulation, anisotropic plasma etching, sputter metallization, and C-V analysis. Topics include isolation, projection alignment, epi-layer growth, thin gate oxidation, and rapid thermal annealing.—II. (II.)

150A. Introduction to Signals and Systems I (4)
Lecture—4 hours. Prerequisite: Engineering 6 (may be taken concurrently), course 100. Characterization and analysis of continuous-time linear systems. Fourier series and transforms with applications. Introduction to communication systems. Transfer function and block diagrams. Elements of feedback systems. Stability of linear systems.—II, III. (II, III)

150B. Introduction to Signals and Systems II (4)

151. Instrumentation Interfacing, Signals and Systems (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: courses 100, 150A, 180A. Study of interfacing instrumentation systems including software development, hardware interfacing, transducers, dynamic response, signal conditioning, A/D conversion, and data transmission.—II. (II.)

152. Digital Signal Processing (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: courses 70 and 150B. Theory and practice of real-time digital signal processing. Fundamentals of real-time systems. Programmable architectures including I/O, memory, peripheral interface, and interfacing issues with A/D and D/A converters to a programmable DSP. Specification driven design and implementation of simple DSP applications.—III. (III.)

157A. Control Systems Laboratory (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 150A. Analysis and design of feedback control systems. Examples are drawn from electrical and mechanical systems as well as other engineering fields. Mathematical modeling, stability criteria, root-locus and frequency domain design methods.—I. (I.)

157B. Control Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 157A. Control system design; transform-function and state-space methods; sampled-data implementation, digital control. Laboratory includes feedback system experiments and simulation studies.—II. (II.)

158. Control System Design Methods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 157A. Design methods for feedback control systems, including quantitative feedback theory and linear quadratic forms.—III. (III.)

160. Signal Analysis and Communications (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150A. Signal analysis based on Fourier methods. Fourier series and transforms; time-scaling, convolution, and filtering; spectral density; modulation: carrier-amplitude, carrier-frequency, and pulse-amplitude.—I. (I.)

Lecture—3 hours; discussion—1 hour. Prerequisites: course 100. Probabilistic and statistical analysis of electrical and computer systems. Discrete and continuous random variables, expectation and moments. Transformation of random variables. Joint and conditional distributions. Limit theorems and statistics. Noise models, system reliability and testing.—I. (I, I.)

165. Statistical and Digital Communication (4)
Lecture—3 hours; project—3 hours. Prerequisite: course 160. 161. Introduction to random process models of modulated signals and noise, and analysis of receiver performance. Analog and digitally modulated signals. Signal-to-noise ratio, probability of error, matched filters. Intersymbol interference, pulse shaping and equalization. Carrier and clock synchronization.—II. (II.)

170. Introduction to Computer Architecture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 180A; course 70 or Computer Science Engineering 50. Introduction to basic aspects of computer architecture, including computer performance measurement, compiler, computer arithmetic, pipelined/non-pipelined implementation, and memory hierarchies (cache and virtual memory). Presents a simplified Reduced Instruction Set Com-
189A-V. Special Topics in Electrical Engineering and Computer Science (1-5)
Prerequisite: Special Topics in (A) Computer Science; (B) Programming Systems; (C) Digital Systems; (D) Communications; (E) Signal Transmission; (F) Digital Communication; (G) Control Systems; (H) Signal Processing; (I) Image Processing; (J) High-Frequency Phenomena and Devices; (K) Solid-State Devices and Physical Electronics; (L) Systems Theory, (M) Active and Passive Circuits; (N) Power Electronics; (O) Computer Software; (P) Computer Engineering; (Q) Microprocessing; (R) Electronics; (S) Electromagnetics; (T) Opto-Electronics; (U) Computer Networks. May be repeated for credit when topic differs. — I, II, III, IV, V.

190C. Research Group Conferences in Electrical and Computer Engineering (1)
Discussion—1 hour. Prerequisite: upper division standing in Electrical and Computer Engineering; consent of instructor. Research group conferences. May be repeated for credit. (P/NP grading only.)—I, II, III, IV, V.

192. Internship in Electrical and Computer Engineering (1-5)
Internship—3-15 hours. Prerequisite: completion of a minimum of 84 units; project approval before period of internship; consent of instructor. Supervised work experience in an industrial computer engineering firm. May be repeated for credit if project is different. (P/NP grading only.)—I, II, III, IV, V.

193A. Senior Design Project (2)
Project—6 hours. Prerequisite: senior standing in Electrical or Computer Engineering; course 196 (may be taken concurrently); consent of instructor. Team design project for seniors in Electrical or Computer Engineering. Project involves analysis, design, implementation and evaluation of an Electrical Engineering or Computer Engineering system. Project is supervised by a faculty member. ( Deferred grading only, pending completion of sequence.)—I, II, III, IV, V.

193B. Senior Design Project (2)
Project—6 hours. Prerequisite: course 193A. Team design project for seniors in Electrical Engineering or Computer Engineering. Project involves analysis, design, implementation and evaluation of an Electrical Engineering or Computer Engineering system. Project is supervised by a faculty member. ( Deferred grading only, pending completion of sequence.)—I, II, III, IV, V.

194A. Micromouse Design Project (2)
Discussion—1 hour; laboratory—3 hours. Prerequisite: course 70 or Computer Science Engineering 50; Engineering 17 (may be taken concurrently); course 100 or Engineering 100 recommended (may be taken concurrently); course 180A recommended (may be taken concurrently). Design of robotic mouse for the IEEE Micromouse competition. May be repeated once for credit. (Deferred grading only, pending completion of sequence.)—I, II.

194B. Micromouse Design Project (2)
Discussion—1 hour; laboratory—3 hours. Prerequisite: course 70 or Computer Science Engineering 50; Engineering 17 (may be taken concurrently); course 100 or Engineering 100 recommended (may be taken concurrently); course 180A recommended (may be taken concurrently). Design of robotic mouse for the IEEE Micromouse competition. Limited enrollment. May be repeated once for credit. (Deferred grading only, pending completion of sequence.)—I, II.

195A. NATCAR Design Project (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: courses 110A, 110B or 157A (can be taken concurrently); 170 recommended (taken concurrently) if student intends to complete project with digital circuits. Design and construct an autonomous race car. Students work in groups to design, build and test speed control circuits, track sensing circuits, and a steering control loop. Limited enrollment. (Deferred grading only pending completion of sequence.)—I. (I.)

195B. NATCAR Design Project (2)
Laboratory—6 hours. Prerequisite: course 195A. Design and construct an autonomous race car. Students work in groups to design, build and test speed control circuits, track sensing circuits, and a steering control loop. Limited enrollment. (Deferred grading only pending completion of sequence.)—II. (II.)

196A. Senior Design Project (1)
Lecture/discussion—1 hour. Prerequisite: English 101, 102, or 104, or successful completion of English Composition 1A and 1B; senior standing in Electrical or Computer Engineering; restricted to the Electrical Engineering or Computer Engineering majors. Involves an integration of principles and capstone design project for Electrical and Computer Engineering. Project incorporates engineering standards and realistic constraints including economic, manufacturability, sustainability, ethical, health and safety, environmental and social-political. Completion of a portfolio of upper division course work. (Deferred grading only, pending completion of sequence.)—I. (I.)

1977. Tutoring in Electrical and Computer Engineering (1-3)
Discussion—1 hour; discussion/laboratory—2-8 hours. Prerequisite: upper division standing; consent of instructor. Tutoring in Electrical and Computer Engineering courses, especially introductory courses. For upper-division undergraduate students who will provide tutorial assistance. (P/NP grading only.)—I, II, III, IV, V.

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. May be repeated three times for credit. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses
201. Digital Signal Processing (4)
Lecture—4 hours. Prerequisite: course 150B, Statistics 120 or Mathematics 131 or Mathematics 167 recommended. Theory and design of digital filters. Classification of digital filters, linear phase systems, all-pass functions and IIR filter design methods and optimality measures, numerically robust structures for digital filters. —II.

202. Advanced Digital Signal Processing (4)
Lecture—4 hours. Prerequisite: courses 201, 260, and Mathematics 167 are recommended. Multirate DSP theory and wavelets, optimal transform and subband coders in data compressions, advanced sampling theory and oversampled A/D converters, transmultiplexers, digital high-speed signal processing systems, geometric signal processing. Offered in alternate years. —III.

206. Digital Image Processing (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 150B. Twodimensional systems theory; image perception, sampling and quantization, transform theory and applications, enhancement, filtering and restoration, image analysis, and image processing systems. —II.

207. Pattern Recognition and Classification (3)
Lecture—3 hours. Prerequisite: Statistics 120. Topics in statistical pattern recognition and classification: linear decision functions and minimum distance classification, Bayes and minimum risk theory, clustering algorithms, the generalized perceptron, multi-layer neural networks, and feature extraction. Offered in alternate years. —III.

208. Image Analysis and Computer Vision (3)
Lecture—3 hours. Prerequisite: course 150B. Geometry of two-dimensional objects. Edge detection and image segmentation. Image feature extraction. Fundamental principles of computer vision. Recovery of three-dimensional structure from shading or stereo information. Analysis of motion and estimation of motion parameters. Geometry and representation of three-dimensional objects. Offered in alternate years. —III.

210. MOS Analog Circuit Design (3)
Lecture—3 hours. Prerequisite: course 110A, 1118 and 1408. Analysis and design of MOS amplifiers, bias circuits, voltage references and other analog circuits. Stability and compensation of feedback amplifiers. Introduction to noise analysis in MOS circuits. — I. (I.)

211. Advanced Analog Circuit Design (3)
Lecture—3 hours. Prerequisite: course 210; Statistics 131A and course 112 recommended. Noise and distortion in electronic circuits and systems. Application of communication circuits. Topics include mixers, low-noise amplifiers, power amplifiers, phase-locked loops, oscillators and receiver architectures. —II. (II.)

212. Analog MOS IC Design for Signal Processing (3)
Lecture—3 hours. Prerequisite: course 210. Analysis and design of analog MOS integrated circuits. Passive components, single-ended and fully differential op amps, sampled-data and continuous-time filters. —II. (II.)

213. Data-Conversion Techniques and Circuits (3)
Lecture—3 hours. Prerequisite: course 210. Digital-to-analog and analog-to-digital conversion; component characteristics and matching; sample-and-hold, comparator, amplifier, and reference circuits. —III. (III.)

214. Computer-Aided Circuit Analysis and Design (3)
Lecture—3 hours. Prerequisite: courses 110A, 110B and knowledge of FORTRAN or C. Network equation formulations. Nonlinear DC, linear AC, time-domain [both linear and nonlinear], steady-state [nonlinear] and harmonic analysis. DC, AC, and time-domain sensitivities of linear and nonlinear circuits. Gradient-based design optimization. Behavioral simulation. Extensive CAD project.—II. (II.)

215. Circuits for Digital Communications (3)
Lecture—3 hours. Prerequisite: courses 150B and 210 (may be taken concurrently); course 165, 166 or 265 recommended. Analog, digital, and mixed-signal CMOS implementations of communication-circuit blocks; gain control, adaptive equalizers, sampling detectors, clock recovery. Offered in alternate years.

216. Low Power Digital Integrated Circuit Design (3)
Lecture—3 hours. Prerequisite: course 118. IC design for low power and energy consumption. Low power architectures, logic styles and circuit design. Variable supply and threshold voltages. Leakage management. Power estimation. Energy sources, power electronics, and energy recovery. Applications in portable electronics and sensors. Thermodynamics.—II. (II.)

218A. Introduction to VLSI Circuits (3)
Lecture—3 hours. Prerequisite: courses 110A and 110B. Theory and practice of VLSI circuit and system design. Extensive use of VLSI computer-aided design. Students undertake a VLSI design project.—I. (I.)

218B. Multiprocessor Chip Design (1)
Lecture—3 hours. Prerequisite: course 218A. CMOS and NMOS multiprocessor chip layouts of projects begun in courses 218A, 212, and 219 are assembled and submitted to the DARPA/NSF MOSIS program for fabrication. —II.
tion and spectral density, ergodicity and duality between time averages and expected values, filters and dynamical systems. —II. —III.

261. Signal Processing for Communications (4)
Lecture—4 hours. Prerequisite: course 165, 260 or consent of instructor. Signal processing in wireless and wireline communication systems. Characterization and distortion of wireless and wireline channels. Channel equalization and maximum likelihood sequence estimation. Channel precoding and pre-equalization. CDMA and transmultiplexing. Array processing. Offered in alternate years. —III.

262. Multi-Access Communications Theory (4)
Lecture—3 hours; project. Prerequisite: Statistics 120 or equivalent; course 173A or Engineering Computer Science 152A. Maximum stable throughput of Poisson collision channels. Classic collision resolution algorithms. Carrier sensing multiple access and its performance analysis. System stability analysis. Joint design of the physical/medium access control layers. Capacity region of multi-access channels. Multi-access with correlated sources. Offered in alternate years. —III. —IV. —V.

263. Optimal and Adaptive Filtering (4)

264. Estimation and Detection of Signals in Noise (4)

265. Principles of Digital Communications (4)
Lecture—4 hours. Prerequisite: courses 165 and 260, or consent of instructor. Introduction to digital communications. Coding for analog sources. Characterization of signals and systems. Modulation and demodulation for the additive Gaussian channel. Digital signals in the presence of band-limited white noise. Detection of signals in noise. Offered in alternate years. —II. —III. —IV. —V.

266. Information Theory and Coding (3)
Lecture—3 hours. Prerequisite: Statistics 120. Information theory and coding. Measure of information. Redundancy reduction encoding of an information source. Capacity of a communication channel, error-free communications. Offered in alternate years. —II. —III. —IV. —V.

269A. Error Correcting Codes I (3)
Lecture—3 hours. Prerequisite: course 165 and 269A. Introduction to convolutional codes, turbo codes, trellis and block coded modulation codes, soft-decision decoding algorithms, the Viterbi algorithm, reliability-based decoding, trellis-based decoding, multistage decoding. Offered in alternate years. —II. —III. —IV. —V. —VI.

270. Computer Architecture (3)
Lecture—3 hours. Prerequisite: course 170 or Computer Engineering 152A. Introduction to modern techniques for high-performance single and multiple processor systems. Topics include advanced pipeline design, advanced memory hierarchy design, cache memory, and memory use, and memory sharing among multiprocessors. Case studies of recent single and multiple processor systems. —II. —III. —IV. —V. —VI.

271. Multimedia Networking and Communications (4)
Lecture—3 hours; project—2 hours. Prerequisite: knowledge of programming language (Matlab, C or C++); basic knowledge of computer networks and multimedia compression preferred, but not required. Concepts and principles underlie transmission of multimedia through heterogeneous wired and wireless IP networks. Multimeda communication over Internet and wireless networks; error resilient multimedia compression techniques and error concealment strategies; multimedia streaming architectures; channel models and channel estimation strategies; joint source/channel coding techniques. Offered in alternate years. —II. —III. —IV. —V. —VI.

272. High-Performance Computer Architecture and Implementation (3)
Lecture—3 hours. Prerequisite: course 170 or Computer Science Engineering 154A, 154B and course 270 or Computer Engineering 250A. Architectural issues in achieving high-performance via concurrent execution of instructions and associated problems and limitations. Specialized architectures. Offered in alternate years. —II. —III. —IV. —V.

273. Computer Networks (4)
Lecture—3 hours; project. Prerequisite: Mathematics 131 or Statistics 120 or 131A, Computer Science Engineering 152A. Concepts and design principles of computer network architecture and protocols; implementation principles (transport/network/data-link layers), network algorithms, router mechanisms, design requirements of applications, network error control, modeling and performance analysis. Examples primarily from the Internet protocol suite. —I. (I.)

274. Internet Measurements, Modeling and Analysis (4)
Lecture—3 hours; project. Prerequisite: Computer Science Engineering 252 or course 273. Advanced topics in the theoretical foundations of network measurements, modeling, and statistical inference. Applications to Internet traffic engineering, routing optimization, load balancing, traffic engineering, fault tolerance, anomaly detection, and network security. Individual project requirement. Offered in alternate years. —II. —III. —IV. —V. —VI.

275. Fault-Tolerant Computer Systems: Design and Analysis (3)
Lecture—3 hours. Prerequisite: courses 170, 180A. Introduces fault-tolerant digital system theory and practice. Covers flip-flops and other digital techniques based on hardware redundancy, time redundancy, information redundancy, and software redundancy. Examines hardware and software reliability analysis, and example fault-tolerant designs. Not open for credit to students who have completed course 276A. Offered in alternate years. —II. —III. —IV. —V. —VI.

276. Graphics Architecture (3)
Lecture—3 hours. Prerequisite: Computer Science Engineering 154A, 154B, Computer Science Engineering 175. Design and analysis of the architecture of computer graphics systems. Topics include the graphics pipeline with a concentration on hardware techniques and algorithms, exploiting parallelism in graphics, and case studies of noteworthy and modern graphics architectures. Offered in alternate years. —II. —III. —IV. —V. —VI.

277. Computer Arithmetic for Digital Implementation (3)
Lecture—3 hours. Prerequisite: courses 170, 180A. The design and implementation of computer arithmetic logic units are studied with particular emphasis on high-speed parallel processing requirements. Addition (subtraction), multiplication and division operations are covered, and fixed and floating-point representations are examined. Offered in alternate years. —II. —III. —IV. —V. —VI.

278. High-Performance System Design (3)
Lecture—3 hours. Prerequisite: courses 148, 11B, 180B. Advanced digital circuits. Logic families of high-performance systems: processors and DSP. Timing, clock generation, clock distribution and clock storage elements. Pipelining in high-performance sys-
Engineering: Mechanical and Aeronautical

[College of Engineering]

Jean-Jacques Chattot, Ph.D., Chairperson of the Department
Fidelis O. Eke, Ph.D., Vice Chairperson of the Department

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Jerald M. Henderson, D.Engr., Professor Emeritus
Myron A. Hoffman, Sc.D., Professor Emeritus
John D. Kemper, Ph.D., Professor Emeritus
Lawrence W. Reif, Ph.D., Professor Emeritus
Allan A. McKenzie, Ph.D., Professor Emeritus

Affiliated Faculty
James Schaaf, Ph.D., Lecturer

Division of Aeronautical Science and Engineering

Mission. The Department of Mechanical and Aeronautical Engineering is committed to educating future engineers so they may contribute to the economic growth and well-being of both the state and the nation, and advancement of knowledge in the mechanical and aeronautical sciences.

Objectives. The objectives of the programs offered in Mechanical and Aeronautical Engineering include the following: to prepare its graduates to practice mechanical engineering or aeronautical engineering in a broad range of industries, to enable interested graduates to pursue graduate education, to prepare its graduates to participate in research and development, and in creative and innovative effort in science, engineering, and technology and to allow interested graduates to pursue entrepreneurial endeavors.

The Aeronautical Science and Engineering Major Program

Aeronautical Science and Engineering is the branch of engineering that applies scientific knowledge to the design, manufacture and operation of aircraft. Our Bachelor of Science degree in Aeronautical Science and Engineering provides a broad background and fundamental education in mathematics, the physical sciences, and the engineering sciences. These fundamentals, when complemented by the required technical courses, prepare you for employment in government or industry, where simultaneously establishing an excellent foundation for graduate studies.

The fundamental disciplines of this branch of engineering apply to all bodies and vehicles whose applied loads are influenced by aerodynamic forces.

Courses in fundamental engineering principles are supplemented with courses in aircraft propulsion, aerodynamics, performance, stability and control, aircraft preliminary design, aeronautical structures, and aerelasticity.

Aeronautical Science and Engineering Program

The Aeronautical Science and Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; (410) 347-7700.

Lower Division Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics 1A-1B</td>
<td>10</td>
</tr>
<tr>
<td>Physics 9A-9B</td>
<td>16</td>
</tr>
<tr>
<td>Chemistry 2A-2B</td>
<td>10</td>
</tr>
<tr>
<td>Engineering 4</td>
<td>3</td>
</tr>
<tr>
<td>Engineering 6 or Mechanical Engineering 2</td>
<td>3</td>
</tr>
<tr>
<td>Engineering 17, 35, 45</td>
<td>11</td>
</tr>
<tr>
<td>English 3 or University Writing Program 1</td>
<td>4</td>
</tr>
<tr>
<td>Comparative Literature 1, 2, 3, 4, or 5</td>
<td>4</td>
</tr>
</tbody>
</table>

Minimum Lower Division Units ...... 93

Upper Division Requirements:

A broad range of technical elective courses is available. Some students choose these electives from one area of study in order to begin developing a specialty. Others choose from several areas in order to broaden their background in the sciences and engineering. Typical aerospace science and engineering specialties include aerothermodynamics, propulsion systems, aircraft performance, stability and control, aeronautical structures, aerelasticity, flight testing, or component and mechanism design. There are a number of electives that could be recommended to all aeronautical science and engineering students regardless of their chosen area of specialization.

Suggested technical electives:
Aeronautical Science and Engineering 137, 139


Upper Division Required Courses

Engineering 100, 102, 103, 104, 105 | 19
Select one course from Applied Science Engineering 115, Engineering 180 or Mathematics 128C | 4
Engineering 190 | 3
Technical electives | 7
A combined maximum of four units may be selected from project/independent study courses (184A, 184B, 185A, 185B, 192, 199).

General Education electives ...... 8
Minimum Upper Division Units ...... 95

Minimum Units Required for Major ...... 188
The Mechanical Engineering Major Programs

The mechanical engineer uses basic science in the design and manufacture of complex engineering systems, requiring an application of physical and mechanical principles to the development of machines, energy conversion systems, materials, and equipment for guidance and control.

Work in this broad field of engineering requires a thorough knowledge of mathematics, physics, chemistry, fluid mechanics, thermodynamics, heat transfer, mass transfer, electricity, manufacturing processes, and economics.

The Mechanical Engineering Program is designed to provide a broad-based technical and associated applied sciences so that you may practice in a broad range of industries, pursue graduate studies, participate in research and development, and/or pursue entrepreneurial endeavors.

The Mechanical Engineering/Materials Science Program is a combined major that offers students a unique interdisciplinary experience requiring work with mechanical engineering and materials science students. In addition to performing work in mechanical engineering as described above, this program provides the background to understand the structure, properties, and behavior of materials and to pursue these fields in industry and/or graduate school.

Mechanical Engineering Program

The Mechanical Engineering program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Street, Suite 10, Baltimore, MD 21202-4012; (410) 347-7700.

Mechanical Engineering Programs

Lower Division Requirements:
The lower division requirements for the Mechanical Engineering/Materials Science and Engineering programs are the same.

Lower Division Required Courses

Requirements for the Mechanical Engineering and Mechanical Engineering/Materials Science and Engineering programs.

UNITS

Mathematics 21A 21B 21C 21D .......................... 16
Mathematics 22A 22B ........................................... 6
Physics 4A 4B 9C 9D ........................................... 19
Chemistry 2A 2B or 2AH 2BH ......................... 10
Engineering 4 ...................................................... 3
Engineering 6 or Mechanical Engineering 5 ...... 4
Engineering 17 35 45 .......................................... 11
Mechanical Engineering 50 ........................... 4
English 3 or University Writing Program 1, or Comparative Literature 1 3 3 or 4, or
Native American Studies 5 ................................ 4
Communication 1 or 3 ........................................ 4
General Education Activities .......................... 12

Minimum Lower Division Units ............................ 93

Mechanical Engineering Upper Division Requirements:

You spend your third year in further study of fundamental courses, and in the fourth year you may tailor your studies to your own interests by selecting courses in controls and systems analysis, fluid mechanics, mass transfer, mechanical design or thermodynamics. You can either prepare for graduate study in Mechanical Engineering or obtain a broad background for entering engineering practice at the bachelor's level.

You are encouraged to select elective courses from among the areas of specialization listed below.

Areas of Specialization

Mechanical Design. The creation and improvement of products, processes, or systems that are mechanical in nature are the primary activities of a professional mechanical engineer. The development of a product from concept generation to detailed design, manufacturing process selection and planning, quality control and assurance, and life cycle considerations are all important areas of specialization.

Suggested technical electives:

- Aeronautical Science and Engineering 130A, 130B, 133, 137, 139
- Biological Systems Engineering 165
- Applied Science Engineering 115
- Engineering 111, 122, 160 (only one unit of credit towards technical Electives requirement)
- Materials Science and Engineering 180, 181

Mechanical Engineering 134, 1508, 151, 152, 161, 162, 184A with 184B (either course must be taken), 185A with 185B (both courses must be taken).


Biomedical and Mechanical Fluid Mechanists,

This field of study is based on the fundamentals of fluid mechanics and their broad range of applications in the biomedical and engineering areas.

Areas of current research include blood circulation and its potential role in the regulation of normal physiological function and in the development of disease; groundwater and atmospheric flows and their implications for pollutant transport and environmental concerns; aerodynamic flow around transportation vehicles and its impact on vehicle performance; and flow in combustion engines and other energy systems with considerations of efficiency and environmental impact. These areas are investigated both experimentally and computationally.

Suggested technical electives:

- Aeronautical Science and Engineering 138 Engineering 160 (only one unit of credit towards technical requirements);
- Engineering 180
- Chemical Engineering 161A, 161B
- Civil and Environmental Engineering 144, 149
- Mechanical Engineering 161, 162, 163

Suggested Advisers: R.C. Aldredge, A.I. Barakat, J.J. Chattot, M. Hafez, I.M. Kennedy, W. Kollmann, B.D. Shaw

Combustion and the Environment.

Combustion is widely used in generation, propulsion, and waste disposal systems. As such, it has important applications in the design and operation of electrical power systems, chemical processes, and aerospace systems. Therefore, combustion has become an important area of research in the field of mechanical engineering.

Suggested technical electives:

- Mechanical Engineering 161, 163, 184A with 184B (both courses must be taken).


Suggested technical electives:

- Aeronautical Science and Engineering 129, 139
- Engineering 122
- Mechanical Engineering 134, 152, 184A with 184B (both courses must be taken).

Suggested Advisers: R.C. Aldredge, R. Davis, P.A. Erickson, I.M. Kennedy, W. Kollmann, B.D. Shaw

Manufacturing. Manufacturing is concerned with the conversion of raw materials into finished products by a variety of processes, such as machining, forming, casting, and molding. Modern manufacturing technology is increasingly dependent upon integration with computer-aided design systems and precision computer controls. There are opportunities for students to participate in engineering projects on continuously variable transmissions, active and semi-active suspension systems, modeling and control of vehicles, energy generation, power generation, propulsion, heat exchanges, industrial processes, refining, and chemical processing. This area of specialization is important to many industries—aerospace, defense, automotive—as well as to the thermal design of electronic and computer packages.

Suggested technical electives:

- Aeronautical Science and Engineering 138 Engineering 111, Mechanical Engineering 161, 162, 163

Suggested Advisers: R.C. Aldredge, R. Davis, P.A. Erickson, I.M. Kennedy, W. Kollmann, B.D. Shaw

Systems Dynamics and Control. Engineers are increasingly concerned with the performance of integrated dynamic systems in which it is not possible to optimize component parts without considering the overall system.


An Automotive System Dynamics Laboratory is being used for testing components such as engines, transmissions, brakes, and steering systems as well as testing complete vehicles.

Suggested technical electives:

- Aeronautical Science and Engineering 129, 139
- Engineering 122
- Mechanical Engineering 134, 152, 184A with 184B (both courses must be taken).


General Education (GE) credit: ArtHum = Arts and Humanities, SciEng = Science and Engineering, SocSci = Social Sciences, Div = Social- Cultural Diversity, Wrt = Writing Experience
Ground Vehicle Systems. An important aspect of mechanical engineering is the design of more environmentally benign surface vehicles that provide efficient individual and public transportation. Innovations in the field require competence in vehicle dynamics, control of vehicle dynamics, power sources and power transmission, lightweight structures and systems, alternatively fueled power systems, including electrical drives and fuel cells, and mechanical systems.

Transportation Systems. As society recognizes the increasing importance of optimizing transportation systems to minimize environmental degradation and energy expenditure, engineers will need to consider major innovations in the way people and goods are moved. Such innovations will require competence in vehicle dynamics, propulsion and control, and an understanding of the problems caused by present-day modes of transportation. Vehicle control requires an understanding of sensors and actuators, and the integration of yet-to-be-proposed concepts into overall vehicular dynamics. Competence in these areas allows for the development of alternative propulsion concepts, such as electric, hybrid, and fuel cell.

Suggested technical electives:
Aeronautical Science and Engineering 127, 129
Civil and Environmental Engineering 131, 149
Engineering 122, 160 (only one unit of credit towards Technical Electives requirement) Mechanical Engineering 134, 150B, 161, 162, 163


Mechanical Engineering Upper Division Required Courses
Engineering 100, 102, 103, 104, 105 ........................................... 12
Mechanical Engineering 150A and 172, and one course chosen from 185A with 185B (both courses must be taken in consecutive quarters), or Aeronautical Science and Engineering 130A................................................. 12
Engineering 190.................................................... 3
Select one course from Applied Science Engineering 115; Engineering 180; Mathematics 128C; Statistics 120, 131A ................................................... 4
Technical electives ............................................. 4 Technical electives ............................................. 24

Sixteen of the 24 units must be selected from upper division courses in engineering; of these units one course must be chosen from the following: Engineering 122, Mechanical Engineering 150B, 154 (Mechanical Engineering and Aeronautical Science and Engineering double majors may petition to substitute Aeronautical Science and Engineering 137 or 139).
Two additional courses must be chosen from the following design courses: Aeronautical Science and Engineering 129, 130B, 130C, 137, 138, 139, Materials Science and Engineering 180, 180A, Mechanical Engineering 134, 151, 152, 154, 161, 162, 163. You may also choose from Mechanical Engineering 150B, 184A with 184B (these courses must be taken in consecutive quarters). 185A with 185B [these courses must be taken in consecutive quarters], if these courses are not used for a core design requirement above.
A maximum of 4 units of courses numbered 184A, 184B, 185A, 185B may be applied to the technical elective degree requirement.

General Education electives ............................. 12 Minimum Upper Division Units ....101
Minimum Units Required for Major .........194

The Graduate Program
M.S., M.Eng., D.Engr. and Ph.D.
Professional Certificate
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http://www.mae.ucdavis.edu (530) 752-0581

The defining element of graduate study in the department of Mechanical and Aeronautical Engineering is interdisciplinary design. Research within the department advances design in diverse fields such as vehicles, biomechanics, aerostructures, sensors, combustion and energy systems. Graduate student researchers acquire skills to address both fundamental issues in these areas and to design complex, multi-component systems. The highly collaborative environment fosters multidisciplinary research while drawing on the strengths of mathematics, electrical engineering, materials science, biology and nanotechnology. Recruiters from industry are active here, knowing that, in addition to having hands-on design experience, our students are well-versed in engineering fundamentals. They study with professors who "wrote the book" on their discipline, and work on design projects with researchers who are international authorities in their field. Our graduate students are able to work closely with faculty in a friendly but demanding environment where teamwork and faculty mentoring are important, as is the cross-disciplinary, collaborative culture that is unique to UC Davis.

Generous financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid.

Research Highlights:
• Aeronautics and Astronautics
• Space Systems
• Flight Dynamics and Control
• Computational Fluid Dynamics
• Dynamic Systems and Controls
• Thermodynamics and Heat Transfer
• Automotive System Dynamics
• Biofluid Mechanics
• Biosensors/Microelectromechanical Systems (MEMS)
• Biosiloid Mechanics
• Manufacturing and Mechanical Design
• Sports Biomechanics
• Energy Systems/Fuel Cell/ Hybrid Vehicle Technology
• Robotics

Research Facilities and Partnerships:
• Center for Computational Fluid Dynamics
• Institute of Transportation Studies
• Center for Advanced Highway Maintenance and Construction Technology
• GATE Center for Hybrid Electric Vehicles
• Aeronautical Wind Tunnel Facility

Complete Information on our Website:
Courses in Engineering: Mechanical (ME)
Courses in Mechanical Engineering (ME) are listed below; courses in Aeronautical Science and Engineering (EAE) are listed immediately following; graduate courses in Mechanical and Aeronautical Engineering (MAE) follow.

Lower Division Courses
1. Mechanical Engineering (1)
Lecture—1 hour. Description of the field of mechanical engineering with examples taken from industrial applications, discussions of the practice with respect to engineering principles, ethics, and responsibilities. (P/NP grading only)—I, II, III

2. Computer Programming for Engineering Applications (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 16A or 21A (may be taken concurrently). Structured programming in C for solving problems in engineering. Introduction to MATLAB and comparison study of C/C++ with MATLAB. Not open for credit to students who have completed course 124—II, II, III, IV

3. Manufacturing Processes (4)
Lecture—discussion—3 hours; laboratory—3 hours. Prerequisite: Engineering 4 with grade of C or better, Physics 9A. Modern manufacturing methods, safety, manufacturing instructions, computer-aided manufacturing and their role in the engineering design and development process.—II, II, III, IV

92. Internship in Mechanical Engineering (1-5)
Internship. Prerequisite: lower division standing; approval of project prior to period of internship. Supervised work-study experience in engineering. May be repeated for credit. (P/NP grading only)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor; lower division standing. (P/NP grading only)
Upper Division Courses

106. Thermo-Fluid Dynamics (4)
Lecture—4 hours. Prerequisite: Engineering 103 and 105. Restricted to Mechanical Engineering, Aeronautical Engineering and Mechanical Engineering/ Materials Science Engineering majors. Inviscid incompressible flow, compressible flow, thermodynamic relations, ideal gas mixtures, psychrometric, reacting mixture and combustion. —I, III; II, III, III

107A. Experimental Methods (3)
Lecture—2 hours; laboratory—1.5 hours. Prerequisite: course 106; open to Mechanical Engineering, Aeronautical Science & Engineering and Mechanical/Materials Science Engineering Majors only. Experiments to illustrate principles of thermal-fluid systems. Statistical and uncertainty analysis of data; statistical design of experiments; measurement devices; experiments involving thermodynamic cycles, combustion, compressible and incompressible flows. Only two units of credit for students who have previously taken Chemical Engineering 155A; only one unit of credit for students who have taken Chemical Engineering 155B; only two units of credit for students who have taken Civil and Environmental Engineering 141L, II, III. —II, III; III

107B. Experimental Methods (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Engineering 100, Engineering 104, (both may be taken concurrently), and course 107A. Experiments to illustrate principles of mechanical systems. Theory of mechanical vibration; Demonstration basic sensors for mechanical systems; Experimental project design; Experiments involving voltage measurement; strain gauges, dynamic systems of Oth, 1st and 2nd order systems. Only two units of credit for students who have previously taken Biomedical Engineering 111; only one unit of credit for students who have previously taken Biological Systems Engineering 165. —I, II, III; II, III, III

134. Vehicle Stability (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 171. Introduction to the static and dynamic stability characteristics of transportation vehicles with examples drawn from aircraft, high performance automobiles, rail cars and boats. Laboratory experiments illustrate the dynamic behavior of automobiles, race cars, bicycles, etc. —II, III; III

141. Space Systems Design (4)
Lecture—2 hours, laboratory—3 hours, discussion—1 hour. Prerequisite: Engineering 102. Introduction to space systems design including space project organization, preliminary design, selection of systems, design evaluation, system performance, system interfaces, subsystem design. Prototypes space mission concepts are presented and a multidisciplinary mission design is developed that considers all primary architecture elements. Offered in alternate years. —I

150A. Mechanical Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 and 104, Mechanical Engineering 50 (may be taken concurrently). Principles of engineering mechanics applied to mechanical design. Theories of static and fatigue failure of metals. Design projects emphasizing the progression from conceptualization to detail. —I, II, III; II, III, III

150B. Mechanical Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 102A. Engineering mechanics applied to the design and selection of mechanical components. Design projects, which concentrate on conceptual design, engineering analysis, methods of manufacture, cost estimation, and cost Introduction to Computer-Aided Design. —II, III

151. Statistical Methods in Design and Manufacturing (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 102A. Methods of statistical analysis with emphasis on applications in mechanical design and manufacturing. Applications include product evaluation and decision making, stress-strength interference, probabilistic design, system reliability, and fatigue under random loading. —II, II, II, II

152. Computer-Aided Mechanism Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 5 or Engineering 6 and 102. Principles of computer-aided design. Computer-aided kinematic, static, and dynamic analysis and design of planar mechanisms such as multiple-loop linkages and geared linkages. Introduction to kinematic synthesis of mechanisms. —II, III

154. Mechanotronics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100, 102, course 50. Mechanotronics system concept and overview; control system design overview; control software architecture, control hardware-ware interface, microcontroller and interface technology for mechanotronics control, sensor for mechanotronics systems, actuator drives. —III

161. Combustion and the Environment (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 106. Introduction to combustion kinetics; the theory of premixed flames and diffusion flames; turbulent combustion; formation of air pollutants in combustion systems; examples of combustion devices which include internal combustion engines, gas turbines, furnaces and waste incinerators; alternative fuel sources. —II, III

162. Modern Power Plants (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 106. Modern power plants for electric power generation and cogeneration. Thermodynamic analysis of different types of power plants using various fuels. Design studies of specific power plants. —II, III

163. Internal Combustion Engines and Future Alternatives (4)
Lecture—3 hours, laboratory—3 hours. Prerequisite: Engineering 103 and 105. Fundamentals of internal combustion engine design and performance. Future needs to adapt to environmental concerns, and the feasibility of better alternatives in the future. —II, III

165. Heat Transfer (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 5 or Engineering 6, 103 and 105. Conduction, convection and radiation heat transfer. Com- putational modeling of heat transfer in engineering. Applications to engineering equipment with the use of digital computers. —I, II, II, III

171. Analysis, Simulation and Design of Mechanotronic Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100 and 102, upper division standing. Modeling of dynamic engineering systems in various energy domains. Analysis and design of dynamic systems. Response of linear systems. Digital computer-simulator and physical experiments. —I, II, III, II, III

172. Automatic Control of Engineering Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 171, Engineering 100. Classical feedback control; block diagrams; control systems performance specifications; steady state errors; rise and settling times; root locus; PID controllers; control design with Bode and Nyquist plots; stability; phase and gain margin; lead and lag compensators; state variable feedback controllers. —I, II, II, III

184A. Senior Design Project (2)
Laboratory—6 hours. Prerequisite: courses 150B, 165, and 172, consent of instructor, senior standing in Mechanical Engineering. Performance of practical mechanical engineering projects which include one or more of the following: analysis, design, development, and evaluation of mechanical system engineering. (Deferred grading only, pending completion of sequence). —I, II, III, II, III

184B. Senior Design Project (2)
Laboratory—6 hours. Prerequisite: course 184A in a previous quarter from the same instructor, consent of instructor. Performance of practical mechanical engineering projects which include one or more of the following: analysis, design, development, and evaluation of a mechanical engineering system. —I, II, II, III

185A-185B. Mechanical Engineering Systems Design Project (2-2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 150A, 165, senior standing in Mechanical Engineering or Aeronautical Science and Engineering. Capstone mechanical engineering design course, the mechanical engineering design process and its use in the design of engineering systems. (Deferred grading only, pending completion of sequence). —III, III, III, III, III

189A. Selected Topics in Mechanical Engineering (1)
Lecture/discussion—1 hour biweekly; laboratory—3 hours biweekly. Prerequisite: consent of instructor. Directed group study of selected topics with separate sections in (A) Fluid Mechanics Laboratory (B) Thermodynamics Laboratory. —II, III, III

192. Internship in Engineering (1-5)
Internship. Prerequisite: upper division standing; approval of project prior to period of internship. Supervised work experience in mechanical engineering. May be repeated for credit. [P/NP grading only]

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. [P/NP grading only]

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. [P/NP grading only]

Courses in Aeronautical Science and Engineering (EAE)

Lower Division Courses

1. Introduction to Aerospace Science Engineering (1)
Lecture—1 hour. Description of the field of aerospace engineering with examples from industry, government, and research. Aerospace engineering principles, ethics, and responsibilities. [P/NP grading only] —I

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor and lower division standing. [P/NP grading only]

Upper Division Courses

126. Theoretical and Computational Aerodynamics (4)

127. Applied Aircraft Aerodynamics (4)

229. Stability and Control of Aerospace Vehicles (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 150, Aircraft and Space Systems Laboratory. Aircraft flight control systems. Specialized. equations of motion for orbiting spacecraft. Spacecraft attitude control systems. —II, III

General Education (GE) credit: ArtsHum—Arts and Humanities; ScieFreq—Science and Engineering; SocSci—Social Sciences; Div—Social-Cultural Diversity; Wrt—Writing Experience

Quarter Offered: I—Fall, II—Winter, III—Spring, IV—Summer. 2009-2010 offering in parentheses

Engineering: Mechanical and Aeronautical Science
Courses in Mechanical and Aeronautical Engineering (MAE) (Formerly courses in Aeronautical Science and Engineering and Mechanical Engineering.)

Graduate Courses

207. Engineering Experimentation and Uncertainty Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 107A and 107B. Design and analysis of engineering experiments with emphasis on measurement standards, data analysis, and statistical uncertainty analysis, including statistical treatment of experimental data intervals, propagation of bias and precision errors, correlated bias approximations, and using filter programs. (I.) Margolis

208. Measurement Methods in Fluid Mechanics and Combustion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 165 and Engineering 103. Application of shadow, schlieren and other flow visualization methods. Introduction to optics and lasers. Measurement of velocity and concentrations in reacting and non-reacting flows with laser diagnostic techniques including LDV, Rayleigh, Raman and fluorescence scattering and CARS. Offered in alternate years.—(III.) Kennedy

210A. Advanced Fluid Mechanics and Heat Transfer (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 165 and Engineering 103. Application of fluid mechanics to option, schlieren and other flow visualization methods. (I.) Kollmann

210B. Advanced Fluid Mechanics and Heat Transfer (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 210A. Study of stability and transition to turbulence. Introduction to the physics of turbulence. Modelling of turbulence for numerical determination of momentum and heat transfer. (II.) Kollmann

211. Fluid Flow and Heat Transfer (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103, 105 and Mechanical Engineering 165 or the equivalent. Design aspects of selected topics; heat conduction, flow transport in ducts, boundary layers and separated flows; heat exchangers. (I.) Kollmann

212. Biomedical Heat and Mass Transport Processes (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 165, Biological Systems Engineering 125, Chemical Engineering 153 or the equivalent. Application of principles of heat and mass transfer to biomedical systems related to heat exchange between the biomedical system and its environment, mass transfer across cell membranes and the design and analysis of artificial human organs. (Same course as Biomedical Engineering 212.) Offered in alternate years.—(III.) Aldredge

213. Advanced Turbulence Modeling (4)
Lecture—4 hours. Prerequisite: course 210B. Methods of analyzing turbulence, kinematics and dynamics of homogeneous turbulence, Reynolds stress and heat-flux equations; second order closures and their simplification; numerical methods; application to boundary-layer-type flows; two-dimensional and three-dimensional flows and environmental flows. Offered in alternate years.—(III.) Aldredge, Kollmann

215. Biomedical Fluid Mechanics and Transfusion Physics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 or Chemical Engineering 150B or Civil and Environmental Engineering 141. Application of fluid mechanics and transport to biomedical systems. Flow through arterial wall and in tumors, and issue engineering. (Same course as Biomedical Engineering 225.)—(III.) Barakat, lumen flame structure and turbulent combustion. Offered in alternate years.—(II.) Shaw

216. Advanced Thermodynamics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 105. Study of topics important to energy conversion systems, propulsion, and other systems using high temperature gases. Classical thermodynamics and quantum statistical mechanics of nonreacting and chemically reacting gases, gas mixtures, and other substances.—(I.) Shaw

217. Combustion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 and 105. Review of chemical thermodynamics and chemical kinetics. Discussions of reacting flows, their governing equations and transport phenomena; laminar flow and turbulent combustion. Offered in alternate years.—(II.) Aldredge, Kennedy, Shaw

218. Advanced Energy Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 and 105, or the equivalent. Review of options available for advanced power generation. Detailed study of basic power balances, component efficiencies, and overall powerplant performance for one advanced concept such as a fusion, magnetohydrodynamic, or solar electric powerplant. Offered in alternate years.—(II.) Hoffman

219. Introduction to Scientific Computing in Social, Materials and Dynamic Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 103 and 104. Scientific calculations with finite element and finite difference methods for multi-dimensional problems in solid and fluid dynamics are performed with examples of laminar, turbulent, and reacting flows; random processes and vibrations; auto-correlation; spectral density; first passage and fatigue failure; nonlinear systems; phase plane. —(III.) Margolis

222. Advanced Dynamics (4)
Lecture—4 hours. Prerequisite: Engineering 102. Dynamics of particles, rigid bodies and distributed systems with engineering applications; generalized coordinates; Hamilton’s equations of motion; Lagrange’s equations; Hamilton-Jacobi theory; modal dynamics; quantum mechanics and quantum statistical mechanics of systems using high temperature gases. Detailed study of nonreacting and chemically reacting gases, gas mixtures, and other substances. —(III.) Barakat

223. Biomechanics (4)
Lecture—4 hours. Prerequisite: Engineering 102. Coupled rigid-body kinematics/dynamics; reference frames; vector differentiation; configuration and motion constraints; holonomics; generalized speeds; partial velocities; mass, inertia tensor/theorem; angular momentum; generalized forces; comparing Newton/Euler, Lagrange’s, Kane’s methods; computer-aided equation derivation; orientation; Euler; Rodrigues parameter. Same course as Biomedical Engineering 223.)—(III.) Eke, Hubbard

225. Spatial Kinematics and Robotics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: C Language and course 222. Spatial kinematics, screw theory, spatial motors, spatial motions and synthesis, robot kinematics and dynamics, robot workspace, path planning, robot programming, realtime architecture and software implementation. (Same course as Biomedical Engineering 225.) Offered in alternate years.—(II.) Cheng, Ravani

226. Acoustics and Noise Control (4)
Lecture—4 hours. Prerequisite: Engineering 122. Description of sound using normal modes and waves; interaction between vibrating solids and sound fields; sound absorption in enclosed spaces; sound transmission through barriers; applications in...
266 Engineering: Mechanical and Aeronautical

design, acoustic enclosures and sound walls, room acoustics, design of quiet machinery. Offered in alternate years. —III. Van der Steg.

227. Research Techniques in Biomechanics

Lecture—2 hours; laboratory—4 hours; term paper or discussion—1 hour. Prerequisite: Mathematics 226 and 228 or consent of instructor. Exercise Science 115 recommended. Experimental techniques for biomechanical analysis of human movement. Techniques evaluated include data acquisition and analysis by computer, force and moment assessment, strength assessment, planar and three-dimensional videography, data reduction and smoothing, body segment parameter estimation, electromyography, and biomechanical modeling. [Same course as Biomedical Engineering 227/Exercise Science 227].—II. (J.) Williams, Hawthkins.

231. Musculo-Skeletal System Biomechanics

Lecture—4 hours. Prerequisite: Engineering 102. Mechanics of skeletal muscle and mechanical models of muscle, solution of the inverse dynamics problem, theoretical and experimental methods of kinematic and kinetic analysis, computation of intersegmental load and muscle forces, applications to gait analysis and sports biomechanics. [Same course as Biomedical Engineering 231].—III. (I.) Hull.

232. Skeletal Tissue Mechanics

Lecture—3 hours; laboratory—1 hour. Prerequisite: Engineering 104B. Overview of the mechanical properties of the various tissues in the musculoskeletal system, the relationship of these properties to anatomic and histologic structure, and the changes in these properties caused by aging and disease. The tissues considered include bone, cartilage and synovial fluid, ligament and tendon. [Same course as Biomedical Engineering 232].—III. (I.) Martin.

234. Design and Dynamics of Road Vehicles

Lecture—4 hours. Prerequisite: Mechanical Engineering 134. Analysis and numerical simulation of road vehicles with an design applications. Offered in alternate years.—III. (I.) Vellinsky.

236. Aerodynamics in Nature and Technology

Lecture—4 hours. Prerequisite: Engineering 103. Introduction to aerodynamics in nature, fundamentals of turbulence in atmospheric flows, planetary boundary layers, pedestrian-level winds in urban areas, and development of an introductory modeling of atmospheric flows, wind-tunnel testing. Offered in alternate years.—III. (I.) White.

237. Analysis and Design of Composite Structures

Lecture—3 hours; discussion—1 hour. Prerequisite: Aeronautical Science and Engineering 137. Modeling and analysis methodology for composite structures including response and failure. Laminated plate bending modes and buckling failure processes. Offered in alternate years.—III. (I.) Saponara.

238. Advanced Aerodynamic Design and Optimization

Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor. Application of aerodynamic theory to obtain optimum aerodynamic shapes. Both analytic solutions and solutions obtained with numerical optimization techniques will be examined. Includes introduction to the calculus of variations and numerical optimization techniques. Offered in alternate years.—II. (I.) van Dam.

239. Advanced Finite Elements and Optimization

Lecture—4 hours. Prerequisite: Engineering 180 or Applied Science 115 or Mathematics 128C. Introduction to advanced finite elements and design optimization methods, with application to modeling of complex, three-dimensional, nonlinear, and multiphase and multiphysics systems. Application of states of the art in finite elements in optimal design of components under realistic loading conditions and constraints. Offered in alternate years. [Same course as Biomedical Engineering 239].—III. Saruğç-Kliijn.

240. Computational Methods in Nonlinear Mechanics

Lecture—4 hours. Prerequisite: Applied Science Engineering 115 or Mathematics 128B or Engineering 180B. Introduction to the solution of finite element methods for mechanical, aeronautical, and biological systems. Offered in alternate years. [Same course as Biomedical Engineering 240].—II. (I.) Cheng.

242. Stability of Thin-Walled Structures

Lecture—4 hours. Prerequisite: Engineering 104 or equivalent. Static stability of thin-walled aerospace structures treated from both theoretical and practical design perspectives. Both nonlinear and composite construction considerations, failure prediction of panels, shells, and thin-walled beams, experimental methods and failure/cracking processes. Offered in alternate years.—III. (I.) Hull.

248. Advanced Turbomachinery

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 and 105. Preliminary aerodynamics and mechanics of turbo machinery and engines. Application of advanced techniques to mechanical design problems. Offered in alternate years.—III. (I.) Hull.

250A. Advanced Methods in Mechanical Design

Lecture—4 hours. Prerequisite: Mechanical Engineering 150A and 150B or the equivalents, or consent of instructor. Application of advanced techniques to solid mechanisms to mechanical design problems. Coverage of advanced topics in stress analysis and static failure theories with emphasis in design of machine elements. Design projects emphasizing advanced analysis tools for life cycle evaluation.—I. (I.) Farouki.

250B. Advanced Methods in Mechanical Design

Lecture—4 hours. Prerequisite: course 250A. Applications of advanced techniques of solid mechanics to mechanical design problems. Advanced topics in variational methods of mechanics with emphasis in design of machine elements. Design projects emphasizing advanced analysis tools for life cycle evaluation.—II. (I.) Hill.

250C. Mechanical Performance of Materials


251. Mechanotransduction Systems Design

Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 154 and 172 or Electrical and Computer Engineering 157A, 157B. Motion mechanism design, electric actuator, power electronics motion control, sensor technologies, personal computer-based control systems design, motion control general operating system and real time operating systems, motion control software design, discrete event control and model-based design. Offered in alternate years.—I. (I.) Yamasaki.

252. Information Processing for Autonomous Robotics

Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor. Engineering 5, or equivalent programming experience, Mechanical Engineering 154, 171, or consent of instructor. Computational principles for sensing, reasoning, and navigation for autonomous robots. Offered in alternate years.—II. (I.) Hazlett.

254. Engineering Software Design

Lecture—3 hours; laboratory—3 hours. Prerequisite: Mechanical Engineering 5, Engineering 180. Principles and design of engineering software. Advantages and disadvantages of object-oriented programming, very high-level languages, real-time multithread computing and sensor fusion, web-based networked computing, graphics, and GUI in engineering. Offered in alternate years.—III. (I.) Cheng.

255. Computer-Aided Design and Manufacturing

Lecture—3 hours. Laboratory—3 hours. Prerequisite: proficiency in a high level programming language such as Fortran, Pascal, or C. Representation and processing of geometrical information in design and manufacturing. Numeric and symbolic computation algorithms. Finite systems solutions to classical Bezier and B-spline curves and surfaces. Interpolation and approximation methods. Intersections, offsets, and blends. Path planning for machining, inspection, and robotic applications. Offered in alternate years.—III. (I.) Farouki.

258 Hybrid Electric Vehicle System Theory and Design

Lecture—3 hours, laboratory—3 hours. Prerequisite: Mechanical Engineering 150B, graduate standing in Mechanical and Aeronautical Engineering. Advanced vehicle design for fuel economy, performance, and low emissions, considering regulations, societal demands and manufacturability. Analysis and verification of computer design and control of vehicle systems in real vehicle tests. Advanced engine concepts. Offered in alternate years.—III. (I.) Frank.

261. Gas Dynamics

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 or the equivalent. Flow of compressible fluids. Isentropic flow. Flow with friction, heat transfer, chemically reacting gas and particle mixtures. Normal and oblique shock waves, combustion, blast and expansion waves. Method of characteristics. Offered in alternate years.—III. (I.) Farouki.

262. Advanced Aerodynamics

Lecture—3 hours; discussion—1 hour. Prerequisite: Aeronautical Engineering 126. Study of inviscid and viscous flows about aerodynamic shapes at subsonic, transonic and supersonic conditions. Application of aerodynamic theory to design of aircraft and airfoils. Prediction of maximum lift and increased lift. Offered in alternate years.—II. (I.) van Dam, Hazlett, Chatot, White.

263. Introduction to Computational Aerodynamics and Fluids

Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 or consent of instructor. Introduction to numerical methods for solution of fluid flow problems. Discretization techniques and solution algorithms. Application of finite system solutions to classical model equations pertinent to wave phenomena, diffusion phenomena, or equilibrium. Application to the incompressible Navier-Stokes equation. Offered in alternate years.—II. (I.) Chatot, Dewar, Hazlett.

264. Computational Aerodynamics


266 Advanced Wind-Tunnel Testing

Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: undergraduate course in fluid dynamics. Aspects of low-speed wind-tunnel testing for solving aeronautical and non-aeronautical prob-
lems including tunnel corrections, scale effects, force and moment measurements, and flow visualization.

Offered in alternate years.—(III.) van Dam

267. Parallel Computations in Fluid/Thermal Sciences (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: Mechanical Engineering 106, 165, Engineering 180 or equivalent, or consent of instructor. Programming languages and constructs for engineering analysis on parallel computers including MPI (distributed), OpenMP (shared), and Fortran95. Graduate or junior/senior undergraduate as a technical elective.—I, II, III. (I, II, III) Davis

268. Wind Power Engineering (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: Mechanical Engineering 106, 107, 165, or equivalent, or consent of instructor; graduate or junior/senior undergraduate as a technical elective. Basics of electrochemistry and fuel cell engines in mobile and stationary applications. Aspects of fuel cell energy converters and their subsystems including practice with existing fuel cell and hydrogen systems on campus. Limited enrollment. Offered in alternate years.—II. Erickson

271. Advanced Modeling and Simulation of Mechatronic Systems (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: Mechanical Engineering 172 or the equivalent. Multiport models of mechanical, electrical, hydraulic, and thermal devices; bond graphs, block diagrams and state equations; modeling of multiple energy domain systems; three-dimensional mechanics; digital simulation laboratory.—I. (I) Karnopp, Margolis

272. Theory and Design of Control Systems (4)
Lecture—4 hours. Prerequisite: Mechanical Engineering 172 or the equivalent. Mathematical representations of linear dynamical systems. Feedback principles; benefits and cost of feedback. Analysis and design of control systems based on classical and modern approaches, with emphasis on applications to mechanical and aeronautical systems.—II. (II) Horsley, Karnopp

Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 172. Discrete systems analysis; digital filtering; sample data systems; state space and transfer function techniques; quantization effects, multi-input, multi-output systems. Offered in alternate years.—III. Hess

275. Advance Aircraft Stability and Control (4)

276. Data Acquisition and Analysis (4)
Lecture—3 hours; discussion—1 hour. Application of computers for data acquisition and control. Topics include computer architecture, characteristics of transducers, hardware for laboratory applications of computers, fundamentals of interfaces between computers and experimental equipment, programming techniques for data acquisition and control, and basic data analysis. Offered in alternate years.—I. Hill

290C. Graduate Research Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. Individual and/or group conference on problems, progress, and techniques in mechanical and aeronautical engineering research. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III)

297. Seminar (1)
Discussion—1 hour. Prerequisite: consent of instructor. Current engineering including development in mechanical and aeronautical engineering with presentations by students, faculty, and visitors. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III)

298. Group Study (1-5)

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only)

Professional Courses

390. The Teaching of Aeronautical Science and Engineering (1)
Discussion—1 hour. Prerequisite: meet qualifications for teaching assistant and/or associate in Aeronautical Science and Engineering. Methods of leading discussion groups or laboratory sections, writing and grading quizzes, use of laboratory equipment, and grading laboratory reports. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III)

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III)

English

(College of Letters and Science)
Margaret Ferguson, Ph.D., Chairperson of the Department
Department Office, 176 Voorhies Hall (530) 752-2257; http://english.ucdavis.edu

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Seeta Chaganti, Ph.D., Assistant Professor
Joshua Clover, MFA, Associate Professor
Lucy Corin, MFA, Associate Professor
Joanne F. Diehl, Ph.D., Professor
Gregory Dobbins, Ph.D., Associate Professor
Frances E. Dolan, Ph.D., Professor
Margaret W. Ferguson, Ph.D., Professor
Lynn R. Freed, Ph.D., Professor
Elizabeth S. Freeman, Ph.D., Associate Professor
W. Jack Hicks, Ph.D., Senior Lecturer
Pam Houton, B.A., Professor
Mark Jerger, Ph.D., Assistant Professor
Alessa Johns, Ph.D., Associate Professor
Richard A. Levin, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Christopher Loar, Ph.D., Assistant Professor
Desiree Martin, Ph.D., Assistant Professor
John Marx, Ph.D., Associate Professor
Sandra J. McPherson, B.A., Professor
Collin Milburn, Ph.D., Assistant Professor
Patricia L. Moran, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Christine Morton, D. Phil., Professor
Richdevich D. Richardson, Ph.D., Associate Professor
Academic Senate Distinguished Teaching Award
Christopher Schreiner, Ph.D., Professor
Scott C. Shershow, Ph.D., Professor
Scott Simon, Ph.D., Professor
David Simpson, Ph.D., Professor
Christopher Thais, Ph.D., Professor
David Van Leer, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Claire Waters, Ph.D., Associate Professor
Emreti Faturi
Max Byrd, Ph.D., Professor Emeritus
Peter Dale, Ph.D., Professor Emeritus
Sandra M. Gilbert, Ph.D., Professor Emeritus
Thomas A. Hanzo, Ph.D., Professor Emeritus
Wayne Harsh, Ph.D., Professor Emeritus
John O. Hayden, Ph.D., Professor Emeritus
Peter L. Hayes, Ph.D., Professor Emeritus
Michael J. Hoffman, Ph.D., Professor Emeritus
Robert H. Hopkins, Ph.D., Professor Emeritus
Clarence Major, Ph.D., Professor Emeritus
Linda A. Morris, Ph.D., Professor Emeritus
James J. Murphy, Ph.D., Professor Emeritus
Marjane Osbahr, Ph.D., Professor Emerita
David A. Robertson, Ph.D., Professor Emeritus
Academic Senate Distinguished Teaching Award
Gwendolyn Schwabe, M.A., Senior Lecturer
Daniel Silvia, Ph.D., Professor Emeritus
Gary Snyder, B.A., Professor Emeritus
Raymond B. Waddington, Ph.D., Professor Emeritus
Jany J. Woodress, Ph.D., Professor Emeritus
Karl F. Zender, Ph.D., Professor Emeritus

The Major Program
The study of English develops skills in reading analytically and perceptively and in writing clearly and effectively.

The Program. The English department offers three kinds of courses: composition courses, undergraduate courses, and graduate courses. Composition courses develop skills in reading analytically and in writing persuasively. Undergraduate and graduate courses cover the entire range of English and American literature, as well as creative writing. Students majoring in English may elect a creative writing emphasis or a literature, criticism, and theory emphasis. All majors take courses introducing them to the literatures of various periods and places, to critical theory, and to frontiers of literary expression, such as the relationship of literature to environmentalism or the emergence of new media. The creative writing emphasis focuses on fiction, poetry, and article writing. The literature, criticism, and theory emphasis focuses on advanced critical analysis and research. All majors have the opportunity to work with distinguished writers, critics, scholars, and teachers.

Career Alternatives. Graduates have found the major excellent pre-professional training for graduate study in English, as well as for careers in teaching, writing, law, medicine, and library work. Many graduates are employed in journalism, publishing, advertising, and public information. Others have worked in local, state, and federal government agencies, as well as in industry and agriculture. Some have established their own businesses.

A.B. Major Requirements:

Preparatory Subject Matter.................20

English 3 or University Writing Program 1..................................4
One course from ENL 40, 43, 44, 45 .......4
English 10A, 10B, 10C..........................12

Depth Subject Matter .....................44
English 110A or 110B..........................4
Please note that English 110A or 110B is a prerequisite for advanced study in the major.

Historical Distribution

Requirements.................................20
Three courses focusing on literature written in English before 1800, at least one of which must be on literature written primarily before 1500
Before 1500
English 111, 113A, 113B
1300-1800
English 115, 117A, 117B, 117C, 122, 123, 142, 150A, 155A
One course focusing on literature written in English between 1800 and 1900
English 130, 133, 143, 144, 152, 155B, 158A, 181A
One course focusing on literature written in English between 1900 and present
English 137N, 138, 141, 147, 150B, 155C, 156, 158B, 166, 167, 168, 181B
Non-Historical Distribution

Requirements: ................................................. 8
One course: 10A. Historical introduction to English language and literature from 1700-1900.

Linguistic borrowing, innovation, colonization, and change. Emergence and development of key literary genres. America, Britain, Ireland, Scotland, and India as important sites of English literary production and consumption. GE Credit: Wrt.

10C. Literatures in English III: 1900 to Present ................................................. 4
Lecture/discussion—3 hours; extensive writing. Pre-
requirement: course 10B. Historical introduction to Eng-
lish language and literature from 1900–present.

Linguistic borrowing, innovation, and change. Emer-
gence and development of key literary genres. For-
mal experimentation. Modernism as transnational
phenomenon. GE Credit: Wrt.

30A. Survey of American Literature (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 3 or University Writing Program 1 or the equivalent.
American literature from the seventeenth century to 1865. GE credit: ArtHum, Div. Wrt.

30B. Survey of American Literature (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 3 or University Writing Program 1 or the equivalent.
American literature from 1865 to the present. GE credit: ArtHum, Div. Wrt.

40. Introductory Topics in Literature (4)
Lecture/discussion—3 hours; extensive writing. Pre-
requirement: course 3 or University Writing Program 1 or the equivalent. Study of a special topic. Literature written in English in any period or place or genre.
Theme, formal, or temporal focus. May be repeated two times for credit if content differs. GE Credit: Wrt.

42. Approaches to Reading (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 3 or University Writing Program 1 or the equivalent. Close reading of selected works of British and American drama. Range of historical periods. Focus on a topic. Frequent written assignments. GE Credit: Wrt.

43. Introductory Topics in Drama (4)
Lecture/discussion—3 hours; extensive writing. Pre-
requirement: course 3 or University Writing Program 1 or the equivalent. Close reading of selected works of British and American drama. Range of historical periods. Focus on a topic. Frequent written assignments. GE Credit: Wrt.

44. Introductory Topics in Fiction (4)
Lecture/discussion—3 hours; extensive writing. Pre-
requirement: course 3 or University Writing Program 1 or the equivalent. Close reading of British and American Fiction. Short stories, novellas, novels. Focused on a topic. Frequent written exercises. GE Credit: Wrt.

45. Introductory Topics in Poetry (4)
Lecture/discussion—3 hours; extensive writing. Pre-
requirement: course 3 or University Writing Program 1 or the equivalent. Close reading of selections from Eng-
lish and American poetry. Focused on a topic. Frequent written exercises. GE Credit: Wrt.

46A. Masterpieces of English Literature (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 3 or University Writing Program 1 or the equivalent. Selected works of principal writers to 1640. History of literary conventions and back-
grounds in religious thought, intellectual and social history, and related art forms. GE Credit: Wrt.

46B. Masterpieces of English Literature (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 3 or University Writing Program 1 or the equivalent. Selected works of principal writers from 1640 to 1832. History of the Grand Tour Program background in religious thought, intellectual and social history, and related art forms. GE Credit: Wrt.
46C. Masterpieces of English Literature (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Selected works of principal writers from 1832 to present. The history of literary conventions and backgrounds in religious thought, intellectual and social history, and related art forms. GE credit: ArtHum, Wrt.

92. Internship in English (1-12) Internship—3-36 hours. Prerequisite: course 3 or University Writing Program 1. Internships in fields where English combines with graduate skills. May be repeated for credit for a total of 12 units. (P/NP grading only.)

98. Directed Group Study (1-5) Lecture—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Selected major works of Shakespeare’s later period, between 1604 and the end of his career. GE credit: ArtHum, Wrt.

112. Milton (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historical or thematically focused study of works of Milton. May be repeated for credit when content differs. GE credit: Wrt.

123. 18th-Century British Literature (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of 18th-century English literature. May be repeated for credit when content differs. GE credit: Wrt.

127N. British Literature, 1900-1945 (4) Lecture—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of works of British literature (drama, poetry, prose fiction) from the period between 1900 and World War II. May be repeated twice for credit when topic differs. Only 2 units of credit to students who have completed course 137. GE credit: Wrt.

138. British Literature: 1945 to Present (4) Lecture—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of works of British literature (drama, poetry, prose fiction) from the period after World War II. May be repeated twice for credit when topic differs. Only 2 units of credit to students who have completed course 137. GE credit: Wrt.

142. Early American Literature (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of American literature of the 17th and 18th centuries. May be repeated for credit when content differs. GE credit: Wrt.

144. Post-Civil War American Literature (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of works of post-Civil War American literature. May be repeated for credit when content differs. GE credit: Wrt.
146N. American Literature: 1900-1945 (4)
Lecture—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of American literature (drama, poetry, prose fiction) from the period between 1900 and the end of World War II. May be repeated two times for credit when topic differs. Only 2 units of credit to students who have completed course 146. GE credit: Wrt.

147. American Literature, 1945 to the Present (4)
Lecture—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of American literature (drama, poetry, prose fiction) from the period between 1945 and the present. May be repeated two times for credit when topic differs. Only 2 units of credit to students who have completed course 147. GE credit: Wrt.

149. Topics in Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Intensive examination of literature considered in topical terms, not necessarily historically. May be repeated for credit when content differs. GE credit: Wrt.

150A. British Drama to 1800 (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused study of works of British drama from 1800 to the present. May be repeated for credit when topic differs. GE credit: Wrt.

150B. British Drama from 1800 to the Present (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused study of works of British drama from 1800 to the present. May be repeated for credit when topic differs. GE credit: Wrt.

152. American Drama (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Study of American dramatic literature. Either a historical survey from 18th-century beginnings to the present or an in-depth analysis of fewer playwrights, such as O'Neill, Miller, Williams. May be repeated for credit when topic differs. GE credit: Wrt.

153. Topics in Drama (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historical or thematically focused study of works of drama. May be repeated for credit when topic differs. GE credit: Wrt.

155A. 18th-Century British Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically organized examination of the 18th-century British novel, with particular emphasis on its evolution, including the epistolary novel, the picaresque novel, and the Gothic novel. Richardson, Fielding, Sterne, Austen. GE credit: Wrt.

155B. 19th-Century British Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically organized examination of the 19th-century British novel, with emphasis on the historical novel, the social novel, and novels by women: Scott, Dickens, the Brontes, Eliot, Hardy. GE credit: Wrt.

153C. 20th-Century British Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically organized examination of the 20th-century British novel, with emphasis on the revolt against naturalism; the experimental novel; the modernist reaction: Conrad, Joyce, Woolf, Lawrence, Drabble, Rhys. GE credit: Wrt.

156. The Short Story (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historical or thematically focused study of the short story as a genre, its historical development, techniques, and formal character as a literary form. European and as American writers. GE credit: ArtHum, Wrt.

158A. The American Novel to 1900 (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically organized examination of American novels from its beginnings; Hawthorne, Melville, Twain, James, and others. GE credit: Wrt.

158B. The American Novel from 1900 to the Present (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically organized examination of American novelists of the twentieth century; Faulkner, Hemingway, Fitzgerald, Morrison, and others. GE credit: Wrt.

159. Topics in the Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Close reading of works of fiction by Ralph Ellison, James Baldwin, Toni Morrison, among others. GE credit: Wrt.

160. Film as Narrative (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 3 or University Writing Program 1. A study of modern film (mid-1930 to present) as a storytelling medium. Offered in alternate years. GE credit: ArtHum, Wrt.

161A. Film History I: Origins to 1945 (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 3 or University Writing Program 1. Cultural and aesthetic history of filmmaking from origins in the 1890’s through 1945. (Courses 161A and 161B need not be taken in sequence.) Offered in alternate years. GE credit: ArtHum, Wrt.—II.

161B. Film History II: 1945 to Present (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 3 or University Writing Program 1. Cultural and aesthetic history of filmmaking from 1945 through the present. (Courses 161A and 161B need not be taken in sequence.) Offered in alternate years. GE credit: ArtHum, Wrt.

162. Film Theory and Criticism (4)
Laboratory—3 hours; discussion—2 hours; lecture—1 hour. Prerequisite: course 3 or University Writing Program 1. Film theory and criticism, with a study of ten major works of international film art. Offered in alternate years. GE credit: ArtHum, Wrt.

1635. Topics in British Literature and Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 or University Writing Program 1. Study of writers, playwrights and novelists who worked in London. Examination of Elizabethan, Restoration, Augustan, Romantic/Victorian, and the Modernist/PostModernist periods. To be taught in London. GE credit: ArtHum, Wrt.

164. Writing Science (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Texts and writing practices in the production of scientific knowledge. Surveys the literary structure of scientific arguments; history of scientific genres; rhetoric and semiotics in scientific culture; graphical systems in the experimental laboratory; narratives of science, including science fiction. [Same course as Science & Technology Studies 164.] GE credit: ArtHum, Wrt.

165. Topics in Poetry (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 and course 45. Intensive examination of various topics expressed in poetry from all periods of English and American literature. May be repeated for credit when topics cover different poets and poems. GE credit: Wrt.

166. Love and Desire in Contemporary American Poetry (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Close reading of contemporary American poems on the theme of love and desire by poets of diverse ethnicities and of gay, lesbian, and heterosexual orientations. Offered in alternate years. GE credit: Wrt.

167. Twentieth-Century African American Poetry (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Twentieth-century African American poetry, including oral and literary traditions. Authors covered may include Gwendolyn Brooks, Countee Cullen, Robert Hayden, and Langston Hughes. Offered in alternate years. GE credit: Div, Wrt.

168. 20th Century American Poetry (4)
Lecture—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1. Historical Study of American poetry since 1900, with thematic and formal focus at the instructor’s discretion. May be repeated two times for credit if content differs. GE credit: Wrt.

171A. The Bible as Literature: The Old Testament (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. May be taken independently of course 171B. Selected readings from the Old Testament illustrating various literary forms. Emphasis on the Pentateuch, the Historical Books, and the Wisdom Books. Offered in alternate years. GE credit: ArtHum, Div, Wrt.

171B. The Bible as Literature: Prophets and New Testament (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. May be taken independently of course 171A. Selected readings from the Old Testament prophets and the New Testament. Offered in alternate years. GE credit: ArtHum, Div, Wrt.

173. Science Fiction (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3 or Science and Technology Studies 1, or the equivalent. The literary modes and methods of science fiction. Representative texts, authors, and themes of the genre—e.g., time travel, alternative universes, and utopias. Relations of science fiction to science, philosophy, and the other arts. [Same course as Science and Technology Studies 173.] GE credit: ArtHum, Wrt.

175. American Literary Humor (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1, or standing above freshman level. American humorous vision of man, nature, and the supernatural. Includes one or more of the following: colonial humor; south-western and New England humor; pre- and post-Civil War masters; local colorists; journalistic gadflies; anti-provicialists; modernist poets and prose writers; black humor. GE credit: ArtHum, Wrt.

177. Study of an Author (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Survey of the works of an individual author other than Chaucer, Shakespeare, or Milton. May be repeated for credit when a different author is studied. GE credit: Wrt.

178. Special Topics in Ethnic Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Intensive study of a topic drawn from multietnic literature. Course may focus on particular ethnic groups, historical periods, writers, genres, and/or themes. May be repeated one time for credit when topic differs. GE credit: Div, Wrt.
179. Multi-Ethnic Literature of the United States (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or standing above freshman level. Writings by American authors of diverse races and ethnicities (African, Latin, American, Native American, and mixed ancestry) clarifying the roles of storytelling and cultural heritage in constructing identity, experiencing displacement, recovering history, and cultivating an inclusive society. GE credit: ArtHum, Div, Wrt.

180. Children's Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. History and development of types of children's literature, folklore and oral tradition, levels of interest, criticism and evaluation, illustration and bibliography. GE credit: ArtHum, Div, Wrt.

181A. African American Literature to 1900 (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. African American literature from the colonial period to 1900. Emphasis on the rapid development of the African American literary culture from a primarily oral tradition to various literary genres, including the slave narrative. GE credit: Div, Wrt.

181B. African American Literature 1900—Present (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Major African American writers in the context of cultural history from 1900 to the present. Writers may include Richard Wright, Ann Petry, James Baldwin, Ralph Ellison, Paule Marshall, Toni Morrison, Alice Walker, Clarence Major. GE credit: Div, Wrt.

182. Literature of California (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. California literature in the context of California's social, political, and intellectual history. Reading of poetry, fiction, and essays. Emphasis on nineteenth- and twentieth-century naturalists, turn of the century novelists, the Beats, and writers of the last two decades. GE credit: ArtHum, Div, Wrt.

183. Adolescent Literature (4)
Lecture—3 hours; term paper. Prerequisite: acceptability to the English Department Subject Matter Preparation Program or consent of instructor. The theoretical, critical, and literary complexities that inform the study and teaching of adolescent literature.

184. Literature and the Environment (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historical and/or present survey of topics in writing about the environment. GE credit: ArtHum, Div, Wrt.

185A. Literature by Women I (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. English language literature by women from Bradstreet and Behn to the Brontes, Eliot, and Dickinson. The effects of social constraints upon women's art; the rise of feminism; new trends in literary criticism. GE credit: Div, Wrt.

185B. Literature by Women II (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. course 185A recommended. English language literature by women from Chopin and Woolf to Flannery O'Connor, Rich, and Morrison. The effects of social constraints upon women's art; the rise of feminism; new trends in literary criticism. GE credit: Div, Wrt.

186. Literature, Sexuality, and Gender (4)
Lecture/dis—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused intensive examinations of gender and sexuality in British and American literature. May be repeated for credit when content differs. GE credit: Div, Wrt.

187. Literature and the Other Arts (4)
Seminar—3 hours; term paper. Prerequisite: junior or senior standing with a major in English or consent of instructor. Group study of the relationship between the forms of literature and the forms of the other arts, with detailed study of one of the crucial periods of artistic development in western culture. GE credit: Wrt.—I.

188. Special Topics in Literary Studies (4)
Seminar—3 hours; term paper. Prerequisite: junior or senior standing with a major in English or consent of instructor. Group study of a special topic drawn from English or American literature. Course will be offered in sections according to the topic studied, and papers will be assigned. Limited enrollment. GE credit: Wrt.—I. Prerequisite: 188.

189. Seminar in a Major Writer (4)
Seminar—3 hours; term paper. Prerequisite: junior or senior standing; a major in English or consent of instructor. One major writer's artistic development with attention to intellectual and literary milieu. Limited enrollment. GE credit: Wrt.—I, II, III, (II, III, Ill.)

190. Internship in English (1-12)
Internship—3-36 hours. Prerequisite: course 3 or University Writing Program 1. Internships in fields where students can practice their skills. A maximum of four units is allowed toward the major in English. May be repeated for credit for a total of 12 units. (P/NP grading only.)

190H. Special Study for Honors Students (4)
Seminar—3 hours; term paper. Prerequisite: admission to English Department Senior Honors Program. Study of a special literary topic or of the works of a major writer, and preparation for writing an honors thesis in course 195H. —I.

195H. Honors Thesis (4)
Independent study—12 hours. Prerequisite: course 194H. Preparation of a thesis, under the supervision of an instructor. Students satisfying requirements for the general major or the teaching emphasis write on a scholarly or critical subject; creative writing students submit a volume of poems or fiction.

197T. Tutoring in English (1-5)
Tutoring—1-4 hours. Prerequisite: upper division course in area studied. Does not fulfill requirement for a major. May be repeated for credit for a total of 8 units. (P/NP grading only.)

198. Directed Group Study (1-5)
Directed study with a major in English or consent of instructor. May be repeated for credit for a total of 8 units. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses
200. Introduction to Graduate Studies in English (4)
Seminar—3 hours; term paper or discussion—1 hour. Prerequisite: graduate standing. Introduction to scholarly work with special attention to the elements of professionalism and to different modes of literary investigation. (S/U grading only).—I. (I)

205. Anglo-Saxon Language and Culture (4)
Lecture—3 hours; conference and term paper. The language and culture of Anglo-Saxon England; readings in Old English prose and poetry. Offered in alternate years.

206. Beowulf (4)
Discussion—3 hours; oral and written reports; conferences with students. Prerequisite: course 205 or the equivalent. A study of the poem and the Heroic Age of Germanic literature. Offered in alternate years.

207. Middle English (4)
Discussion—3 hours; term paper. Study of the phonology, morphology, syntax, and lexicon between 1100 and 1500 with investigation of the regional dialects; pertinent facts of both the internal and external linguistic history; intensive reading of texts.

210. Readings in English and American Literature (4)
Seminar—3 hours; conference—1 hour. Prerequisite: upper division course in area studied. May be repeated if topic differs.

225. Topics in Irish Literature (4)
Seminar—3 hours; conference—1 hour. Prerequisite: graduate standing. Varied topics, including the nineteenth-century novel, contemporary Irish poetry, rise of the drama, or a study of a major author. May be repeated for credit if topic differs.

230. Study of a Major Writer (4)
Seminar—3 hours; conference—1 hour. Prerequisite: graduate standing. Study of a s major writer and his intellectual and literary milieu. May be repeated for credit when a different writer is studied.

232. Problems in English Literature (4)
Seminar—3 hours; conferences with individual students—1 hour. Selected issues in the current study and critical assessment of a limited period or topic in English literature. May be repeated for credit when different period or topic is studied.

233. Problems in American Literature (4)
Seminar—3 hours; conferences with individual students—1 hour; research papers. Selected topics for intensive investigation. May be repeated for credit when different topic or period is studied.

234. Dramatic Literature (4)
Lecture—3 hours; conference—1 hour. Historical introduction to dramatic theory; the genres of tragedy, comedy, and tragicomedies. May be repeated for credit if topic differs.

235. Theory of Fiction (4)
Seminar—3 hours; conference—1 hour. Prerequisite: graduate standing. Theories of fiction as they relate to the professional writer's practice of the craft. For students in the Creative Writing Program. May be repeated for credit when focus differs.

236. Poetics (4)
Seminar—3 hours; conference—1 hour. Prerequisite: graduate standing. Theories of poetry as revealed in structure, prosody, and idiom of British and American poems, variably approached—through intensive study of a single poet, historically, or theoretically—at the instructor's discretion. For students in the Creative Writing Program. May be repeated for credit when focus differs.

238. Special Topics in Literary Theory (4)
Seminar—3 hours; term paper. Prerequisite: course 237 or the equivalent. Advanced topics in literary theory and criticism. Preparation and evaluation of research paper. May be repeated for credit when topic and/or reading list differs. Offered in alternate years.

240. Medieval Literature (4)
Seminar—3 hours; conference—1 hour. Studies of Medieval literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.
242. Sixteenth-Century Literature (4)
Seminar—3 hours; conference—1 hour. Studies in sixteenth-century literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

244. Shakespeare (4)
Seminar—3 hours; conference—1 hour. Studies in Shakespeare. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

246. Seventeenth-Century Literature (4)
Seminar—3 hours; conference—1 hour. Studies in seventeenth-century literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

248. Eighteenth-Century Literature (4)
Seminar—3 hours; conference—1 hour. Studies in eighteenth-century literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

250. Romantic Literature (4)
Seminar—3 hours; conference—1 hour. Studies in Romantic Literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

252. Victorian Literature (4)
Seminar—3 hours; conference—1 hour. Studies in Victorian Literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

254. Twentieth-Century British Literature (4)
Seminar—3 hours; conference—1 hour. Studies in twentieth-century British literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

256. Early American Literature (4)
Seminar—3 hours; conference—1 hour. Studies in Early American literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

260. American Literature: War to 1914 (4)
Seminar—3 hours; conference—1 hour. Studies in American literature from 1800 to Civil War. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

262. American Literature after 1914 (4)
Seminar—3 hours; conference—1 hour. Studies in American literature after 1914. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

264. Studies in Modern British and American Literature (4)
Seminar—3 hours; conference—1 hour. Studies in modern British and American literature. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when a different topic is studied.

270. Studies in Contemporary World Literature (4)
Seminar—3 hours; conference—1 hour. Prerequisite: graduate standing, consent of instructor, with preference given to those enrolled in the masters program in Creative Writing. Emerging global, international or transnational techniques, theories, and individual works of contemporary world prose and poetry. Discussion, seminar reports, research papers. May be repeated for credit when topic differs.

285. Literature by Women (4)
Seminar—3 hours; conference—1 hour. Studies in literature by women and the theoretical approaches to literature by women. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when topic and/or reading list differs.

289R. Seminar in Creative Writing of Fiction (4)
Seminar—3 hours; 1 additional hour of writing. Prerequisite: consent of instructor; graduate standing with preference given to those enrolled in master’s program in Creative Writing. Writing of prose. Evaluation of written materials and individual student conferences. May be repeated for credit.—I, II, III, (I, II, III).

289NF. Seminar in Creative Writing of Non-Fiction (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor, graduate standing, preference given to those enrolled in the master’s program in Creative Writing. The writing of literary nonfiction, with emphasis on autobiography, biography, memoir, the occasional or nature essay, or other non-fiction prose narratives. May be repeated for credit.

290P. Seminar in Creative Writing of Poetry (4)
Seminar—3 hours; 1 additional hour of writing. Prerequisite: consent of instructor; graduate standing, with preference given to those enrolled in master’s program in Creative Writing. Writing of poetry. Evaluation of written materials and individual student conferences. May be repeated for credit.—I, II, III, (I, II, III).

298. Directed Group Study (1-5)
(S/U grading only.)

299. Individual Study (1-12)
(S/U grading only.)

299D. Special Study for the Doctoral Dissertation (1-12)
(S/U grading only.)

Professional Courses

391. Teaching Creative Writing (2)
Discussion—2 hours. Prerequisite: graduate standing; appointment as Teaching Assistant in the English Department. Designed for new instructors of English 5F or 5P; discussion of ways to facilitate creative writing workshops and to respond to student manuscripts. (S/U grading only.)

393. Teaching Literature and Composition (2)
Discussion—2 hours. Prerequisite: graduate standing; appointment as Teaching Assistant in the English Department. Designed for new instructors of English 3 or the equivalent courses; discussion of problems related to teaching literature and composition to lower division students. (S/U grading only.)

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III, (I, II, III.)

Entomology

(College of Agricultural and Environmental Sciences)

Walter S. Leal, Ph.D., Professor, Chairperson of the Department

Thomas W. Scott, Ph.D., Vice Chairperson

Frank G. Zalom, Ph.D., Vice Chairperson

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Timothy Proult, Ph.D., Professor Emeritus
Richard E. Rice, Ph.D., Lecturer Emeritus
Robbyn W. Thorp, Ph.D., Professor Emeritus
Robert K. Washino, Ph.D., Professor Emeritus

Affiliated Faculty

Anton Cornel, Ph.D., Lecturer
Mary L. Flint, Ph.D., Lecturer
Larry Godfrey, Ph.D., Lecturer
Robert Kimsey, Ph.D., Associate Adjunct Professor
Eric C. Mussen, Ph.D., Lecturer

The Major Program

The Entomology major is a general biological science program. The curriculum is designed to develop an understanding of fundamental biological concepts by studying insects. Insects offer unique opportunities to study biological systems and are model experimental animals. Many insects are either pests, or beneficial species that have great importance to the economy, environment or public health. Students may focus on specific areas of interest including agricultural entomology, insect systematics and evolution; behavior and ecology; medical entomology; and insect molecular biology, physiology and toxicology.

The Program. Students begin their study in entomology with selected insect biology courses. After completing these courses, students may enroll in courses in their particular area of interest. A student interested in applied entomology, for example, could enroll in courses such as arthropod pest management and biological control.

Career Alternatives. Entomology graduates find careers in many different areas of applied or basic biology. Graduates have the opportunity to continue
in professional graduate programs such as veterinary or human medicine, or get advanced degrees leading to careers in bioinformatics, conservation biology, or academic teaching and research. Many graduates have participated in internship programs with the California Department of Food and Agriculture and found careers in insect diagnostic laboratories, conducting insect surveys, and/or developing entomological collections. Other graduates have worked in agriculture in the area of insect pest management. Graduates are prepared for managerial and technical positions with state and federal agencies and in agricultural production and supporting industries. Some entomologists graduate pursue careers in primary, secondary, and college level science education.

B.S. Major Requirements:

English Composition Requirement ........... 0-8
See College requirement.

Preparatory Subject Matter.................. 46-47
Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C ............... 14-15
Chemistry 2A, 2B, 8A, 8B .................... 16
Mathematics 14A, 14B ......................... 3
Physics 1A, 1B .................................. 6
Statistics 13, 32, or Plant Sciences 120 ............. 3-4
Plant Sciences 21, Engineering 5, or Mathematics 168 .......... 3

Breadth Subject Matter ...................... 6-24
Satisfaction of General Education requirement.

Depth Subject Matter ....................... 34-40
Microbiology 102, Plant Biology 118, 148, Plant Pathology 120 or Plant Pathology, Microbiology, and Immunology 128 .................. 3-5
Biological Sciences 101 .................................. 4
Environmental Science and Policy 100 or Evolution and Ecology 101 .............. 4
Evolution and Ecology 100 ..................... 4
Biological Sciences 102 and 103 or Animal Biology 102 and 103 ............. 6-10
Entomology 100, 100L ............................ 6
All at least 7 units from Entomology 102, 103, 104, 107, 109, or 116 ............. 7

Restricted Electives ......................... 34
Upper division entomology courses ........... 14
Upper division electives related to student’s interest with approval of adviser ....... 20
Note: Not more than 6 units from Entomology 192, 197T and 199 may count toward fulfilling depth subject matter or restricted elective units.

Unrestricted Electives ....................... 26-60
Total Units for the Major .................... 180

Minor Adviser. S. Lawler

Minor Program Requirements:
The Department of Entomology has five minor programs open to students in other disciplines who are interested in rounding out their academic study with a concentration in the area of entomology.

UNITS

Insect Biology .................................. 19-23
Entomology 100, 100L ............................ 6
At least seven units from Entomology 102, 103, 107, 109, or 110 ................. 7
At least two additional upper division Entomology courses (except courses 192, 198, 199) .................................. 6-10

Agricultural Pest Management ............... 21-23
Entomology 110, 135 ......................... 15
At least two courses from Entomology 100, Plant Sciences 176, Plant Pathology 120 .................................. 6-8

Insect Ecology and Evolution ................ 20
Entomology 100, 100L, 104 ................. 9
At least seven units from Entomology 107, 109, 116, 158 ................. 7

Evolution and Ecology 149 or Environmental Science and Policy 12 ................. 4

Medical–Insect Entomology ................. 19
Entomology 100, 100L, 104, 153 ............ 15
At least four units from Entomology 156L, 158, Pathology, Microbiology, and Immunology 126, 128 ...................... 4

Forensic Entomology ......................... 22
Entomology 100, 100L, 102, 158 ................ 13
Biological Science 1A ............................. 5
Evolution and Ecology 104 ................. 4

Minor Adviser. S. Lawler
Graduate Study. The Department of Entomology offers a program of study and research leading to the M.S. and Ph. D. degrees. See Graduate Studies, on page 104 and the Graduate Announcement, for further details.

Graduate Advisers. See the Class Schedule and Registration Guide.
Related Courses. See courses in Nematology.

Courses in Entomology (ENT)

Lower Division Courses

1. Art, Science and the World of Insects (3)
   Lecture—3 hours; laboratory—3 hours. Fusion of entomology and art to create an appreciation of insect biology, ecology and interactions with humans and importance in human culture. Multidisciplinary approaches in education and career paths in entomology and art. GE credit: ArtHum or SciEng—II. (I) Hammock, Leal

2. Biodiversity (3)
   Lecture—2 hours; lecture/discussion—1 hour. Introduction to nature, scope and geographical distribution of biodiversity (the diversity of life, with emphasis on plants and animals, especially insects). Humans and biodiversity—domestication, aesthetic, ethics and valuation. Species richness and “success.” Biodiversity through time; monitoring, evaluation and conservation. Biomes—global, continental and Californian. (Same course as Evolution and Ecology 2) GE credit: SciEng, Wrt.—II. (I) Gunn, Cranston, Shaffer

10. Natural History of Insects (3)
   Lecture—2 hours. Designed for students not specializing in entomology. Not open for credit to students who have had course 100, but students who have taken this course may take course 100 for credit. An introduction to the insects detailing their great variety, structures and functions, habits, and their significance in relation to plants and animals including man. GE credit: SciEng—II. (I) Kaya, Ullman

50. Insects in the Environment (3)
   Lecture—1 hour, discussion—1 hour, laboratory—3 hours. Prerequisite: course 100 or Evolution and Ecology 2 or course 102 or Biological Sciences 1B or consent of instructor. Ecological roles of insects in different habitats and environmental systems. The uses of insects in terrestrial and aquatic surveys and environmental monitoring. Field and laboratory research, data analysis and scientific writing. —III. (I) Cranston, Gunn

90X. Special Topics in Entomology (2)
   Seminar—2 hours. Freshman seminar course for in-depth examination of a special topic within the subject area. May be repeated twice for credit. (P/NP grading only.)—I, II, II

92. Internship (1-12)
   Internship—3-36 hours. Prerequisite: consent of instructor. Work–learn experience on and off campus in all subject areas offered by the department, supervised by the permanent faculty. May be repeated up to 12 units of credit. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
   (P/NP grading only)

Upper Division Courses

100. General Entomology (4)
   Lecture—3 hours; term paper. Prerequisite: Biological Sciences 1B. Biology, anatomy, physiology, development, classification, and general and relation of insects to human welfare. GE credit: SciEng, Wrt.—I, II, III. (II, III) Cranston, Gunn, Kimsey

100L. General Entomology Laboratory (2)
   Laboratory—6 hours. Prerequisite: course 100 (may be taken concurrently). Anatomy, development, population ecology, methods of collecting, classification and identification of insects of all orders and of major families. GE credit with concurrent enrollment in course 100: Wrt.—I. (I) Kimsey

101. Functional Insect Morphology (3)
   Lecture—2 hours; laboratory—3 hours. Prerequisite: course 100. Study of the basic external and internal structures, organs and tissues of insects, with emphasis on functional systems. Functional anatomy, histology and fine structures of important organs and tissues will be discussed. GE credit: SciEng—II. (I) Kimsey

102. Insect Physiology (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or course in physiology or invertebrate zoology. Processes by which insects maintain themselves, reproduce, and adapt to environment. Insects as models for basic/applications research through detailed analysis of metabolic, physiological, and behavioral processes. Emphasis on analysis of methodologies, fact, and theory. GE credit: SciEng—II. (II) Hammock, Leal

103. Insect Systematics (3)
   Lecture—2 hours; discussion—1 hour. Prerequisite: introductory course in zoology or entomology. Principles and methods of systematics with particular reference to insects. Emphasis on different theories of classification and analysis of phylogenetic relationships. Offered in alternate years. GE credit: SciEng, Wrt.—III. Cranston, Gunn

104. Behavioral Ecology of Insects (3)
   Lecture—3 hours. Prerequisite: introductory biology or zoology. Basic principles and mechanisms of insect behavior and ecology. An evolutionary approach to understanding behavioral ecology of insects. GE credit: SciEng—II. (III) Lewis

107. California Insect Diversity (5)
   Lecture—1 hour; laboratory—6 hours; fieldwork—6 hours. Prerequisite: introductory course in entomology. Survey of the diversity of insects from selected ecological zones with emphasis on collection, identification, and natural history. Offered in alternate years. GE credit: SciEng, Wrt.—III. Ward

109. Field Taxonomy and Ecology (7)
   Lecture—2 hours; laboratory—36 hours; five-week course. Prerequisite: an introductory course in entomology or consent of instructor. The study of insects in their natural habitats, their identification and ecology. Offered in alternate years. GE credit: SciEng, Wrt.—IV (V) Ward

110. Arthropod Pest Management (5)
   Lecture—3 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1B. Development of the ecological basis for the integrated pest management paradigm with emphasis on agriculture. Ecological and practical aspects of control tactics. Laboratory emphasizes identification of pests and beneficials of agriculture and urban situations. GE credit: SciEng, Wrt.—II. (I) Zalom

116. Biology of Aquatic Insects (3-5)
   Lecture—2 hours and laboratory (Saturday field trips); optional laboratory on identification and/or aquatic insect collection. Course 100 or consent of instructor. A study of the life history, ecology, and identification of insects associated with streams, ponds, and lakes. GE credit: SciEng—III. (III) Lowell

117. Longevity (4)
   Lecture—3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Nature, origin, determinants, and limits of longevity with par-
Ecological reference to humans; emphasis on implications of findings from non-human model systems including basic biology and evolution of life span; description of basic demographic techniques including life table methods. (Same course as Human Development 117.) GE credit: SciEng. Wrt.—I. (Coreq.)

119. Apiculture (3)
Lecture—3 hours; papers. Prerequisite: Biological Sciences 1C recommended. Biology and behavior of honeybees; communication, orientation, social organization, foraging activities, honey production, pollination activities. GE credit: SciEng. Wrt.—III. (III.)

123. Plant-Virus-Vector Interaction (3)
Lecture—9 hours; prerequisites: Biological Sciences 1A, 1C, 101; Plant Biology 105, Plant Pathology 120, and course 100 recommended. Analysis of the interactions necessary for viruses to infect plants. Interactions among insect vectors and host plants involved in the plant virus cycle. Evolutionary aspects of the molecular components in viral infection and modern experimental approaches to the interplay of virus, vector, and host. Offered alternate years. (Same course as Plant Biology 123/Plant Pathology 123.)—(I.) Lucas, Gilbertson, Ullman

135. Introduction to Biological Control (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 100 or 110. Principles of biological control of agricultural pests. Biology of pathogens, entomopathogenic nematodes, parasitoids, and predators. Implementation in classical and augmentative biological control. Role of biological control in pest management. Offered in alternate years—I. Kaya, Parello

153. Medical Entomology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B, upper division standing in one of the biological sciences or consent of instructor. Basic biology and classification of medically important arthropods with special emphasis on the ecology of arthropod-borne diseases and principles of their control. Relationships of arthropods to human health. GE credit: SciEng. Wrt.—II. (II.) Scott

140S. Biodiversity and Conservation in South Africa (S)
Lecture—3 hours; lecture/discussion—2 hours; term paper; field work. Prerequisite: Biological Sciences 1A, 1B, 1C. A comprehensive overview of biodiversity in a South African context. This Quarter Abroad course, based in Stellenbosch, provides immersion in anatomical culture and a novel biota. Field visits involve weekends and homework requires evening effort. Limited enrollment. May be repeated once for credit. Only six units of credit allowed for students who have previously taken course 2 or Evolution and Ecology 2. Engineering 36. GE credit: SciEng. Wrt.—II. (II.) Cranston, Gullan

156. Biology of Parasitism (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A or consent of instructor. Lectures on the biological and ecological aspects affecting host-parasite relationships using selected examples from protozoan and metazoan fauna. GE credit: SciEng. Wrt.—III. (III.) Kimsey, T., N. K., N. M., R. M., R. S.

156L. Biology of Parasitism Laboratory (1)
Laboratory—3 hours. Prerequisite: course 156 (concurrently) or consent of instructor. Laboratory demonstrations using selected examples of protozoan and metazoan parasites, along with various techniques used in parasitology to exemplify concepts presented in the lecture course. GE credit with concurrent enrollment in course 156: Wrt.—III. (III.) R. Kimsey

158. Forensic Entomology (3)
Lecture—2 hours; laboratory—4 hours. Prerequisite: Biological Sciences 1B or Entomology 100, upper division standing. Arthropods, their general biology, succession, developmental cycles and population biology in matters of criminal prosecution and civil litigation. Emphasis on basic arthropod biology, ecological and developmental concepts and methods, development of reasoning abilities, implication, development of opinions and evidence. GE Credit: SciEng or SocSci. Wrt.—III. (III.) R. Kimsey

192. Internship (1-12)
Internship—3.36 hours. Prerequisite: completion of 84 units and consent of instructor. Laboratory experience or fieldwork off and on campus in all subject areas offered in the Department of Entomology. Internships supervised by a member of the faculty. (P/NP grading only.)

197T. Tutoring in Entomology (1-3)
Discussion—3 hours. Leading small discussion groups. Preview assignments and prepare guidelines for discussion. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

212. Molecular Biology of Insects and Insect Viruses (3)
Lecture—3 hours. Prerequisite: consent of instructor. A molecular biological analysis of insect systematics, physiology, and evolution. Molecular biology of insect viruses. Baculovirus expression vectors and post-translation modification of expressed polypeptides. Biological control of using neurotoxins and toxin genes in insect viruses.—II. (II.)

214. Vector-Borne Infectious Diseases: Changing Patterns (2)
Lecture/discussion—2 hours. Vector-borne infectious diseases especially as they relate to changing patterns associated with climate changes, trade, and population movement. (Same course as Population Health and Reproduction 214.)—I. (I.) Chomel

225. Terrestrial Field Ecology (4)
Seminar—1 hour; field work—12 hours. Prerequisites: introductory ecology and introductory statistics or consent of instructor. A field course conducted over spring break and four weekends at Bodega Bay, emphasizing student projects. Ecological hypothesis testing, data gathering, analysis and written and oral presentation of results. (Same course as Ecology 225/Population Biology 225.)—III. (III.) Karbon

230. Advanced Biological Control (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: graduate or upper division standing in biological science or consent of instructor. Principles and current issues in biological control of arthropod pests and weeds, laboratory devoted to identification and history of the major groups of parasitic and predacious arthropods. Offered in alternate years.—I.

253. Advanced Medical Entomology (3)
Lecture—2 hours, discussion—1 hour. Prerequisite: one upper division course in entomology (other than course 153) and one course in microbiology; course 153 strongly recommended. An analysis of several arthropod-borne human diseases with emphasis on the relationships of the biology of the vector to the ecology of the disease. Discussion includes demonstration of vectors and techniques. Offered in alternate years.—III.

290. Exploratory Topics in Entomology (2)
Seminar—2 hours. Interdisciplinary topics in entomology, including innovative applications of entomological concepts to other fields of research and human endeavor (e.g. medicine, technology, art, criminalology). May be repeated up to 8 units of credit when topic differs. —I, II, III.

291. Current Topics in Medical and Veterinary Entomology (2)
Seminar—2 hours. Prerequisite: course 153. Discussion of parasitological and entomological aspects related to vectors of pathogens causing disease in humans and animals. May be repeated once for credit. Not offered every year.—I, II, III. Kimsey, Scott

292. Current Topics in Insect Physiology and Behavior (2)
Seminar—2 hours. Prerequisite: course 102 if topic is physiology, a course in behavior if topic is behavior, or either if topic bridges both. Analysis of contemporary advances in insect physiology, biochemistry and/or behavior. Interpretation and description of physiological and behavioral mechanisms and functions. Application of general principles to solution of problems in the laboratory and field. May be repeated for up to 8 units of credit if topic differs. Not offered every year.—I, II, III. Hammock, Leal

293N. Current Topics in Insect Biotechnology and Genomics (2)
Seminar—2 hours. Prerequisite: course 212. Discussion of advances in insect biotechnology, including genetic engineering and genomics. May be repeated for credit up to eight units if topic differs. Not offered every year.—I, II, III.

295. Current Topics in Agricultural Entomology and Bee Biology (2)
Seminar—2 hours. Prerequisite: course 110 if topic covers pests and beneficial predators, course 119 if topic is bee biology, or either if topic bridges both. Discussion of advanced topics about the biology, ecology, behavior, and management of pest and beneficial insects. May be repeated for up to 8 units of credit if topic differs. Not offered every year.—I, II, III. Granett, Parrella, Rosenheim

297N. Seminar in Entomology (1)
Prerequisite: course 103. General course in ecology or evolution. Discussions of advanced topics in ecology, evolution and systematics with emphasis on analysis of factors influencing the distribution, abundance, adaptations and evolutionary relationships of insects. Includes consideration of applications of basic theory (e.g. biological control). May be repeated for credit up to eight units if topic differs. Not offered every year.—I, II, III.

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Environmental Biology and Management

This major will be discontinued as of Fall 2008; See Environmental Science and Management, on page 280 (College of Agricultural and Environmental Sciences)

Faculty
See the Department of Environmental Science and Policy, on page 281.

The Major Program
The Environmental Biology and Management major offers an education in the basic natural sciences, especially ecology, together with a set of management and public policy analysis courses. Students completing the program will understand the scientific basis for environmental decision making, and the legal, economic, and political issues involved in management of the environment in the United States and worldwide.

Any student in good standing is eligible to transfer to the major; to do so, please see the major adviser, Marcel Holyoak in 3154 Wickson Hall or Kimberly Mahoney in 2134 Wickson Hall.
The Program. Courses in chemistry, physics, mathematics, biology, and earth sciences form the foundation of the major. More courses are then tied together by courses in ecology. Computing, statistics, and other methods courses give the student basic quantitative skills in economics, political science, and techniques of quantitative management. Offerings dominate the management and public policy requirements. A moderate degree of specialization is permitted in three upper division options. Students in the Conservation Biology and Management option take courses in conservation biology, genetics, evolution and biogeography, resource economics, environmental policy, and computer analysis and field experience. This option emphasizes the study of biological diversity and the natural and human processes that control it. Key areas of the option include the design of nature reserves, the management of small populations of endangered species, environmental law, policy, and economics.

Students in the Environmental Biology option take course work in population ecology, physiology, and other biological specialties, as well as quantitative analysis.

Students in the Environmental Management option take courses in, resource economics, planning and public policy, and, especially, quantitative management techniques. This option emphasizes the management of public and private land and natural resources in wildland and rural areas. Practical courses in field level planning and management are featured. Students interested in urban problems and/or legislative approaches should examine the Policy Analysis and Planning major.

Career Alternatives. The major prepares students to enter careers in management of natural resources and public lands, as well as in basic ecological research. Students interested in professional schools, e.g., medicine, should consult an adviser early to plan for their special requirements, such as organic chemistry. Graduates who choose the Environmental Biology option are prepared for graduate or professional training and, eventually, careers working for public agencies and private firms specializing in environmental quality, natural resources, or ecological research. Graduates with the Environmental Management option are prepared for jobs in public agencies at the federal, state, or local levels.

B.S. Major Requirements:

UNITS

English Composition Requirement 7-16

See College requirement 8

University Writing Program 101, 102A, 102B, 104A, 104B, 104C, 104D, or 104E 4

Communication 1 or 3 or Dramatic Art 10 3-4

Preparatory Subject Matter 47-51

Biological Sciences 1A, 1B, 1C or 2A, 2B, 2C 14-15

Chemistry 2A/2B or 2AH/2BH 10

Environmental Science and Policy 1 4

Political Science 1 or Economics 1A 4

Choose Environmental Science and Management option is selected 4-5

Mathematics 16A-16B or 21A-21B 6-8

Physics 7A-7B or 9A-9B 8-10

Breadth/General Education 12-24

Select subject area (substitution for general education requirement to include 12 units of humanities and/or civilization and culture 12-24

Depth Subject Matter 28-33

These units must be taken for a letter grade attaining an overall grade point average of 2.0 or higher.

Select one course from Plant Biology 117, Environmental Science and Policy 100, Evolution and Ecology 101, Wildlife, Fish, and Conservation Biology 151 4

Environmental Science and Policy 110 and 172 12-14

Environmental Geology 275

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer; 2009-2010 offering in parentheses

General Education (GE) credit: ArthHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Social-Cultural Diversity; Wrt=Writing Experience

Economics 100 or Agricultural and Resource Economics 100A 4

Environmental Science and Policy 161, 169, or 171 3-4

Environmental Science and Policy 179 3

Economic Geology 106 or Sociology 106 3-4

Management of a natural resource, choose two courses from one of the following three groups.

Animal Resources: Plant Sciences 135, or Wildlife, Fish, and Conservation Biology 110, 111, 120, 122, 151, 154, or Environmental Sciences and Policy 123, Forest and Rangeland Resources: Plant Sciences 131, 134, Air, Water, and Soil Resources: Environmental and Resource Sciences 131, or Hydrologic Science 103, 122, 141, or Soil Science 118, or Environmental Science and Policy 151 and 151I, 153 and 155L.

Unrestricted Electives 26-68

Total Units for the Degree 180

Major Adviser. M. Holyoak (Environmental Science and Policy)

Minor Program Requirements:

The faculty for Environmental Biology and Management offers a minor in Recreation for students in Physical Education, Psychology, Sociology, or Human Development; students in Landscape Architecture desiring to specialize in recreation area design; Community and Regional Development students wishing to work in educational and therapeutic recreation; Environmental Policy Analysis and Planning students seeking careers in public recreation policy analysis and management; Agricultural and Managerial Economics students wishing to go into the administration of commercial recreation enterprises; and those students in Plant Sciences interested in park landscape construction and maintenance.

UNITS

Recreation 18-20

Agricultural and Resource Economics 4

Environmental Planning and Management 4

Recreation policy analysis (see adviser) 4

Agricultural and Resource Economics 112, Community and Regional Development 163, Political Science 183, 189 4

Internship in Recreation Management, Environment Science and Policy 192 4

Minor Adviser. M. Holyoak (Environmental Science and Policy)

Courses. Questions pertaining to courses in Environmental Biology and Management and the specific minor program..
Environmental Horticulture

(Commercial and Agricultural Sciences) Faculty. See Plant Sciences, on page 448.

The Program. Students of Environmental Horticulture learn how plants improve the environment and the quality of our lives. Plants are used to revegetate and restore disturbed landscapes, control erosion, reduce energy and water consumption. The ornamental use of plants to improve the aesthetic quality of urban and rural landscapes, recreational areas, and commercial sites is an important aspect of the study of environmental horticulture.

Students interested in Environmental Horticulture can obtain a B.S. degree in Environmental Horticulture and Urban Forestry and may specialize in Floriculture/Nursery Management, Urban Forestry, Landscape Management/Turf or Plant Biodiversity/Restoration. Students can develop an individual major with the help of an Environmental Horticulture faculty adviser and approval of the College’s Individual Major Committee. A minor in Environmental Horticulture or Landscape Restoration is available to students in other majors.

Career Opportunities. Opportunities in this field include growing and/or managing plants in a variety of settings, including nurseries, golf courses and arboreta, consulting as an urban, landscape, or restoration horticulturist, business ownership, working for public agencies or private landscape firms/corporations, park management and landscape contracting. Students are encouraged to develop internships on or off campus to augment their activities in the classroom and laboratory.

Minor Program Requirements:

<table>
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<tr>
<th>Units</th>
<th>Courses</th>
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<tr>
<td>23-25</td>
<td>Environmental Horticulture 6 and 105-107 Plant Sciences 171..</td>
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</table>

Select three courses from Environmental Horticulture 100, 120, 125, 130, 133... | 11-13 |

Minor Advisers. J.A. Harding or D.W. Burger (Plant Sciences)

Related Undergraduate Programs. See the undergraduate majors in Environmental Horticulture and Urban Forestry, on page 277, Agricultural Management and Rangeland Resources, on page 132, Crop Science and Management, on page 198, and Plant Biology, on page 443.

Graduate Study. For graduate study related to this field, see the M.S. and Ph.D. degree programs in the graduate programs of Horticulture and Agronomy, Plant Biology, Ecology, and Genetics. Also see Graduate Studies, on page 104.

Related Courses. See Plant Biology and Plant Sciences.

Courses in Environmental Horticulture (ENH)

Questions pertaining to the following courses should be directed to the instructor or to the Plant Sciences Advising Office. (For Environmental Horticulture courses, contact Environmental Sciences Building [S30] 752-7738.)

Lower Division Courses

1. Introduction to Environmental Horticulture/Urban Forestry (3)
   Lecture—3 hours. Introduction to the use of plants to enhance the physical, visual and social environment. The use of ecological principles in developing a sustainable, low maintenance landscape systems will be presented. Career opportunities will be discussed. GE credit: ScEng. WRIT. [I.] Burger

2. Introduction to Environmental Plants (4)
   Lecture—1 hour; discussion—2 hours; laboratory—3 hours. Classification, nomenclature and variation of environmental plants. The use of floral and vegetative characteristics and terminology to key unknown plants. Characteristics of plant groups and basics of climate, soils and plant selection. Identification of 150 common landscape plants. —I. [I.] Young

Upper Division Courses

100. Urban Forestry (4)
   Lecture—2 hours; laboratory—3 hours; term paper. Prerequisite: Biological Sciences 1C or Plant Sciences 2. Principles and practices of planning and managing urban landscapes. Practical aspects of tree appraisal, natural resource inventory, and development of long term urban forest management plans. —II. [I.] Harding

101. Trees of the Urban Forest (2)
   Lecture—1 hour; laboratory—2 hours. Prerequisite: course 6 or consent of instructor. Identification and evaluation of 200 tree species of the urban forest on campus, in the Arboretum, and in the city of Davis; appraised and aesthetic values, condition, and branch structure; contributions of trees to this ecosystem. Bicycle required. —II. [I.] Harding

102. Physiological Principles in Environmental Horticulture (4)
   Lecture—2 hours; discussion—1 hour. Prerequisite: Biological Sciences 1C. Physiological principles and processes essential to floriculture, nursery crop production, turfculture and landscape horticulture. Emphasis on the control of reproductive and productive development for a broad species range in greenhouse and extensive landscape environments. —II. [I.] Burger

103. Taxonomy and Ecology of Environmental Plant Families (4)
   Lecture—2 hours; laboratory—6 hours. Prerequisite: course 6 or consent of instructor. Classification and identification of introduced and native species used in urban forests, with emphasis on floral and vegetative characteristics of the prominent families of angiosperms and gymnosperms, adaptations to environmental variations in western landscapes, and horticultural classification. —III. [III.] Harding

120. Management of Container Media (3)
   Lecture—2 hours; laboratory—3 hours. Prerequisite: Soil Science 10. Principles of soil science and practices related to management of container media are taught, emphasizing appropriate use of soils and amendments, irrigation, and fertilizers. Physical and chemical properties are tested and effects of management on crops are evaluated in the laboratory. —III. [III.] Evans

125. Greenhouse and Nursery Crop Production (5)
   Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: Plant Sciences 2 or Biological Sciences 1C. Principles and techniques for the production of ornamental greenhouse and nursery crops. Hands-on experience producing greenhouse crops. Optional weekend field trip. —II. [II.] Leth

129. Analysis of Horticultural Problems (4)
   Lecture—1 hour; laboratory—6 hours. Prerequisite: course 102, Entomology 110, Plant Pathology 120, and Soil Science 100 or the equivalents. Methods of analysis of common plant disorders seen in the landscape, greenhouse, and nursery. Diagnosis of plant disorders caused by soil, water, insects, disease, chemical agents, climatic conditions or cultural practices. Approaches to diagnosis that emphasize acquisition and integration of information. —III. [III.] Durzan

130. Turfgrass and Amenity Grassland Utilization and Management (4)
   Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 1C or Plant Sciences 2. Utilization and management of amenity grassland and landscape grasslands. Emphasis on biology of grass species, ecology and culture practice of sports turf and landscape grassland systems, social and environmental benefits, environmental impacts, and integrated management systems. —III. [III.] Burger

133. Woody Plants in the Landscape: Growth, Ecology and Management (4)
   Lecture—3 hours; laboratory—1 hour; discussion—1 hour. Prerequisite: Biological Sciences 1C or the equivalent preparation in plant biology. Principles and practices of managing trees and shrubs in the urban landscape and other managed environments. Topics include woody plant form; growth response and adaptation; tree management in relation to soil, moisture, climate, plant problems. —II. [I.] Berry

145. Tree Improvement and Utility (3)
   Lecture—2 hours; discussion—1 hour. Prerequisite: course 102 and Biological Sciences 1C. Tree biology 160 recommended. Life histories, adaptive plasticity, longevity, utility of trees and the uniqueness of biological materials. Applications of cloning, secondary products, wood science, and space biology in the context of academic, governmental and industrial viewpoints. —Durzan

160. Restoration Ecology Laboratory (1)
   Laboratory/discussion—3 hours. Prerequisite: Biological Sciences 1C or the equivalent. Conservation of genic diversity, measurement of diversity, threats to diversity and reasons for protection, the process of extinction, distribution of diversity, determination of what to conserve and means of conservation. Examples drawn largely from forest tree species. —III. [III.] Josenski, Chetelat, Ledyard

160. Restoration Ecology Laboratory (1)
   Laboratory/discussion—3 hours. Prerequisite: course 160 (may be taken concurrently). Companion field course to course 160. A series of part-day and all day visits to various field sites, involving site evaluations, guest field presentations by local restorat-
### Environmental Horticulture and Urban Forestry

(Chair of Department of Agricultural and Environmental Sciences)

#### Preparatory Subject Matter

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Recommended Units</th>
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<tbody>
<tr>
<td>HORT 1</td>
<td>Environmental Horticulture</td>
<td>8-12</td>
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<tr>
<td>LADES 30</td>
<td>Landscape Architecture</td>
<td>8-12</td>
</tr>
<tr>
<td>BIOS 1A, 1B, 1C</td>
<td>Biological Sciences</td>
<td>24-28</td>
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<tr>
<td>BIOS 2A, 2B</td>
<td>Biological Sciences</td>
<td>24-28</td>
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<tr>
<td>PLTS 1</td>
<td>Plant Sciences</td>
<td>15-20</td>
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<tr>
<td>CHEM 1A-B</td>
<td>Chemistry</td>
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<td>PHYS 2A-B</td>
<td>Physics</td>
<td>10-12</td>
</tr>
<tr>
<td>MATH 1A-B</td>
<td>Mathematics</td>
<td>10-12</td>
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</tbody>
</table>

#### English Composition Requirement

- University Writing Program 101, 102A, 104A, 104B, 104C, 104D, 104E...4
- Communication 1 or 2 or Dramatic Art 10...3-4

#### Preparatory Subject Matter

- Biological Sciences 1A or 2A or 10V...4-5
- Chemistry 2A...10
- Plant Sciences 21 or 120, 122, 155 or 175...4
- Sociology 18...3
- Economics 1A, 1B...8
- Animal Science 1, Biological Sciences 1B or 2B, 28, Geology 1, Hydrologic Science 124...3-5
- Plant Biology 12, Soil Science 100...3-5
- Environmental Science and Policy 1...4
- Mathematics 16A-16B or 21A-21B...6-8
- Physics 1A or 2A...4
- Political Science 1...4
- Statistics 13, 32, 102...3-4

### Environmental Policy Analysis and Planning

(Chair of Department of Agricultural and Environmental Sciences)

#### The Major Program

- The major in environmental policy analysis and planning develops an understanding of governmental policy-making and skills for analyzing policy in fields related to environmental quality.
- Any student in good standing is eligible to transfer to the major; to do so, please see the major adviser, Paul Sabater in 2144 Wickson Hall or Kimberly Mahoney in 2144 Wickson Hall.

#### Advanced Policy Analysis Option

- Select one course from Political Science 100, 104, 105, 120, 122, 125 or Environmental Science and Policy 169...3-4
- Select one course from Political Science 162, 164, or 170...4
- Select one course from Political Science 124, 126, or American Studies 101G...4
- Select one course from Applied Biological Systems Technology 180, 185 or Environmental and Resource Sciences...3-4
- Select one course from Civil and Environmental Engineering 153, Agricultural and Resource Economics 106, or Economics 130...3-4

#### City and Regional Planning Option

- Select one course from Applied Biological Systems Technology 180, 185, or Environmental and Resource Sciences 186, 186...4-5
- Select one course from Civil and Environmental Engineering 165, Environmental Science and Policy 163...3-4
Environmental and Resource Sciences

This major will be discontinued as of Fall 2008; see Ecological Management and Restoration, on page 208.

(College of Agricultural and Environmental Sciences)


The Major Program

The Environmental and Resource Sciences major is a program for study of the biological, chemical, and physical features of environmental resources, and the economical and social considerations associated with their use, conservation, protection, management, and restoration. Students who choose this major include those with an interest in careers associated with environmental resource utilization and management, as well as those pursuing post-baccalaureate, academic, or professional training.

The Program. The curriculum for the major provides flexibility in meeting individual needs, interests, and career Science major's list, certain courses are required in the basic physical and biological sciences areas. Upper division general environmental science courses, a resource economics course, and a specified number of units of environmental and resource-oriented courses are required for all students in the major. Students select environmental and resource-oriented courses in consultation with and approval of their student's advisor. Considerable care should be taken to ensure effective utilization of the flexibility of the major, and to meet individual academic and career objectives. Students may specialize their study by selecting one of the options within the major or, in consultation with their advisor, pursuing other specializations.

Internships and Career Alternatives. Positions now held by graduates in environmental and resource sciences are quite varied, but many are employed as resource analysts and planners as well as technical and environmental specialists with government agencies, municipalities, and private firms. A significant proportion undertakes further studies leading to advanced degrees in resources, the environment, and related fields.

B.S. Major Requirements: 

UNITs

Written/Oral Expression: 0-8

See College requirement.

Preparatory Subject Matter: 53-69

Biological Sciences 1A 1B 1C or 2A 2B 2C 14-15

Chemistry 2A 2B 10

Economics 1A 5

Environmental Toxicology 10 3

Geology 1 or 50 3-4

Environmental and Resource Sciences 60

Mathematics 16A 16B or 21A 21B 6-8

Plant Sciences 21, 211, 212, 5

Computer Science 10 15 13

Physics 1A 1B or 7A 7B 7C or 9A 9B 9C or see option requirements 6-12

Physics 7A 7B 7C 9A 9B 9C for Air option

Statistics 13 or 100 or 102 4

Breadth/General Education: 18-24

Satisfaction of General Education requirements; additional units in social sciences and humanities to total 24 units.

Depth Subject Matter: 24-27

Written expression (in addition to college requirement), University Writing Program 101, 104A, 104B, 104C, 104D, 104E, or 104F 4

Agricultural and Resource Economics 147 or 148 3-4

Atmospheric Science 60 or Environmental and Resource Sciences 131 3-4

Soil Science 100 4

Environmental and Resource Sciences 100 3-6

Plant Sciences 101, Environmental Science and Policy 161, 179, Environmental Toxicology 138, Geology 134, and Culture 120, Political Science 107, 171 or Wildlife, Fish, and Conservation Biology 134 3-4

Plant Sciences 130, Environmental and Resource Sciences 144, Environmental Science and Policy 100, Evolution and Ecology 101, or Plant Biology 117 or 112 3-4

Atmospheric Science 192 3

Areas of Specialization (choose one)

Air Resource Option: 26-28

Directed towards a general understanding of the atmosphere as a finite resource and of environmental problems currently faced by humankind. The option provides a broad understanding of the physical and chemical properties of the atmosphere, including the impacts of air pollution and global climatic change. Employment opportunities include positions within federal, state, and county agencies concerned with environmental quality and with private companies.

Atmospheric Science 30, 110, 116, 124, 133 16

Environmental Science and Policy 110 6-9

Choose two from Atmospheric Science 115, 149, 160; Environmental and Resource Sciences 131, 173, 185, 186; or Environmental Science and Policy 116 6-8

Unrestricted electives (to total 180) 25-52

Environmental Resources Option: 18-26

For the general study of the physical, chemical and biological features of renewable natural resources, and the economic and social considerations associated with their use, protection and management. For those who plan careers associated with resource utilization and management, and those pursuing post-baccalaureate, academic, or professional training.

Choose at least two from Soil Science 111, 112, 118; Geology 130, 134 6-9

Choose at least two from Atmospheric Science 116, 124, 133, 160; Environmental Toxicology 131, 138 6-7

Choose at least two from Plant Sciences 110; Environmental and Resource Sciences 144, 173, 185, 186; Geology 135; Hydrologic Science 134, 141, 145 6-10

Unrestricted electives (to total 180) 25-60

GIS and Remote Sensing Option: 26

Conceptual and practical training in the application of remote sensing technology and geographical information systems to natural resource assessment and to monitoring human impacts on the environment. Appropriate training for those seeking employment in GIS specializations with government, management agencies or environmental consulting firms.

Environmental and Resource Sciences 105, 185, 186; Applied Biological Systems Technology 180, 181 26

Unrestricted electives (to total 180) 25-52

Hydrobiology Option: 32-35

Training in the biological aspects of water resources focusing on the understanding and protection of polluted and unpolluted water systems, the structure, function, and principles of aquatic systems. Graduates may seek employment with state and federal agencies such as Water Resources Control Board, Department of Fish and Game, Department of Water Resources, or consulting firms concerned with environmental impacts.
Choose 28-35 units from Entomology 116; Environmental and Social Policy 123, 124, 131, 155; Environmental Toxicology 101; Geology 116, 135, 139; Hydrologic Science 134, 141; Plant Biology 118, 178; Wildlife, Fish, and Conservation Biology 120, 120L, 123, 151; Plant Sciences 150; 28-35

Unrestricted Electives (to total 180). 16-50

Land and Water Management Option.................................................. 17-29

A broad background in management of soil and water resources in both natural and agricultural eco-systems. Emphasis on analysis of soils and waters for estimating crop nutrient requirements and principles of irrigation and drainage of agricultural land. Appropriate for those seeking employment with state and federal agencies or with agribusiness.

Choose at least two from Soil Science 105, 109, 111, 118, 120……………… 8-13

Choose at least two from Hydrologic Science 110, 124, 134, 141, 143, 144………… 6-12

Choose at least one from Plant Sciences 150; Environmental and Resource Sciences 144, 173; Geology 134, 135…………………. 3-4

Unrestricted Electives (to total 180). 22-61

Plant Environmental Interactions Option............................................. 22-28

Provides background in plant functioning and allows integration of biological and environmental science to provide understanding of natural and managed ecosystems.

Note: Chemistry 8A, 8B prerequisite to Plant Biology 111 and 112.

Choose 23-28 units from Plant Sciences 160, 131; Atmospheric Science 133; Environmental and Resource Sciences 144, 173; Environmental Science and Policy 123, 135; Hydrologic Science 124; Plant Biology 111, 11D, 11L, 112, 113, 117, 141, 142, 157, 158; Soil Science 109, 111, 112………………….. 23-28

Unrestricted Electives (to total 180). 23-55

Total Units for the Major…………………………………………………… 180

Major Advisor. Mark Grismer (Land, Air, and Water Resources)

Advising Center for the major is located in 1152 Plant and Environmental Science Building (PSB) 752-1669.


Courses in Environmental and Resource Sciences (ERS)

Questions pertaining to the following courses should be directed to the instructor or to the Resource Sciences Teaching Center in 1152 Plant and Environmental Science Building (PSB) 752-1669.

Lower Division Courses

6. Map Reading and Remote Sensing (3)

Lecture—3 hours. Basic skills in map reading, map grid systems, projections, aerial photography, photogrammetry, remote sensing sensors and platforms; the role of cartography and remote sensing in an environmental analysis.—I.

8. Water Quality at Risk (3)


30. World Ecosystems & Geography (3)

Lecture—3 hours. An introduction to the earth’s major geographic regions and associated ecosystems, such as deserts, temperate forests, and oceans with an examination of how climate, vegetation regimes, ecological processes, and human activities interact in different regions of the world. (Same course as Environmental Science and Policy 30.) GE credit: SciEng.—II. (II, III)

47. Watershed Processes and Water Quality in the Tahoe Basin (2)

Lecture/lab—9 hours. Water in watershed: flow through porous media, water in the soil-phrionosphere-atmosphere continuum, water quality, flow through open channels, and representative water-resource problems. GE credit: SciEng.—II. (II, III) Grismer

99. Special Study for Undergraduates (1-5)

(PS) grading only.)

Upper Division Courses

100. Principles of Hydrologic Science (4)

Lecture—4 hours. Prerequisite: Chemistry 28, Mathematics 168, and Physics 7A or 9A. Topics include hydrology (surface and ground water), hydraulic flow through porous media, water in the soil-phrionosphere-atmosphere continuum, water quality, flow through open channels, and representative water-resource problems. GE credit: SciEng.—II. (II) Grismer

100L. Principles of Hydrologic Science Laboratory (2)

Laboratory—3 hours; discussion—1 hour. Prerequisite: course 100 concurrently. Principles governing water transport in pipes, soil, and rainfall runoff. Water quality concerns associated with salinity and contamination. GE credit with concurrent enrollment in course 100: Wrt.—I. (II) Grismer

108. Environmental Monitoring (3)

Lecture/discussion—2 hours; fieldwork. Prerequisite: entry-level course work in student’s major; specifically: Evolution and Ecology 101, Environmental Science and Policy 100, Environmental Toxicology 101, Wildlife, Fish, and Conservation Biology 100, Environmental and Resource Sciences 100, Soils Science 100, Environmental Horticulture 100, Landscape Architectuare 50 or the equivalent for any of these courses. Instrumentation and methodology for environmental parameters.—III. (III) Southard

120. Global Environmental Interactions (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 88 or the equivalent General Biology or equivalent. Relationships among climate, hydrology, biogeochemistry, and vegetation; distribution of vegetation in different biomes. Emphasis on physical, chemical, and biological processes affecting ecosystems from the poles to the equator, and human impact on the environment. Limited enrollment.—II. (II) Hennes

121. Water and Society (3)

Lecture—2 hours; discussion—1 hour. Prerequisite: Physics 10 or Geology 1. The role of water as an essential natural resource in contemporary society. Aspects of the scientific method, including descriptions of natural phenomena, measurement techniques, and predictive models. Supply and use of water for municipalities, agriculture, industry, wildlife and recreation. GE credit: SciEng, Wrt.—III. (II) Hennes

131. Air as a Resource (3)

Lecture—2 hours; discussion—1 hour. Prerequisite: Chemistry 10. Degradation of the atmospheric resource, historical aspects and effects of air pollution examined. Evaluation of primary gaseous and particulate pollutants and discussion of their impact. GE credit: SciEng, Wrt.—II. (II) Flocchini

136. Chemistry of the Hydrosphere (3)

Lecture—3 hours. Prerequisite: Chemistry 28 and an upper division course in soil science, hydrologic science, geology, or limnology. Chemical characteristics of water in the hydrologic cycle. Understanding processes and conditions regulating chemical composition of natural waters with particular emphasis on dissolved mineral constituents. Not open for credit to students who have completed Water Science 180 or Hydrologic Science 136. (Former course Hydrologic Science 136.)—III. (III) Hennes

140. Culinary and Medicinal Herbs (3)

Lecture/discussion—3 hours. Prerequisite: Biological Sciences 1C. Growth, identification, cultivation, and use of common culinary and medicinal herbs; herbal pest/animal management; effects of active herbs; herbal medicine; ecology and geography of herbs; herb garden design; secondary chemistry of active compounds. (Same course as Plant Biology 140.)—III. (III) Hennes

141. Role of Fire in Natural Ecosystems (4)

Lecture—3 hours; term paper. Prerequisite: Biological Sciences 1B and 1C, upper division or graduate standing or consent of instructor, general ecology or environmental science course recommended. Fire regimes and roles in major North American vegetation types, especially in the west. Physics of fire, effects on organisms and ecosystem functioning, reconditioning fire histories, fire in resource management, and fire use by indigenous peoples.—II. (II) Barbour

144. Trees and Forests (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Plant Sciences 2 or Biological Sciences 1C or 2C. Biological structure and function of trees as organisms; understanding of forests as communities and as ecosystems; use of forests by humans; tree phenology, photosynthesis, respiration, soil processes, life histories, dormancy, forest biodiversity, and agroforestry. Not open for credit to students who have completed Plant Biology 144 or Environmental Horticulture 144. (Former course Plant Biology/Environmental Horticulture 144.) (Same course as Plant Sciences 144.)—I. (I) Bledsoe, Berry, Dahlgren

185. Aerial Photo Interpretation and Remote Sensing (4)

Lecture—2 hours; laboratory—4 hours. Basics of remote sensing and photogrammetry, grids and map projections, aerial photo interpretation, sensors and platforms for aerial and space photography and non-photographic imagery. Interpretation, photogrammetry, microwave sensing, and introduction to remote sensing applications.—I. (I) Hennes

186. Environmental Remote Sensing (3)

Lecture—2 hours. Prerequisite: Mathematics 168 and Physics 7C or 9A. An overview of satellite, airborne, and ground-based remote sensing. Building on properties of EM Radiation, isotropic and non-isotropic scattering and absorption, examines applications in remote sensing processes, weather and climate, ecology and land use, soils, geology, forestry, and agriculture. Not open for credit to students who have taken Hydrologic Science 186. (Former course Hydrologic Science 186.)—III. (III) Ustin

186L. Environmental Remote Sensing Lab (2)

Laboratory—4 hours. Prerequisite: course 186 with grade of C or better. Computer based analysis and visualization of digital images and image processing techniques. Continuation of course 186 providing theory and direct experience in digital image processing.—III. (III) Ustin

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer. 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Social-Cultural Diversity; Wrt=Writing Experience
Environmental Science and Management

The Environmental Science and Management (ESM) major is jointly administered by the Departments of Environmental Science and Policy (ESP) and Land, Air, and Water Resources (LAWR). Any student in good standing is eligible to transfer to the major; to do so, please see the student affairs officers in 2134 Wickwire, 415 Social Sciences or 1152 Plant and Environmental Sciences Building.

Career Alternatives. Graduates from this program are prepared to pursue careers as practicing environmental scientists, resource analysts and planners working for public agencies and private firms specializing in environmental quality, natural resources or ecological research. The major is also an excellent preparation for graduate or professional training in physical and/or biological environmental science, as well as in environmental law, administration and environmental policy.

B.S. Major Requirements:

<table>
<thead>
<tr>
<th>UNITS</th>
<th>Written and Oral Expression. This also meets College requirements</th>
<th>11-12</th>
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<tbody>
<tr>
<td>4</td>
<td>English 2 or University Writing Program 1</td>
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<tr>
<td>4</td>
<td>University Writing Program 102A or 102B or 101 or 104E</td>
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<td>3</td>
<td>Communication 1, 3 or Dramatic Art 10</td>
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<td>3-5</td>
<td>Preparatory Subject Matter</td>
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<td>14-15</td>
<td>Biological Sciences 1A, 1B, 1C or 2A, 2B, 2C</td>
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<td>Geology 1</td>
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<td>10</td>
<td>Chemistry 2A, 2B or 2AH, 2BH</td>
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<td>8</td>
<td>Economics 1</td>
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<td>4</td>
<td>Mathematics 16A, 16B or 21A, 21B</td>
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<td>Environmental Science and Policy 1</td>
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<td>Breathing and General Education</td>
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<td>See General Education requirement</td>
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Core Subject Matter 29-32

Environmental and Resource Sciences 120...................... 4
Environmental Science and Policy 100 .................. 4
Environmental Science and Policy 162 .................. 4
Statistics 13 or 100 [Statistics 100 recommended] .......... 4
Select one course from Environmental and Resource Sciences 109 or Environmental Science and Policy 192.......... 4
Applied Biological Systems Technology 180 ................. 4
Internship—Environmental Sciences and Resource Sciences or Environmental Science and Policy 192 .................. 3
Capstone Class—Environmental and Resource Sciences 195 ... 2
Honors Thesis (optional)—Environmental and Resource Sciences 194H........................................ 0-3

Ecology, Biodiversity and Conservation Track ............. 37-45

Select one course from Atmospheric Science 100, 106, 116, 133, Environmental and Resource Sciences 121, 131, Environmental Science and Policy 152, Geology 134 or Soil Science 100, 118 ........................................ 3-5
Select one course from Environmental Science and Policy 170, 171, 172 or 179 [179 required if not taken under Core Subject Matter]................................................. 4
Evolution and Ecology 100 .................................. 4
Select one course from Environmental Science and Policy 127 or Wildlife, Fish, and Conservation Biology 154 ....... 4
Select one course from Environmental Science and Policy 123, 124 or Wildlife, Fish, and Conservation Biology 100 .................. 3-4
Select one course from Environmental Science and Policy 121, Plant Sciences 124, 131 or Soil Science 100, 118, Environmental Science and Policy 144, 150C, 151, 155, Evolution and Ecology 115, Plant Biology 117, Plant Sciences 130 or Wildlife, Fish, and Conservation Biology 111, 112, 120 ........................................ 7-9
Select one course from Environmental Science and Policy 161 or Hydrology 150 .... 3-4
Statistics 103 (or equivalent upper-division statistics) .... 4
Select two courses from Atmospheric Science 116, Environmental and Resource Sciences 121, 131 or Soil Science 100, 118, Environmental and Resource Sciences 185 (or equivalent) .... 4

Climate Change and Air Quality Track 33-39

Atmospheric Science 60 ........................................ 4
Select three courses from Atmospheric Science 115, 116, 133, 160, Environmental and Resource Sciences 131 or Geology 108 ........................................ 9-11
Select two courses from Environmental and Resource Sciences 100, 121, Environmental Science and Policy 116, Hydrology 143 or Soil Science 100 ........................................ 6-9
Select one course from Environmental and Resource Sciences 144, Environmental Science and Policy 124, 150C, 151, 155, Evolution and Ecology 115, Plant Biology 117, Plant Sciences 130 ........................................ 3-4
Select one course from Evolution and Ecology 147 or 149 .... 4
Select two courses from Agricultural and Resource Economics 147, Environmental Science and Policy 163, 167, 171 or 179 [179 required if not taken under Core Subject Matter] ........................................ 7-9

GIS and Remote Sensing Track 34-42

Select three courses from Applied Biological Systems Technology 185, Environmental and Resource Sciences 185, 186 or Hydrology 182 ........................................ 11-12
Select two courses from Agricultural and Resource Economics 147, Environmental Science and Policy 163, 169, 171, 172 or 179 [179 required if not taken under Core Subject Matter] ........................................ 6-8
Select two courses from Environmental Science and Policy 121, Plant Sciences 121, Statistics 104, 106, 108, 130A, 130B or 137 ........................................ 8-12
Other applicable information technology courses from the Engineering department including database management, digital library science and network and Web technologies may be substituted for spatial information with approval.
Select three courses from the following options. Must cover both physical and biological courses from Atmospheric Science 110, 116, 133, Soil Science 100, 112 or 118, Environmental Science and Policy 144, 150C, 151, 152, 155, Geology 136, Plant Sciences 101 or Plant Biology 117 .... 9-14
Environmental Science and Policy

(Concentration of Agricultural and Environmental Sciences)

How many credits are required for this concentration? 281

- Soils and Biogeochemistry .......................... 38-46
  Soil Science 100 ........................................ 5
  Select four courses from Environmental and Resource Sciences 100, Hydrology 134, Soil Science 105, 107, 109, 111, 112 or 120 ......................................................... 17-21
  Select two courses from Environmental and Resource Sciences 121, Environmental Science and Policy 171, 172 or 179 [since it requires if not taken under Core Subject Matter] ........................... 7-8
  Select one course from Environmental and Resource Sciences 185, Geology 134, Hydrology 147, Landscape Design 150 or Soil Science 118 ........................................... 5-4
  Select two courses from Environmental and Resource Sciences 144, Environmental Science and Policy 116, 150A, 150C, 151, 155, Plant Biology 117 or Plant Sciences 130 ........................................ 6-8

Watershed Science Track ................................ 37-42
  Hydrology 10 ............................................. 3
  Environmental and Resource Sciences 100:.................... 4
  Hydrology 143 ........................................... 3
  Geology 35 .............................................. 3
  Soil Science 100 ........................................ 5
  Select two courses from Environmental and Science and Policy 168A, 169, 179 or Hydrology 150 [since it requires if not taken under Core Subject Matter] ........................... 6-8
  Select one course from Atmospheric Science, 115, 116 or 113 .................................................. 3-4
  Select one pair from Environmental Science and Policy 151 & 153 or 155 & 153L ........................................ 3-5
  Select one course from Entomology 115, Evolution and Ecology 115, 134 or Wildlife, Fish, and Conservation Biology 120 ............. 3-5

Unrestricted Electives ..................................... 13-51
  Total Units for the Major ................................ 180


Advising centers for the major, including peer advising, are located in both the Environmental Science and Policy and Land, Air, and Water Resources departments.

Climate Change, GIS, and Soils tracks are administered by Merlyn Potters in 1152 Plant and Environmental Sciences.

Ecology, Natural Resource and Watershed tracks are administered by Kimberly Mahoney in 2134 Wickson Hall.

Environmental Science and Policy

Howard V. Cornell, Ph.D., Chairperson of the Department

Department Office, 2132 Wickson Hall (310) 752-3026

Faculty

- Marissa T. Baskett, Ph.D., Assistant Professor
- Howard V. Cornell, Ph.D., Professor
- Charles F. Goldman, Ph.D., Professor
- Distinguished Graduate Mentoring Award
- Susan L. Hruby, Ph.D., Professor
- Paul P. Harris, Ph.D., Professor
- Alan M. Hastings, Ph.D., Professor
- Marcel Hoyola, Ph.D., Professor
- John L. Largier, Ph.D., Professor
- C.-Y. Cynthia Lin, Ph.D., Assistant Professor
- (Environmental Science and Policy, Agricultural and Resource Economics)
- Mark N. Lubell, Ph.D., Associate Professor
- Steven G. Morgan, Ph.D., Professor
- Joan M. Ogden, Ph.D., Professor
- Michael S. O’Hara, Ph.D., Professor
- James E. G. Ph.D., Professor
- Elisa Rejmkova, Ph.D., Professor
- Peter J. Richerson, Ph.D., Professor
- Paul A. Sabatier, Ph.D., Professor
- James N. Sanchirico, Ph.D., Associate Professor
- Mark W. Schwartz, Ph.D., Professor
- Andrew Sih, Ph.D., Professor
- Daniel Sperling, Ph.D., Professor (Environmental Science and Policy, Civil and Environmental Engineering)
- Thomas P. Tomich, Ph.D., Professor (Environmental Science and Policy, Human and Community Development)

Affiliated Faculty

- Edwin D. Grosholtz, Ph.D., Specialist in Cooperative Extension

Emeriti Faculty

- Robert A. Johnston, M.S., Professor Emeritus
- Seymour I. Schwartz, Ph.D., Professor Emeritus
- Academic Senate Distinguished Teaching Award

The Program of Study

The Environmental Science and Policy program is a teaching and research department offering courses, workshops, and directed group study classes that focus on the complex problems of human-environmental relations. The department offers a Bachelor of Science degree in Environmental Biology and Management and in Environmental Policy Analysis and Planning. Courses in Environmental Science and Policy also supplement major programs in a wide variety of established disciplines, although highly motivated undergraduates who find existing majors unsuited to their educational objectives are encouraged to contact the chairperson and faculty of the department regarding individual major options in the College of Agricultural and Environmental Sciences [see Individual Major, on page 331].

Current Information

Through its continuing contacts with many other departments and teaching divisions on the campus, the department develops a variety of special courses and workshops each year that cannot be listed here. Check with the Department Office and with the expanded course description handbook of the College of Agricultural and Environmental Sciences for up-to-date information about courses.

Graduate Study

The Graduate Program in Ecology, which is housed in Environmental Science & Policy, offers a Master’s and Ph.D. degree program. Further information about graduate programs in ecology should be obtained from the chairperson of the Graduate Program in Ecology.

Graduate Adviser. See the Class Schedule and Registration Guide.

Courses in Environmental Science and Policy (ESP)

Lower Division Courses

Environmental Analysis (4)

Lecture—2 hours; discussion—1 hour. Prerequisite: University Writing 1; Biological Sciences 1A, 1B; upper-division University Writing Program recommended. Analysis of the physical, biological, and social interactions which constitute environmental problems. Emphasis on analysis of environmental problems, the consequences of proposed solutions, and the interaction of environmental science and public policy in creating solutions. [II. (III.) Sanchirico]

Current Issues in the Environment (3)

Lecture—2 hours. Prerequisite: elementary biology recommended. The science behind environmental issues, and policy capability to solve domestic and international environmental problems. Resources, environmental quality, regulation, environmental perception and conservation. Integrative case studies. Not open for credit to students who have completed course 1. GE credit: SciEng. [II. (III.) Schwartz]

100. General Ecology (4)

Lecture—2 hours; discussion—1 hour. Prerequisite: Biological Sciences 1A, 1B, 1C, Mathematics 16A, 16B; Statistics 13 recommended. Theoretical and experimental analysis of the distribution, growth, and regulation of species populations; predator-prey and competitive interactions; and the organization of natural communities. Application of evolutionary and ecological principles to selected environmental problems. [II. (III.) Cornell, Sih]


Lecture—2 hours; discussion—1 hour. Prerequisite: Biological Sciences 1A, 1B, 1C; Environmental and Resource Sciences 100. Interdisciplinary study of diversity and change in human societies, using frameworks from anthropology, evolutionary ecology, history, archaeology, psychology, and other fields. Topics include population and natural resources; subsistence transitions, family organization, disease, economics, warfare, politics, and resource conservation. [Same course as Anthropology 101] GE credit: SocSci, Div. Wrt.—I., (II.) Borg-

102. Cultural Ecology (4)

Lecture—2 hours; discussion—1 hour. Prerequisite: one lower-division course in the social sciences, upper division standing. Comparative survey of the interaction between diverse human cultural systems and the environment. Primary emphasis given to people in rural and relatively undeveloped environments as a basis for interpreting complex environments. Not open for credit to students who have completed course 133. [Former course 133.] [Same course as Anthropology 102] GE credit: SocSci, Div. Wrt.—II. (III.) Borgerhoff Mulder

105. Evolution of Societies and Cultures (4)

Lecture—2 hours; discussion—1 hour. Prerequisite: Anthropology 1 or 2 or course 30 or Evolution and Ecology 100 or Biological Sciences 101. Interdisciplinary study of social and cultural evolution in humans. Culture as a system of inheritance, psychology of cultural learning, culture as an adaptive system, evolution of maladies, evolution of technology and institutions, evolutionary transitions in human history, coevolution of genetic and cultural variation. Only 2 units of credit to students who have completed...
Environmental Science and Policy

course 101 or Anthropology 101 prior to fall 2004. (Same course as Anthropology 105.) GE credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Social-Cultural Diversity; Wrt—Writing Experience

Environmental Science

110. Principles of Environmental Science (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 1A or 7A, Mathematics 16B or 218, and Biological Sciences 1A. Application of physical and chemical principles to ecological concepts, and systems approach to policy analysis of atmospheric environments, freshwater and marine environments, land use, energy supplies and technology, and other resources.—II. (J.) Lariger

111. Marine Environmental Issues (1) Discussion—1 hour; seminar—2 hours. Prerequisite: upper division standing and consent of instructor; concurrent enrollment in at least one course from courses 124, 152, Evolution and Ecology 106, 110, 114, residence at or near Bodega Marine Laboratory required. Student must complete the application available at http://www.bml.ucdavis.edu. An examination of critical environmental issues occurring in coastal waters. Course links together material from concurrent courses at BML to develop an integrative understanding of marine environments and their conservation issues through group discussions, and interaction with visiting speakers. May be repeated two times for credit. (Same Course as Evolution and Ecology 111.)—IV. (IV) Gaylord, Lariger, Morgan, Sanford

116. The Oceans (3) Lecture—3 hours. Introductory survey of the marine environment; oceanic physical phenomena, chemical constituents, geological history, the sea’s biota, and utilization of marine resources. (Same course as Geology 116.) GE credit: SciEng

116N. Oceanography (3) Lecture—2 hours; laboratory—3 hours; field work. Prerequisite: one of Geology 1, 2, 16 or 50. Advanced oceanographical topics: Chemical, physical, geological, and biological processes; research methods and data analysis; marine resources, anthropogenic impacts, and climate change, integrated earth/ocean/atmosphere systems, weekly lab and one weekend field trip. Offered in alternate years. (Same course as Geology 116N.)—III. (III) Hill, McClain, Spero

Ecological Analysis

121. Population Ecology (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1B, 1C, Mathematics 16A-16B. Development of exponential and logistic growth models for plant and animal populations, analysis of age structure and genetic structure, analysis of competition and predator-prey systems. Emphasis is on developing models and using them to make predictions and solve problems. Offered in alternate years. GE credit: SciEng—ArtHum—Arts and Humanities

123. Introduction to Field and Laboratory Methods in Ecology (4) Lecture—2 hours; laboratory—6 hours. Prerequisite: course 100 or the equivalent, Statistics 102 or the equivalent. Introduces students to methods used for collecting ecological data in field and laboratory situations. Methods used by population ecologists and community ecologists; emphasis on experimental design, scientific writing and data analysis.—III. (III) Schwartz

124. Marine and Coastal Field Ecology (3) Lecture—2 hours; discussion—1 hour; laboratory—3 hours; fieldwork—3 hours. Prerequisite: upper division standing or consent of instructor. Introductory animal biology (Biological Sciences 1B) recommended; residence at or near Bodega Marine Lab required. Student must complete the application available at http://www.bml.ucdavis.edu. Ecology of marine populations and communities living in diverse habitats along the California coast. Hands-on learning using scientific process and tools of the biological sciences and ecological questions arising during field trips. Critical thinking through discussion of scientific literature.—IV. (IV) Morgan

Field Ecology (4) Lecture—15 hours; discussion—10 hours; field work—15 hours for two-week period. Prerequisite: consent of instructor. Designed to instruct and demonstrate to students the value and approaches of experimental research using the hypothetico-deductive experimental research approach. May be taken only as part of the White Mountain Research Supercourse.

125B. Physiological Ecology (4) Lecture—15 hours; discussion—10 hours; laboratory—15 hours (for two-week period). Prerequisite: consent of instructor. Application of the functional means by which animals and plants cope with their environments, the physiological limits that determine the boundary conditions of various ecological niches. Unifying processes that describe the regulatory features of all animals or plants emphasized. May be taken only as part of the White Mountain Research Supercourse.—Quinn

125C. Applied Conservation Biology (4) Lecture—10 hours; discussion—10 hours; field work—15 hours (for two-week period). Prerequisite: consent of instructor. Designed to introduce students to the complexities, and realities, of natural resource exploitation and preservation, analyzing the trade-offs between economic benefits and ecosystem stability and sustainability. May be taken only as part of the White Mountain Research Supercourse.

127. Plant Conservation Biology (4) Lecture/discussion—1 hour; term paper. Prerequisite: Environmental Science and Policy 100 or equivalent upper division general ecology. Principles governing the conservation of plant species and plant communities, including the roles of fire, exotic species, grazing, pollination, soils, and population genetics; analytic and practical techniques for plant conservation; and introduction to relevant legal, ethical, and policy issues. Limited enrollment.—II. (II) Harrison

Aquatic Ecosystems Analysis

150A. Physical and Chemical Oceanography (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Environmental Science and Policy/Geology 116; Physics 98B, Mathematics 22C, Chemistry 1C; or upper division standing in a natural science and consent of instructor. Physical and chemical properties of seawater, fluid dynamics, air-sea interaction, currents, waves, tides, mixing, major oceanic geochemical cycles. (Same course as Geology 150A.)—I. (I) McClain, Spero, Lariger

150B. Geological Oceanography (3) Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: Geology 50 or 116. Introduction to the origin and geologic evolution of ocean basins. Composition and structure of oceanic crust; marine volcanism; and deposition of marine sediments. Interpretation of the history of the ocean floor in terms of sea-floor spreading theory. (Same course as Geology 150B.)—II. (II) McClain, Spero, Lariger

150C. Biological Oceanography (4) Lecture—3 hours; discussion—1 hour; fieldwork—15 hours for two-week field trip. Prerequisite: Biological Sciences 1A and a course in general ecology or consent of instructor. Ecology of major marine habitats, including intertidal, shelf benthic, deep-sea and plankton communities; existing knowledge and contemporary issues in research. Segment devoted to human use. (Same course as Geology 150C.)—IV. (IV)

Limnology I (3) Lecture—3 hours; discussion—1 hour; special project. Prerequisite: Biological Sciences 1A and junior standing. The biology and productivity of inland waters with emphasis on the physical and chemical environment.—I. (I)

151L. Limnology Laboratory (3) Laboratory—6 hours; two weekend field trips. Prerequisite: course 151 (may be taken concurrently); junior, senior, or graduate standing. Limnological studies of lakes, streams, and reservoirs with interpretation of aquatic ecology.—III. (III) C. Goldman

152. Coastal Oceanography (3) Lecture—2 hours; discussion—1 hour; laboratory—3 hours; fieldwork—3 hours. Prerequisite: division standing or consent of the instructor; physics (Physics 98B), calculus (Mathematics 21B) and exposure to physical and chemical oceanography. GE credit: Environmental Science and Policy 150A are recommended; residence at or near Bodega Marine Laboratory required. Student must complete the application available at http://www.bml.ucdavis.edu. The oceanography of coastal waters, including bays, river plumes, nearshore and estuaries; focus on transport patterns, how they are forced and implications for ecological and environmental problems. Pertinent for students taking oceanography, ecology, environmental engineering, geology and hydrology.—IV. (IV) Lariger

155. Wetland Ecology (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Plant Biology 117 required; course 110 or 151 recommended. Introduction to wetland ecology. The structure and function of major wetland types and principles that are common to wetlands and other natural and aquatic ecosystems.—I. (I) Rejmankova

Wetland Ecology Laboratory (3) Lecture—1 hour; laboratory—6 hours; fieldwork—two days-week field trips. Prerequisite: course 125 required (may be taken concurrently). Modern and classic techniques in wetland field ecology. Emphasis on sampling procedures, vegetation analysis, laboratory analytical procedures, and examples of successful wetland restoration techniques.—I. (I) Rejmankova

Environmental Policy Analysis

160. The Policy Process (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Political Science 1; Economics 1A; intermediate statistics course 172. Alternative models of public policymaking and application to case studies in the U.S. and California.—II. (II) Sabatier

161. Environmental Law (4) Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing and consent of instructor. Introduction to environmental science (course 1, 10, 110, Biological Sciences 1A, Environmental Toxicology 10, or Resource Sciences 100); Political Science 1 and University Writing Program 1 recommended. Introduction for Non-Law School students to some of the principal issues in environmental law and the judicial interpretation of some important environmental statutes, e.g., NEPA. GE credit: SocSci—Social Sciences in Environmental Policy (3)

162. Environmental Policy (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A. Compares economic and sociocultural approaches to understanding the causes of environmental problems and strategies for addressing them. Includes different approaches to the policy process, policy instruments, and environmental behavior. Applies these principles to several problems.—III

Energy and Environmental Aspects of Transportation (4) Lecture—3 hours, extensive writing. Prerequisite: Economics 1A and Civil and Environmental Engineering 162. Engineering, economic, and systems planning concepts. Analysis and evaluation of energy, air quality and selected environmental attributes of transportation technologies. Strategies for reducing pollution and petroleum consumption in light of institutional and political constraints. Evaluation of vehicle emission models. (Same course as Civil and Environmental Engineering 163.) Offered in alternate years. GE credit: Wrt—Writing Experience

Ethics in Environmental Policy (3) Lecture—3 hours. Prerequisite: courses 160, 168A; seniors only in Environmental Policy Analysis and Planning or by consent of instructor. Basic modes of ethical reasoning and criteria of distributive justice applied to selected topics in environmental policy making.—III. (III) Sabatier
Pmended. Analysis of Lecture—3 hours; discussion—1 hour. Prerequisite: Lecture—3 hours; La
factors affecting the influence of scientists, cations of research and evaluation techniques to 168B. Methods of Environment tion.—I. (I.) Ogden cost analysis, distri
b that sha
land use, and energy p
and a course in environmental science. How cities p
or Engineering 160; course 160 or Political Science 167. Energy Policy (4) or inter-agency
lement and environmental protection. Internet resources and field work used to design and execute a research and a website on a selected agency or inter-agency program. GE Credit: Wrt.
Energy Policy (4) Lecture—4 hours. Prerequisite: Resource Sciences 3 or Engineering 160; course 160 or Political Science 101, 107, or 109. Overview of U.S. energy policy; policy analysis, philosophy and methods; major pol
issues, such as renewable vs. nonrenewable; and applied studies of power plants, solar residen
and strategic policy options. Offered in alternate years. —(III.) Ogden
Methods of Environmental Policy Evaluation (5) Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: Statistics 3; Economics 100 or Agri
cultural and Resource Economics 100A; Mathemat
ics 168 or 218; course 1; upper division standing. Evaluation of alternatives for solution of complex environment problems. Various evaluation techniques to problems of transportation, air and water pollu
ion, land use, and energy policy. Students will apply the methods and concepts by means of a major project.
Water Policy and Politics (3) Lecture—3 hours. Prerequisite: Economics 1A or Political Science 1. The governance of water, including issues of water pollution/quality and water sup
ply. The politics of water decision-making and effectiveness of water policy. Broad focus on federal water policy, with case examples from nationally sign
ificant U.S. watersheds. GE credit: SocSci.—III. (III.) Lubell
(f) Environmental Planning
Conservation Biology Policy (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 and Economics 1A; Economics 100 or Agra
cultural and Resource Economics 100A recommended. Analysis of policies designed to conserve species and their habitats. Emphasis on how individual incentives affect the success of conservation polici
es. Valuation of endangered species and biodiversity. Criteria for deciding conservation priori
eties. —(II.) Lubell
Urban and Regional Planning (4) Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: course 1; a course in social science and a course in environmental science. How cities plan for growth in ways that minimize environmental harm. Standard city planning tools (general plan, zoning ordinance) and innovative new approaches. Focus on planning requirements and practices in California and a comparison of local, regional, state, and federal policy.—III. (III.) Handy
Public Lands Management (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A. Investigation of alternative approaches to public lands management by Federal and state agencies. The role each agency’s legisla
tion plays in determining the range of resource allo
Land Use and Growth Controls (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Political Science 1A; intermediate sta
istics (Sociology 106 or Statistics 102 or the equiva
ten), and local government (Applied Behavioral Science 157, 158 or Political Science 102, 104.) Exploration of political, and legal factors affecting land use and growth con
trols, and helps students critically evaluate written materials in terms of their arguments and supporting data.
Natural Resource Economics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural and Resource Economics 100B or Eco
nomics 100 or the equivalent. Economic concepts and policy issues associated with natural resources, renewable resources (ground water, forests, fisher
ies, and wildlife populations) and non-renewable resources [minerals and energy resources, oil] (Same course as Agricultural and Resource Econom
ics 175.) GE credit: SocSci.—III. (III.) Lin
Applied Research Methods (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 103 or Sociology 106 or the equivalent. Research methods for analysis of urban and regional land use, transportation, and environmental prob
lems. Survey research and other data collection tech
iques; demographic analysis, basic forecasting, air quality, and hierarchical multiple regression; Collection, inter
pretation, and critical evaluation of data.—II. (II) Handy
Environmental Impact Assessment (4) Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing and one course in environ
mental science (course 100, 110 or the equivalent). Introduction to the information resources and meth
ods typically used in environmental impact analysis. Emphasis on how environmental information is applied to planning, environmental regulation, and public policymaking, with case studies from Califor
nia land use and natural resource policy.—III. (III.) Quinn
Environmental Impact Reporting Using Geographic Information (2) Laboratory/discussion—2 hours; laboratory—4 hours. Prerequisite: course 179 concurrently. Intro
duction to Geographic Information Systems (GIS) by using ArcView for assessment and environmental planning. Not open for credit to students who have completed Applied Biological Systems Technology 190, 191 or Agricultural Systems and Environment 132.
Environmental Impact Reporting Using Geographic Information (2) Laboratory/discussion—2 hours; laboratory—4 hours. Prerequisite: course 179 concurrently. Intro
duction to Geographic Information Systems (GIS) by using ArcView for assessment and environmental planning. Not open for credit to students who have completed Applied Biological Systems Technology 190, 191 or Agricultural Systems and Environment 132.
Other Courses
Workshops on Environmental Problems (1-8) Laboratory—2-16 hours. Prerequisite: consent of instructor. Workshops featuring empirical analyses of contemporary environmental problems by multidiscipli
nary student teams. Guided by faculty and lay professionals, the teams seek to develop an inte
grated view of a problem and outline a series of alternative solutions. Open to all upper division and graduate students on application. (P/NP grading only)—I., II., III., (II, III.)
Internship (1-12) Internship—3-12 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in all subject areas offered in the College of Agricultural and Environmental Sciences. Internships supervised by a member of the faculty. (P/NP grading only.)
Directed Group Study (1-5) (P/NP grading only)
Environmental Policy Process (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course in public policy (e.g., Environmental Science and Policy 160); environmental law (e.g., Environ
mental Science and Policy 161); course in bureau
cratic theory (e.g., Political Science 187 on Environmental Science and Policy 166); course in statistics (e.g., Sociology 106 or Agricultural and Resource Economics 106). Introduction to selected topics in the policy process, applications, and the field of environmental policy. Develops critical reading skills, understanding of frameworks of the policy pro
cess and political behavior, and an ability to apply multiple frameworks to the same phenomena. Offered in alternate years. —(Same course as Ecology 212A) I.—III. Sabatier
Environmental Policy Evaluation (4) Lecture—1 hour; discussion—1 hour; seminar—2 hours. Prerequisite: intermediate microeconomics (e.g., Economics 100); Statistics 108 or Agricultural and Resource Economics 106; policy analysis (e.g., Environmental Science and Policy 168A or the equivalent); Agricultural and Resource Economics 176. Methods and practices of policy analysis; philos
ophical and intellectual bases of policy analysis and the political role of policy analysis. (Same course as Ecology 212B.) Offered in alternate years.
Tropical Ecology (3) Lecture—2 hours; discussion—1 hour. Prerequisite: advanced introductory ecology course—course 100, Evolution and Ecology 101, 117; Evolution and Ecology 138 recommended. Graduate and undergraduate students who meet requirement subject to consent of instructor. An overview of pres
ent status of knowledge on structure and processes of major tropical ecosystems. Differences and simi
larities among tropical communities and their stress. Offered in alternate years.—(III.) Rejman
Advanced Simulation Modeling (3) Lecture—2 hours; discussion—1 hour. Prerequisites: courses 128-128B, Statistics 108 or Agricultural and Resource Economics 106. Advanced techniques in simulation modeling; optimization and simulation, dynamic parameter estimation, linear models, error propagation, and sensitivity testing. Latter half of course will introduce model evaluation in ecological and social systems models.
Sustainable Transportation Technology and Policy (5) Lecture—2 hours; discussion—1 hour. Prerequisite: course 160 or the equivalent. Role of technical fixes and demand management in creating a sustainable transportation system. Emphasis on technology options, including alternatives to conventional electric propuls
ion, and IHVS. Analysis of market demand and travel behavior, environmental impacts, economics and politics. (Same course as Civil and Environmen
tal Engineering 252) —III. Sperring
Economic Analysis of Resource and Environmental Policies (5) Lecture/discussion—4 hours. Prerequisite: Agricul
tural and Resource Economics 204/Economics 204. Development of externality theory, market failure concepts, welfare economics, theory of renewable and nonrenewable resource use, and political eco
nomic models. Applications to policy issues regard
ing the agricultural/environment interface and managing resources in the public domain. (Same course as Agricultural and Resource Economics 275.) —III. (III.)
Research Methods in Environmental Policy (3) Lecture/discussion—3 hours. Prerequisite: Agricul
tural and Resource Economics 106 or the equivalent. Introduction to scientific research in environmental policy. Major issues in the philosophy of the social sciences. How to design research that acknowledges theoretical assumptions and that is likely to produce evidence in an inter-subjectively reliable fashion with explicit recognition of its uncertainties. Offered in alternate years.—(III.) Sabatier
Directed Group Study (1-5) Graduate Courses
Environmental Policy Process (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course in public policy (e.g., Environmental Science and Policy 160); environmental law (e.g., Environ
Environmental Sciences

See Agricultural Management and Rangeland Resources, on page 132; Atmospheric Science, on page 161; Environmental and Resource Sciences, on page 278; Environmental Biology and Management, on page 274; Environmental Horticulture and Urban Forestry, on page 277; Environmental Policy Analysis and Planning, on page 277; Environmental Toxicology, on page 284; Hydrology, on page 329; Landscape Architecture, on page 342; Soil and Water Science, on page 481; and Wildlife, Fish, and Conservation Biology, on page 516.

Environmental Toxicology

[College of Agricultural and Environmental Sciences]
Ronald S. Tjeerdema, Ph.D., Chairperson of the Department
Department Office. 4138 Meyer Hall
(530) 752-1142; http://www.envtox.ucdavis.edu

Faculty
Gary N. Chen, Ph.D., Professor (Environmental Toxicology, Nutrition)

Michael S. Denison, Ph.D., Professor
Fumio Matsumura, Ph.D., Professor (Environmental Toxicology, Entomology)

Patricia Oteiza, Ph.D., Professor (Environmental Toxicology, Nutrition)

Robert H. Rice, Ph.D., Professor

Takayuki Shibamoto, Ph.D., Professor

Ronald S. Tjeerdema, Ph.D., Professor

Barry W. Wilson, Ph.D., Professor (Animal Science, Environmental Toxicology)

Y. Reed, Ph.D., Lecturer

Emeriti Faculty
Donald G. Crosby, Ph.D., Professor Emeritus

Dennis P. H. Hsieh, Sc.D., Professor Emeritus

James N. Seiber, Ph.D., Professor Emeritus

Michael W. Stimmann, Ph.D., Lecturer Emeritus

Dorothy A. Woolley, Ph.D., Professor Emeritus

Affiliated Faculty
George V. Alexeef, Ph.D., Associate Adjunct Professor

Deborah Bennett, Ph.D., Assistant Professor (Public Health Sciences, School of Medicine)

James Byard, Ph.D., Lecturer
Arthur Craigmill, Ph.D., Specialist in Cooperative Extension Mari Golub, Ph.D., Adjunct Professor (CNPRC)

Dirk Holstege, Ph.D., Assistant Adjunct Professor

Mike Johnson, Ph.D., Associate Adjunct Professor (School of Veterinary Medicine)

Norman Kado, Ph.D., Adjunct Professor

John Knezovich, Ph.D., Adjunct Professor

Keith Mires, Ph.D., Lecturer (USCSS)

Alyson E. Mitchell, Ph.D., Associate Professor (Food Science and Technology)

Ruby Reed, Ph.D., Lecturer

Cecilia R. Reynolds-Walsh, Ph.D., Lecturer

JLC Davis Extension Forensics Program and Department of Justice

Zachary A. Wang, Ph.D., Adjunct Professor

The Major Program

Toxic agents found in the environment include pesticides, food additives, industrial waste, metals and chemicals produced by animals, plants, fungi and bacteria. Students in the Environmental Toxicology major learn about the potential for toxicants to produce adverse effects by understanding both their environmental fate and biological activity. They learn about monitoring concentrations and the distribution and persistence of agents found in water, soil, air and foods. Toxicity testing procedures and exposure assessment are used to help predict potential for harm to humans and other species. By understanding the cellular targets and biochemical mechanisms of perturbation by toxicants, toxicologists can better estimate adverse effects. Overall, students learn mechanisms by which toxic agents act, their origin and fate and how toxicologists evaluate the risk of adverse effects and balance them against the benefits of use.

The Program. Preparatory courses in biology, chemistry, mathematics, and physics are required to provide the chemical and biological principles which underlie toxicology. Students in the major are expected to understand the environmental fate and biological activity of different classes of toxic substances, and the legislative issues which arise from chemical use. Opportunities are available to develop in-depth understanding in areas of emphasis through selection of electives.

Internships and Career Alternatives. Occupations that use environmental toxicology include risk assessment, pharmaceutical or food additive toxicity testing and research, managing regulatory compliance, residue or forensic analysis, pest control, monitoring and field sampling, industrial hygiene, and environmental health and safety. A substantial proportion of graduates elect to pursue advanced training in graduate or professional schools. Others with the B.S. degree have gone on to law, medical, pharmacy, or veterinary medical school, as well as to graduate degrees in pharmacology, toxicology, agricultural and environmental chemistry, or public health. During undergraduate study, optional internships or research projects are recommended to provide training and work experience to help students set future goals.

B.S. Major Requirements:

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<tr>
<th>Requirement</th>
<th>Units</th>
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<tr>
<td>Environmental Composition Requirement</td>
<td>0-8</td>
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<tr>
<td>Preparatory Subject Matter</td>
<td>64-70</td>
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<tr>
<td>Biological Sciences</td>
<td>1A, 1B, 1C</td>
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<td>2A, 2B, 2C</td>
<td>6</td>
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<tr>
<td>Chemistry</td>
<td>2A/2B/2C</td>
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<td>129D</td>
<td>3</td>
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<td>272B</td>
<td>3</td>
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<tr>
<td>Plant Sciences</td>
<td>21</td>
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<td>272A</td>
<td>3</td>
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<tr>
<td>Environmental Toxicology</td>
<td>10, 20 or 30</td>
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<tr>
<td>Mathematics</td>
<td>16A-16B or 21A-21B</td>
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<tr>
<td>Physics</td>
<td>1A-1B or 2A-2B</td>
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<td>Statistics</td>
<td>100</td>
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<tr>
<td>Breadth/General Education</td>
<td>36</td>
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<tr>
<td>Satisfaction of the General Education requirement to include courses selected with adviser's approval to complement the major; courses in agricultural economics, environmental studies, political science, psychology, and sociology are particularly recommended.</td>
<td>24</td>
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<tr>
<td>Additional breadth in humanities and social sciences</td>
<td>12</td>
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<tr>
<td>Depth Subject Matter</td>
<td>34-35</td>
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<tr>
<td>Biological Sciences</td>
<td>101, 102 or 103</td>
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<td>Restricted/Other Electives</td>
<td>24</td>
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<tr>
<td>Electives selected for area of specialization with adviser's approval; see department web page for details</td>
<td>7-14</td>
</tr>
</tbody>
</table>

Unrestricted Electives | 180 |

Major Adviser. Takayuki Shibamoto

Advising Center for the major is in 4111 Meyer Hall. Contact the Academic Program Adviser at (530) 752-1042.

Minor Program Requirements:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Units</th>
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<tbody>
<tr>
<td>Environmental Toxicology</td>
<td>18</td>
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<tr>
<td>Environmental Toxicology 101, 102A, 103A</td>
<td>12</td>
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<tr>
<td>Elective courses 6 units minimum, selected from Environmental Toxicology 10, 128, 131, 135, 138, 146, 190, 198 and 199; 4 units combined maximum of 190, 198 and 199 with adviser approval</td>
<td>6</td>
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Minor Adviser. M.S. Denison

Graduate Study. Programs of study leading to M.S. and Ph.D. degrees are available through related Graduate Groups such as Pharmacology and Toxicology, Biochemistry and Molecular Biology, and Agricultural and Environmental Chemistry. For information on graduate study, contact the Advising Center or the appropriate graduate adviser; see Graduate Studies, on page 104.

Graduate Advisers. M. G. Miller (Pharmacology and Toxicology), T. Shibamoto (Agricultural and Environmental Chemistry)

Courses in Environmental Toxicology (ETX)

Lower Division Courses

10. Introduction to Environmental Toxicology (3)

Lecture—3 hours. Hazardous substances, their effects on humans and their actions and movements in the environment. Emphasis on substances of current concern. GE credit: SciEng—I. (I.) Tjeerdema

20. Introduction to Forensic Science (4)

Lecture—3 hours, discussion—1 hour. Basic principles of forensic science and the types of information on which investigations focus, how the information is obtained and how it is used in criminal investigations, types of scientific skills that are required to practice forensic science as a profession, guidance on future training. Real cases will be discussed, and demonstrations of certain methods provided. GE credit: SciEng, Wrt.—III. (III.) Miller

30. Chemical and Drug Use and Abuse (3)

Lecture—3 hours. An overview of chemical use and abuse in our society. The effects of chemicals (therapeutic drugs, pesticides, food additives, herbal remedies, environmental contaminants, and recreational drugs) on humans and other living systems. GE credit: SciEng.—II. (II.) Byard

92. Internship (1-12)

Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in all subject areas offered in the College of Agricultural and Environmental Sciences. Internships supervised by a member of the faculty. (P/NP grading only)

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only)

Upper Division Courses

101. Principles of Environmental Toxicology (4)

Lecture—3 hours, discussion—1 hour. Prerequisite: Chemistry 88, 118B, or 128B and Biological Sciences 1A. Principles of toxicology with a focus on environmental, industrial, and natural chemicals. Topics include fate and effects of chemicals in organisms and the environment, air pollutants, insecticides, aquatic toxicology, endocrine disruptors, biomarkers and bioassays, and risk assessment. (I.) Denison
102A. Environmental Fate of Toxicants (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 8B, 118B, 128B or consent of instructor. Properties of toxic chemicals influencing their distribution and transformations; action of environmental forces affecting toxicant breakdown, movement, and accumulation, and occurrence of major classes of environmental toxicants. Not open for credit to students who have completed course 112A. —II. (II.) Tjeerdema

102B. Quantitative Analysis of Environmental Toxicants (5) Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 102A. Sample preparation methods for trace analysis of environmental toxicants. Detection and quantification of advanced analytical instrumentation. Interpretation and use of analytical data. Not open for credit to students who have not completed course 112B. —II. (III.) Shibamoto

103A. Biological Effects of Toxicants (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 102; course 101 and Neurobiology, Physiology, and Behavior 101 recommended. Biophysical and biochemical effects of toxic substances in living organisms. Metabolism, cellular and tissue targets, mechanisms of action, and pathological effects. Not open for credit to students who have not completed course 114A. —II. (II.) Rice

103B. Biological Effects of Toxicants: Experimental Approaches (5) Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 103A. Experimental approaches for assessing the biological effects of toxicants. Not open for credit to students who have not completed course 114B. —II. (III.) Miller

104. Environmental and Nutritional Factors in Cellular Regulation and Nutritional Toxicants (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 101; Biological Sciences 103 or Animal Biology 103. Cellular regulation from nutritional/toxicological perspective. Emphasis: role of bioactive products, modulation of signal transduction pathways, role of specific organelles in organization/ regulation of metabolic transformations, major cofactor functions, principles of pharmacology/toxicology important to understanding nutrient/toxicant metabolism. (Same course as Nutrition 104). —III. (III.) Oteiza, Rucker

110. Toxic Tragedies and Their Impact on Society (2) Lecture—2 hours. Prerequisite: Biological Sciences 10 or the equivalent or consent of instructor; Chemistry 118B recommended. Examination of toxic tragedies, their origins, consequences, and effects on society in the context of regulation. Offered in alternate years. GE credit: Wrt. —II. Rice

111. Introduction to Mass Spectrometry (3) Lecture—3 hours. Prerequisite: Chemistry 118C. Introduction to mass spectrometry, including ionization techniques, interfaces, data analysis and applications of mass spectrometry. Emphasis on fundamental concepts of mass spectrometry necessary to identify and quantify organic molecules. —III. (III.)

120. Perspectives in Aquatic Toxicology (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 8B, 118B or 128B, Biological Sciences 1A; or consent of instructor. Toxic substances, their fate in aquatic systems, aquatic organisms, and their effects on aquatic organisms, populations, and ecosystems. Emphasis on substances and issues of current concern. Offered in alternate years. —II. Cher, Tjeerdema

127. Environmental Stress and Development in Marine Organisms (10) Lecture—4 hours; laboratory—12 hours; discussion—2 hours. Prerequisite: course 101 or Biological Sciences 118B or the equivalent; course 114A or Nutrition 114 recommended. Course taught at Bodega Marine Laboratory. Effects of environmental and nutritional stress, including pollutants, on development and function in embryos and larvae of marine organisms. Emphasis on advanced experimental methods. [Same course as Nutrition 127.] GE credit: Sci. —IV. Chen

128. Food Toxicology (3) Lecture—3 hours. Prerequisite: Biological Sciences 102 and 103. Chemistry and biochemistry of toxins occurring in foods, including plant and animal toxins, intentional and unintentional food additives. The assessment of food safety and toxic hazards. [Same course as Food Science and Technology 128.] GE credit: Sci. —II. (III.) Shibamoto, Mitchell

130. The Role and Application of Toxicology in Modern Industry (3) Lecture—3 hours. Prerequisite: course 101 required; course 103A recommended. Role of toxicology in industry research and development, human health and environmental hazard and risk evaluations, risk management and communications, product stewardship, and regulatory compliance. Scientific principles and methods of toxicology in chemical, energy, pharmaceutical, pesticide, biotechnology industries. —III. (III.) Wong

131. Environmental Toxicology of Air Pollutants (3) Lecture—3 hours. Prerequisite: Chemistry 8B (may be taken concurrently) or the equivalent; Biological Sciences 102 recommended. Field trip required. Toxicology of air pollutants in the ambient, indoor, and occupational environments. Health effects, sources, environmental fate, pulmonary responses, sampling and analyses, and air-quality criteria and standards. —I. (I.) Kado

135. Health Risk Assessment of Toxicants (3) Lecture—3 hours. Prerequisite: course 101; course 114A recommended. Current practices of health risk assessment of environmental chemicals using toxicological principles and their application to regulatory control of these chemicals. GE credit: Sci. —I. (I.) Reed

138. Legal Aspects of Environmental Toxicology (3) Lecture—3 hours. Prerequisite: course 10 or 101 recommended. Federal and California legislation concerning air and water pollution, pesticide use, food and feed additives, consumer protection, and occupational exposure to toxic substances; roles of federal regulatory agencies; alternatives to government control. —II. (II.) Alexeff

146. Exposure and Dose Assessment (3) Lecture—3 hours. Prerequisite: course 112A; course 135 recommended. The exposure component of risk assessment; sensitive population and/or formation of toxic substances in environmental media, their movement within and between contaminated media, and the contacts of human populations with these media. Offered in alternate years. GE credit: Sci. —III. (III.) Bennett

190. Seminar (1) Seminar—1 hour. Prerequisite: consent of instructor. Selected topics presented by students, faculty, or outside speakers covering current research and instructional activities within environmental toxicology. Reports and discussions concerning oral and written presentations, literature sources, and career opportunities. (P/NP grading only). —I. (I.) II. (II.) III. (III.)

190C. Research Group Conference (1) Discussion—1 hour. Prerequisite: consent of instructor. Weekly conference of advanced research methods and the interpretation of research results. (P/NP grading only). —I. (I.) II. (II.) III. (III.)

190S. Environmental Toxicology Career Seminar (1) Seminar—1 hour. Careers in environmental toxicology; discussions with graduates from the Department of Environmental Toxicology and other experts in the field. (P/NP grading only). —I. (I.)

192. Internship (1-12) Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in all subject areas offered in the College of Agricultural and Environmental Sciences. Internships supervised by a member of the faculty. (P/NP grading only.)

194HA-194HB. Honors Research (3-3) Discussion—1 hour; laboratory—6 hours. Prerequisite: senior standing, minimum GPA of 3.250, consent of instructor. Specific research projects conducted under the supervision of a faculty sponsor. Experience to include experimental design, learning new techniques, data analysis and interpretation of findings. (P/NP grading only, deferred grading pending completion of a research sequence.)

194HC. Honors Research (3) Laboratory—6 hours; discussion—1 hour. Prerequisite: senior standing, minimum GPA of 3.250, and consent of instructor. Continuation of course 194HA-194HB. (P/NP grading only.)

197T. Tutoring in Environmental Toxicology (1-5) Hours and duties will vary depending upon course being tutored. Prerequisite: advanced standing in Environmental Toxicology, a related major, or the equivalent experience and consent of instructor. Teaching toxicology including conducting discussion groups for regular departmental courses under direct guidance of staff. May be repeated for credit up to a total of 5 units. (P/NP grading only.)

198. Directed Group Study (1-5) Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5) (P/NP grading only.)

Graduate Courses

203. Environmental Toxicants (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 128C (or the equivalent), or Chemistry 8B and consent of instructor. Toxic chemicals: selected topics illustrating their occurrence, adverse effects, and the reactions underlying detection, toxicity, fate, and ecological importance. Offered in alternate years. —II. Matsumura

214. Mechanisms of Toxic Action (3) Lecture—3 hours. Prerequisite: Biological Sciences 102, 103, and consent of instructor. Chemical, biochemical, and molecular mechanisms underlying the adverse effects of toxic chemicals. Students are required to write a grant proposal and participate in a grant review panel. Offered in alternate years. —III. Denison, Hammock

220. Analysis of Toxicants (3) Lecture—3 hours. Prerequisite: coursework in organic chemistry; Principles of microanalysis of toxicants. Theoretical considerations regarding separation, detection and quantitative determination of toxicants using chemical and instrumental techniques. (Same course as Forensic Science 220.) —I. (I.) Wood

220L. Analysis of Toxicants Laboratory (2) Laboratory—6 hours. Prerequisite: course 220 (may be taken concurrently) and consent of instructor. Laboratory techniques for microanalysis of toxicants. Separation, detection, and quantitative determination of toxicants using chemical and instrumental methods. —I. (I.) Wood

228. Gas Chromatography/Mass Spectrometry of Toxic Chemicals (3) Lecture—1 hour; discussion—1 hour; laboratory—3 hours. Prerequisite: course 220 and Chemistry 129C, or consent of instructor. Application of GC/MS techniques to investigate toxic chemicals. Mass spectral fragmentations and their application to the structural elucidation. Practical application of GC/MS in current research. Preference given to environmental toxicology graduate students. —II. (II.) Holstege

234. Neurophysiologic Basis of Neurotoxicology (3) Lecture—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101 or the equivalent, basic understanding of neurophysiology. Mechanisms of
286

Epidemiology

action at the cellular and systemic level of a number of different neurotoxins and toxicants. Examples of ways toxicology may act on the nervous system and techniques for study of neurotoxicology. [Same course as Physiology 234.].—I. (I)

240. Ecotoxicology (3)
Lecture—2 hours; laboratory—1 hour. Prerequisite: elementary course in toxicology and ecology or the equivalent, or consent of instructor. Principles of toxicology as applied to chemical action on natural populations, communities, and ecosystems. Physical, chemical, and biological characteristics which influence ecological effects, modeling, and field research. Selected case histories are analyzed and presented in class. — (III) John-
son, Miles

250. Reproductive Toxicology (3)
Lecture—1.5 hours; lecture/discussion—1.5 hours. Prerequisite: Physiology 220 or Pharmacology—Toxicology 203. Application of toxicological principles in reproductive studies. Effects of toxicants on the male, female, and developing embryo/fetus. Critical evaluation of reproductive toxicity studies and development of mechanistic approaches to understanding how chemical exposure can adversely affect reproductive outcomes. Offered in alternate years. — (III) Miller, Golub

260. Immunotoxicology (3)
Lecture—3 hours. Prerequisite: undergraduate or graduate introduction to immunology coursework recommended, but not required; graduate standing or consent of instructor. Provides students with skills and knowledge for evaluating and applying research on the impact of environmental toxicants on immunological function in human and wildlife populations. Offered in alternate years. — Golub

270. Toxicology of Pesticides (3)
Lecture—3 hours. Prerequisite: one course each in (a) Organic Chemistry, (b) Biochemistry, (c) Toxicology (course 101 or equivalent), or consent of instructor; graduate standing. Classification and chemical properties of pesticides, their mode of action, metabolism and disposition, pesticide resistance, effects on human health and ecological health and methods of risk benefit analyses. Offered in alternate years. — (II) Matsumura

278. Molecular Techniques (3)
Lecture—3 hours. Prerequisite: graduate standing or consent of instructor. Recombinant DNA technology and its applications. [Same course as Forensic Science 278.] Offered in alternate years. — (I) Denison, Rice

280. Forensic DNA Analysis (3)
Lecture—3 hours. Prerequisite: coursework in genetics and molecular biology. Foundation in theory and practice of forensic DNA analysis; past, present, and emerging technologies; legal and quality assurance issues. DNA extraction, DNA quantitation, multiplex amplification of STR loci, capillary electrophoresis of amplified products, and analysis of STR typing data. [Same course as Forensic Science 280.] Offered in alternate years. — Von Beroldingen

290. Seminar (1)
Seminar—1 hour. Current topics in environmental toxicology. (S/U grading only)—I, II, III. (I, II, III)

290C. Advanced Research Conference (1)
Lecture/discussion—1 hour. Prerequisite: consent of instructor. Presentation and critical discussion of advanced research methods and interpretation of research results. Designed primarily for graduate students. (S/U grading only)—I, II, III. (I, II, III)

297T. Tutoring in Environmental Toxicology (1-5)
Hours and duties will vary depending upon course being tutored. Prerequisite: graduate standing in Environmental Toxicology. tutor must have major, or the equivalent experience, and consent of instructor. Teaching toxicology including conducting discussion groups for regular departmental courses under direct guidance of the instructor. May be repeated for credit up to a total of 5 units. (S/U grading only).

298. Group Study (1-5)
299. Research (1-12)
(S/U grading only)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—I, II, III, (I, II, III)

Epidemiology

See Epidemiology and Preventive Medicine (EPP), on page 380; and Medicine and Epidemiology (VME), on page 306.

Epidemiology

(A Graduate Group)

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(VM: Medicine & Epidemiology)
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Lihong Qi, Ph.D. (Human Genetics)
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Robert Shumway, Ph.D., Professor (Statistics)
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Steve Thrall, M.D.
(Pulmonary & Critical Care Medicine)
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Alexander Tsoodlik, Ph.D.
(Public Health Sciences, Biostatistics)
Jessica Ults, Ph.D., Professor (Statistics)
Michael Ziccardi, Ph.D. (Wildlife Health Center)

Emeriti Faculty

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Bruce Eldridge, Ph.D., Professor Emeritus
Alvin Wiggins, Ph.D., Professor Emeritus

Affiliated Faculty

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Agronomist/Assistant Cooperative Extension Specialist (Population Health and Reproduction)
Rahman Azari, Ph.D., Lecturer (Statistics)
Nicholas Lerche, Ph.D., Associate Adjunct Professor (Population Health and Reproduction)
Jonna Mazet, M.P.V.M., D.V.M., Ph.D., Assistant Clinic Professor (Wildlife Health Center)
Steven Samuels, Ph.D., Assistant Clinical Professor (Epidemiology and Preventive Medicine)

Graduate Study. The Graduate Group in Epidemiology offers programs of study and research leading to the M.S. and Ph.D. degrees. Areas of emphasis include environmental/occupational epidemiology; infectious disease epidemiology; epidemiologic methods and biostatistics; health services and economics; nutritional epidemiology. For detailed information regarding the program, address the chairperson of the group or see the Web page.

Graduate Advisers. P. Kass (Population Health and Reproduction), Tim Carpenter (VM: Medicine & Epidemiology) Danielle Harvey (Public Health Sciences, Biostatistics)
Required Courses for the Program

Prerequisite Courses. Prerequisites may be taken concurrently with required courses below.

Mathematics 16A-16B or 21A-21B
Statistics 102, 110, 110A, 108, or Preventive Veterinary Medicine 402, 403

Required Courses. These courses are required of all students in the program. M.S. and Ph.D. degrees. These requirements cannot be waived and must be met before a student’s Qualifying Examination. Epidemiology 204, 205A, 205B, 206, 207, 208, 209, 210A, 210B, 210C, 210D, and 210E

Courses in Epidemiology (EPI)

Graduate Courses

204. Statistical Models, Methods, and Data Analysis for Scientists (4)
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisites: Statistics 102 or 110B, or 133, or Statistics 108 recommended. Development of broad statistical skills useful for the analysis of scientific data. Special emphasis given to determining factors associated with characteristics like disease and time-to-event. Analysis of data that can be modeled as generalized linear and generalized linear mixed models, parametric and non-parametric survival models, and models for correlated, clustered, longitudinal data.—II. Johnson

205A. Principles of Epidemiology (4)
Lecture—4 hours. Prerequisite: Preventive Veterinary Medicine 402 or consent of instructor. Basic epidemiologic concepts and approaches to epidemiologic research, with examples from veterinary and human medicine, including outbreak investigation, infectious disease epidemiology, properties of tests, and an introduction to epidemiologic study design and surveillance. (Same course as Preventive Veterinary Medicine 405.)—I. (Gold)

205B. Integration of Epidemiologic Concepts (2)
Discussion—2 hours. Prerequisite: Preventive Veterinary Medicine 405C or course 205A can be taken concurrently. In-depth analysis and integration of basic epidemiologic concepts and approaches to epidemiologic research. Prerequisites: Preventive Veterinary Medicine 405C or course 205A, with more mathematical and theoretical basis and examples from veterinary and human medicine, including outbreak investigation, infectious disease epidemiology, properties of diagnostic tests, study design, and surveillance.—I. (Gold)

206. Epidemiologic Study Design (3)
Lecture—1.5 hours; discussion—0.9 hours; laboratory—1.8 hours. Prerequisite: Preventive Veterinary Medicine 405C or course 205A, course 205B. Builds on concepts presented in course 205A. Concepts of epidemiologic study design—clinical trials, observational cohort and case-control studies—introduced in course 205A are covered in more depth, using a problem-based format. Discussion of published epidemiologic studies. (Same course as Preventive Veterinary Medicine 406A.)—II. (Gold)

207. Advanced Concepts in Epidemiologic Study Design (4)
Lecture/discussion—4 hours. Prerequisite: course 205B and 206. In-depth integration of advanced concepts in study design, with theory and examples including confounding, effect modification under additive and multiplicative models, internal and external validity, bias, misclassification, alternate designs, source populations, statistical power and sample size, causation, and genetic epidemiology.—II. (Gold)

208. Analysis and Interpretation of Epidemiologic Data (3)
Lecture—16 sessions; laboratory—21 sessions, project. Prerequisites: Preventive Veterinary Medicine 205C or taken concurrently) and 207, and either Statistics 144A or Population Health and Reproduction 202 and entry level skill in standard statistical software (e.g., SPSS, BMDP, SAS, Stata, WinTab, S-Plus). Application of theory and concepts of statistics and epidemiology to analysis and interpretation of data typically found in veterinary and human epidemiologic research.—I. (Gold)

210A. Analytic Epidemiology I: Case-Control Studies (3)
Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: Statistics 130B and Preventive Veterinary Medicine 406B or the equivalent, or consent of instructor. Theory and practice of epidemiologic data analysis. Topics include confounding, stratification, matching, interaction, and logistic regression. (Same course as Population Health and Reproduction 210A.)—II. (Gold)

210B. Analytic Epidemiology II: Cohort Studies (3)
Lecture—3 hours. Prerequisite: course 210A. Theory and practice of epidemiologic data analysis. Topics include rates, regression, time series analysis, Poisson regression, and survival/failure-time methods. (Same course as Population Health and Reproduction 210B.)—III. (Kass)

220. Problems in Epidemiologic Study Design (4)
Lecture—3 hours; term paper. Prerequisite: Preventive Veterinary Medicine 405D and 406B or the equivalent; Population Health and Reproduction 207 concurrently; Statistics 102 and 106 or the equivalent. Design and development of research protocols and funding applications for peer review. Application of research methods and data collection and management and statistical analysis in research proposals. Methods of evaluating research proposals, mechanisms of funding, specifying human subjects consents, and peer review.—(I.) (Kass)

222. Epidemiological Modeling (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Preventive Veterinary Medicine 405D. Techniques of model building and simulation of infectious diseases will be explored. Epidemiologic modeling philosophies, construction and implementation will be emphasized. Offered in alternate years.—II. (Carpenter)

223. Spatial Epidemiology (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Preventive Veterinary Medicine 405D or Environmental Studies 126, or Veterinary Medicine 405, and Statistics 102 or the equivalent. Geostatistics, disease maps, and global positioning systems; applications to specific disease problems. Topics include mapping and analysis of disease occurrence by geographic location and statistical aspects of spatial disease distribution. Offered in alternate years.—II. (Carpenter)

224. Health and Ecological Risk Analysis (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Preventive Veterinary Medicine 406D or consent of instructor; background in epidemiology, including multivariable techniques; a course in differential equations. A methodological approach to risk analysis for human and animal-related health and ecological issues. Basic principles of risk assessment, including perception, communication, assessment and management. Focus on the assessment of risk.—II. (Carpenter)

225. Advanced Topics in Epidemiology Methods (2)
Discussion—2 hours. Prerequisite: courses 205B, 206, and 207 (or equivalents, with consent of instructor). An in-depth study of topics in epidemiology theory and methods, selected from: causal inference, confounding, study design, or other related areas, with year to year variation. Readings are assigned and students are expected to lead discussions on them. May be repeated for credit when topic differs. Not offered every year.—II. (II.) Hertz-Picciotto

228. Quantitative Methods for Epidemiology (4)
Lecture—3 hours; discussion—1 hour. Prerequisites: Mathematics 16A-B or 17A-B or 21A-B or equivalent; basic knowledge of the principles of linear algebra, such as those taught in mathematics 22A or the equivalent, is assumed. The application of calculus and linear algebra techniques to epidemiologic problems. Topics include applications of derivatives, integration, extremals and logarithms, multivariable calculus, infinite series, and matrix algebra, with examples and problems taken from epidemiology and related subjects.—I. (I.) Harvey

240. Principles of Injury Epidemiology (3)
Lecture/discussion—3 hours. Overview of the epidemiology of human injury, including general principles, surveillance methods, behavioral, environmental factors, treatment issues and legal interventions related to vehicular injuries, drownings, falls, fires and burns, poisonings, firearm injuries, and other intentional injuries.—I. (Romano)

250. Introduction to Clinical Research Design and Epidemiology (1)
Lecture—1 hour. Prerequisite: graduate standing or medical students. May be taken concurrently. A broad survey of clinical study design and analysis methods. (S/U grading only).—I. (McCurdy, Romano)

251. Environmental Epidemiology (3)
Lecture—3 hours. Prerequisite: Preventive Veterinary Medicine 405 (may be taken concurrently); upper division undergraduates who have completed Environmental Studies 126, or the equivalent. Examination of the human health effects and the risk of disease from community, occupational, and personal exposure to toxic substances. Offered in alternate years.—II. (Gold)

260. Epidemiology of Chronic Diseases and Aging (3)
Lecture/discussion—3 hours. Overview of the epidemiology of chronic disease in old age. Topics include biology of aging, epidemiology of cardiovascular disease, neoplasms, osteoporosis and fractures, psychosocial factors and health in old age, dementia, functional status and prevention of disease.—II. (Gold)

270. Research Methods in Occupational Epidemiology (3)
Lecture/discussion—3 hours. Prerequisite: Environmental Studies 126 or Preventive Veterinary Medicine 405 or 406, and Statistics 102 or Epidemiology and Preventive Medicine 402. Methods used in epidemiologic research on occupational hazards. Topics include design and analysis of cohort and case-control studies, sample size, measuring dose, choosing a control group, validation of employment and health data, interpreting negative studies, and analysis software. Offered in alternate years.—II. (Beaumont)

272. Cancer Epidemiology (2.0)
Recitation—1 hour; discussion—1 hour. Prerequisite: must have basic understanding of epidemiologic and statistical concepts that are covered in courses 205A, 205B, 206, and 207 (may be taken concurrently), and Statistics 102. We will cover the underlying concepts essential to understanding cancer epidemiology, such as trends in incidence and survival, epidemiologic methods used to assess cancer etiology, prevention of disease, and an introduction to the cancertainment and progression multi-stage model.—II. (II.) Butler, Cress

290. Seminar in Epidemiology (1)
Seminar—1 hour. Students will actively participate in presentation and discussion of ongoing or published research projects in epidemiology. (S/U grading only.)—III. (II.)
Evolution and Ecology

[College of Biological Sciences]
Maureen Stanton, Ph.D., Chairperson of the Department

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Sebastian Schreiber, Ph.D., Professor
H. Bradley Shaffer, Ph.D., Professor
Arthur M. Shapiro, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Anyam V. Kopp, Ph.D., Assistant Professor
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Sergey V. Nuzhdin, Ph.D., Adjunct Professor

The Evolution, Ecology and Biodiversity Major Program

The major in Evolution, Ecology and Biodiversity offers the student a broad background in the theoretical and empirical basis of our understanding of the diversity and distribution of living organisms.

The Program. The program of study for the major begins with a core of introductory courses in mathematics, physical sciences, and biology. These are followed by survey courses in biodiversity, evolution and ecology and various more specialized courses that focus the student on particular disciplines or organisms, with an emphasis on problem-solving and critical-thinking skills. Ecology and Biodiversity majors may earn either a Bachelor of Science or a Bachelor of Arts degree. The requirements for the B.S. degree program include more science courses, such as biochemistry, whereas those for the B.A. degree program allow room for more electives within the humanities and social sciences. The B.A. degree is especially appropriate for those students who wish to combine arts or languages with evolution and ecology for career preparation in such areas as scientific writing, translating or illustration.

Career Alternatives. A degree in evolution, ecology and biodiversity prepares the student for career opportunities in research, teaching, health professions, veterinary medicine, agriculture, environmental management, and industry. Many students gain some research experience while at UC Davis and choose to continue their training at the graduate level. This track offers careers in academics, government, environmental organizations, or business.

A.B. Major Requirements:

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Sciences 2A-2B-2C</td>
<td>14</td>
</tr>
<tr>
<td>Chemistry 2A-2B</td>
<td>8</td>
</tr>
<tr>
<td>Mathematics 16A-16B or Statistics 100 or 102</td>
<td>4-6</td>
</tr>
<tr>
<td>Physics 1A-1B</td>
<td>6</td>
</tr>
</tbody>
</table>

Depth Subject Matter: 36

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Sciences 101</td>
<td>4</td>
</tr>
<tr>
<td>One course from Evolution and Ecology 100; Geology 107; Anthropology 151</td>
<td>3-4</td>
</tr>
<tr>
<td>One course from Evolution and Ecology 101; Environmental Science and Policy 100; Wildlife, Fish, and Conservation Biology 151</td>
<td>3-4</td>
</tr>
<tr>
<td>Additional upper division course in biological science to achieve a total of 36 or more units</td>
<td>2-4</td>
</tr>
</tbody>
</table>

Note: At least one course from each of the areas of study below.

Areas of Study:


Note: A maximum of 4 units of variable-units courses (numbered 192, 198, 199) may be applied to upper division elective requirements. Evolution, Ecology and Biodiversity majors may not substitute course 192 for the upper division laboratory requirement. Courses numbered 197T are not applicable to the upper division elective unit requirement.

Total Units for the Major: 106-115

Biological Sciences Electives

The following courses are acceptable toward the fulfillment of the upper division biological sciences requirement in the A.B. and B.S. major programs and may be selected without adviser approval. Other elective courses are approved on an individual basis by petition through an adviser.

Anatomy, Physiology and Cell Biology 100
Anthropology 151, 152, 153, 154A, 154B, 155, 156
Biology, all upper division courses
Chemistry 107A, 107B
Entomology, all upper division courses except 110
Environmental Science and Policy 110, 116, 121, 123, 150C, 151, 153L
Geology 107, 107L, 150C
Microbiology, all upper division courses
Molecular and Cellular Biology, all upper division courses
Nematology 110
Neurobiology, Physiology, and Behavior, all upper division courses
Nutrition 101, 111
Pathology, Microbiology, and Immunology 101, 126, 126, 128
Philosophy 108
Plant Biology, all upper division courses
Psychology 121, 122, 127, 129
Wildlife, Fish, and Conservation Biology 120, 120L, 121

Minor Program Requirements:

Evolution, Ecology and Biodiversity... 18

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer; 2009-2010 offering in parentheses


Statistics 100, 102 or 130A-130B........... 4-8
Additional upper division course work in biological science to achieve a total of 49 or more units including at least 2 units (6 hours per week) of laboratory......................... 20-27
Biodiversity and two courses from the Advanced Evolution and Ecology areas of study below.

Areas of Study:

1. Biodiversity: Entomology 103; Evolution and Ecology 105, 108, 112 and 112L, 134, 134L and 134F, 140; Microbiology 105; Nematology 110, 118, 119, 147, 149, 180A and 180B.


Note: A maximum of 4 units of variable-units courses (numbered 192, 198, 199) may be applied to upper division elective requirements. Evolution, Ecology and Biodiversity majors may not substitute course 192 for the upper division laboratory requirement. Courses numbered 197T are not applicable to the upper division elective unit requirement.

Total Units for the Major: 106-115

Evolution, Ecology and Biodiversity... 18


Notes: Some courses taken to fulfill these requirements must include a laboratory or field component.
Courses in Evolution and Ecology (EVE)

Lower Division Courses

2. Biodiversity (3)
Lecture—2 hours; discussion—1 hour. Introduction to nature, scope and geographical distribution of biodiversity (the diversity of life, with emphasis on plants and animals, especially insects). Humans and biodiversity—domestication, aesthetics, ethics and valuation. Species richness and success. Biodiversity through time; monitoring, evaluation and conservation. Biomes—global, continental and Californian. (Same course as Entomology 2.) GE credit: SciEng. WI — I. (I.) Gullan, Cranston

Lecture—3 hours; discussion—1 hour. Prerequisite: elementary biology recommended. Ecological principles with emphasis on humans and their interactions with the environment; how humans affect and depend on natural ecosystems, the future of the Earth’s biosphere. GE credit: SciEng. WI — II. Toft

12. Life in the Sea (3)
Lecture—3 hours. Diversity of life in the sea; adaptations to physical/chemical ocean environment; marine science research methods; utilization of living marine resources by humans; factors and processes that influence diversity of sea life, including humans. Limited enrollment. GE credit: SciEng. WI — II. Williams

92. Internship (1-12)
Internship—3.36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in all subject areas offered in the Department of Evolution and Ecology. Internships supervised by a member of the faculty. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Lower Division Students (1-5)
(P/NP grading only.)

Upper Division Courses

100. Introduction to Evolution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C; Biological Sciences 1A, 1B, 1C or the equivalent; Statistics 13 or 100 (Statistics 100 recommended). A general survey of the origins of biological diversity and evolutionary mechanisms. — I, II, (II, III) Begen, Coop, Groskopf, Kopp, Langley, Turelli

101. Introduction to Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C, Mathematics 16A, 16B, 16C or the equivalent. A general survey of the principles of ecology. — I, II, III, (II, III) Gaylord, Sanford, Schoener, Schreiber, Shapiro

101Q. Introduction to Computer Models in Ecology (1)
Automatal—1.5 hours; extensive problem solving—1.5 hours. Prerequisite: concurrent enrollment in course 101. Computational methods and mathematical models used to study ecological phenomena.

102. Population and Quantitative Genetics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 101, and Statistics 100 or 102, and course 100. Evolution as caused by random mating, genetic drift, natural selection, inbreeding, migration, and mutation in theory and actuality. The relation between relatives and consequences of selection for quantitative traits. Application of these ideas to topics such as the evolution of sex. — III. (III) Langley

103. Phylogeny and Macroevolution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100. Patterns and processes of evolution above the species level. Homology, homoplasy, and character evolution. Adaptive radiation; modes and rates of diversification. Evolution of complexity, and macroevolution of the genome. Principles of phylogenetic reconstruction and their application to macroevolutionary studies. — II. Turelli

104. Community Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 101 or Environmental Science and Policy 100. Population growth and density dependence; predation; exploitative, interference and apparent competition; coexistence mechanisms; niches, spatial and temporal variation; stability, diversity, and productivity of food webs; applications to conservation and biological control. Emphasis on quantitative understanding through models, concepts, and empirical evidence.

106. Phylogenetic Analysis of Vertebrate Structure (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1A and 1B, or 2B and 2C. The structure of the classes and subclasses of vertebrates is described and interpreted in terms of phylogeny. — I. Waisman

106. Mechanical Design in Organisms (3)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours; fieldwork—3 hours. Prerequisite: upper division standing or consent of instructor; introductory animal biology [Biological Sciences 1B or 2B]; invertebrate zoology (course 112), and/or ecology (course 101) are recommended; residence at or near Bodega Marine Lab required. Student must complete the application available at http://www.bml.ucdavis.edu. An examination of critical environmental issues occurring in coastal waters. Course links together teaching, research and courses at BML to develop an integrative understanding of marine environments and their conservation. Includes readings, group discussions, and interaction with visiting speakers. Exams repeated two times for credit. (Same course as Environmental Science and Policy 111.)—IV. (IV) Gaylord, Sanford

112. Biology of Invertebrates (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1B, or 2B and 2C; courses in statistics, ecology, and evolution recommended. Survey of the invertebrate phyla, emphasizing aquatic forms, and focusing on morphology, development, natural history, ecology, and phylogenetic relationships. Limited enrollment. — II. (II) Grosberg, Sanford

112B. Biology of Invertebrates Laboratory (2)
Laboratory—6 hours. Prerequisite: Biological Sciences 1B, or 2B and 2C; course 112 concurrently. Field and laboratory experience with representative members of the major invertebrate phyla discussed in course 112. Emphasis on comparative morphology, natural history, ecology, and behavior of living invertebrates. Two field trips required. — II. (II) Grosberg, Sanford

114. Experimental Invertebrate Biology (3)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours; fieldwork—3 hours. Prerequisite: upper division standing or consent of instructor; introductory cell; animal and plant biology [Biological Sciences 1A, 1B and 1C]; invertebrate zoology (Evolution and Ecology 112), ecology (Evolution and Ecology 101), and/or evolution (Evolution and Ecology 100) are recommended; residence at or near Bodega Marine Lab required. Student must complete the application available at http://www.bml.ucdavis.edu. The biology, ecology, and evolution of local marine invertebrates with a focus on adaptations to environmental and biological factors. Research centered on local field and laboratory learning with an emphasis on generating and testing hypotheses. — IV. (IV) Sanford

115. Marine Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 101 or Environmental Science and Policy 100 or Biological Sciences 2B, or consent of instructor. Processes affecting the distribution, abundance,
Evolution and Ecology

and diversity of plant and animal life in the sea. Introduction to marine habitat diversity and human impacts on marine environments.—I. [J.] Stachowicz

117. Plant Ecology (4) Lecture—3 hours; fieldwork—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C; Plant Biology 111 recommended. The study of the interactions between plants, their environment, and vegetation types and their physical and biological environment. Special emphasis on California. Four full-day field trips and brief write-up of class project required. (Same course as Plant Biology 117.)—I. [J.] Rejmanek

119. Population Biology of Weeds (3) Lecture—2 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C; Botany 290. Emphasis on the fundamental aspects of weed biology. The role of geologic, climatic, and biotic interactions in the geographic distribution of weeds. Offered in alternate years. —I. [J.] Shapiro

140. Biogeography (4) Lecture—3 hours; term paper. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C. Movements of terrestrial organisms. The role of geologic, climatic, and biologic changes in the geographic distribution of organisms. Offered in alternate years. —I. [J.] Shapiro

149. Evolution of Ecological Systems (4) Lecture—3 hours; term paper. Prerequisite: course 101 or Environmental Studies 100 (or the equivalent), and course 100 (or the equivalent). Evolution as an organizing force in natural communities. Co-adaptation in plants and animals. Competitive relationships. Ecology of polymorphisms, clines, and specialization. Offered in alternate years.—I. Shapiro

150. Evolution of Animal Development (3) Lecture—3 hours. Prerequisite: molecular and cellular biology 150 or 163 or equivalent course in developmental biology; may be waived for graduate students with consent of instructor. Comparative analysis of animal development and the genetic basis of morphological diversification. Offered in alternate years.—I. Kopp

175. Computational Genetics (3) Lecture—2 hours; discussion—1 hour. Prerequisite: Biological Sciences 101 and Statistics 100 or 102. The use of computer languages (Python) in computational genetics and evolution. Introduction to a general purpose computer language (Python), computational statistical methods, and applications such as QTL mapping, linkage detection, estimation of rates of evolution, and gene finding.

180A-180B. Experimental Ecology and Evolution in the Field (4-4) Lecture/lab—3 hours; fieldwork—3 hours. Prerequisite: course 100; course 101 or Environmental Science 100. Experimental design in field ecology. Students will critique primary literature, design project, gather and analyze data. Students required to write original research paper based on field experiments. Offered in alternate years. (Deferred grading only pending completion of sequence.)

189. Introduction to Biological Research (1) Discussion—1 hour. Prerequisite: upper division standing in Evolution and Ecology or related biological science; consent of instructor. Introduction to research methods in biology. Presentation and discussion of research by faculty, graduate, and undergraduate students. May be repeated for credit up to a total of 3 units. (P/NP grading only.)—I, II, III (I, II, III)

210. Molecular Phylogenetic Analysis (3) Lecture—2 hours; laboratory—3 hours. Theory and practice of inferring phylogenetic trees using molecular sequence data. Practical techniques for obtaining sequence data, advantages and disadvantages of common approaches for inferring trees, statistical methods for comparing alternative hypotheses. (Same course as Nematology 210.) Offered in alternate years.—II. Naeder

221. Applied Phylogenetics (3) Lecture—2 hours; laboratory—3 hours. Prerequisites: course 103 or 210 or Population Biology 200C or the equivalent, graduate standing. Applications of phylogenetic methods to fields outside of systematics. Core lectures/labs in remedial phylogenetics: phylogeny, conservation and comparative morphology. Special topics vary yearly. May be repeated once for credit.—II. (J.) Shaffer, W. Wright

220. Species and Speciation (3) Lecture—2 hours; discussion—1 hour. Prerequisite: course 100, Philosophy 108B or the equivalent; History and Philosophy of Science 130B recommended. Current status of species concepts and speciation research. Critical evaluation of major models of speciation, current research on speciation, and relevance of species to conservation biology. Offered in alternate years.—II. Shapiro

31. Principles of Biological Data Analysis (3) Lecture—2 hours; laboratory—3 hours. Introduction to the principles of data analysis, experimental design, statistical modeling, inference, and hypothesis testing. Statistical methods of particular importance in biological applications will be emphasized. Examples will be presented from the fields of ecology and evolutionary genetics. (S/U grading only.)—II. Rannala

240. Paleobotany and Angiosperm Evolution (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: Plant Biology 108, 116, or course 140. Critical analysis of the plant fossil record as a source of evidence on origin, evolution, and phylogeny of the angio-sperms, Cretaceous and Tertiary climates, geographic history of modern taxa, and origin of major angiosperm types. Offered in alternate years.—II. Doyle

290C. Research Conference (1) Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Presentation and discussion of faculty and graduate student research in biology. May be repeated for credit. (S/U grading only.)—I, II, III (I, II, III)

298. Group Study (1-5) (S/U grading only.)

299. Research (1-12) (S/U grading only.)

Professional Course

390. Methods of Teaching (2) Lecture—1 hour; discussion—1 hour. Graduate standing and consent of instructor. Practical experience in the methods and problems of teaching. Includes analyses of texts and supporting material, discussion of teaching techniques and preparation and conducting of laboratory and discussion sections. May be repeated for credit for a maximum of 8 units. (S/U grading only.)—I, II, III (I, II, III)

Graduate Courses

210. Molecular Phylogenetic Analysis (3) Lecture—2 hours, laboratory—3 hours. Theory and practice of inferring phylogenetic trees using molecular sequence data. Practical techniques for obtaining sequence data, advantages and disadvantages of common approaches for inferring trees, statistical methods for comparing alternative hypotheses. (Same course as Nematology 210.) Offered in alternate years.—II. Naeder

221. Applied Phylogenetics (3) Lecture—2 hours; laboratory—3 hours. Prerequisites: course 103 or 210 or Population Biology 200C or the equivalent, graduate standing. Applications of phylogenetic methods to fields outside of systematics. Core lectures/labs in remedial phylogenetics: phylogeny, conservation and comparative morphology. Special topics vary yearly. May be repeated once for credit.—II. (J.) Shaffer, W. Wright

220. Species and Speciation (3) Lecture—2 hours; discussion—1 hour. Prerequisite: course 100, Philosophy 108B or the equivalent; History and Philosophy of Science 130B recommended. Current status of species concepts and speciation research. Critical evaluation of major models of speciation, current research on speciation, and relevance of species to conservation biology. Offered in alternate years.—II. Shapiro

31. Principles of Biological Data Analysis (3) Lecture—2 hours; laboratory—3 hours. Introduction to the principles of data analysis, experimental design, statistical modeling, inference, and hypothesis testing. Statistical methods of particular importance in biological applications will be emphasized. Examples will be presented from the fields of ecology and evolutionary genetics. (S/U grading only.)—II. Rannala

240. Paleobotany and Angiosperm Evolution (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: Plant Biology 108, 116, or course 140. Critical analysis of the plant fossil record as a source of evidence on origin, evolution, and phylogeny of the angio-sperms, Cretaceous and Tertiary climates, geographic history of modern taxa, and origin of major angiosperm types. Offered in alternate years.—II. Doyle

290C. Research Conference (1) Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Presentation and discussion of faculty and graduate student research in biology. May be repeated for credit. (S/U grading only.)—I, II, III (I, II, III)

298. Group Study (1-5) (S/U grading only.)

299. Research (1-12) (S/U grading only.)
Exercise Biology

See Neurobiology, Physiology, and Behavior, on page 420.

Exercise Science (A Graduate Group)

Charles L. Stebbins, Ph.D., Chairperson of the Group

Group Office. 310 Life Sciences (530) 752-2981; http://biosci2.ucdavis.edu/ggc/exs/

Faculty

Sue Bodine, Ph.D., Professor (Neurobiology, Physiology & Behavior)
George Brooks, Ph.D., Professor (Integrative Biology-UC Berkeley)
Gretchen Casazza, Ph.D., Research Director (Sports Medicine)
Chao-Yin Chen, Ph.D., Assistant Research Biochemist (Med. Pharm & Tox)
Youngran Chung, Ph.D., Assistant Research Biochemist (Integrative Biology-UC Berkeley)
Gretchen Casazza, Ph.D., Research Director (Sports Medicine)
Samantha Harris, Ph.D., Assistant Professor (Neurobiology, Physiology, and Behavior)
Dave Hawkins, Ph.D., Professor (Neurobiology, Physiology & Behavior)
Martin D. Hoffman, Ph.D., Associate Professor (Biological and Agricultural Engineering)
Fadi Fadlallah, Ph.D., Associate Professor (Neurobiology, Physiology, and Behavior)
Youngran Chung, Ph.D., Assistant Research Biochemist (Integrative Biology-UC Berkeley)
Thomas Jue, Ph.D., Professor (Neurobiology, Physiology, and Behavior)
Ulrike Kreutzer, Ph.D., Assistant Adjunct Professor (Neurobiology, Physiology, and Behavior)
Samantha Harris, Ph.D., Assistant Professor (Neurobiology, Physiology, and Behavior)
Dietrich Jacob, Ph.D., Professor (Neurobiology, Physiology & Behavior)
Sue Stover, Ph.D., Professor (Biochemistry and Molecular Medicine)
John C. Wingfield, Ph.D., Professor (Neurobiology, Physiology & Behavior)

Graduate Study. The Graduate Group in Exercise Science offers a program of study and research leading to an M.S. degree. The program advances training in two areas of emphasis. The Exercise Physiology Area involves the study of functional, metabolic, nutritional, and regulatory aspects of the cardiovascular, respiratory, and skeletal muscle systems as they relate to measured exertion and exercise. The Biochemistry Area includes the study of skeletal muscle mechanics, motor control, biomechanical analysis of human movement, tissue mechanics, motor control, and clinical biochemistry.

Graduate Advisers. M. Kaufman, C. Stebbins, K. Williams

Courses in Exercise Science (EXS) Graduate Courses

200. Introduction to Research in Exercise Science (3)
Discussion—2 hours; seminar—1 hour. Prerequisite: graduate standing in Exercise Science or consent of instructor. Principles of scientific research in Exercise Science: scientific method, literature review, experimental design, hypotheses formulation, data collection, analysis, inferences, biases, human subject and animal protocols. Ethics. I. Jue

201. Exercise Cardiorespiratory Physiology (3)
Lecture/discussion—3 hours. Prerequisite: undergraduate course in systemic physiology, exercise physiology, and biochemistry (intermediate metabolism). Advanced course on integrated responses of the cardiovascular and respiratory systems to exercise. Includes hemodynamic, neurohumoral, and autonomic aspects of cardiovascular function, principles of myocardial metabolism, and mechanisms underlying changes in pulmonary function and gas transport. I. Jue

206. Exercise Metabolism (3)
Lecture/discussion—3 hours. Prerequisite: undergraduate course in metabolism (Biological Sciences 103, Nutrition 101) or consent of instructor. The integrated metabolic response to exercise. Includes bioenergetics and metabolic regulation and skeletal muscle, role of cardiovascular, respiratory, hemodynamic, and neurohumoral control. I. Jue

210. Introduction to Human Performance Testing (2)
Discussion—1 hour; laboratory—3 hours. Introduction to human exercise testing and measurement. Safety procedures and measurement capabilities of the Human Performance Laboratory at UC Davis. Potential areas for graduate research. I. Jue

221. Anthropometry in Physical Activity (3)
Lecture—2 hours; laboratory—five 3-hour sessions to alternate weekly with five 1-hour discussion sessions. Prerequisite: Exercise Biology 101 and 102. Consideration of physical constitution, body proportions, and body composition in man as they affect physical performance, and of body structural and compositional changes accompanying prolonged, systematic physical conditioning.

222. Metabolic Functions in Exercise (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: Exercise Biology 102, Neurobiology, Physiology, and Behavior 101. Review of the current research literature on the metabolic responses to exercise in man; a laboratory survey of respiratory response, metabolic and blood balances, blood gas adjustments and acid-base balance with particular reference to the effect of environmental conditions.

224. Exercise Electrocardiography (2)
Lecture—2 hours. Prerequisite: Exercise Biology 112 or consent of instructor. Physiological bases and clinical implications of normal and abnormal exercise electrocardiograms (ECG) are treated in detail. Exercise prescription is considered as is the predictive significance of normal and abnormal ECG.

225. Seminar in Cardiac Rehabilitation (2)
Seminar—2 hours. Prerequisite: Exercise Biology 112 or graduate standing and consent of instructor. Critical examination of literature dealing with the causes, prevention and treatment of cardiovascular disease with particular emphasis on intervention through cardiac rehabilitation. Both the theoretical bases and practical approaches to cardiac rehabilitation will be examined.

227. Research Techniques in Biomechanics (4)
Lecture—2 hours; laboratory—4 hours; term paper/discussion—1 hours. Prerequisite: consent of instructor. Mathematics 22B; Exercise Biology 112 recommended. Experimental techniques for biomechanical analysis of human movement are examined. Techniques evaluated include data acquisition and analysis

Exercise Biology 291

Family and Community Medicine

See Medicine, School of, on page 367.

Feminist Theory and Research

Susan B. Kaiser, Ph.D., Program Director
Program Office. 2222 Hart Hall (530) 752-4066; http://wms.ucdavis.edu/wgssite/

Graduate Study. The Woman and Gender Studies Program at UC Davis offers a Designated Emphasis in Feminist Theory & Research with graduate programs in Anthropology, Comparative Literature, Cultural Studies, Education, English, French, German, Geography, History, Native American Studies, Performance Studies, Psychology, Sociology, and Spanish.

The Designated Emphasis in Feminist Theory & Research allows graduate students to receive a Ph.D. in the field of their choice while completing a special emphasis in feminist theory & scholarship. The courses listed for the Designated Emphasis are open to all graduate students. However, students must complete the Designated Emphasis requirement in order to receive credit for the special emphasis.
credit on their transcripts for a Ph.D. with "Special Emphasis in Feminist Theory & Research." Students must complete all the requirements for the Ph.D. in their home department; the requirements for the Designated Emphasis in Feminist Theory and Research are the successful completion of the two core courses, Women's Studies 200A and Women's Studies 200B, and two additional courses focusing on women and gender, one in the student's home department and one outside their home department. A member of the DE affiliated faculty must be a member of the student's qualifying examination. Analysis of gender is expected to be a central component of both the student's qualifying examination and doctoral research.

Students must consult with the chair of the Designated Emphasis in Feminist Theory & Research before enrolling in a graduate course for which they wish to receive credit to ensure that it will count toward fulfilling the requirements of the Designated Emphasis. It is possible, please bring a copy of the syllabus or an expanded course description to your meeting.

Graduate Adviser. Consult the Women and Gender Studies office (530) 752-4686.

B.S. Major Requirements:


3. Statistics 13 or Plant Sciences 120, 4

4. Textiles and Clothing 6 or Engineering 45, 8

5. University Writing Program 104A, 104B, 104C, 104D, 104E, or 104F .........4


7. Mathematics 22A, 22B


10. 180A will be continued and completed in course 180B. (Deferred grading only, pending completion of sequence.)—I, II, III, IV

11. 192. Internship in Fiber and Polymer Science (1-12)

Internship—3-36 hours. Prerequisite: consent of instructor. Work experience off campus in a fiber and polymer science related area. Supervision by a member of the Textiles and Clothing faculty. (P/NP grading only.)

197T. Tutoring in Fiber and Polymer Science (1-5)

Tutorial—3-15 hours. Prerequisite: upper division fiber and polymer science related major and consent of instructor. Tutoring of students in Fiber and Polymer Science courses. Assistance with discussion groups and laboratory sections under supervision of instructor. May be repeated for credit if tutoring in another Fiber and Polymer Science course. (P/NP grading only.)

198. Directed Group Study (1-12)

Prerequisite: permission of instructor. (P/NP grading only.)

Graduate Courses

250A-F. Special Topics in Polymer and Fiber Science (3)

Lecture—3 hours. Prerequisite: Fiber and Polymer Science 100 or consent of instructor. Selected topics of current interest in polymer and fiber science. Topics will vary each time the course is offered. (Same course as Materials Science Engineering 250A-F.)—I, II, III, IV

299. Research (1-12)

Independent study—3-36 hours. (S/U grading only)

Professional Course

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III, IV

Film Studies

[College of Letters and Science]

Elizabeth Constable, Ph.D., Program Director

Program Office. 524 Sproul Hall

(530) 752-4999, http://filmstudies.ucdavis.edu

Committee in Charge

Moradewun Adejumobi, Ph.D. (African and African-American Studies)

Emily Albu, Ph.D. (Classics)

Elizabeth Constable, Ph.D. (French)

Jesse Drew, Ph.D. (Technocultural Studies)

Jaime Fisher, Ph.D. (German and Russian)

Margherita Heyen-Caput, Ph.D. (Italian)

Michael Lazzara, Ph.D. (Spanish)

Pablo Oriz, Ph.D. (Music)

Scott Simon, Ph.D. (English)

Eric Smaadin, Ph.D. (American Studies)

Quarter Offered: I—Fall, II—Winter, III—Spring, IV—Summer, 2009-2010 offering in parentheses

The Major Program
This interdisciplinary major takes one of the most influential art forms of the twentieth century and today’s subject of study. The field of Film Studies addresses the history, theory, and culture of this art form and asks questions about film texts themselves: modes of production (including everything from studio to avant-garde); the constraints of financial reality (i.e., the role of the global economy); historical, national, and cultural contexts; and spectators and audiences. Questions of gender, race, sexuality, and nationality, in all of these contexts, have been brought to Film Studies almost since its inception and continue to shape much of the work in the field. While the program emphasizes film history, criticism, and theory, students also have opportunities to explore film/video production.

The Program.
Students majoring in Film Studies take upper-division courses in film history and film theory, as well as in at least three of five general areas of study. Students also develop a thematic emphasis, in consultation with an advisor, that draws on courses from at least two different departments/programs and that allows them to pursue their particular interests within the field of Film Studies. Students have the option of completing a senior thesis (either a written paper or an original film/video) within this emphasis.

Career Alternatives. The A.B. degree in Film Studies prepares students for a variety of careers in media industries: local and national film and television production companies, local television newsrooms, community television stations, computer graphic companies, advertising and marketing agencies, public relations departments, and film distribution companies. Students wishing to pursue graduate work will be prepared to go on in film studies, as well as a variety of other fields that draw on interdisciplinary knowledge, for example, American studies, English, literatures and languages, drama, communication, computer science, cultural studies, women and gender studies, and ethnic studies programs. Many film studies students also choose to go on to law school, and the academic skills, writing abilities, and familiarity with theoretical developed through the film major prepare them well for the study and practice of law.

A.B. Major Requirements:

Preparatory Subject Matter 20-40
UNITS
Film Studies 1 ................................. 4
A four-course sequence in a single language or equivalent ........................................ 0-20
One course from African American and African Studies 15, 50; American Studies 1A, 21, 30; Art History 5; Art Studio 30; Chicana/o Studies 50, 60; Design 1; French 50; Humanities 60; Italian 50; Japanese 25; Native American Studies 32, Textiles and Clothing 7; Women’s Studies 20, 25 .... 4
One course from African American and African Studies 10, 15, 50; Asian American Studies 1, 2; Chicana/o Studies 10, 50, 60; Native American Studies 1, 10, 32, 33; Women’s Studies 20, 25, 50, 70, 80 .... 4
Two courses from Art History 1A, 1B, 1C, 1D; Asian American Studies 2; Chinese 10; Classics 10; Comparative Literature 3, 4, 5, 6, 7; Dramatic Art 1, 20; English 43, 44; German 48, 48A, 48C, 10C, 178, 728; Humanities 5, 6; Japanese 10; Music 10, 28; Native American Studies 33; Russian 41, 42 .... 8
Note: One of the two courses may come from Design 15, 16 or Dramatic Art 10, 21A, 21B, 218, 24.

Depth Subject Matter 36-40
UNITS
One course from English 161A, 161B or Film Studies 124 .... 4
One course from English 162; Film Studies 127, Philosophy 127; Women and Gender Studies 162 .... 4
One course each from three of the following topic areas: Cinematic Traditions and Movements, Visual and Popular Culture, Gender/Sexuality, Film Aesthetics, Race/Ethnicity/Class, Production and Performance ............................ 12
A current list of approved classes is available from the Program office and from the faculty coordinator.

Total Units for the Major ............................. 56-80

Major Advisers. E. Constable (French)

Minor Program Requirements:

UNITS
Film Studies ................................. 24
One course from English 127; Film Studies 127, Philosophy 127; Women and Gender Studies 162 .... 4
One course each from three of the following topic areas: Cinematic Traditions and Movements, Visual and Popular Culture, Gender/Sexuality, Film Aesthetics, Race/Ethnicity/Class, Production and Performance ............................ 12
A current list of approved classes is available from the Program office and from the faculty coordinator.

Upper Division Courses

120. Italian-American Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 1. Exploration of representations of Italian-American identity in American (U.S.) cinema. Analysis of both Hollywood and independently produced films, especially as they represent ethnicity, gender, and social class. Not open for credit to students who have completed Humanities 120. GE credit: Art/Hum, Div, Wrt.—III. (III) Heyer-Caput

124. Topics in U.S. Film History (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 1. Study of an aspect of American film history (such as the silent era; the studio system, U.S. avant-garde cinema), including the influences of technological, economic, aesthetic and artistic forces. Not open for credit to students who have completed Humanities 124 unless topic differs. May be repeated twice for credit if topic differs. GE credit: Art/Hum, Wrt.—III. (III) Clover, Constable, Fisher, Simmons

125. Topics in Film Genres (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 1. Study of one or more of the film genres (such as the documentary, the musical, film noir, screwball comedy, or the western), including genre theory and the relationship of the genre(s) to culture, history, and film industry practices. Not open for credit to students who have completed Humanities 125 unless topic differs. May be repeated twice for credit if topic differs. GE credit: Art/Hum, Wrt.—II. (II) McConnell, Simmons

127. Film Theory (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 1 or consent of instructor. Survey of the conceptual frameworks used to study film (including semiotics, psychoanalysis, spectatorship, auteur, genre and narrative theories). Historical survey of major film theorists. GE credit: Art/Hum, Wrt.—III. (III) Constable

142. New German Cinema (4)
Lecture/discussion—3 hours; extensive writing. German filmmakers of the 1960s, 1970s, and 1980s, such as Fassbinder, Herzog, Syberberg, Bruckner, Schlondorff, Kluge, Wenders. Knowledge of German not required. May be repeated for credit with consent of instructor. (Same course as German 142) GE credit: Art/Hum, Wrt.—I. (I) Fisher

176A. Classic Weimar Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: Humanities 1. German Weimar (1919-1933) cinema. Fritz Lang, F.W. Murnau, and G.W. Pabst among others. Influence on world-wide (e.g., Hollywood) film genres such as film noir, horror, science fiction, and melodrama. Not open for credit to students who have completed Humanities 176A. Offered in alternate years. (Same Course as German 176a.) GE credit: Art/Hum, Wrt.—I. Fisher

176B. Postwar German Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 1. European cinematic output from after World War II, especially as they reflect the complexities of German cinema from 1945 to 1980, when the Nazi past was a central theme. Includes study of postwar “rubble films,” “escapist homeland films,” and “New German Cinema of the 1970s,” including films by Fassbinder, Kluge, Syberberg, and Herzog. Not open for credit to students who have completed Humanities 177. Offered in alternate years. GE credit: Art/Hum, Wrt.—II. Merit

189. Special Topics in Film Studies (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 1, upper division standing, or consent of instructor. Group study of a special topic
in film, focusing on a national tradition, a major filmmaker, or a specific era. May be repeated three times for credit. GE credit: WR—II, III, III] Clover, Constable, Fisher, Heyer-Caput, Lu, Simmon, Smo- 
din.
190X. Upper Division Seminar (4) 
Seminar—4 hours. Prerequisite: upper division standing or consent of instructor. Study of a special topic in film studies in a small class setting. May be repeated for credit if topic differs. (P/NP grading only)—I, II, III, [I, II, III.]
192. Internship (1-12) 
Supervised internship off and on campus in areas of Film Studies. May be repeated for credit. (P/NP grading only.)

194H. Special Study for Honors Students (1-5) 
Variable—1-5 hours; independent study—3-15 hours. Prerequisite: senior standing; GPA of at least 3.500; consent of instructor. Guided research on a topic in Film Studies in preparation for the writing of an honors thesis in course 195H or the creation of an honors project in course 196H. May be repeated twice for credit. (P/NP grading only)—I, II, III, [I, II, III.]
195H. Honors Thesis (1-5) 
Independent study—3-15 hours. Prerequisite: course 194H and consent of instructor; GPA of at least 3.500; senior standing. Writing of an honors thesis on a topic in Film Studies under the direction of a faculty member. May be repeated twice for credit. (P/NP grading only)—I, II, III, [I, II, III.]
196H. Honors Project (1-5) 
Project—3-15 hours. Prerequisite: course 194H and consent of instructor; GPA of at least 3.500; senior standing. Creation of an honors film, video, or mixed-media project under the direction of a faculty member. May be repeated twice for credit. (P/NP grading only)—I, II, III, [I, II, III.]
197. Tutoring in Film Studies (1-5) 
Tutorial—2-51/2 hours. Prerequisite: consent of program director. Leading of small voluntary discussion groups affiliated with one of the Program’s regular courses. May be repeated for credit. (P/NP grading only.)
198. Directed Group Study (1-5) 
(P/NP grading only.)
199. Special Study for Advanced Undergraduates (1-5) 
(P/NP grading only.)

Professional 
396. Teaching Assistant Training Practicum (1-4) 
Prerequisite: graduate standing. May be repeated for credit [5/4 grading only.]

Fisheries 
See Animal Science, on page 141; Biological and Agricultural Engineering, on page 166; and Wildlife, Fish, and Conservation Biology, on page 516.

Food Science 
College of Agricultural and Environmental Sciences) 
The Major Program 
Food science applies chemical, physical, biological, engineering, and social sciences to processing, preservation, development, packaging, storage, evaluation, identity and utilization of foods. 
The Program. Students majoring in food science spend the first two years of study developing the scientific and general background necessary for upper division study. The science courses include chemistry, biology, physics, and mathematics. General background is provided by courses in the social science/humanities area and by optional courses in introductory food sciences. At the upper division level, students take courses in nutrition, food microbiology, food chemistry, food analysis, food commodities, food processing, and food engineering, and may choose to specialize in one of seven career-oriented options. The major, including all seven options, is accredited by the Institute of Food Technologists. Students enrolled in the program are eligible for various scholarships, including scholarships from the Institute of Food Technologists.

Career Alternatives. Opportunities for employment include positions in the food and allied industries, local, state, and federal government agencies, and educational and research institutions. Graduate study for the food science student may lead to the M.S. or Ph.D. degree in food science, or in related fields such as agricultural chemistry, biochemistry, engineering, microbiology, and nutrition.

B.S. Major Requirements: 

UNITS

English Composition Requirement.................. 0-8
See College requirement.
Preparatory Subject Matter.......................... 52-70
University Writing Program 102F, 104A, or 104E (if not already taken to satisfy college English requirement).................. 4
Communication 1 (if not already taken to satisfy college English Requirement).................. 4
Mathematics 1A-1B-1C................................. 9
Life Science 1A-1B................................. 8
Biological Sciences 1A, 1C or 2A, 2B, 2C.................. 10-14
Chemistry 2A-2B-2C................................. 15
Organic chemistry (see option for requirement)

Physics 7A-7B-7C................................. 12
Food Science and Technology 1 and/or 2; both recommended, but not required.................. 3-6
Food Science and Technology 50.................. 3
Nutrition 10 (or approved substitute).................. 3

Breadth/General Education Requirement.................. 24
Satisfaction of General Education requirement plus social science and humanities electives to total 24 units

Depth Subject Matter.............................. 50
Biological Sciences 102, 103.................. 6
Agricultural Management and Rangeland Resources 120: Plant Sciences 120.................. 4
Food Science and Technology 100A, 100B, 101A, 101B, 103, 104, 104L, 160, 190.................. 28
Food Science and Technology 100A-110B, Applied Biological Systems Technology 110L.................. 8
Food Science and Technology 127 or 107.................. 4

Select one of the following five options: 
Food Technology Option

The Food Technology option provides a broad exposure to food chemistry, food microbiology, food engineering and food processing. Students find positions in quality assurance, product development, and food processing in the food industry.

Specific course requirements.................... 11
Chemistry 8A-8B.................................. 6
Food Science and Technology 108, 109.................. 5

Selected additional courses..................... 15
Select courses from a master list available from the department Advising Center.

Food Business and Management Option

The Food Business and Management option allows students to integrate study of the science and technology of food with that of business and economics in a unique program. Students prepare for positions of management in small food companies, and research-and-development oriented marketing or technical sales opportunities in corporate food industries.

Specific course requirements.................... 24
Chemistry 8A-8B.................................. 6
Economics 1A.................................. 4
Agricultural and Resource Economics 112, 113.................. 8
Management 100.......................... 3
Food Science and Technology 109.................. 3

Selected additional courses..................... 10
Select courses from a master list available from the department Advising Center.

Consumer Food Science Option

The Consumer Food Science option prepares students for jobs in food product development, research-and-development oriented marketing and sensory analysis, quality assurance, extension service, creative writing, and community service. Students who fulfill the requirements for this option may also teach elementary or secondary school home economics.

Specific course requirements.................... 19
Chemistry 8A-8B.................................. 6
Food Science and Technology 47, 109, 159.................. 6
Additional Food Science and Technology 107 or 127.................. 4
Consumer Science 100.......................... 3

Selected additional courses..................... 10
Select courses from a master list available from the department Advising Center.

Brewing Science Option

The Brewing Science option prepares students for careers in production or quality assurance within the brewing industry or other fermentation industries (e.g., other alcoholic beverages, vinegar, and cheese). The option also prepares students for graduate study in food science. The option exposes the students to a diversity of coursework, including chemistry, biochemistry, microbiology and engineering as they pertain to the malting and brewing processes. Issues of quality assurance, plant sanitation and packaging are also key. Of course, there is a thorough grounding in malting and brewing.

Specific course requirements.................... 26-29
Chemistry 8A, 8B.................................. 6
Food Science and Technology 3.......................... 6
Food Science and Technology 102A, 102B, 108, 109, 123, 131.................. 20

Selected additional courses..................... 9
Select courses from a master list available from the department Advising Center.

Food Biology/Microbiology Option

The Food Biology/Microbiology option is for students interested in research and development careers with food companies or government laboratories, in teaching and research at academic institutions, or in professional (medical, veterinary, pharmacy, optometry or dental) school. This option prepares students for graduate study and research in several areas, including food science, biochemistry, biotechnology, microbiology, and post-harvest biology.

Specific course requirements.................... 18-24
Biological Sciences 1B or 2B.................. 5
Chemistry 8A-8B or 118B.......................... 118B.................. 6-12
Microbiology 102, 102L.......................... 7

Selected additional courses..................... 10
Select courses from a master list available from the department Advising Center.

The Food Biology/Microbiology option prepares students for graduate study and research in food science, biochemistry, biotechnology, microbiology, pharmacology, post-harvest biology, and commodity emphasis. The program is designed for students interested in
Food Science (A Graduate Group)

Food Science and Technology

(College of Agricultural and Environmental Sciences)

Charles W. Bamforth, Ph.D., D.Sc, Chairperson of the Department

Department Office, 1206 RMI South Building
P.O. Box 564, Davis, CA 95616-0564
P: (530) 752-1465, FAX: (530) 752-4759
http://www.foodscience.ucdavis.edu

Food Science (A Graduate Group)

graduate or professional school, leading to careers in research in universities, food companies or government laboratories or in teaching at academic institutions. The option can also serve to prepare students for professional schools such as pharmacy, optometry, dentistry, public health or medicine.

Specific course requirements

31

Biological Sciences 1B or 2B. Prerequisite: course 100A or consent of instructor.

Gr

in universities, food companies or government laboratories, in teaching and research at academic institutions, or in professional [medical, veterinary, or dental] school.

Specific course requirements

20-21

Chemistry 118A-118B-118C or 128A-128B-128C. Prerequisite: course 100A or consent of instructor. Sensory quality of food commodities. —II. (II.) German

I. (I.) Shoemaker

II. (II.) Shoemaker and Technology, Biological and Agricultural Engineering

Food Chemistry

The Food Chemistry option prepares students for graduate study and research in such areas as flavor chemistry, food additive chemistry, biotechnology, biochemistry and toxicology. This option is for students interested in research and development careers with food companies or government laboratories, in teaching and research at academic institutions, or in professional [medical, veterinary, or dental] school.

Selected additional courses

9

Select courses from the masters list available from the department Advising Center.

Unrestricted Electives

Vary by option

Total Units for the Degree

180

Major Adviser:

C. F. Shoemaker (Food Science and Technology)

Advising Center for the major is located in 1206 RMI South Building (530) 752-1468.

Graduate Study

A program of study and research leading to the M.S. and Ph.D. degrees in Food Science is available (see below). For further information on graduate study, contact the graduate adviser.

Food Science and Technology

Related Courses. See courses in Consumer Science, Engineering, Molecular and Cellular Biology, Nutrition, Viticulture and Enology, Environmental Toxicology, Population Health and Reproduction, and Plant Biology.

Courses in Food Science and Technology (FST)

Lower Division Courses

1. Principles of Food Science (3)

Lecture—2 hours; discussion—1 hour. Food science fundamentals. Fresh and processed food technologies; world food problems; food composition; food microbiological and biochemical safety; food laws; evaluation of acceptability and nutritional value. Not open for credit to students who have completed any Food Science and Technology course except course 10—II. (II.) Bamforth

3. Introduction to Brewing and Beer (3)

Lecture—3 hours. Basic description of brewing and associated processes, from raw materials to final product; history of brewing and brewing science; types of beer worldwide; world beer markets; basics of beer quality, including wholesomeness; role of scientist in brewing. GE credit: SciEng—1, II. (I, II) Bamforth

10. Food Science, Folklore and Health (3)


47. Food Product Development Field Study (1)

Discussion—6 hours; fieldwork—2 days (course given between winter and spring quarters). Prerequisites: advance enrollment required in winter quarter with instructor; background knowledge in foods from such courses as Food Science and Technology 1. Commercial aspects of the large-scale development, distribution, and evaluation of food products intended for human consumption. (Former course Consumer Science 47.) (P/NP grading only)—III. (III.)

50. Introduction to Food Preservation (3)

Lecture—3 hours. Prerequisite: Chemistry 2A, Biological Sciences 1A. Introduction to fruits, vegetable, cereal, dairy, seafood and meat commodity groups. Overview of food preservation principles, including heat processing, refrigeration and freezing, dehydration, fermentation, high pressure processing, irradiation and packaging. (I, II) Kricha

99. Special Study for Undergraduates (1-5)

P/NP grading only.

Upper Division Courses

100A. Food Chemistry (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 8B; Biological Sciences 1A recommended. Chemical aspects of food composition. Emphasis on the functional properties and chemical reactions of the major classes of food: carbohydrates, lipids, proteins, and water.—I. (I.) Dungan

100B. Food Properties (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A or consent of instructor. Sensory quality, chemical and microbiological safety, and nutritional properties of foods. Effects of food processing and preparation on these properties. Selected properties of food commodities.—II. (II.) Germain

101A. Food Chemistry Laboratory (2)

Lecture—4 hours. Prerequisite: course 100A (may be taken concurrently). Chemical aspects of food composition discussed in course 100A.—I. (I.) Reid

101B. Food Properties Laboratory (2)

Lecture—4 hours; 3 hours. Prerequisite: course 100B (may be taken concurrently). Study of properties of food described in course 100B.—II. (II.) Shoemaker
102A. Malting and Brewing Science (4) Lecture—4 hours. Prerequisite: Biological Sciences 102. The junior standing recommended. The technology of the malting, brewing and fermentation processes is integrated with the chemistry, biochemistry and microbiology that determine industrial practices and products open for credit to students who have taken course 102. —II. Bamforth

102B. Practical Malting and Brewing (4) Lecture/discussion—2 hours, laboratory—6 hours. Prerequisite: theoretical and applied coursework beyond Chemistry 2C, such as Viticulture and Enology 123, Food Science and Technology 103, 123L, Molecular and Cellular Biology 120L. Open to seniors only. In Integrated Science or Food Science and Technology. Provides practical working knowledge of analytical methods used in malting and brewing and experience with brewing materials and processes, by analysis of samples that illustrate the range of values experienced in practice and pilot scale brewing. —II. (I.) Bamforth

103. Physical and Chemical Methods for Food Analysis (4) Lecture—2 hours, discussion—1 hour; laboratory—3 hours. Prerequisite: Chemistry 2C, Biological Sciences or Animal Biology 102 (may be taken concurrently), courses 100A, 101A (may be taken concurrently). The utilization of physical and chemical methods for determining the constituents of foods. Modern separation and instrumental analysis techniques are stressed. —II. (I.) Mitchell

104. Food Microbiology (3) Lecture—1 hour; discussion—1 hour; laboratory—2 hours. Prerequisite: Biological Sciences 1A, 102. Microorganisms in food safety, spoilage, and production. Foodborne disease agents and their control. Growth parameters of food spoilage agents. Detection of microbes in food. Food fermentation. The development of microbes as a resource for the food industry. —I. (I.)

104L. Food Microbiology Laboratory (4) Lecture—1 hour; discussion—1 hour; laboratory—6 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, course 104. Cultural and morphological characteristics of microorganisms involved in food spoilage, in foodborne disease, and food fermentation. Analysis of microbiological quality of foods. —II. (III) Young

107. Food Sensory Science (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: Agricultural Management and Rangeland Resources 120 or course 117 (may be taken concurrently). An introduction to the sensory and cognitive systems associated with the perception of food. Not open for credit to students who have completed course 107A. —I. (I.) O'Mahony

108. Food Processing Plant Sanitation (2) Lecture—2 hours. Prerequisite: Chemistry 8B, Biological Sciences 104 (may be taken concurrently) or consent of instructor. Sanitary control of food processing, including water treatment, chemical and physical sanitizing agents; principles of cleaning and hard surface detergency, metal corrosion, pest control, and waste disposal; role of regulatory agencies.

109. Principles of Quality Assurance in Food Processing (3) Lecture—2 hours; discussion—1 hour. Prerequisite: Statistics 13 or Agricultural Management and Rangeland Resources 120. Quality assurance measurement techniques applied to selected food processing and production problems. Rationale for establishing valid quality assurance programs including selection of samples at critical points. Statistical problems in quality assurance programs used by the food industry. —II. (II.) McCarthy

110A. Physical Principles in Food Processing (3) Lecture—2 hours; laboratory—2 hours. Prerequisite: Physics 5A and 5B or 7A/78-7C or the equivalent; calculus recommended. Not open for credit to students enrolled in College of Engineering. Applications of the conservation of mass and energy to food processing; transfer of heat, mass, and momentum; chemical, physical, and biological changes occurring in foods, including plant and animal toxins, intentional and unintentional food additives. The assessment of food safety and toxic hazards. (Same course as Environmental Toxicology 128.) GE credit: Social Science; Social Sciences; Social Science; Social Sciences. (Formerly: M. Smith)

110B. Heat and Mass Transfer in Food Processes (3) Lecture—2 hours; laboratory—2 hours. Prerequisite: course 110A or the equivalent; Applied Biological Systems Technology 110L recommended (may be taken concurrently). Rate processes: conduction, convection, and mass transfer; microwave heating, refrigeration, freezing, psychrometrics; mass transfer during drying and storage. —III. (I.) Singh

117. Design and Analysis for Sensory Food Science (3) Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: Statistics 13 or consent of instructor. Methods of design and analysis for sensory food science. Relative merits and limitations of parametric and nonparametric approaches. Use of human judges. Data analysis and computation. Modifications for quality assurance. —I. (I.) O'Mahony

119. Chemistry of Technology of Milk and Dairy Products (4) Lecture—4 hours; demonstrations and a field trip. Prerequisite: Biological Sciences 1A and 102, or consent of instructor. Composition, structure and properties of milk, milk components, milk processing, and analysis. Chemical, microbiological, and technological principles to commercial practices in processing of milk and its products. —II. Rosenberg

120. Principles of Meat Science (3) Lecture—3 hours. Prerequisite: Biological Sciences 1A. Anatomical, physiological, developmental and biochemical aspects of muscle underlying the conversion of muscle to meat. Includes meat processing, preservation, microbiology and public health issues associated with meat products. (Same course as Animal Science 120.) GE credit: SciEng. —III. (II.) Lee

120L. Meat Science Laboratory (2) Discussion—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 1A; course 120 (may be taken concurrently). Laboratory exercises and student participation in transformation of live animal to carcass and meat, structural and biochemical changes related to meat quality, chemical and sensory evaluation of meat, and field trips to packing plant and processing plants. (Same course as Animal Science 120L.) —III. (II.) Lee

123. Introduction to Food Toxicology (3) Lecture—3 hours. Prerequisite: Biological Sciences 103. Principles of physical, chemical and catalytic properties of enzymes and their importance. Purification, characterization, and quantitative evaluation of reaction conditions on activity are stressed. Specificity and mechanism of action illustrated by use of selected enzymes. (Former course Biochemistry and Biophysics 123.) —III. (II.) G. Smith

123L. Enzymology Laboratory (2) Lecture—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 103, course 123 (concurrently). Laboratory procedures involved in detection, purification and characterization of enzymes. (Former course Biochemistry and Biophysics 123L.) —II. (II.) G. Smith

127. Sensory Evaluation of Foods (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: Agricultural Management and Rangeland Resources 120 or course 117. A critical examination of methods of sensory measurement applied to food and beverage systems; descriptive analysis and consumer tests and their application to quality assurance, product development and optimization. —II. (II.) Guirard

128. Food Toxicology (3) Lecture—3 hours. Prerequisite: Biological Sciences 102, 103. Chemistry and biochemistry of toxins occurring in foods, including plant and animal toxins, intentional and unintentional food additives. The assessment of food safety and toxic hazards. (Same course as Environmental Toxicology 128.) GE credit: Social Science; Social Sciences; Social Science; Social Sciences. (Formerly: M. Smith)

131. Food Packaging (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 8B, Biological Sciences 1A, Physics 7C. Principles of food packaging. Functions of packaging. Properties of metal, glass, plastic, and paper materials and packages. Design, fabrication, and applications of food packaging. Packaging of fresh and processed foods, including fruits and vegetables, dairy foods, beer and wine. —I. (I.) Krachot

151. Food Freezing (1) Discussion—1 hour; online lecture. Prerequisite: course 110A or the equivalent. Mechanisms of ice crystalization, interpretation of freezing diagrams, and modes of heat transfer. Food properties at subfreezing temperatures, refrigeration requirements, and estimation of freezing times. Industrial systems used in freezing foods. —III. (I.) Singh

159. New Food Product Ideas (2) Lecture/discussion—2 hours. Prerequisite: upper division standing with background course work in food science (course 50 or 100A), biological sciences (Biological Sciences 1A, 1B, 1C), or the physical sciences (Physics 5A, 5B, 5C or Chemistry 2A, 2B, 2C). Course will familiarize students with initial stages of food product development, including definition and articulation of a problem, generation of ideas to solve the problem, screening of ideas, and the formal presentation of a new product concept.

160. Food Product Development (4) Lecture—1 hour; discussion—1 hour; laboratory—6 hours. Prerequisite: upper division standing with background course work in food science (course 50 or 100A), biological sciences (Biological Sciences 1A, 1B, 1C), or the physical sciences (Physics 5A, 5B, 5C or Chemistry 2A, 2B, 2C). Product implementation stage of food product development including preliminary product description, prototype development, product testing, and formal presentation of a new product development. —II. (II.)

190. Senior Seminar (1) Seminar—1 hour. Prerequisite: senior standing or consent of instructor. Selected topics presented by students on recent advances in food science and technology. Reports and discussions concerning oral and written presentations, literature sources and career opportunities. —II. (II.) Shoemaker

192. Internship for Advanced Undergraduates (1-12) Internship—3-36 hours. Prerequisite: consent of instructor. Work experience in food science or off campus in the practical application of food science. (P/NP grading only)

198. Directed Group Study (1-5) Prerequisite: consent of instructor. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5) (P/NP grading only)

Graduate Courses


202. Chemical and Physical Changes in Food (4) Lecture—3 hours; term paper. Prerequisite: Biological Sciences 103; Chemistry 107B. Fundamental principles of chemistry and physics are applied to a study of changes in water in foods, activity, changes in proteins, nutrients, toxic constituents, and other compounds during storage, heating, freezing, dehydration, and concentrating of food materials. —III. (III) Dungan

Quarter Offered: I-Fall; II-Winter; III-Spring; IV-Summer; 2009-2010 offering in parenthesis

General Education (GE) credit: ArtHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Social-Cultural Diversity; Wrt=Writing Experience
203. Food Processing (3)
Lecture—3 hours. Prerequisite: course 110A, Physics 2C or 2C, Chemistry 107B, and one undergraduate food processing course. Principles of food engineering applied to food processing. Relationship of Newtonian and non-Newtonian fluid properties to heat and mass transfer. Application of mass transfer in controlling kinetics and quality changes of foods.—II. (III.) K. McCarthy, M. McCarthy

204. Advanced Food Microbiology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1C or 1A, Chemistry 107A or a course in microbiology. Principles of and recent developments in food microbiology, including food pathogen virulence and detection, parameters of microbial growth in food, and the microbiology of food and beverage fermentations.—III. (III.) Price, Ogrydziak, Young

205. Industrial Microbiology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 102, 103, Microbiology 130A-130B or Biological Sciences 101 recommended. Use of microorganisms for producing substances such as amino acids, peptides, enzymes, antibiotics and organic acids. Emphasis on metabolic regulation of pathways leading to fungal metabolites, yeasts, and bacteria, and on genetic manipulations (including recombinant DNA techniques) of industrial microorganisms. Offered in alternate years.

207. Advanced Sensory-Instrumental Analyses (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 107 and consent of instructor. Basic principles of measurement of color, texture, and flavor of foods by sensory and instrumental methods. Advanced statistical analysis of relation of colorimetry, texturometry, and chemistry of volatile compounds to perception of appearance, texture, flavor. Offered in alternate years.

210. Proteins: Functional Activities and Interactions (3)
Lecture—3 hours. Prerequisite: Biological Sciences 103. The relationships of structure of proteins to their biological functions. Structural proteins, complexing proteins, and catalytic proteins in plant and animal materials and products.

211. Lipids: Chemistry and Nutrition (3)
Lecture—3 hours. Prerequisite: Biological Sciences 103, Chemistry 107B, 128B. Chemistry of lipids as it pertains to research in food and nutrition. Emphasis on lipids and their properties in tissues and foods. Regulation of absorption, transport and metabolism of lipids. Implications of dietary fats and health.—II. (II) German

217. Advanced Food Sensory Science (2)
Lecture—2 hours. Prerequisite: course 107A (may be taken concurrently). Advanced study of the techniques and theory of the sensory measurement of food as an analytical tool and as a measure of consumer perception and acceptance. Advanced examination of the sensory and cognitive systems associated with the perception of food.—I. (II) O’Mahony

227. Food Perception and the Chemical Senses (2)
Lecture—2 hours. Prerequisite: course 107B (may be taken concurrently). Consent of instructor. Examination of the anatomy and physiology of the chemical senses (taste, smell, and the trigeminal senses) and how they are involved in the perception of food and food intake.—II. (II) Guinand

290. Seminar (1)
Seminar—1 hour. May be repeated for credit. (S/U grading only)—I, II, III, (I, II, III)

290C. Advanced Research Conference (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Critical presentation and evaluation of original research by graduate students. Planning of research programs and proposals. Discussion led by individual major instructors for their research group. (S/U grading only)—I, II, III, (I, II, III)

291. Advanced Food Science Seminar (1)
Seminar—1 hour. Prerequisite: completion of at least one quarter of course 290. Oral presentation of student’s original research, discussion, and critical evaluation. (S/U grading only)—III.

298. Group Study (1-5)
299. Research (1-12)
Prerequisite: graduate standing. (S/U grading only)

396. Teaching Assistant Training Practicum (1)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—I, II, III. (I, II, III)

Food Service Management

(College of Agricultural and Environmental Sciences)
Faculty. See under the Department of Nutrition, on page 427.

The Major Program and Graduate Study
Food Service Management is incorporated within the major of Clinical Nutrition. If you are interested in preparing for a career in commercial organizations such as hotels, restaurants, industrial cafeterias, or contract food services, as well as in public or private institutions such as hospitals, correctional institutions, schools, or colleges, consult the Department of Nutrition.

Related Courses. See Food Science and Technology and Nutrition.

Courses in Food Service Management (FSM)
Questions pertaining to the following courses should be directed to the Food Service Management office in 3211 Meyer Hall (530) 752-2512.

Upper Division Courses
120. Principles of Quantity Food Production (4)
Lecture—3 hours; independent study—1 hour. Prerequisite: Food Science and Technology 100B and 101B. Restricted to upper division Clinical Nutrition students only. Fundamental principles of food service management, including quantity food preparation, institutional equipment, receiving and storage, service, menu planning, merchandising, and safety. Students will earn food safety certification.—III. (III) Hudson

120L. Quantity Food Production Laboratory (2)
Laboratory—6 hours. Prerequisite: course 120. Laboratory experience in quantity food production and service.—I. (I) Hudson

122. Food Service Systems Management (3)
Lecture—3 hours. Prerequisite: Agricultural and Resource Economics 112, courses 120, 120L, 121. Principles of quantity food production management: production schedules, portion control, financial management, layout and equipment planning, evaluation of alternative systems, and computer applications.—II. (II) Hudson

192. Internship (1-12)
Internship—3 or 9 hours. Prerequisite: one upper division course in Food Service Management and consent of instructor. Work experience on or off campus in practical aspects of food service management, supervised by faculty member. (P/NP grading only)—Steinberg

197T. Tutoring in Food Service Management (1-2)
Discussion/lab—3 or 6 hours. Prerequisite: Didactics or related course. Tutoring Food Service Management course in which tutoring is done. Tutoring of students in food service management, assistance with discussion groups or laboratory sections; weekly conference with instructor in charge of course; written evaluations. May be repeated if tutoring a different course. (P/NP grading only)—Steinberg

198. Directed Group Study (1-5)
(P/NP grading only)—Steinberg

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)—Steinberg

Forensic Science (A Graduate Group)

Robert H. Rice, Ph.D., Chairperson of the Group

Group Office. 1333 Research Park Drive, Davis, CA 95618 (530)757-8699; http://extension.ucdavis.edu/forensics

Faculty

Faculty members are listed on the Web site.

Graduate Study. The Forensic Science Graduate Program offers the degree of MS in Forensic Science. This program, offered in conjunction with a Plan II Capstone Project option, has two tracks, DNA or Criminalistics, enabling the student to take core courses emphasizing the physical or biological sciences. Each track requires the student to take six core courses, totaling 18 units, three units of seminar, and the appropriate number of elective/research units, depending on the selection of Plan I or Plan II, for a total of 48 units. Students can take courses outside their specialization, but they must complete the courses required for their own track. The FOR seminar course in the fall quarter is required for new students. The FOR seminar can be taken in any spring quarter before graduation. Students must also take one additional Seminar course in another department.

Preparation. Appropriate preparation is an undergraduate degree in physical or natural sciences, engineering or a closely related field with a GPA of 3.00 or higher. Examples include Biochemistry, Chemistry, Molecular Biology, Biology, Genetics, and Engineering. Applicants must have completed at least one year each of general chemistry, organic chemistry, general physics and math through calculus. Other recommended courses include general biology, biochemistry, general statistics.

Graduate Advisors. Ralph Aldredge (Mechanical and Aeronautical Engineering), David Howitt (Chemical Engineering and Materials Science), You-Lo Hsieh (Chemistry, Polymer Science), Ed Imwinkelried (School of Law), Leslie Lyons (Population Health & Reproduction), Bahram Ravani (Mechanical and Aeronautical Engineering), Moshe Rosenberg (Food Science and Technology).

Courses in Forensic Science (FOR)

200. Fundamental Concepts in Forensic Science (3)
Lecture—2 hours; fieldwork—0.25 hours; lecture/laboratory—0.25 hours; seminar—0.5 hours. Overview of forensic science. Problem definition, strategies for problem solving, analytical tools, and professional and ethical considerations. (II.)—Sensabough

205. Microscopy and Microanalytical Methods in Forensic Science (3)
Lecture—2 hours; seminar—1 hour. Prerequisite: consent of instructor. Introduction to optical and electron microscopy. Transmission and reflection and absorption; polarized light and polarizing crystals; phase contrast; radiography; image recording, SEM analysis of gunshot residues, paints, glass. EDS, XRF, analysis, minimum detectable levels and homogeneity. Restricted to students enrolled in the M.S. in Forensic Science Program.
210. Personal Identification Methods in Forensic Science (3)
Lecture—3 hours. Prerequisite: restricted to students enrolled in the M.S. Forensic Science Program or consent of instructor. Methods for identifying individuals from evidence collected at crime scenes, suspects or victims, crime scene examination and analytical methods used to support such investigations. Topics include: anthropology and odontology; latent prints; shoe prints; facial reconstruction/recognition; eyewitness identifications; biometric systems. Offered in alternate years. —III. (II) Thornton

212. Scientific Evidence and Courtroom Testimony (3)
Lecture—2 hours; discussion—1 hours. Prerequisite: graduate students enrolled in the M.S. Forensic Science program or consent of instructor. Explores the relationship between science and the criminal justice system. Admissibility of scientific testimony and documentary proof during the trial, concepts of relevancy, hearsay and opinion rule, examination of expert witnesses, impact of Kelley-Fry and Daubert decisions & court testimony. —III. (II) DeHaan

220. Analysis of Toxicants (3)
Lecture—3 hours. Prerequisite: coursework in organic chemistry. Principles of microanalysis of toxicants. Theoretical considerations regarding separation, detection and quantitative determination of toxicants using chemical and instrumental techniques. (Same course as Environmental Toxicology 220.) —I. (I) Seiber, Wood

221L. Forensic Science Analytical Instrumentation (2)
Lecture/discussion—1 hour; laboratory—3 hours. Methodology and instruments used for the analysis of substances and materials in the discipline of Forensic Science. Practical experience with modern instrumental techniques & methodologies used in the advanced forensic science laboratory. Limited to students enrolled in the Forensic Science Graduate program or subject to the approval of the instructor if the student has the appropriate chemistry, calculus and physics courses required of students in the graduate forensic science program. —I. (I) Land

240. Homicide Crime Scene Investigation (3)

268. Statistics in Forensic Science (3)
Lecture—3 hours. Prerequisite: consent of instructor. Restricted to students enrolled in the M.S. in Forensic Science Program or consent of Forensic Science Program Director. Statistics that are used by the forensic scientist, their limitations/applications in presenting evidential results in such areas as DNA-STR results, trace evidence correlation, fingerprint statistics, population sampling and the Bayes method. Offered in alternate years. —II. Land

278. Molecular Techniques (3)
Lecture—3 hours. Prerequisite: graduate standing or consent of instructor. Recombinant DNA technology and its applications. (Same course as Environmental Toxicology 278.) Offered in alternate years. —I. (I) Denison, Rice

280. Forensic DNA Analysis (3)
Lecture—3 hours. Prerequisite: coursework in genetics and molecular biology. Foundation in theory and practice of forensic DNA analysis; past, present, and emerging technologies; legal and quality assurance issues. DNA extraction, DNA quantitation, multiplex amplification of STR loci, capillary electrophoresis of amplified products, and analysis of STR typing data. (Same course as Environmental Toxicology 280.) —II. (II) Von Berlendis

281. Principles and Practice of Forensic DNA Typing (2)
Lecture—1 hour; laboratory/discussion—3 hours. Prerequisite: consent of instructor; course 278 or 280, or equivalent. Application in the laboratory using theories to extract, quantify and type human DNA as found in forensic samples. Offered in alternate years. —II.

289. Survey in Forensic Science (3)
Lecture—3 hours. Analytical methods in contemporary forensic science. Clandestine laboratories in California, crime scene management, examination and analysis of human hair, forensic ballistics/trjectory reconstruction, shoe/foot prints impressions, serial number restoration, forensic aspects of alcohol impairment, bloodstain pattern interpretation, microscopy of building materials, biological aspect of forensic science. May be repeated for credit when topic differs. —I, II, III. Howitt

290. Seminar in Forensic Science (1)
Seminar—3 hours. Students will be exposed to topical areas in Forensic Science by presentations conducted by expert guest speakers. The seminar will also serve as a medium whereby the exiting students will present the research conducted as part of their thesis requirement. May be repeated for credit when topic differs. Restricted to students enrolled in the M.S. in Forensic Science Program. (S/U grading only.) —I, II, III.

290C. Graduate Research Conference in Forensic Science (1)
Graduate Research Conference in Forensic Science (1)

290C. Graduate Research Conference in Forensic Science (1)
Independent study—1 hour. Individual and/or group conference on problems, progress and techniques in forensic science and research. May be repeated for credit when topic differs. (S/U grading only.) —I, II, III.

293. Forensic Science Research Methodology (2)
Lecture—1.5 hour, extensive writing or discussion—0.5 hours. Prerequisite: graduate students enrolled in the M.S. Forensic Science program or consent of instructor. Introduction to research, formulation, and solution of meaningful scientific problems encountered in the Forensic Science area including experimental design/and/or theoretical analysis of new and previous data and hypotheses. Students will present and defend their thesis research/journal article proposals. Limited enrollment. (S/U grading only.) —III.

298. Group Study in Forensic Science (1-5)
(S/U grading only.)

299. Research in Forensic Science (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

French (College of Letters and Science)

Julia Simon, Ph.D., Chairperson of the Department
Department Office, 522 Sproul Hall
(530) 752-1219; http://french.ucdavis.edu

Faculty
Bruce Anderson, Ph.D., Assistant Professor
Nicole Asquith, Ph.D., Assistant Professor
Marc E. Blanchard, Agréé de Lettres, Professor
(French, Comparative Literature)
Elizabeth Constand, Ph.D., Associate Professor
Jeff Fort, Ph.D., Assistant Professor
Noah Guynn, Ph.D., Associate Professor
Eric Russell Webb, Ph.D., Assistant Professor
Julia Simon, Ph.D., Professor

Emeriti Faculty
Claude Abraham, Ph.D., Professor Emeritus
Edward M. Bloom, Ph.D., Professor Emeritus
Ruby Cohn, Ph.D., Professor Emerita
Gerald Herman, Ph.D., Senior Lecturer Emeritus
Margo R. Kaufman, M.A., Senior Lecturer Emerita
Manfred Kusch, Ph.D., Senior Lecturer Emeritus
(French, Comparative Literature)

Marshall Lindsay, Ph.D., Professor Emeritus
Maria I. Manoliu, Ph.D., Professor Emerita
Michèle Praeger, Ph.D., Professor Emerita
Leslie Rabine, Ph.D., Professor Emerita
(Women and Gender Studies, French)

Kath B. York, Ph.D., Senior Lecturer Emerita

The Major Program
The major program prepares students for graduate studies in French. Students will complete the major in a minimum of 12 units in French at the advanced level, including French 101, 102, 115, 116, and 117A. The major requires completion of 23 units in French, including French 101, 102, 115, 116, 117A, 117B, 118A, 118B, 119A, 119B, 119C, 120, 121, 124, 125, 130, 140, 141 and 122. The major also requires completion of at least one semester in a French-speaking country.

A.B. Major Requirements:

1. Preparatory Subject Matter

   Preparatory Subject Matter: 4-34

  French 1, 2, 3 (or the equivalent)...........0-15
   French 21, 22, 23..............................0-15
   Linguistics 1 or 4.............................4

2. General Education Requirements: 44

   French 100........................................12

   Three French literature courses from among the following (at least one course must cover pre-revolutionary literature; such courses are marked with an asterisk):

   Total Units: 115

   French 100........................................12
Two French culture courses from among the following: 107, 108, 127, 128-130, 140-141, 160, 161, 162. Recommended
French 107, 108, 109, 160 and 161 in addition to upper division courses, for a total of 45 units for students interested in obtaining a "single subject" teaching credential in California.

Major Adviser: J. Fort

Minor Program Requirements:

**UNITS**

French .......................................................... 24

Honors Program. Candidates for high or highest honors in French must write a senior thesis under the direction of a faculty member. For this purpose, honors candidates must enroll in French 194H (3 units) and French 195H (3 units). Normally, a student will undertake the honors project during the first two quarters of the senior year; other arrangements must be authorized by the department chair. Only students who, at the end of the junior year (135 units), have obtained a grade-point average of 3.500 in courses required for the major will be eligible for the honors program. The requirements for earning high and highest honors in French are in addition to the regular requirements for the major in French.

Teaching Credential Subject Representative. B. Anderson; see the Teaching Credential/M.A. Program on page 109.

Graduate Study. The Department offers programs of study and research leading to the Ph.D. degree in French. Candidates for the Ph.D. have the option of enriching their degree program by preparing a designated emphasis in African American and African Studies, Critical Theory, Feminist Theory and Research, Classics, or Second Language Acquisition, Studies in Performance and Practice. Detailed information may be obtained from the graduate adviser or the department chairperson.

Graduate Advisers. N.D. Guynn

Prerequisite Credit. Credit will not normally be given for a course if it is the prerequisite of a course already successfully completed. Exceptions can be made by the department chairperson only.

Courses in French (FRE)

Students offering high school language preparation as a prerequisite must take a placement test.

Course Placement. Students with two years of high school French normally take French 2, those with three years take French 3 and those with four years take French 21.

Lower Division Courses

1. Elementary French (5)
   Discussion—5 hours. Laboratory—1 hour. Students who have successfully completed French 2 or 3 or in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed. —I, II, III. (I, II, III)

21. Intermediate French (5)
   Lecture/discussion—5 hours. Prerequisite: course 1. Continuation of course 2. —I, II, III. (I, II, III)

22. Intermediate French (5)
   Lecture/discussion—5 hours. Prerequisite: course 21. Continuation of course 22. Grammar, oral practice, composition. Technical terminology in such diverse fields as government, security, the nation and centralization, the rise of politics, justice, social and economic institutions; reading and discussion of short literary texts.—I, II, III. (I, II, III)

23. Intermediate French (5)

3. Elementary French (5)
   Discussion—5 hours. Laboratory—1 hour. Prerequisite: course 1. Course 1, 2, or 3.—IV. (IV.) Anderson

5. French Film (4)
   Lecture—1 hour; discussion—2 hours; term paper. Introduction to the tradition of French cinema from its invention by Méliès and the Lumière brothers through New Wave (especially the works of Truffaut and Godard) and more recent developments in French and French literature translated into English. Offered in alternate years. GE credit: ArtHum.—(II.) Fort, Guynn

52. France and the French-Speaking World (4)
   Lecture—2 hours; discussion—1 hour; term paper. Readings in French and Francophone literature from the Middle Ages to the present. Particular attention is given to the longstanding interest of French writers in issues of social, regional, gender, sexual, and ethnic identity. GE credit: ArtHum, Div. Wrt.—II. (II.) Anderson

53. French as a World Language (4)

98. Directed Group Study (1-5)
   Prerequisite: consent of instructor. (P/NP grading only)

99. Special Study for Undergraduates (1-5)
   Prerequisite: consent of instructor. (P/NP grading only)

Upper Division Courses

101. Introduction to French Poetry (4)
   Lecture—3 hours; short papers. Prerequisite: course 100 or consent of instructor. Analysis and evaluation of works representing the main types of French poetry. Study of formal features and aesthetic effects. GE credit: ArtHum.—II. (I.) Guynn

102. Introduction to French Drama (4)
   Lecture—3 hours; short papers. Prerequisite: course 100 or consent of instructor. Analysis and evaluation of plays representing the main types of French drama, with emphasis on dramatic structure and techniques. GE credit: ArtHum.—III. (III.) Guynn

103. Introduction to French Prose (4)
   Lecture—3 hours; short papers. Prerequisite: course 100 or consent of instructor. Analysis and evaluation of works representing the main types of French prose, with emphasis on narrative structure and techniques. GE credit: ArtHum.—III. (III.) Simon

104. Translation (4)
   Lecture—3 hours; extensive writing. Prerequisite: course 100 or the equivalent. Practice in English-to-French and French-to-English translation using a variety of non-literary materials, illustrating different problems and styles.—III. (III.) Russell Webb

105. Advanced French Grammar (4)
   Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 23 or the equivalent. Understanding of, and extensive practice with, various grammatical structures in French. Lexical-semantic, morphological, and syntactic analysis.—II. (II.) Anderson, Russell Webb

106. French in Business and the Professions (4)
   Lecture—1 hour; discussion—2 hours; frequent written assignments. Prerequisite: course 100 or consent of instructor. The French language as used in the commercial sphere. Emphasis on proper and correct form in letter-writing, and in non-literary composition. Technical terminology in such diverse fields as government and world business.—I. (I.)

107. The Making of Modern France (4)
   Lecture—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Introduction to French culture through a historical approach to topics such as the citizen and the state (politics, justice, social security), the nation and centralization, the rise of public education, colonization, class and social relationships. Offered in alternate years. GE credit: ArtHum.—II. (II.) Anderson, Simon

108. Modern French Culture (4)
   Lecture—3 hours; extensive writing. Prerequisite: course 100 or consent of instructor. Survey of modern French culture from the Dreyfus affair to the present day. Topics may include women and French culture, decolonialization and modernization, education, social welfare and immigration.—Constable, Simon

109. French Phonetics (4)
   Lecture/discussion—3 hours; laboratory—1 hour. Prerequisite: course 23 or the equivalent. Introduction to the sound-inventory of French and practice in phonetic transcription, with a focus on ways in which phonetic contrasts signal grammatical contrasts; spoken forms and spelling; formal differences...
between the ‘Standard’ and other varieties across the French-speaking world. Offered in alternate years. GE credit: ArtHum.—I. Anderson, Russell Webb

110. Stylistics and Creative Composition (4) Lecture—3 hours; frequent papers. Prerequisite: course 100 or consent of instructor. Intensive course in creative composition using a variety of techniques and literary devices in an Fundamentals of Arrangement of the text andchoice. May be repeated once for credit when topics differ. Offered in alternate years. GE credit: ArtHum.—I. Lyon

111. Medieval French Literature and Society (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. The social and cultural life of medieval France as studied through representation in such literary works as La Chanson de Roland, courtly love lyric, the Arthurian romances of Chrétien de Troyes, Aucassin et Nicolette, selected fabliaux and jongleurs. Offered in alternate years. GE credit: ArtHum.—I. Lyon

116. The French Renaissance (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Overview of major works of the 16th century. GE credit: ArtHum.—II. Anderson, Russell Webb

117A. Baroque and Preclassicism (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Overview of major works of the 17th century. GE credit: ArtHum.—III. Anderson, Russell Webb

118A. The Age of Reason and Revolution (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. History of the French romans from the Middle Ages to the Revolution with particular emphasis on the novels of the 18th century. Offered in alternate years. GE credit: ArtHum.—II. Simon

119A. The Romantic Imaginary (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Major concepts and themes of French Romanticism, such as dream and the supernatural, impossible love, exoticism, revolution, individualism, nature, the mal du siécle, Romantic irony, the creative imagination, the cult of ruin. Offered in alternate years. GE credit: ArtHum.—II. Simon

119B. Realism, History and the Novel (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Investigation of the narrative and historical modes of French realist fiction, with emphasis on the representation of history in the realist novel, its depiction of social realities such as class and gender, and its relation to the historical and institutional context of the time. Offered in alternate years. GE credit: ArtHum.—II. Constable

119C. From Baudelaire to Surrealism (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Study of the main poets and poetic movements from the mid-19th to the early 20th century, including Baudelaire, the Symbolists, and the Surrealists. Offered in alternate years. GE credit: ArtHum.—II. Deniel

120. Modern French Thought (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Overview of post-World War II modern French intellectual currents from existentialism to modernism and deconstruction. Offered in alternate years. GE credit: ArtHum.—II. Anderson, Russell Webb

121. Twentieth Century French Novel (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 101. Novels and theories of the novel, from Proust to the Nouveau Roman and beyond. Offered in alternate years. GE credit: ArtHum.—II. Constable, For

122. French and Francophone Film (4) Lecture/discussion—4 hours; extensive writing; fieldwork—3 hours. Prerequisite: course 100 or consent of instructor. French and Francophone film from the Lumière Brothers to the present. May include analysis of film form and narrative, major filmmakers and filmic traditions, and film theory. May be repeated once for credit. Offered in alternate years. GE credit: ArtHum.—II. Constable

124. Post-Colonialist and Francophone Literature (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Introduction to Post-Colonialism in African and/or Caribbean, oriental and/or North African literatures written in French. Selected topics include: identity and subjectivity, the role of the intellectual, women’s voices, languages and oral literatures, cultural syncretism, theories of post-colonialism. May be repeated once for credit when topics differ. Offered in alternate years. GE credit: ArtHum.—III. Adejumobi

125. French Language and Other Arts (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. The relationship between French literature and other arts—painting, music, cinema, architecture, opera—from the 17th to the 20th century. Offered in alternate years. GE credit: ArtHum.—III. Blaischke

128. Topics in French Culture (4) Lecture—3 hours; extensive writing. Prerequisite: course 100 or consent of instructor. In-depth study of a particular topic in French culture. Topics may include the Court of Louis XIV, the French Revolution and Immigration. May be repeated once for credit when topics differ. Offered in alternate years. GE credit: ArtHum.—III. Blaischke

130. From Page to Stage: Theatre and Theatricality (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 102. French theater as literature and performance. May be repeated once for credit when topics differ. Offered in alternate years. GE credit: ArtHum.—I. Guynn

133. Gender and Politics in French Literature and Society (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 101, 102, or 103. Examination of the thematic, theoretical and political tendencies in contemporary French fiction. BARTHES, Foucault, Duras, GUDET, considered in terms of their writing on identity and gender. Offered in alternate years. GE credit: ArtHum.—Div.—I.

140. Study of a Major Writer (4) Lecture—3 hours; term paper. Prerequisite: course 101 and course 102. Topics appropriate to selected topic, or consent of instructor. Concentrated study of works of a single author. May be repeated once for credit as author-subject changes. —II. Anderson, Russell Webb

141. Selected Topics in French Literature (4) Lecture—3 hours; term paper or short papers. Prerequisite: courses 100 and 101 or 102 or 103 as appropriate to the selected topic or consent of instructor. Subjects and topics to be announced. May be repeated twice for credit when topics differ. —II. Anderson, Russell Webb

160. Linguistic Study of French—Sound and Form (4) Seminar—3 hours; term paper. Prerequisite: Linguistics 1 and one of course 104, 105, 109, 110. Introduction to the linguistic study of modern French, with focus on sound structure and form, inflection and derivation. —II. Anderson, Russell Webb

161. Linguistic Study of French—Form and Meaning (4) Seminar—3 hours; term paper. Prerequisite: Linguistics 1 and one of course 104, 105, 109, 110. Introduction to the linguistic study of modern French, with focus on sentence construction and constituency, meaning and discourse functions. —III. Anderson, Russell Webb

162. History of French Language (4) Lecture—3 hours; term paper. Prerequisite: course 160. Main periods in development of the French language, from Latin to contemporary popular aspects, with emphasis on relationship between socio-cultural patterns and evolution of the language. GE credit: ArtHum.—II. Anderson, Russell Webb

192. Internship (1-12) Internship—3-36 hours; term paper. Prerequisite: upper division standing and consent of instructor. Practical application of the French language through work experience in government and/or business, culminating in an oral term paper on a topic approved by the sponsoring instructor. (P/NP grading only)

194H. Special Study for Honors Students (4) Independent study—4 hours. Prerequisite: open only to French majors of senior standing who qualify for honors program. Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in French literature, civilization, or language studies. (P/NP grading only)

195H. Honors Thesis (4) Independent study—4 hours. Prerequisite: course 194H. Writing of an honors thesis on a topic in French literature, civilization, or language studies under the direction of a faculty member. (P/NP grading only)—I, II, III, I, II, III.

197T. Tutoring in the Community (2-4) Seminar—1-2 hours; laboratory—1-2 hours. Prerequisite: upper division standing and consent of Chairperson. Tutoring in undergraduate courses including leadership in small voluntary discussion groups affiliated with departmental courses. May be repeated for credit for a total of 6 units. (P/NP grading only)

197TC. Tutoring in the Community (2-4) Seminar—1-2 hours; laboratory—1-2 hours. Prerequisite: upper division standing and consent of Chairperson. Tutoring in public schools under the guidance of a regular teacher and supervision by a departmental faculty member. May be repeated for credit for a total of 6 units. (P/NP grading only)

198. Directed Group Study (1-5) Prerequisite: consent of instructor. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5) (P/NP grading only)
Graduate Courses

200. Introduction to Graduate Study in French (2)
Seminar—2 hours. Prerequisite: graduate standing. An introduction to a range of methodologies and critical practices in the field of French Studies, including literature, culture, and linguistics. The course will cover basic principles of bibliographic research in the humanities. (S/U grading only)—I. [I] Anderson, Gaynn, Russell Webb

201. History of French (4)
Seminar—3 hours; term paper. Presentation of the main changes in the grammatical structures of French, from Latin to contemporary usage, involving textual analysis and sociolinguistic description.—I. [I] Anderson, Gaynn, Russell Webb

202. Topics in French Civilization (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Interdisciplinary approach to the study of French and Francophone civilization from the Middle Ages to the present. Course content will vary by instructor. May be repeated for credit.—I. [I] Simon

204. Topics in Medieval Literature (4)
Seminar—3 hours; term paper. Study of Medieval French literature, focusing on a particular period, milieu, literary movement, genre, or theoretical approach. May be repeated for credit when topic differs.—I. [I] Gaynn

205A. Sixteenth-Century Literature: The Humanists (4)
Seminar—3 hours. French humanism in its most varied forms. Although at different times Rabelais and Montaigne will be primarily studied, other leading intellectuals and religious writers will also receive attention. May be repeated for credit when different topic is studied.—I. [I]

206A. Seventeenth-Century Literature: Theatrical (4)
Seminar—3 hours. Works of Corneille, Racine, Molière, and minor dramatists. One or more authors may be covered. May be repeated for credit with consent of instructor when different topics are studied.—II. [II]

206B. Seventeenth-Century Literature: Prose (4)
Seminar—3 hours; term paper and/or exposed. Works of authors such as Pascal, Descartes, Mme de Lafayette. One or more authors may be covered. May be repeated for credit with consent of instructor when different topics are studied.—II. [II]

206C. Seventeenth-Century Literature: Poetry (4)
Seminar—3 hours; term paper and/or exposed. Studies of the works of one or more poets of the period. May be repeated for credit with consent of instructor when different topics are studied.—III. [III]

207A. Eighteenth-Century Literature: Philosophies (4)
Seminar—3 hours; term paper and/or exposed. Not a course in philosophy, but an examination of the role of philosophy in the design and context of literary works. Study of one or more authors. May be repeated for credit.—II. [II] Simon

207B. Eighteenth-Century Literature: Novel (4)
Seminar—3 hours. Rise of the novel. Study of narrative experiments in the context of the philosophical climate and new literary values. Course may treat one or more novelists of the period. May be repeated for credit when different topics are studied.—III. [III] Simon

208A. Nineteenth-Century Literature: Fiction (4)
Seminar—3 hours. Study of the works of one or several novelists and/or short story writers of the period. May be repeated for credit with consent of instructor when different topics are studied.—I. [I] Constable

208B. Nineteenth-Century Literature: Poetry (4)
Seminar—3 hours. Study of the works of one or several poets of the period. May be repeated for credit with consent of instructor when different topics are studied.—III. [III] Constable

209A. Twentieth-Century: Prose (4)
Seminar—3 hours; term paper and/or exposure. Study of the works of one or several writers of the period.—II. [II]

209B. Twentieth-Century: Theater (4)
Seminar—3 hours; term paper and/or exposure. Study of the works of one or several dramatists of the period. May be repeated for credit with consent of instructor.—II. [II]

209C. Twentieth-Century: Poetry (4)
Seminar—3 hours; term paper and/or exposure. Study of the works of one or several poets of the period. May be repeated for credit with consent of instructor.—III. [III]

210. Studies in Narrative Fiction (4)
Seminar—3 hours. May be repeated for credit with consent of instructor when different topic is studied.—I. [I]

211. Studies in Criticism (4)
Seminar—3 hours. May be repeated for credit with consent of instructor when different topic is studied.—II. [II]

212. Studies in the Theater (4)
Seminar—3 hours. May be repeated for credit with consent of instructor when different topic is studied.—I. [I]

213. Studies in Poetry (4)
Seminar—3 hours. May be repeated for credit with consent of instructor when different topic is studied.—II. [II]

214. Study of a Literary Movement (4)
Seminar—3 hours. May be repeated for credit with consent of instructor when different topic is studied.—III. [III]

215. Topics in French and Francophone Film (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Aspects of French and Francophone film from the Lumière Brothers through the present. Topics may include a specific historical period of filmmaking, film theory, and the analysis of film form and narrative, and major filmmakers and filmic traditions. May be repeated two times for credit.—III. [III] Constable

224. Francophone Literatures (4)
Seminar—3 hours; term paper. Study of cultural productions (literature, film, visual arts) by Francophone peoples such as those found in North Africa, West Africa, the Caribbean, South-East Asia, the Americas, and Metropolitan France. May be repeated for credit when topic differs and with consent of instructor.—Adejumobi, Constable

250A. French Linguistics I (4)
Seminar—3 hours; term paper. Theoretical approach to the forms and functions of French, with emphasis on phonology and morphology. Overview of current linguistic theories and their application to French. Offered in alternate years.—II. [II] Anderson, Russell Webb

250B. French Linguistics II (4)
Seminar—3 hours; term paper. Theoretical approach to the forms and functions of French, with emphasis on syntax and semantics. Overview of current linguistic theories and their application to French. Offered in alternate years.—II. [II] Anderson, Russell Webb

251. Topics in the Linguistic Study of French (4)
Seminar—3 hours; term paper. Prerequisite: course 201, 250A or 250B, or consent of the instructor. Questions relevant to the linguistic study of French, such as language acquisition, sociolinguistics, or the aural examination of structure. Intended for students in French Linguistics and those applying linguistic models to literature or teaching. May be repeated for credit when topic differs.—III. [III] Anderson, Russell Webb

291. Foreign Language Learning in the Classroom (4)
Seminar—3 hours; project. Overview of approaches to university-level foreign language instruction and the theoretical frameworks underlying current trends in classroom practices across commonly taught foreign languages. (Same course as German 291 and Spanish 291)—I., II. [I, II] Anderson, Arnett, Blake, Iwasaki

297. Individual Study (1-5)
(S/U grading only.)

298. Group Study (1-5)
Seminar—1-5 hours. May be repeated for credit with consent of instructor.

299. Research (1-12)
(S/U grading only.)

299D. Dissertation Research (1-12)
(S/U grading only.)

Professional Courses

300. Teaching of a Modern Foreign Language (3)
Lecture/discussion—3 hours. Prerequisite: senior or graduate standing; a major or minor in a modern foreign language.—II. [II]

390A. The Teaching of French in College (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing or consent of instructor. Course designed for graduate teaching assistants with emphasis on problems and procedures encountered by teachers of lower division classes at the university. May be repeated for credit with consent of instructor. (S/U grading only)—I. [I] Anderson

390B. The Teaching of French in College (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing or consent of instructor. Course designed for graduate teaching assistants with emphasis on problems and procedures encountered by teachers of lower division classes at the university. (S/U grading only)—II. [II] Anderson

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—I, II, III. (I, II, III)

Freshman Seminar Program

Jon Wagner, Program Director
Program Office. 17 Wellman (Teaching Resources Center)
(530) 752-3249; http://trc.ucdavis.edu/trc

Committee in Charge
Caroline Bledsoe, Ph.D.
Land, Air & Water Resources
John Boe, Ph.D. (University Writing Program)
Simone Clay, Ph.D. (French & Italian)
Jon Rossini, Ph.D. (Theatre & Dance)
Yuuko Uchikoshi, Ph.D. (School of Education)

Courses in Freshman Seminar (FRS)

Questions pertaining to the following course should be directed to the instructor or to the Teaching Resources Center.

Lower Division Courses

1. Freshman Seminar (1)
Seminar—1-1.5 hours. The investigation of a special topic through shared readings, discussions, written assignments, term papers, and special activities (such as fieldwork, site visits, laboratory work, etc.). Emphasis is placed upon student participation in learning. Open only to students who have completed...
fewer than 45 quarter units. May be repeated for credit. May take more than one freshman seminar, but not more than one in any given quarter.—I, II, III.

2. Freshman Seminar (2)
Seminar—2-2.5 hours. The investigation of a special topic through shared readings, discussions, written assignments, term papers, and special activities (such as fieldwork, site visits, laboratory work, etc.). Emphasis is placed upon student participation in learning. Open only to students who have completed fewer than 45 quarter units. May be repeated for credit. May take more than one freshman seminar, but not more than one in any given quarter.—I, II, III.

3. Freshman Seminar (1)
Seminar—1-1.5 hours. The investigation of a special topic through shared readings, discussions, written assignments, term papers, and special activities (such as fieldwork, site visits, laboratory work, etc.). Emphasis is placed upon student participation in learning. Open only to students who have completed fewer than 45 quarter units. May be repeated for credit. May take more than one freshman seminar, but not more than one in any given quarter. (P/NP grading only).—I, II, III.

4. Freshman Seminar (2)
Seminar—2-2.5 hours. The investigation of a special topic through shared readings, discussions, written assignments, term papers, and special activities (such as fieldwork, site visits, laboratory work, etc.). Emphasis is placed upon student participation in learning. Open only to students who have completed fewer than 45 quarter units. May be repeated for credit. May take more than one freshman seminar, but not more than one in any given quarter. (P/NP grading only).—I, II, III.

Fungal Biology and Ecology

(College of Agricultural and Environmental Sciences)
The minor in Fungal Biology and Ecology is open to all students interested in a concentrated exposure to and knowledge of the fungi and allied organisms. The minor is sponsored by the Plant Pathology Department.

Minor Program Requirements:

<table>
<thead>
<tr>
<th>UNITS</th>
<th>Fungal Biology and Ecology .......... 18-20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plant Pathology 130, 148, 150 ............ 11</td>
</tr>
<tr>
<td></td>
<td>Selected 7-9 units from Food Science and Technology 104, Medical Microbiology and Immunology 130, Plant Sciences 146, Plant Pathology 40, 135, 151, Science and Society 30, Soil Science 111, 112, Plant Pathology 224 (available to advanced students with consent of instructor) .... 7-9</td>
</tr>
</tbody>
</table>

Minor Adviser, J. D. MacDonal

Genetics

See Molecular and Cellular Biology, on page 406; and Genetics (A Graduate Group), on page 302.

Genetics (A Graduate Group)

David Neale, Ph.D., Chairperson of the Group

Group Office. 310 Life Sciences
(530) 752-4863;
http://bioas2.ucdavis.edu/ggc/ggg

Faculty

Steffen Abel, Ph.D., Professor (Plant Sciences)
Danika Bannasch, Ph.D., Associate Professor (VM: Population Health and Reproduction)
Diane Beckles, Ph.D., Assistant Professor (Plant Sciences)
David Deng, Ph.D., Professor (Evolution and Ecology)
Craig Benham, Ph.D., Professor (Genome Center)
Alan B. Bennett, Ph.D., Professor (Plant Sciences)
Linda F. Bisson, Ph.D., Professor (Viticulture and Enology)
John Bowman, Ph.D., Associate Professor (Plant Biology)
Simeon Boyd, Ph.D., Associate Professor (Pediatrics, M.I.N.D. Institute)
Anne Bagg Britt, Ph.D Professor (Plant Pathology)
Sean Burgess, Ph.D., Associate Professor (Molecular and Cellular Biology)
Kenneth C. Burts, Ph.D., Professor (Molecular and Cellular Biology)
Judith Callis, Ph.D., Professor (Molecular and Cellular Biology)
Simon Chan, Ph.D., Assistant Professor (Plant Biology)
Frederic Chedin, Ph.D., Assistant Professor (Molecular and Cellular Biology)
Hongwu Chen, Ph.D., Associate Professor (Biochemistry and Molecular Medicine)
Roger Chetelat, Ph.D., Associate Agronomist (Plant Sciences)
Douglas Cook, Ph.D., Professor (Plant Pathology)
Lucas Correti, Ph.D., Professor (Plant Biology)
Gina A. Cortopassi, Ph.D., Professor (Molecular and Cellular Biology)
Michael E. Dahmus, Ph.D., Professor (Molecular and Cellular Biology)
Abhaya Dandekar, Ph.D., Professor (Plant Sciences)
Mary Delany, Ph.D., Professor and Chair (Animal Science)
Bruce Draper, Ph.D., Assistant Professor (Molecular and Cellular Biology)
Jorge Dubcovsky, Ph.D., Professor (Plant Sciences)
Jan Dvorak, Ph.D., Professor (Plant Sciences)
JoAnne Engelbrecht, Ph.D., Professor (Molecular and Cellular Biology)
Holly Ernst DVM, Ph.D., Associate Professor (Population Health and Reproduction)
Thomas R. Famula, Ph.D., Professor (Animal Science)
Peggy Farnham, Ph.D., Professor (Pharmacology & Toxicology)
Charles S. Gasser, Ph.D., Professor (Molecular and Cellular Biology)
Paul Gepts, Ph.D., Professor (Plant Sciences)
Robert L. Gilbertson, Ph.D., Professor (Plant Pathology)
David G. Gilchrist, Ph.D., Professor (Plant Pathology)
Thomas Gradziel, Ph.D., Professor (Plant Sciences)
Nobuko Hagiwara, Ph.D., Assistant Professor (Cardiovascular Medicine)
John H. Harada, Ph.D., Professor (Plant Biology)
James A. Harding, Ph.D., Professor (Plant Sciences)
Stacey Harmer, Ph.D., Assistant Professor (Plant Biology)
Wolfgang Heyer, Ph.D., Professor (Microbiology)
Russell Hovey, Ph.D., Associate Professor (Animal Science)
Liping Huang, Ph.D., Assistant Adjunct Professor (Nutrition)
Neil Hunter, Ph.D., Assistant Professor (Microbiology)
Marie Jasieniuk, Ph.D., Assistant Professor (Animal Science)
Clarence I. Kado, Ph.D., Professor (Plant Pathology)

Sree Kanthaswamy, Ph.D., Professional Researcher (Veterinary Genetics, Forensics)
Ken Kaplan, Ph.D., Assistant Professor (Molecular and Cellular Biology)
Daniel Kleibein, Ph.D., Assistant Professor (Plant Sciences)
Paul Knoefer, Ph.D., Assistant Professor (Cell Biology and Human Anatomy)
Artym Kopp, Ph.D., Assistant Professor (Evolution and Ecology)
Ian Korf, Ph.D., Assistant Professor (Molecular and Cellular Biology)
Stephen C. Kowalczykowski, Ph.D., Professor (Microbiology)
Dietmar Kuehl, Ph.D., Associate Professor (Animal Science)
Hsing-Jien Kung, Ph.D., Professor (Biochemistry and Molecular Medicine)
Kit Lam, Ph.D., Professor (Flematology and Oncology)
Charles Langley, Ph.D., Professor (Evolution and Ecology)
Janine LaSalle, Ph.D., Professor (Microbiology and Immunology)
Tom Leding, Ph.D., Adjunct Professor (Plant Sciences)
Su-Lin Lin, Ph.D., Assistant Professor (Microbiology)
William Lucas, Ph.D., Professor (Plant Biology)
Leslie A. Lyons, Ph.D., Associate Professor (Population Health and Reproduction)
Philip Mack, Ph.D., Assistant Research Geneticist (Flematology and Oncology)
Julin Maloof, Ph.D., Assistant Professor (Plant Biology)
Bernie May, Ph.D., Professor (Animal Science)
Juan F. Medina, Ph.D., Professor (Animal Science)
Frederick J. Meyers, Ph.D., Professor (Flematology and Oncology)
Richard Michelmore, Ph.D., Professor (Plant Sciences)
Maria Mudryj, Ph.D., Associate Professor (Microbiology and Immunology)
James D. Murray, Ph.D., Professor (Animal Science)
Jeanette E. Natalle, Ph.D., Associate Professor (Plant Sciences)
David Neale, Ph.D., Professor (Plant Sciences)
Anita M. Oberbauer, Ph.D., Professor (Animal Science)
Dan E. Parfitt, Ph.D., Pomologist (Plant Sciences)
Niels Pedersen, Ph.D., DVM, Professor (VM: Medicine and Epidemiology)
Katherine Pallard, Ph.D., Assistant Professor (Statistics)
Martin L. Privalka, Ph.D., Professor (Microbiology)
Carlos F. Quiros, Ph.D., Professor (Plant Sciences)
Kathryn L. Rakde, Ph.D., Professor (Animal Science)
Pamela C. Ronald, Ph.D., Professor (Plant Pathology)
Alan Rose, Ph.D., Associate Project Scientist (Molecular and Cellular Biology)
Leslie Rose, Ph.D., Associate Professor (Molecular and Cellular Biology)
John Roth, Ph.D., Professor (Microbiology)
Earl Sawai, Ph.D., Associate Adjunct Professor (Pathology)
Carl W. Schmid, Ph.D., Professor Emeritus (Molecular and Cellular Biology)
David Segal, Ph.D., Assistant Professor (Pharmacology and Toxicology)
Michael E. Selsted, Ph.D., Professor (Biochemistry and Molecular Medicine)
Frank Sharp, Ph.D., Professor (Neurology)
Douglas Shaw, Ph.D., Professor (Plant Sciences)
Neelima Sinha, Ph.D., Professor (Plant Biology)
Dina S. St Clair, Ph.D., Professor (Plant Sciences)
Daniel Starr, Ph.D., Assistant Professor (Molecular and Cellular Biology)
Venkatesan Sundaresan, Ph.D., Professor (Plant Biology)
Michael Syvanen, Ph.D., Professor (Microbiology and Immunology)
Thomas Ta, Ph.D., Associate in AES (Plant Sciences)
Larry R. Teuber, Ph.D., Professor (Plant Sciences)
Alison Van Eenennaam, Ph.D., Cooperative Extension Specialist (Animal Science)
205. Molecular Genetics Laboratory (5) Laboratory—1.5 hours. Prerequisite: Biological Sciences 101I or consent of instructor. Students will conduct experiments in molecular genetics laboratories. Individual research problems will emphasize genetic design, experience with methodologies, and data interpretation. May be repeated up to three times for credit. (S/U grading only)—I, II, III, (I, II, III).

207L. Research Methods in Plant Genetics Laboratory (2-5) Laboratory—6-15 hours. Prerequisite: course 207 (may be taken concurrently). Working knowledge of contemporary methodologies in plant genetics is obtained by participation in research programs of the various Plant Genetics Affinity Group members. (S/U grading only)—II, III, I, II, III.

210. Horizontal Gene Transfer (3) Lecture/discussion—3 hours. Prerequisite: background in basic microbiology and genetics required; introductory course in molecular biology, biotechnology and microbial and animal/plant genetics recommended. Transfer of genes between unrelated organisms in nature. Dissemination of foreign DNA from genetically engineered organisms, including plants and animals. Mechanisms by which genes are transferred horizontally, and between kingdoms. —I. II.

211. Concepts in Human Genetics and Genomics (3) Lecture/discussion—3 hours. Prerequisite: course 201A or the equivalent. 201B, 201C or the equivalent recommended. Human genomic organization; genetic structure of populations; positional cloning, application of linkage, association, and haplotypes; quantitative trait loci analysis; integrative genetic studies of gene expression; RNAi repair mechanisms in genetic disease; mutation analyses; epigenetics; mitochondrial disease; gene manipulation and therapy. —II. III.

220. Genomics and Biotechnology of Plant Improvement (5) Lecture—3 hours. Prerequisite: Biological Sciences 101 or the equivalent. Integration of modern bio-technology and classical plant breeding including the impact of structural, comparative and functional genomics on gene discovery, characterization and exploitation. Also covers molecular markers, plant transformation, hybrid production, disease resistance, and novel output traits. (Same course as Plant Sciences 220) —II. (II, III).

297. Seminar in Plant Genetics (1-3) Seminar—1-3 hours. Prerequisite: course 201A or consent of instructor. Core topics in plant genetics will be examined in student-conducted seminars and discussion format. The integration of molecular, organismal and population genetics to address questions in plant biology will be emphasized.

298. Group Study (1-5) Prerequisite: consent of instructor. Group study of selected topics in genetics. (S/U grading only)

299. Research (1-12) (S/U grading only)

Geographic Information Systems

[College of Agricultural and Environmental Sciences]

The Department of Biological and Agricultural Engineering offers a minor in Geographic Information Systems with an emphasis on spatial analysis. This minor is ideal for students interested in information processing of spatial data related to remote sensing, land information systems, marine cartography, thematic mapping, surface modeling, environmental modeling, resources monitoring, decision support systems, emergency response, georeporting, geotechnics, archaeology, military exercises, and computer-aided design. Prerequisites include Mathematics 16A-16B, Statistics 13 or Plant Sciences 120 or Civil and Environmental Engineering 114, and Plant Sciences 21 or Computer Science Engineering 15

Minor Program Requirements:

<table>
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<th>COURSES (GGG)</th>
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| 201A. Advanced Genetic Analysis (5) | Lecture/discussion—5 hours. Prerequisite: Biological Sciences 101, Statistics 100 or the equivalent, graduate standing. Fundamentals of genetic analysis and chromosome structure using model organisms including mutation, transmission, complementation, suppression, and enhancement as well as epigenetic phenomena at the whole organism and molecular levels. —III. II.
| 201B. Genomics (5) | Lecture—3 hours; discussion—2 hours. Prerequisite: course 201A, 201C or the equivalent. Prokaryotic and eukaryotic genomics. Experimental strategies and analytical challenges of modern genomics research and the theory and mechanics of data analysis. Structural, functional, and comparative genomics. Related issues in bioinformatics. —III. III.
| 201C. Molecular Biology (4) | Lecture—4 hours. Prerequisite: Molecular and Cellular Biology 221A or the equivalent. Pass 1 restricted to graduate students in biochemistry and molecular biology, microbiology, or genetics. Structure and organization of DNA and chromatin; DNA replication, repair and recombination; transcription and RNA processing; protein biosynthesis and turnover; transcriptional and post-transcriptional control mechanisms; examples from prokaryotic and eukaryotic cells, and viruses. (Same course as Molecular and Cellular Biology 221C) —III. III.
| 201D. Quantitative and Population Genetics (5) | Lecture—5 hours. Prerequisite: course 201A or consent of instructor. Basic concepts of quantitative and population genetics including gene and genotypic frequencies, multiple factor hypothesis, phenotypic and genotypic values, heritability, selection, genetic variation, the detection of quantitative trait loci and evolution in populations. Experimental and analytical methods. —II. (II)

Geographic Studies

[College of Agricultural and Environmental Sciences]

The interdepartmental minor in Geographic Studies is defined by its concern with place. Geographers strive to answer spatial questions regarding the earth’s surface, to describe and explain the character of regions; to ascertain the ways in which historical and contemporary humans have used and shaped the earth’s surface; and to understand the interactions of physical, biotic, and human systems within our global environment. The minor is compatible with a variety of environmental majors in the college and also with graduate programs in geography.

The minor is sponsored by the Department of Environmental Design.
See Geography (A Graduate Group), below.

Geography (A Graduate Group)

Stephen B. Brush, Ph.D., Chairperson of the Group

Group Office. Carrie Armstrong-Ruport, Program Coordinator; 207 Walker Hall (530) 752-4119; geography@ucdavis.edu

Faculty

Chris Benner, Ph.D., Associate Professor [Human and Community Development]

Cynthia Bradley, Ph.D., Professor [History]

Stephen Brush, Ph.D., Professor [Human and Community Development]

Adela de la Torre, Ph.D., Professor [Graduate Group Office].

Deborah L. Elliott-Fisk, Ph.D., Professor [Wildlife, Fish, and Conservation Biology]

Patty Eubanks Owens, M.L.A., Associate Professor [Landscape Architecture]

T. Mark Francis, M.L.A., Professor [Landscape Architecture]

Ryan Galt, Ph.D., Assistant Professor [Human and Community Development]

Charles Goldman, Ph.D., Professor [Environmental Science and Policy] Distinguished Graduate Mentoring Award

Steven Greco, Ph.D., Associate Professor [Landscape Architecture]

Susan Handy, Ph.D., Professor [Environmental Science and Policy]

Lynette Hart, Ph.D., Professor [Population Health and Reproduction]

David Hird, D.V.M., Ph.D., Professor [Medicine and Epidemiology]

Frank Kibler, Ph.D., Associate Professor [Human and Community Development]

Lovell (Tu) Jarvis, Ph.D., Professor [Agricultural and Resource Economics]

Susa Joseph, Ph.D., Professor [Anthropology, Women and Gender Studies]

Carl Keen, Ph.D., Professor [Nutrition]

Martin Kenney, Ph.D., Professor [Human and Community Development]

Nguyen Kien, Ph.D., Professor [Anesthesiology]

A. Peter Klimley, Ph.D., Adjunct Associate Professor [Wildlife, Fish and Conservation Biology]

David Kyle, Ph.D., Associate Professor [Sociology]

Jeff D. Lux, Ph.D., Adjunct Assistant Professor [Landscape Architecture]

Jay R. Lund, Ph.D., Professor [Civil and Environmental Engineering]

Jay Mechling, Ph.D., Professor [American Studies]

Lucia Menza, Ph.D., Assistant Professor [Women and Gender Studies]

Patricia Mohlabane, Ph.D., Professor [Civil and Environmental Engineering]

Catherine J. Morrison Paul, Ph.D., Professor [Agricultural and Resource Economics]

Jeffrey Mount, Ph.D., Professor [Geology]

Peter B. Moye, Ph.D., Professor [Wildlife, Fish and Conservation Biology]

Kimberly Neffles, Ph.D., Assistant Professor [Women and Gender Studies]

Debbie Niemeier, Ph.D., P.E., Professor [Civil and Environmental Engineering]

Ben Orlove, Ph.D., Professor [Environmental Science and Policy]

Richard Plant, Ph.D., Professor [Plant Sciences]

James Quinn, Ph.D., Professor [Environmental Science and Policy]

Michael Rios, Ph.D., Assistant Professor [Landscape Architecture]

Lynn Roller, Ph.D., Professor [Classics, Art History]

Scott Rozelle, Ph.D., Adjunct Professor [Agricultural and Resource Economics]

Margaret Rucker, Ph.D., Professor [Textiles and Clothing]

Heath Schlenker, M.A., Professor [Landscape Architecture]

Art Shapiro, Ph.D., Professor [Evolution and Ecology]

Janet Shimamoto-Smith, Ph.D., Professor [Anthropology]

Michael P. Smith, Ph.D., Professor [Human and Community Development]

Daniel Sunner, Ph.D., Professor [Agricultural and Resource Economics]

Margaret Swain, Ph.D., Associate Adjunct Professor [Women and Gender Studies]

Julie Sze, Ph.D., Assistant Professor [American Studies]

Thomas P. Tomich, Ph.D., Professor [Environmental Science and Policy]

Susan Vose, Ph.D., Professor [Human and Community Development]

Christina Weil, Ph.D., Professor [Parks, Recreation, and Tourism]

Joel Wittenberg, Ph.D., Professor [Native American Studies]

Truman Young, Ph.D., Professor [Environmental Horticulture]

Minghua Zhang, Ph.D., Associate Adjunct Professor [Wildlife, Fish and Conservation Biology]

Affiliated Faculty

Joan Florsheim, Ph.D., Associate Research Scientist [Geology]

James Griepshopp, Ph.D., Specialist, Cooperative Extension [Human and Community Development]

Joyce Gutstein, Ph.D., Director [Public Service Research Program—JMIE]

James Hill, Ph.D., Specialist, Cooperative Extension [Public Service Research Program—JMIE]

Eric Larson, Ph.D., Associate Research Scientist [Landscape Architecture]

F. Thomas Ledig, Ph.D., Senior Scientist [Plant Sciences]

Greg McPherson, Ph.D., Associate and Lecturer, Agricultural Experiment Station

Kenneth Tate, Ph.D., Specialist, Cooperative Extension [Plant Sciences]

Graduate Study. Graduate Study. The Graduate Group in Geography (GGG) offers programs of study and research leading to the M.A. and Ph.D. degrees. Faculty and students share a common interest in spatial interaction between humans and the biophysical environment. Students choose an area of emphasis from one of the following fields: (a) structural sciences, (b) methods, models and GIS science, (c) nature and society, and (d) people, place and region. Areas of concentration are also available in (1) landscape architecture and environmental design, (2) regional and community development, and (3) global environmental change.

Preparation. Graduate students considered for admission will have an undergraduate major in geography or in a closely related field. Generally, a student without an undergraduate degree in geography will be required to complete the equivalent of a minor in geography, consisting of one course each in human geography, physical geography and geographic methods, plus any additional undergraduate coursework required for the student’s research emphasis, as determined by the student’s guidance committee.

The wide faculty interests attract a diverse set of students in such areas as biogeography, urban forestry and related natural science and engineering fields, as well as human geography and related social science fields. A number of faculty members use and teach geographic information systems, remote sensing, and related geographic techniques, and must have a strong field orientation. The strengths of the Davis campus and its faculty enable the program to focus on important issues including people, place and power, community and regional identity and change, people-environment interaction, agricultural sustainability, landscape architecture, environmental change, biogeography, natural resource management, and technologies for computing and the use of geographic information. Students are mentored by faculty across the many colleges of the university.

Geology

(Shimm ed and species geography. Systems, climate change, and consciousness wili be addressed. Offered in alternate years.

280. Ield Studies in Geography (3)
Lecture—1 hour; fieldwork—6 hours. Prerequisite: undergraduate or graduate coursework in geography and consent of instructor. Topic or discipline will form the theme for the course in any given offering, with a focus on current research on this topic, field methodologies, and data analysis in human and physical geography. May be repeated two times for credit. Limited enrollment.

290. Seminar: Selected Regions (4)
Seminar—3 hours. Region to be announced annually.

291. Seminar in Cultural Geography (4)
Seminar—3 hours.

293. Seminar in Plant Geography (4)
Seminar—3 hours; seminar paper. Prerequisite: graduate standing. Examination of that aspect of cultural plant geography dealing with human impacts and vegetation change in the earth’s major biomes. Particular emphasis on the New World’s savannas, deserts, and grasslands. Offered in alternate years. I.

295. Graduate Internship (1-12)
Prerequisite: consent of instructor. Individually designed, open to students off campus, in community or institutional setting. Developed with advice of faculty mentor. May be repeated for credit. (S/U grading only.)—I, II, III, (I, II, III).

296. Seminar in Urban Geography (4)
Seminar—3 hours—II, III.

297. Graduate Group in Geography (2)
Lecture/discussion—1 hour; term paper. Prerequisite: graduate standing. Seminars by UC Davis faculty and prominent national and international scholars; research presentations by Graduate Group in Geography Ph.D. candidates. May be repeated for credit. (S/U grading only.)

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only)

299. Research (1-12)
(S/U grading only)

299D. Individual Study (1-12)
Prerequisite: graduate student status in Geography and consent of instructor. (S/U grading only)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)

Geology

(Shimm ed and species geography. Systems, climate change, and consciousness wili be addressed. Offered in alternate years.

280. Ield Studies in Geography (3)
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298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only)

299. Research (1-12)
(S/U grading only)

299D. Individual Study (1-12)
Prerequisite: graduate student status in Geography and consent of instructor. (S/U grading only)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)
Recommending. For the B.S. degree, one or more of the following courses are recommended for any of the options or to supplement the options as listed. Note that Mathematics 22A is not a necessary prerequisite to Physics 9C. Note that Mathematics 22A is not a necessary prerequisite to Physics 9C.


Geophysical/Geophysics option: Mathematics 22A, Physics 14, and Chemistry 2C, Chemistry 110A.


Major Advisers. D.A. Osleger, D.Y. Sumner, R.A. Zierenberg

Minor Program Requirements:
Students in other disciplines may elect to complete a minor in Geology by choosing a geological subject emphasis listed below. On transcripts the minor will appear as a minor in Geology.

Geology

19-24

Select one of the five emphases below.

General Geology emphasis............ 19-20

Geology 50 or 50L and 50L. 5-6

Geology 100, 101, 109 and either 107 or 108. 11

Geology 116 or 134.

Minor Advisers. D.A. Osleger, D.Y. Sumner, R.A. Zierenberg

Engineering Geology emphasis........ 19-22

Geology 50 and 50L. 5-6

Civil Engineering 171, 171L. 5-6

Three courses chosen from Geology 134, 135, 141, Hydrology 104, 134, 146, Soil Science 118, 120. 9-12

Minor Adviser. R.A. Zierenberg

Geochemistry emphasis.............. 19-22

Geology 60 and either 146 or 148. 7-9

Chemistry 110A and 110B, or Materials Science and Engineering 130 and 134. 6-8

Chemistry majors may substitute one of the elective courses for Chemistry 110B.

Two elective courses chosen from Chemistry 110C, Geology 108, 146, 148, Hydrologic Science 134, 135, Soil Science 102, 104. 6-9

Chemistry 110C and Materials Science and Engineering 134 cannot both be counted toward the minor.

Minor Adviser. R.A. Zierenberg

Paleobiology emphasis............. 20-21

Geology 107 and 107T. 10-11

Geology 122. 4

At least eight additional units from the following: Anthropology 151 or 152, Evolution and Ecology 100, 101, 102, 105, 112-112L, 140, 149, Geology 109, 150C. 8-9

Minor Advisers. R. Matani or G. Vermeij

Science Teaching Credential. Students who might wish to become a teacher should consult an advisor in the Mathematics and Science Teaching Program (MAST) at http://www.ucdavis.edu) at their first opportunity in order to combine the prerequisites for a credential program with General Education requirements. MAST also offers seminars that give participants experience in elementary, middle school, and high school classrooms. Students hoping to teach Earth and Planetary Science may prepare by satisfying the requirements for the B.S. degree in Natural Sciences (sciences.uc Davis.edu) or the B.A. degree in Geology (77-79 units) and 36 additional units of science as outlined below. Students may also prepare for the science credential by taking the B.S. degree in Geology (108-111 units) and an additional 24 units as indicated by the asterisks (*) below.

Biological Sciences 1A-1B-1C. 15

Chemistry 2C. 5

Physics 7C. 4

Mathematics 16C. 3

Geology 36. 4

Geology 116M. 3

Teaching Credential Subject Representative. H.W. Day. See also the Teaching Credential/M.A. Program on page 109.

Graduate Study. The Department of Geology offers a program of study and research leading to the M.S. and Ph.D. degrees. For information regarding graduate study in geology, address the Graduate Adviser, Department of Geology.

Graduate Advisers. S.J. Carlson, I.P. Monta-niez, J.R. Rustad

Courses in Geology (GEL)

Lower Division Courses

1. The Earth (4)

Lecture—3 hours; discussion—1 hour. Introduction to the study of the Earth. Earth’s physical and chemical structure; internal and surface processes that mold the Earth; geological hazards and resources. Not open for credit to students who have completed course 50. Only 2 units of credit to students who have completed course 1. GE credit: SciEng.—I. (I; II, III, IV) Osleger, Versaci.

2. The Blue Planet: Introduction to Earth Science (3)

Lecture—3 hours. Study of the solid and fluid earth and its place in the solar system. Holistic examination of how the solid earth interacts with the atmosphere, hydrosphere, biosphere, and exobiological environment. Not open for credit to students who have completed course 50. Only 2 units of credit to students who have completed course 1. GE credit: SciEng.—I. (I)

2G. The Blue Planet: Introduction to Earth Science Discussion (1)

Discussion—1 hour. Prerequisite: course 2 concurrently. Small group discussion and preparation of short papers for course 2. GE credit with concurrent enrollment in course 2. Wrt.—I. (I)

3. History of Life (3)

Lecture—3 hours. Prerequisite: course 1 recommended. The history of life during the three and one-half billion years from its origin to the present day. Origin of life and processes of evolution; how to visualize and understand organisms from their fossil remains. GE credit: SciEng.—III. (II, III) Matani

3G. History of Life: Discussion (1)

Discussion—1 hour. Prerequisite: course 3 concurrently. Small group discussion and preparation of short papers for course 3. GE credit with concurrent enrollment in course 3. Wrt.—I. (I)

3L. History of Life Laboratory (1)

Laboratory—3 hours. Prerequisite: course 3 concurrently. Exercises in understanding fossils as the clues to interpreting ancient life, including their functional morphology, paleoecology, and evolution. —II. (II) Matani

4. Evolution: Science and World View (3)

Lecture—2 hours; discussion—1 hour. Introduction to biological evolution. Emphasis on historical development, major lines of evidence and causes of evolution; relationships between evolution and Earth history; the impact of evolutionary thought on other disciplines. GE credit: SciEng.—II. (I) Vermeij

10. Modern and Archean Global Environmental Change (3)

Lecture—3 hours. Fundamental scientific concepts underlying issues such as global warming, pollution, and the future of nonsustainable resources presented in the context of anthropogenic processes as well as natural forcing of paleoenvironmental change throughout Earth’s history. GE credit: SciEng.—III. (III) Monta-niez

12. Evolution and Paleobiology of Dinosaurs (2)

Lecture—2 hours. Introduction to evolutionary biology, paleobiology, ecology and paleoecology, using dinosaurs as case studies. —II. (III) Carlson

16. The Oceans (3)

Lecture—3 hours. Introductory survey of the marine environment. Oceanary: Physical, Physicochemical Constituents and Chemistry of Water, Geological History, the Sea Biota and Human Utilization of Marine Resources. Not open for credit to students who have taken course 116. GE Credit: SciEng.—II. (II, III) Hill

16G. The Oceans: Discussion (2)

Discussion—2 hours; term paper or discussion. Prerequisite: course 16 (concurrent). Scientific method applied to discovery of the processes, biota and history of the oceans. Group discussion and preparation of term paper. Not open for credit to students who have taken course 116G. GE Credit: SciEng. Wrt.—II. (II) Hill

17. Earthquakes and Other Earth Hazards (2)

Lecture—2 hours. The impact of earthquakes, volcanoes, landslides and floods on Man, his structures and his environment. Discussion of the causes, effects, and solution of geologic problems in rural and urban settings. —I. (II, III, IV) Dewey

20. Geology of California (2)

Lecture—2 hours. The geologic history of California, the origin of rocks and the environments in which they were formed, the structure of the rocks and the interpretation of their structural history, mineral resources, and appreciation of the California landscape. —II. (II) Osleger

25. Geology of National Parks (2)

Lecture—2 hours. Appreciation of the geologic framework underlying the inherent beauty of U.S. National Parks. Each park provides a visual focus for understanding a variety of geologic processes such as mountain building, volcanism, stream erosion, and glacial action. —I. (I) Osleger

30. Fractals, Chaos and Complexity (3)

Lecture/discussion—3 hours. Modern ideas about the unifying ideas of fractal geometry, chaos and complexity. Basic theory and applications with examples from physics, earth sciences, mathematics, population dynamics, ecology, history, economics, biology, computer science, and archaeology. Offered in alternate years. (Same course as Physics 350.) GE Credit: SciEng.—II. (II) Rundle

32. Volcanoes (3)

Lecture—3 hours. Role of eruptions, and eruptive products of volcanoes in shaping the planet’s surface, influencing its environment, and providing essential human resources. GE: SciEng.—III. (III) Cooper

35. Rivers (5)

Lecture—3 hours. Introduction to geomorphology, climate and geology of rivers and watersheds, with case examples from California. Assessment of impacts of logging, agriculture, mining, urbanization and water supply on river processes. Optional river field trips. GE credit: SciEng.—III. (III) Mount

36. The Solar System (4)


50. Physical Geology (3)

Lecture—3 hours. Prerequisite: high school physics and chemistry. The Earth, its materials, its internal and external processes. Historical development of ideas through time by sea-floor spreading and global plate tectonics. Students with credit for course 1 or the equivalent may receive only 2 units for course 50. —II. (II, III) Montez, Zierenberg

Quarter Offered: Fall—Winter—Spring—Summer 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Social-Cultural Diversity; Wrt—Writing Experience
field survey in remote wilderness settings with students from diverse scientific backgrounds. Restricted to advanced students in the physical sciences, biological sciences, or engineering. —II. (III) Mount, Moyle

138. Introductory Volcanology (3) Lecture—2 hours; fieldwork—6. Prerequisite: upper division standing; course 60 and 109 or the equivalents, or consent of instructor. Principles of physical and chemical volcanology. Taught in a volcanically active setting [e.g., Hawaii] with a strong field component. GE credit: SciEng.—IV. (IV) Schlichman

139. Fluviology (3) Lecture—3 hours; laboratory—3 hours; fieldwork—3 hours. Prerequisite: courses 50, 50L, Mathematics 21B or 16B recommended. Advanced analysis of fluvial processes, including geomorphic evolution of rivers, floodplains and watersheds at various spatial and temporal scales, and in response to changing land use. Laboratory exercises examine methods of geomorphic analysis of rivers. Includes three weekend field trips. —(I) Mount

141. Evolutionary History of Vertebrates (3) Lecture—3 hours. Evolutionary history of vertebrates; fossil record and phylogeny; timing of major evolutionary events; appearance of major vertebrate groups; physical constraints in vertebrate evolution; paleobiogeography of vertebrates; effect of continental movement on vertebrate evolution; dinosaurs and other strange vertebrates. Offered in alternate years. —II. Maton

141L. Evolutionary History of Vertebrates Laboratory (1) Laboratory—3 hours. Prerequisite: course 141 (may be taken concurrently). Augments lecture course 141 through handling of specimens enabling in-person examination of three-dimensional features observed in vertebrate skeletons, both fossil and living. Offered in alternate years. —II. Maton

142. Basin Analysis (3) Lecture—3 hours; laboratory—2 hours. Prerequisite: courses 50, 50L, and 109. Analysis of sedimentary basins from initiation to maturity, including controls on sedimentary fill, subsidence analysis, sequence stratigraphy, core logs, and applications to petroleum exploration and hydrology. One two-day field trip. Offered in alternate years. —(II) Summer

143. Advanced Igneous Petrology (5) Lecture—3 hours; laboratory—6 hours. Prerequisite: course 105, Mathematics 16C or 21C, Chemistry 2C. Physical and chemical properties of magmatic environments and processes of igneous rock formation. Laboratory study of representative igneous rocks. GE credit: SciEng, Writ.—Cooper, Lesher

144. Historical Ecology (3) Lecture—3 hours. Prerequisite: upper division course in environmental science or ecology, or an introductory course in paleobiology. Ancient ecosystems and the factors that caused them to change. Species, expansion, evolution of new modes of life, geologically induced variations in resource supply, and extinction provide historical perspective on the biosphere of future. —(I) Verner

145. Advanced Metamorphic Petrology (5) Lecture—3 hours; laboratory—6 hours. Prerequisite: course 106; Hydrologic Science 134 or Chemistry 2C, Mathematics 16C or 21C. Metamorphic processes and the origin of metamorphic rocks. Laboratory study of representative rock suites. Offered in alternate years. GE credit: SciEng, Writ.—(II) Day

146. Isotopic Geochemistry (3) Lecture—3 hours. Prerequisite: Chemistry 2C or consent of instructor. Principles and applications of nuclear and mass spectrometric methods of determining geologic ages using K-Ar, Rb-Sr, Nd-Sm, and U-Pb isotopes. The interpretation of apparent ages determined by isotopic methods. The age and origin of the earth. Offered in alternate years. —(II) Day, Yin

147. Geology of Ore Deposits (4) Lecture—3 hours; laboratory—3 hours, optional one-weekend field trip. Prerequisite: Chemistry 2C or Hydrologic Science 134, courses 60, 62, and 105. Tectonic, lithologic and geochemical setting of major metallic ore deposits emphasizing are deposit genesis, genetic control and the environmental effects of mining. Offered in alternate years. —(III) Zierenberg

148. Stable Isotopes and Geochemical Tracers (5) Lecture—2 hours. Prerequisite: Chemistry 2C or Hydrologic Science 134; courses 50, 50L, 60. Use of oxygen and hydrogen isotopes in defining hydrologic processes; carbon, nitrogen, and sulfur isotopes as indicators of exchange between the lithosphere, hydrosphere, atmosphere and biosphere. Radiogenic, cosmogenic, and noble gas isotopic tracers. Offered in alternate years. —III. Zierenberg

150A. Physical and Chemical Oceanography (4) Lecture—2 hours; discussion—1 hour. Prerequisite: course 116/Environmental Science and Policy 116; Physics 9B, Mathematics 21D; Chemistry 2C, or upper division standing in a natural science and consent of instructor. Physical and chemical properties of seawater, fluid dynamics, air-sea interaction, currents, waves, tides, and the physical oceanographic cycles. [Same course as Environmental Science and Policy 150A.]—(I.) McClain, Spero

150B. Geological Oceanography (3) Lecture—3 hours. Prerequisite: course 30 or 116. Introduction to the origin and geochemical evolution of ocean basins. Composition and structure of continental crust; marine volcanism; and deposition of marine sediments. Interpretation of geochemical history of the ocean floor in terms of sea-floor spreading theories. [Same course as Environmental Science and Policy 150B.]—(II.) McClain

150C. Biological Oceanography (4) Lecture—3 hours; discussion—1 hour; fieldwork— one weekend field trip required. Prerequisite: Biological Sciences 1A and a course in general ecology or physical sciences, or consent of instructor. Morphotaxis, systematics, evolution, and analysis of biological communities. Existing knowledge and contemporary issues in research. Segment devoted to human use. [Same course as Environmental Science and Policy 150C.]-—IV. (IV) Hill

152. Paleobiology of Protists (4) Lecture—2 hours; laboratory—2 hours. Prerequisite: courses 107 or Biological Sciences 1A or consent of instructor. Morphology, systematics, evolution, and ecology of single-celled organisms that are preserved in fossil record. Offered in alternate years. —Hill

156. Hydrogeology and Contaminant Transport (5) Lecture—3 hours; laboratory—3 hours; term paper. Prerequisite: Hydrologic Science 145, Civil and Environmental Engineering 144 or the equivalent. Physical and chemical processes affecting groundwater flow and contaminant transport, with emphasis on realistic hydrogeologic systems. Groundwater geochemistry and geology. Fundamentals of groundwater flow and transport analysis. Laboratory includes field pumping test and work with physical and computer models. [Same course as Hydrologic Science 146.]—(II) Fogg

160. Geodetic Data Analysis (3) Lecture/discussion—3 hours. Prerequisite: Mathematics 21A or the equivalent. Introduction to quantitative methods in analyzing geodetic and remote sensing data including basic principles of statistics and probability, error analysis, hypothesis testing, inverse theory, time series analysis and directional data analysis. Use of computer in lectures and homework. —(II) Runde

161. Exploration Geophysics and Seismology (3) Lecture—3 hours. Prerequisite: Mathematics 21C, Physics 5C or 7C or 9C, or consent of instructor. Principles of exploration geophysics and seismology. Use of gravity, magnetic, electrical resistivity, electromagnetic, and seismic measurements to study the structure of the Earth’s crust. Interpretation of data using computers. Survey of well-logging techniques. Seismology and earthquakes. —(II) Bilen

162. Geophysics of the Solid Earth (3) Lecture—3 hours. Prerequisite: Mathematics 21C, Physics 5C or 7C or 9C, or consent of instructor. Theory and use of physics in the study of the solid earth. Gravity, magnetism, paleomagnetism, and heat flow. Application to the interpretation of the regional and large-scale structure of the earth and to plate tectonics. Offered in alternate years. —I. (II) Kellogg

163. Planetary Geology and Geophysics (3) Lecture—3 hours. Prerequisite: Mathematics 21C, Physics 7C or 9C, or course 50 or 36 or Astronomy 10, or consent of instructor. Principles of planetary science. Planetary dynamics, including satellite and orbital mechanics, tidal interactions and ring dynamics. Theory of planetary interiors, gravitational fields, rotational dynamics. Physics of planetary atmospheres. Geologic processes and their modification. Methods of analysis from Earth-based observations and spacecraft.—III. (III) Kellogg, Yin

175. Advanced Field Geology (1-6) Fieldwork—2-12 hours; discussion—1-6 hours. Prerequisite: consent of instructor. Advanced field studies of selected geologic terrains, including making observations, interpreting these observations, and discussing variations in interpretations. May be repeated for up to 6 units of credit if topics differ. [P/NP grading only.].—II, III, (II, III, III)

181. Teaching in Science and Mathematics (2) Lecture/discussion—2 hours; field work—2 hours. Prerequisite: Geology 81/Education 81, previous experience in a K-12 classroom, or consent of instructor. Exploration of effective teaching practices based on examination of how middle school students learn math and science. Selected readings, discussion and field experience in middle school classrooms. [Same course as Education 181.] —P/NP grading only. —II, III, (II, III, III) Day, Passmore, Stevenson

182. Field Studies in Marine Geochemistry (2-8) Lecture—3 hours; laboratory—1-3 hours; fieldwork—6-40 hours. Prerequisite: consent of instructor. Marine geochemistry with an opportunity for working off the coast or into the field on land. Techniques of sea-floor mapping using bottom photography, marine geochemical sampling, and methods of data reduction and sample analysis. Analysis of data/samples collected. —Hill

190. Seminar in Geology (1) Discussion—1 hour; seminar—1 hour; written abstracts. Prerequisite: major in Geology. Presentation and discussion of current topics in geology by visiting lecturers, staff, and students. May be repeated for credit. [P/NP grading only].—II, III, (II, III, III)

192. Internship in Geology (1-12) Internship. Prerequisite: upper division standing; project approval prior to internship. Supervised work experience in geology. May be repeated for credit for a total of 10 units. [P/NP grading only.]

194A-194B. Senior Thesis (3-3) Prerequisite: open to Geology majors who have completed 135 units and who do not qualify for the honors program. Guided independent study of a selected topic, leading to the writing of a senior thesis. [Deferred grading only, pending completion of field experience.]

Graduate Courses

205. Advanced Field Stratigraphy (3)
Lecture—1 hour; seminar—2 hours. Prerequisite: courses 109 and 110 or consent of instructor; course 126 recommended. Fieldwork over spring break. Application of stratigraphic techniques to research problems. Collection, compilation, and interpretation of field data. Integration of data with models for deposition and interpretations of Earth history. Topics will vary. May be repeated for credit.—III. (Ill.) Ogilby

214. Active Tectonics (3)
Lecture/discussion—3 hours. Prerequisite: graduate standing or consent of instructor. Active deformation associated with faults, landslides, and volcanoes. Geodetic measurement techniques such as triangulation, trilateration, leveling, Global Positioning System (GPS), and radar interferometry. GPS data acquisition and analysis. Inversion of geodetic data and mechanical models of crustal deformation.—III. (III.) Cowgill

216. Tectonics (3)
Lecture/discussion—3 hours. Prerequisite: course 101 or consent of instructor. Nature and evolution of tec tonic features of the Earth. Causes, consequences, and evolution of plate motion, with selected examples from the Earth’s deformed belts. Offered in alternate years.—II. (II.) Cowgill

217. Topics in Geophysics (3)
Lecture—1 hour; seminar—2 hours. Prerequisite: consent of instructor. Discussion and evaluation of current research in a given area of geophysics. Topic will change from year to year. May be repeated for credit.—I. (I.) Bellon, Kellogg

218. Analysis of Structures in Deformed Rocks (3)
Seminar—3 hours. Prerequisite: courses 100, 100L, 101L, 101L, 170; or consent of instructor. Recent advances in the understanding and analysis of structures in brittlely and ductily deformed rocks. Detailed investigation of the characteristics of the structures, models for their formation, and applications to inferring the kinematics of large tectonic events. Offered in alternate years.

219. Fracture and Flow of Rocks (3)
Lecture—3 hours. Prerequisite: courses 100, 101, Mathematics 21 or 16, Physics 7 or 9, or consent of instructor. Origins of those structures in rocks associated with brittle and ductile deformation. Theoretical analysis, using continuum mechanics, and experiments to elucidate the mechanisms for the generation of the fractures and permeability. Offered in alternate years. —I. (I.) Billen

220. Mechanics of Geologic Structures (3)
Lecture—3 hours. Prerequisite: course 170, Mathematics 21C, Physics 7A or 5A, or consent of instructor; Mathematics 21D and 22A recommended. Development in tensor notation of the balance laws of continuum mechanics, and constitutive theories of elasticity, viscosity, and plasticity and their application to understanding development of geologic structures such as faults, folds, foliations, and boudinage. Offered in alternate years.

226. Advanced Sedimentary Petrology (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 144 or consent of instructor. Advanced petrography and geochemistry of sediments and sedimentary rocks. Geochemical, textural and mineralogical evolution of sedimentary rocks reflecting depositional or burial processes. Laboratory work emphasizes thin section study. May be repeated for credit when topic differs.—Summer

227. Stable Isotope Biogeochemistry (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: graduate standing and consent of instructor. Discussion and application of stable isotope techniques for scientific research problems. Course emphasizes carbon, oxygen, nitrogen, hydrogen and sulfur isotopes. Laboratory will develop basic skills of cryogenic gas extraction and specific techniques for individual research using stable isotopes.—II. (II.) Spero

228. Topics in Paleoeceanography (3)
Lecture—3 hours. Prerequisite: courses 108, 150A or consent of instructor. Critical discussion and review of selected topics in paleoceanography and paleoclimatology relating to the history of the processes controlling and affecting climate change and ocean circulation. May focus on specific techniques for paleoclimatic reconstruction. Topics may vary. May be repeated for credit.—II. (II.) Hill

235. Surface Processes (3)
Seminar—3 hours. Prerequisite: courses 50, 50I, 139, Mathematics 218 or 168 recommended. Recent advances in the study of landforms and their evolution. Detailed investigation of the tools used to document surface processes. Evaluation of concepts and processes that govern landscape evolution. May be repeated for credit when topic differs.—II. Mount

236. Inverse Theory in Geology and Geophysics (3)
Lecture—3 hours. Prerequisite: consent of instructor. Inversion of data for model parameters. Evaluation of parameter uncertainties. Linear and nonlinear problems for discrete and continuous models. Bokusi-Gilbert inversion. Offered in alternate years.—McClain

238. Theoretical Seismology (3)
Lecture—3 hours. Prerequisite: consent of instructor. Elastodynamic wave equation. Greens' functions and source representations. Ray theory. Plane and spherical waves and their propagation. Elastic wave propagation in stratified media. Offered in alternate years. (P/NP grading only)—McClain

240. Geophysics of the Earth (3)
Lecture—3 hours. Prerequisite: Earth Sciences and Resources 201, Physics 98, Mathematics 228, Physics of the earth's crust, mantle, and core. Laplace's equation and spherical harmonic expression of gravity and magnetic fields. Elastic wave equation in geologic media. Body and surface seismic waves. Equations of state, thermal structure of the earth. Offered in alternate years.—III. (III.) Turcotte

241. Geomagnetism (3)

242. Paleomagnetism (3)

246. Physical Chemistry of Metamorphic Processes (3)
Lecture—2 hours. Prerequisite: course 145, Chemistry 1110A, or consent of instructor. Physical and chemical principles of metamorphic mineral assemblages and methods of interpreting the paragenesis of metamorphic rocks. Offered in alternate years. —(I.) Day

247. Metamorphic Petrology Seminar (3)
Seminar—3 hours. Prerequisite: course 145 or consent of instructor; course 246 recommended. Selected topics in metamorphic petrology (e.g. mass transport processes, textural and ancient sediments, isotopic geology, origin and chemistry of the oceans). May be repeated for credit when topic differs. Offered in alternate years. (S/U grading only)—Day

250. Advanced Geochemistry Seminar (3)
Seminar—3 hours. Prerequisite: course 146 or consent of instructor. Critical review of selected topics in geochemistry including: ore genesis, hydrothermal and geothermal fluids, regional and ancient sediments, isotopic geology, origin and chemistry of the oceans. Subject varies yearly depending on student interest. May be repeated for credit. Offered in alternate years.—III. (III.) Zierenberg

253. Current Topics in Igneous Petrology (3)
Seminar—3 hours. Prerequisite: graduate standing in Geology; course 143 or consent of instructor. Topical seminar designed to help graduate students develop and maintain focus and to put past literature related to igneous rock petrogenesis. May be repeated for credit when topic differs. (S/U grading only)—I. (I.) Lesher, Cooper

254. Physical Chemistry of Igneous Processes (3)
Lecture—2 hours. Prerequisite: course 143 or consent of instructor; Chemistry 110A required; Chemistry 110B and 110C recommended. Introduction of modern concepts in chemical thermodynamics and kinetics, and fluid dynamics of magmatic systems for graduate students in petrology. Offered in alternate years. —Lesher

255. Experimental Petrology (3)
Lecture—2 hours. Laboratory—3 hours. Prerequisite: course 143 or consent of instructor. Introduction to techniques and methods of design and executing experiments on Earth-forming minerals and rocks. Problems and examples from igneous and metamorphic petrology will be utilized. Offered in alternate years. —Lesher

260. Paleontology (3)
Seminar—3 hours. Prerequisite: graduate standing in geology or a biological science. Selected problems in paleontology. Subject to be studied will be decided at an organizational meeting. May be repeated for credit when topic differs. —III. (III.) Vermeesch

261. Paleobiology Graduate Seminar 1: Evolutionary aspects (3)
Lecture—1 hour; seminar—2 hours. Prerequisite: graduate standing in Geology or a biological science; qualified undergraduates accepted on an exception-only basis. This course will treat one or more of several topics in paleobiology from a phylogenetic perspective, including major patterns in evolution, building the tree of life, ontogeny and phylogeny, phylogeny of major phyla, and the relation between taxonomy and phylogeny. May be repeated for credit when topic varies.—I. (I.) Carlson

262. Paleobiology Graduate Seminar: Methodological Aspects (3)
Lecture—1 hour; seminar—2 hours. One or more major methods used in the study of fossils: Morphometrics and three-dimensional reconstruction of fossils, phylogenetic methodology, the application of geochemical techniques, and electron microscopy. May be repeated four times for credit if topic varies.—III. (III.) Carlson, Matomai, Vermeesch

281. Instrumental Techniques for Earth Scientists (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Mathematics 21A, 21B, 21C, Physics 7A, 7B, 7C or 9A, 9B, 9C or consent of instructor. Laboratory
310 Geophysics

research techniques for new graduate students in Geology. Demonstration of and exposure to appropriate techniques in research. --I. (L.) Yim

285. Field Studies in Marine Geochemistry (2-8)
Lecture—3 hours; laboratory—1-3 hours; fieldwork—1-5 hours. Prerequisite: consent of instructor. Marine geochemistry, with the opportunity of going to sea or into the field on land. Techniques of sea-floor mapping using bottom photography, marine geochemical sampling, and method of data reduction and sample analysis. Analysis of data/samples collected. —Hill

290. Seminar in Geology (1)
Seminar—1 hour; discussion—1 hour. Presentation and discussion of current topics in geology by visiting lecturers, staff, and students. (S/U grading only.)—I, II, III. (I, II, III.)

291. Geology of the Sierra Nevada (1)
Seminar—day-long session. Prerequisite: consent of instructor. Short oral presentations by students and faculty concerning results of their past work and plans for future work in the Sierra. A written abstract is required following the format required at professional meetings. (S/U grading only.)—Day

292. River Formations (1)
Seminar—1 hour; optional field trips to evaluate local rivers. Prerequisite: graduate standing. Review and discussion of latest research and fundamental issues surrounding riverine systems, with emphasis on physical processes. Topics vary. (S/U grading only.)—I, II, III. (I, II, III.) Mount

293. Geologic Event of the Week (1)
Discussion—5 hours; seminar—5 hours. Prerequisite: graduate standing. Seminar/discussion group to review and discuss recent earthquakes, volcanic eruptions, and other significant geologic events. The focus is on understanding the available observations, the physical processes behind each event, the geological setting, and societal consequences. May be repeated for credit three times for up to three units. (S/U grading only.)—Kellogg

294. Structure/Tectonics Forum (1)
Seminar—1 hour. Prerequisite: graduate student in geology or consent of instructor. Seminar/discussion group to review and discuss recent research in structural geology and tectonics, and ongoing research of participants. Topics will vary each quarter depending on the interests of the group. Occasional field trips to areas of current interest. May be repeated for credit when topic differs. (S/U grading only.)—I, II, III. (I, II, III.)

295. Advanced Problems in Geodynamics (3)
Seminar—3 hours. Prerequisite: courses 100 and 101 or consent of instructor. Seminar dealing with problems in geodynamics. Topics will vary (e.g., ductile deformation mechanisms, brittle fracture, earthquake prediction, driving forces for plate tectonics, mantle convection). Emphasis on recent literature. May be repeated for credit when topic differs. Offered in alternate years. (S/U grading only.)

296. Advanced Problems in Tectonics (3)
Seminar—3 hours. Prerequisite: course 101 or consent of instructor. Seminar dealing with current problems in tectonics of selected regions. Topics will change from year to year; emphasis on study of recent literature. May be repeated for credit. Offered in alternate years. (S/U grading only.)

298. Group Study (1-5)
(S/U grading only)

299. Research (1-12)
(S/U grading only)

Professional Courses

390. Methods of Teaching Geology (1)
Discussion—1 hour. Prerequisite: graduate student standing in Geology. Discussion of methods and problems of teaching geology. Topics include departmental facilities, grading efficiency/effectiveness, Teaching Assistant/student interaction, and teaching techniques for lecturing, discussions, and labs. Participation in teaching program required for Ph.D. in Geology. (S/U grading only.)—I. (I.) Carlson

391. Ethical Issues in Earth Sciences (1)
Seminar—1 hour. Prerequisite: graduate standing in Geology or consent of instructor. Reading and discussion of ethical issues arising in the earth sciences. Topics include scientific misconduct, gender equity in science, authorship of scientific papers, establishing priorities in research, and related issues. Offered in alternate years. (S/U grading only.)

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Geophysics

[College of Letters and Science]

Geophysics is the study of the physical properties and processes within and surrounding the Earth. Many problems in the Earth Sciences require geophysical techniques for study. The interdisciplinary minor in geophysics is for students with backgrounds in the physical sciences, engineering and other fields who are interested in pursuing a graduate or professional career in geophysics, or those who desire a career in the energy or environmental industries. The minor is sponsored by the Department of Geology in 174 Physics/Geology Building.

Minor Program Requirements:

UNITS
Geophysics.................................................. 21-24
Engineering 5.............................................. 3
Geology 161, 162....................................... 6
Applied Science Engineering 115.................... 3
One course sequence chosen from the following: 9-12
(a) Atmospheric Science 120, 121A, 121B
(b) Geology 100, 100L, 101, 101L
(c) Mathematics 118A, 118B, 118C
(d) Physics 104A, 104B, 105C

Minor Adviser, J.S. McClain, Department of Geology in 392 Physics/Geology (530) 752-7093

German

[College of Letters and Science]

Chairperson of the Department
Department Office. (German and Russian),
622 Sproul Hall
(530) 752-4999; http://german.ucdavis.edu

Faculty
Carlene Arendt, Ph.D., Associate Professor
Clifford A. Bernd, Dr.Phil., Professor
Jaimey Fisher, Ph.D., Assistant Professor
Carole Finley, Ph.D., Professor
Distinguished Teaching Award-Graduate/Professional
Elisabeth Krimmer, Ph.D., Associate Professor
Winder McConnell, Ph.D., Professor
Gerhard Richter, Ph.D., Professor
Emeriti Faculty
John F. Felzer, Ph.D., Professor Emeritus
Ingiborg Hertel, Ph.D., Senior Lecturer Emerita
Academic Senate Distinguished Teaching Award
Karl R. Menges, Dr.Phil., Professor Emeritus
H. Guenther Nerjes, Ph.D., Associate Professor Emeritus
Fritz Sennemann-Frankenegg, Dr.Phil., Lecturer Emeritus

The Major Program
The German major explores in depth the literature and language, the culture and commerce of the German-speaking world. Whereas the General Program accommodates specifically those students whose interest lies in literary studies, German Area Studies as well as the Culture and Commerce emphasis are two options that combine advanced language study with courses featuring the contributions of the German-speaking world to fields such as music, art, philosophy, history, and economics.

The Program. Two of the three major emphases reflect the department’s primary emphasis on literary figures, movements and themes, and thus they share a common core of upper-division literature electives. The Culture and Commerce emphasis has as its goal functional language competence to enable students to live and work in a German-speaking environment. A key feature of this track is a work/study experience abroad. Regardless of emphasis, students will find maximum practice in spoken and written German as well as in listening comprehension in all upper-division courses offered in German.

Career Alternatives. Completion of the major prepares students for graduate study in German or for career opportunities in international fields ranging from employment in business and government to careers in the fine arts and sciences. Also, it permits admission to professional schools such as law and medicine.

A.B. Major Requirements:

Preparatory Subject Matter ....................... 0-27
German 1-2-3 (or the equivalent).............. 0-15
German 20, 21, 22.................................. 0-12

Depth Subject Matter ............................. 44

General Program
German 101A, 101B, 103.................................. 12
German 120 or 118E................................... 4

Four courses chosen from below among offerings taught in German..................... 16
Three additional upper division courses selected from either 104-109 or 121-128......... 12

Or courses in other disciplines that focus on German history, thought, and culture, upon approval of the major adviser. Electives include, but are not limited to:
Art History 176C, 177A, 177B
Comparative Literature 13B, 140-142, 147
Economics 110B, 116, 160A and 160B, 162
Film Studies 142, 176A, 176B
History 142A, and 142B, 144A and 144B
Music 110A, 110C, 110D, 110E
Philosophy 170, 172
Political Science 117, 118C, 137

Note: Many of the above electives from other disciplines have prerequisites.
The total of 44 upper-division units may include units earned in the Education Abroad Program.

Total Units for the Major ........................................ 44

Minor Program Requirements:

The Department offers a German minor consisting of at least 20 upper-division units of courses taught in German Students wishing to minor in German should consult the undergraduate adviser.

UNITS
German...................................................... 20

Major Adviser, E. Krimmer

Honors and Honors Program. The honors program consists of two quarters of research (194H) terminating in an honors thesis. For details consult the undergraduate major adviser. Graduation with high or highest honors requires participation in the honors program.

Graduate Study. The Department offers programs of study and research leading to the M.A. degree and to the Ph.D. degree in German Literature. Additional degree options for a designated emphasis are available through departmental affiliations with the programs in Social Theory and Comparative History, Critical Theory, Feminist Theory, and Second Language Acquisition. Detailed information may be
obtained by writing to the Department Chairperson or the Graduate Adviser.

Graduate Adm. J. Fisher

Prerequisite Credit. Credit normally will not be given in the lower division level for a course that is the prerequisite of a course already successfully completed.

Courses in German (GER)

Lower Division Courses

Course Placement: Students with two years of high school German normally continue in German 2; those with three years, German 3; those with four years, German 20.

1. Elementary German (5)

Discussion—5 hours; laboratory—1 hour. Introduction to German grammar and development of all language skills in a cultural context with special emphasis on communication. Students who have successfully completed German 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student—3 hours, no laboratory is required. All other students will receive a letter grade unless a P/NP petition is filed. Not open to students who have taken course 1A—II. I, II, III, (I), (II), (III) Arnett

1A. Accelerated Intensive Elementary German (5)

Lecture-discussion—15 hours. Special 12 week accelerated, intensive summer session course that combines the work of courses 1, 2, and 3. Introduction to German grammar and development of all language skills in a cultural context with emphasis on communication. Not open to students who have completed courses 1, 2, or 3. IV (IV) Arnett

2. Elementary German (5)

Discussion—5 hours; laboratory—1 hour. Prerequisite: course 1. Completion of course 1 in areas of grammar and basic language skills. Not open for credit to students who have taken course 1A—II. I, II, III, (I), (II), (III) Arnett

3. Elementary German (5)

Discussion—5 hours; laboratory—1 hour. Prerequisite: course 2. Completion of grammar sequence and continuing practice of all language skills through cultural texts. Not open to students who have taken course 1A—II. I, II, III, (I), (II), (III) Arnett

6. Conversational German (4)

Discussion—3 hours; term paper. Prerequisite: course 3. Course 6 may be taken concurrently with course 20. Discussion of intermediate language skills with special emphasis on communication and grammatical accuracy.—II. Chair

20. Intermediate German (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 5. May be taken concurrently with course 20. Review of grammatical principles by means of written exercises; expanding of vocabulary through readings of modern texts. Not open for credit to students who have completed course 4. (Former course 4.)—I, II, III, (I), (II)

21. Intermediate German (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 20. Review of grammatical principles by means of written exercises; expanding of vocabulary through readings of modern texts.—I, II, (I), (II)

22. Intermediate German (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 21. Review of grammatical principles by means of written exercises; expanding of vocabulary through readings of modern texts.—II, III, (II, III)

40. Great German Short Stories (in English) (4)

Lecture/discussion—3 hours; extensive writing. Major German short stories from Goethe at the end of the eighteenth century to Thomas Mann at the beginning of the twentieth century. Offered in alternate years. GE Credit: ArtHum, Div. Wrt. III, (II, III)

48. Myth and Saga in the Germanic Cultures (4)

Lecture—3 hours; term paper. Knowledge of German not required. Reading in English translation from the Norse Eddas, the Volsung and Sigurd-Siegfried cycles, and the Grodny lays, literary mythology in German Romanticism culminating in Wagner’s “total art-work” concept and The Ring of the Nibelung cycle. May not be counted toward major in GER. GE credit: ArtHum, Wrt.—I. (I)

49. Freshman Colloquium (2)

Seminar—2 hours; 90-min. course open only to students who have completed 40 or fewer quarters of transferable college-level work. Readings, discussion and written projects treating topics such as communist-capitalism in German literary culture; masculine “versus” feminine authorial consciousness; disintegration and reconstruction of language reflecting cultural transformation; exercising postcolonial narrated writing in self and individual national foundation—Germany’s new European “mission.”—II. (I)

92. Field Work in German (1-12)

Internship—3-36 hours. Prerequisite: lower division standing. Total immersion program in German or a German-speaking setting. Further develops students’ proficiency in the German language. (P/NP grading only.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Primarily for lower division students and continuing students who have completed intermediate language course using any of the following methods: preparation of term papers; study of major works; research and reading in German literature and culture. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)

(P/NP grading only.)

Upper Division Courses

101A. Survey of German Literature, 800-1800 (4)

Lecture/discussion—3 hours; prerequisite: course 22. German literature from the Middle Ages to Clasicism 800-1800. With an overview of major movements and authors. GE credit: ArtHum—II. (I) Bernd

101B. Survey of German Literature, 1800-Present (4)

Lecture/discussion—3 hours; prerequisite: course 22. German literature from the Age of Romanticism (1800) to the present with an overview of major movements and authors. GE credit: ArtHum—II. (II) Bernd

103. Writing Skills in German (4)

Lecture—3 hours; extensive writing. Prerequisite: course 22. Preparation of different kinds of writing, such as abstracts, correspondence, lectures, analysis of or response to short literary texts.

104. Translation (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 22. Exercises in German-to-English, English-to-German translation using texts from the areas of culture and commerce. Not open for credit to students who have completed course 104A. Offered in alternate years.

105. The Modern German Language (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 22. Introduction to the linguistic analysis of contemporary German, including its phonology, morphology, syntax, semantics, and as well as sociolinguistic considerations. GE credit: ArtHum, Wrt.—I. (I) Arnett

109A. Business German (4)

Lecture/discussion—3 hours; laboratory—1 hour. Prerequisite: consent of instructor. Specialistized language course focusing on business-oriented information and publications as the basis for discussions, role plays, reports, compositions and translations. Offered in alternate years.

109B. Advanced Business German (4)

Lecture/discussion—3 hours; laboratory/discussion—1 hour. Prerequisite: course 22 or consent of instructor. Specialized advanced language course providing in-depth study of major business topics with the help of authentic texts and videos. Offered in alternate years.—(II)

112. Topics in German Literature (4)

Lecture/discussion—3 hours; extensive writing. Prerequisite: upper division standing or consent of instructor. Investigation of significant themes and issues within their European context. Knowledge of German is not required. May be repeated once for credit. Offered in alternate years. GE credit: ArtHum, Wrt.—II.

113. Goethe’s Faust (4)

Discussion—3 hours; term paper. Knowledge of German not required. Intensive study of Goethe’s Faust in its entirety. Discussion in English; reading the text in the original is encouraged. (Same course as Humanities 113) Offered in alternate years. GE credit: ArtHum, Div. Wrt.—II, III. Bernd

114. From Malevich to Richter and Lita: Lolita Run: German Woman and Film (4)

Lecture/discussion—3 hours; extensive writing. Knowledge of German not required. Women in German film from the Weimar Republic to present, with special emphasis on their contribution to gender, historical and political context, aesthetic and filmic innovations. GE Credit: ArtHum, Wrt.—II. (III) Krimmer

115. German Literature Since 1945 (4)

Lecture—3 hours; extensive writing. Knowledge of German not required. Major writers of the post-war generation of Austria, Switzerland and Germany: novelists, such as Ball, Grass, Johnson, Walser, Handke, playwrights such as Frisch, Dürrenmatt and Hochhuth, and poets, such as Celan, Enzensberger, and Aichinger. May be repeated for credit in different topic area. GE credit: ArtHum, Wrt.—II. (I)

116. Readings in Jewish Writing and Thought in German Culture (4)

Lecture—3 hours; term paper. Prerequisite: Religious Studies 23 or consent of instructor. Historical tradition of Jewish thought in the German cultural context; unique contributions of Jewish writers to culture of the German-speaking world; what it means to be “other” in the mainstream culture. No credit will be given to those students who have completed Humanities 121. May be repeated two times for credit if topic differs. Offered in alternate years. (Same course as Jewish Studies 116.) GE credit: ArtHum, Div. Wrt.—II. (I)

118A. Vienna at the Turn of the Twentieth Century (The End of the Habsburg Empire) (4)

Lecture—1 hour; discussion—2 hours; extensive writing. Knowledge of German not required. Cultural ferment in Vienna, capital of the multi-national Habsburg empire, at the turn of the century, with consideration of innovations in literature, music, graphic arts, architecture, philosophy and psychology, heralding European modernism. Offered in alternate years. GE credit: ArtHum, Wrt.—I. Finney

118B. Weimar Culture: Defeat, the Roaring Twenties, the Rise of Nazism (4)

Lecture—1 hour; discussion—2 hours; extensive writing. Knowledge of German not required. Expressionism in graphic arts, literature, film, New Objectivity, Brecht and Bauhaus considered in the context of the failure of the German experiment in democracy, the Weimar Republic of 1919-33. Offered in alternate years. GE credit: ArtHum, Wrt.—II.

118C. Germany Under the Third Reich (4)

Lecture/discussion—3 hours; term paper. Prerequisite: background in modern European history; course 118B recommended. Knowledge of German required. Interdisciplinary study of German society and culture during the Third Reich (1933-45); readings in aesthetics, history, and philosophy; study of Fascist cultural ideology, film, architecture, and the graphic arts; focus on everyday life in Hitler’s Germany. GE credit: ArtHum, Wrt.—I. McConnachie

118E. Contemporary German Culture (4)

Lecture/discussion—3 hours. Prerequisite: course 22. The political, economic, social and cultural scene of Germany today. Offered in alternate years. GE credit: ArtHum, Wrt.—II.
119. From German Fiction to German Film (4)
Lecture—3 hours; discussion—1 hour; term paper. Examines a number of film adaptations of major German prose works and plays to ascertain the types of changes involved in the shift in medium and the positive and negative effects achieved by such transfers. GE credit: ArtHum, Wrt.—II. (III.) Bernd
120. Survey of German Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 22. Major developments in German art, philosophy, literature, social institutions, and political history. GE credit: ArtHum.—III. (III.) Bernd
121. The Medieval Period in German Literature (4)
Discussion—3 hours; extensive writing. Prerequisite: course 22. Lecture of philosophical profile of the Mittelhochdeutsche Blütezeit in terms of the significant epics, romances, and lyric poetry. Readings in German offered in alternate years. GE credit: ArtHum.—I. Bernd
122. Reformation and Baroque (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 22. Exemplary literary works of the 16th and 17th centuries tracing the principal lines of development and providing reflection in literature of the social, as well as religious, scenes. Offered in alternate years. GE credit: ArtHum.—I. Bernd
123. Literature of the Classical Age (4)
Discussion—3 hours; term paper. Prerequisite: course 22. Consideration of the principal works of Goethe and Schiller within the historical and philosophical context of their times. Offered in alternate years. GE credit: ArtHum.—I. Bernd
124. Major Movements in German Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 22. Significant movements and schools in German literary history (e.g., the medieval troubadours, the romantics, the Georgic Circle, the expressionists), with emphasis on the broader cultural dynamics and ideas as these apply to individual literary works. May be repeated once for credit when topic differs. Offered in alternate years. GE credit: ArtHum.—II. Finney
125. Short Fiction: 1880-1914 (4)
Lecture—3 hours; term paper. Prerequisite: course 22. Reading of short German fiction from the fin-de-siècle period and representative of various prose styles and cultural currents. Offered in alternate years. GE credit: ArtHum.—III. Finney
126. Modern German Literature (4)
Discussion—3 hours; extensive writing. Prerequisite: course 22. Lecture of significant works of major contemporary writers, such as Hesse, Mann, Kafka, Rilke, Brecht, Grass. May be repeated once for credit with consent of adviser. GE credit: ArtHum.—I. McConnell
127. Major Writers in German (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 22. Examination of representative works by a major writer, set in the broader cultural context of the relevant period or movement. May be repeated once for credit when topic differs. Offered in alternate years. GE credit: ArtHum.—II. Finney
128. Postwar Women Writers (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 22. Lecture of major women writers in both German, Austrian, and Switzerland since 1945. Topics include the concept of a feminist aesthetics, East vs. West German women writers, and the status of minority women writers in Germany (Jewish, Turkish-German, Afro-German). GE credit: ArtHum.—Div.—I. Finney
131. German Lyric Poetry (4)
Lecture—3 hours; term paper. Prerequisite: course 22. Study of the genre of lyric poetry from the late Middle Ages to the Baroque, Classicist, Romantic, and Modern periods in correlation with other literary forms and the social climate of each period. Offered in alternate years. GE credit: ArtHum.—I. Bernd
132. The German Novelle (4)
Lecture—3 hours; term paper. Prerequisite: course 22. Lecture of the novelle through analysis of the materials and formal devices of representative authors from Goethe to Kafka. Offered in alternate years. GE credit: ArtHum.—I. Bernd
133. The German Drama (4)
Lecture—3 hours; term paper. Prerequisite: course 22. Readings in the works of Germany’s leading dramatists from the eighteenth century to the present day, such as Lessing, Goethe, Schiller, Kleist, Buchner, Hauptmann, Brecht. Offered in alternate years. GE credit: ArtHum.—III. (III.) Bernd
134. Topics in German Intellectual History (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 22. Topics in German intellectual history with materials from a number of periods, genres, and disciplines. May be repeated twice for credit when topic differs. GE credit: ArtHum.—II. I. (I.) I. III. (II.)
141. The Holocaust and its Literary Representation (4)
Lecture—2 hours; discussion—1 hour. Prerequisite: Knowledge of German not required. Aesthetic representation and meaning formation of the holocaust in its historical and/or psychological perspectives. Offered in alternate years. GE credit: ArtHum, Wrt.—II. (I.)
142. New German Cinema (4)
Lecture/discussion—3 hours; extensive writing. German filmmakers of the 1960s-1980s such as Fassbinder, Herzog, Syberberg, Bruckner, Schlöndorff, Kluge, Wenders. Knowledge of German not required. May be repeated with consent of instructor. (Same course as Film Studies 142) GE credit: ArtHum, Wrt.—II. (I.) Fisher
143. Language Through Media (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 22. Study of contemporary German-language news media (press, video, film, CD-ROM, Internet) for insight into political and cultural developments in the German-speaking countries. Offered in alternate years. GE credit: ArtHum.—II. III. (II.) Arnott
160. Love in the Middle Ages (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 22. Analysis of the phenomenon of love in selected medieval lyrical poems and romances of the thirteenth and fourteenth centuries. Origins of courtly love, love and individualism, love and the Church, love and adultery. Not offered every year. GE credit: ArtHum.—I. III. McConnell
168. Multiculturalism in German Literature (4)
Lecture/discussion—3 hours; term paper or discussion—1 hour. Prerequisite: course 22. Examples of German Literature from the High Middle Ages to the present that explore the "encounter with the other" (people of color, different beliefs and cultures, and inner-German minorities). Offered in alternate years. GE credit: ArtHum, Div.—II. Arnott
176A. Classic Weimar Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: Humanities 1. German Weimar (1919-1933) cinema. Fritz Lang, F.W. Murnau, and G.W. Pabst among others. Influence on world-wide (esp. Hollywood) film genres such as film noir, horror, science fiction, and melodrama. Not open for credit to students who have completed Humanities 176. Offered in alternate years. (Same Course as Film Studies 176A) GE credit: ArtHum, Wrt.—II. Fisher
185. The Age of Bismarck (4)
Discussion—3 hours; term paper. Prerequisite: course 22. Notable literary repercussions of the zenith of Germany’s international status at the time of Bismarck’s Chancellorship. The poetry of Storm, the prose of Fontane, the drama of Hauptmann. Offered in alternate years. GE credit: ArtHum.—II. Bernd
192. Field Work in German (1-12)
Internship—3-16 hours. Prerequisite: course 109A or consent of instructor. Total immersion program in Germany or a German speaking setting in the U.S. to further develop students proficiency in the German language. May be repeated twice or up to 12 units of credit with consent of instructor. (P/NP grading only.)
194HA-194HB. Honors Program (3-3)
Independent study—2 hours; term paper. Prerequisite: open only to majors with a 3.50 minimum GPA in at least 135 units in German. [A] Research of an integrative nature (in either "General" or "Area Studies Emphasis" fields of major), guided by thesis advisor chosen by student; [B] Writing of Honors Thesis on topic selected by student in consultation with thesis advisor. (P/NP grading only. Deferred grading only, pending completion of course sequence.)
197T. Tutoring in German (1-4)
Tutoring—3-12 hours. Prerequisite: consent of German Program Director. Tutoring in undergraduate courses including leadership in small voluntary discussion groups affiliated with department courses. May be repeated up to eight units of credit. (P/NP grading only)
198. Directed Group Study (1-5)
(P/NP grading only)
199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)

Graduate Courses
202. Middle High German (4)
Discussion—3 hours; term paper. Prerequisite: course 22. Reading of short German fiction from the fin-de-siècle period or movement. May be repeated with consent of instructor. Knowledge of German not required. (P/NP grading only.)
Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing. Analysis of grammar and application of cognitive grammar to language instruction. Syntactical problems and analyses relevant to the language the student will teach. Not offered every year.—III. Arnott
210. Techniques of Literary Scholarship (4)
Seminar—3 hours; term paper. The bibliographical, organizational, and methodological tools and resources of advanced, independent research. —I. (I.)
211. Concepts in Literary Theory (4)
Seminar—3 hours; written reports. Advanced course in concepts of literary theory and criticism. Discussion of the emergence of theoretical concepts and their impact on the understanding and appreciation of literary works. Discussion in German and English, readings in German.—II. (II.)
212. Contemporary Approaches to Literary Theory (4)
Seminar—3 hours; term paper. Study of contemporary theoretical approaches such as structuralism, deconstruction, feminism, Marxism/Frankfurt School, and reception theory in conjunction with the works of major authors.—II. (III.) Finney
239. Narrative and Narrative Theory (4)
Seminar—3 hours; term paper. Studies, in a theoretical and literary historical context, major elements of 19th- and 20th-century narrative, such as techniques of framing, refraction, and montage; narrative perspective; mimesis; and self-consciousness. Focuses on paradigmatic prose texts alongside a spectrum of critical approaches. Offered in alternate years.—I. Finney
240. Forms of German Verse (4)
Seminar—3 hours; term paper. The development of German verse from the Middle Ages to the present, with special emphasis on different techniques of text analysis and interpretation. May be repeated for credit with consent of instructor. Offered in alternate years.—II. Bernd
241. The German Drama (4) Seminar—3 hours, term paper. The major forms of German dramatic myths from its origins to the middle of the twentieth century. May be repeated for credit with consent of instructor.—I. (I.) Finney

242. The German Novel (4) Seminar—3 hours, term paper. The major German Novelists, with particular emphasis on the flowering of this genre in the nineteenth century. May be repeated for credit with consent of instructor.—II. (II.) Bernd

243. Fontane and the Rise of the Modern German Novel (4) Seminar—3 hours, term paper. Fontane, the father of the modern German novel and the chief German representative of the European novel at its greatest, in the context of the nineteenth-century European political and social scene.—I. (I.) Bernd

244. Gender and Comedy (4) Seminar—3 hours, term paper. Studies of genre and gender in German-language comedy by male and female writers from the 18th century to the present. Authors treated include Lessing, Kleist, Büchner, Eber-Eschenbach, Hauptmann, Hofmannsthal, Frisch, Langner, and Jelinek. Offered in alternate years—III. Finney

252. The Writings of Lessing (4) Seminar—3 hours, term paper. Study of Lessing's theory of literature with particular emphasis upon his critical attacks on French drama.—I. (I.) Bernd

253. Goethe (4) Seminar—3 hours, term paper. Study of the origins of Goethe's thought in German Pietism, and his principal artistic, autobiographical, scientific, and philosophical works.—I. (I.) Bernd

254. Schiller (4) Seminar—3 hours, term paper. A critical analysis of Schiller's major works and his impact on the intellectual climate in Germany during the late eighteenth and early nineteenth centuries.—III. (III.) Bernd

255. Aesthetics in the Age of Goethe (4) Seminar—3 hours, term paper. The parabolic and didactic style in Germany's literature during the sixteenth century. May be repeated for credit with consent of instructor.—I. (I.) Finney

256. German Literature of the Baroque (4) Seminar—3 hours, term paper. The "Elegantiadizel" and the varying methods used to portray it in seventeenth-century German literature. May be repeated for credit with consent of instructor.—I. (I.) Bernd

257. Heinrich von Kleist (4) Seminar—3 hours, term paper. Kleist's important dramatic works; special attention will be given to the peculiar hermeneutics problems in modern German, French, and Anglo-American Kleist criticism.—III. (III.) Bernd

258. The Novels of Thomas Mann (4) Seminar—3 hours, term paper. Reading of selected novels with emphasis on aesthetic techniques, originality, ethical and political views, and influence on the contemporary literary scene in Germany.—II. (II.) Bernd

259. Studies in Kafka (4) Seminar—3 hours, term paper. Study of Kafka's narrative techniques with special emphasis in the shorter works on the existential development from its roots in Expressionism.—II. (II.) Finney

260. The Poetry of Rilke (4) Seminar—3 hours, term paper. Study of the principal motifs, myths and images, and problems in the poetry of Rainer Maria Rilke.—I. (I.) Finney

261. Brecht and the Epic Theater (4) Seminar—3 hours, term paper. A reading of Brecht's works with emphasis on the ideas which impelled the development of new literary forms and concepts.—III. (III.) Finney

262. Studies in Turn-of-the-Century Culture (4) Seminar—3 hours, term paper. Investigates literary currents in turn-of-the-century Germany and Austria against the background of contemporaneous developments in psychology, the visual arts, philosophy, and music. Authors treated include Hauptmann, Holz and Schlaf, Schnitzler, T. Mann, Wedekind, Musil, Hofmannsthal. Offered in alternate years.—II. (II.) Finney

285. Middle High German Literature (4) Lecture/discussion—3 hours, term paper. Prerequisite: consent of instructor. Extensive reading of Middle High German texts in the original language. Examines linguistic and literary problems. May be repeated for credit when topic differs.—III. (III.) McConnell

288. The Renaissance and Reformation in German Literature (4) Seminar—3 hours, term paper. The parabolic and didactic style in Germany's literature during the sixteenth century. May be repeated for credit with consent of instructor.—I. (I.) Finney

289. German Literature of the Baroque (4) Seminar—3 hours, term paper. The "Elegantiadizel" and the varying methods used to portray it in seventeenth-century German literature. May be repeated for credit with consent of instructor.—I. (I.) Bernd

290. The Enlightenment in German Literature (4) Seminar—3 hours, term paper. Revolt against the concept of the "Elegantiadizel," and evolution of a new literature based on reason and will. May be repeated for credit with consent of instructor.—I. (I.) Bernd

291. Foreign Language Learning in the Classroom (4) Seminar—3 hours, project. Overview of approaches to university-level foreign language instruction and the theoretical notions underlying current trends in classroom practices across commonly taught foreign languages. (Same course as French 291 and Spanish 291.)—I., II., III. Anderson, Arnett, Blake, Iwakoshi

292. Sentimentality and Sturm und Drang in German Literature (4) Seminar—3 hours, written reports. Reaction to emphasis on Reason: theories of Homan and Herder and works of poets such as Lez, Leisenritz, the early Goethe and Schiller. May be repeated for credit with consent of instructor.—III. (III.) Bernd

293. The Classical Age of German Literature (4) Seminar—3 hours, term paper. Inquiry into the aesthetic and humanistic qualities of Germany's greatest literary epoch. May be repeated for credit with consent of instructor.—II. (II.) Bernd

294. The Romantic Period in German Literature (4) Seminar—3 hours, term paper. Survey of the works of early nineteenth-century authors in reaction against the age of classicism. May be repeated for credit with consent of instructor.—I. (I.) Bernd

295. Poetic Realism in German Literature (4) Seminar—3 hours, term paper. Outstanding figures in German literature between 1840 and 1890. Important phases in their developments will be treated. May be repeated for credit with consent of instructor.—I. (I.) Bernd

296. Twentieth-Century German Literature (4) Seminar—3 hours, term paper. Considers the revolt of the Hauptmann generation, Symbolism, Expressionism, and the chief currents of the contemporary scene. May be repeated for credit with consent of instructor.—I. (I.) Finney

297. Special Topics in German Literature (4) Seminar—3 hours, term paper. Various special topics in German literature, which may cut across the more usual period and genre rubrics. May be repeated for credit with consent of instructor.

298. Group Study (1-5)

299. Individual Study (1-12) (S/U grading only)

299D. Professional Course (1-4)

Professional Course

300. Tutorial and Instructional Internship (1-3)

Discussion—1-3 hours. Prerequisite: graduate standing. Apprentice training in ongoing undergraduate literature courses taught by regular staff, with supplementary weekly critical sessions; internship. May be repeated for credit.—I., II., III, IV. (I, II, III) Arnett

Professional Course

400. Global and International Studies

Discussion—1-3 hours. Encompasses a wide range of courses and topics. May be repeated for credit. (S/U grading only)—I., II., III, IV. (I., II., III.) Arnett

Global and International Studies

(Completion of a minor in Global and International Studies will enable students not only to learn about global and international issues at UC Davis, but also to gain first-hand academic experience abroad. The minor is also designed to give recognition for upper division course work while studying abroad. However, the minor can also be completed with approved course work taken at UC Davis. Students will be expected to work closely with an academic adviser in developing an intellectually coherent program of study. Each proposal must be approved by the Faculty Director of the Education Abroad Center.

The minor is sponsored by the Humanities Program. For information, visit the Education Abroad Center Website at http://eac.ucdavis.edu.

Minor Program Requirements:

UNITS

Global and International Studies........... 24

Arts and Humanities Emphasis:

One course from Anthropology 4, 20,
International Relations 1, Political Science 3 or Sociology 5 ................. 4

One upper division course within each of the following areas: Global or international studies in the Arts and Humanities ......................... 3-4

Course cluster requirement .............. 16-17

The minor requires the selection of interrelated courses totaling a minimum of 16-17 upper division units in area and regional studies or thematic course clusters in global and international studies in the Arts and Humanities.

Suggested course clusters include:

(1) Country or region-specific courses:
Western Europe; Russia and East/Central Europe; Asia and the Pacific; Latin and South America; Africa and the Middle East;
Greek

See Classics, on page 182.

Health Informatics (A Graduate Group)

Formerly Medical Informatics (A Graduate Group)

Peter Yellowlees, M.B.B.S., M.D., Chairperson of the Group

Group Office.
UC Davis Health System
Health Informatics Program
2450 48th St., Suite 2700, Sacramento, CA 95817
[916] 734-8710; ucdinformatics@ucdavis.edu

Faculty
Aaron Bair, M.D., Associate Professor
(Emergency Medicine)
Matt Bishop, Ph.D., Professor (Computer Science)
Jo Anne Bookman, MS Librarian
[Health Sciences Library]
Robert Cardiff, M.D., Ph.D., Professor
(Pathology and Laboratory Medicine)
James Case, M.S., D.V.M., Ph.D., Professor
(California Animal Health & Food Safety Laboratory System)
Anthony Cheung, Ph.D. Professor Emeritus and Vice Chair
(Pathology and Laboratory Medicine)
Marc Christ, D.V.M., Ph.D., Professor
(Pathology, Microbiology, and Immunology)
Kristina Davis, Ph.D., Assistant Professor
(Mechanical and Aeronautical Engineering)
Tom Engil, M.D., Associate Professor
(Anesthesiology and Pain Medicine)
Jose Galvez, M.D., Associate Clinical Professor
(Pathology and Laboratory Medicine)
Regina Gaudron-Edwards, M.D., Professor
(Pathology and Laboratory Medicine)
Estella Geraghty, M.D., M.S., M.P.H., Assistant Professor
(Clinical Internal Medicine
(General Medicine)
Michael Gertz, Ph.D., Associate Professor
(Computer Science)
Glenna Gobor, D.V.M., M.P.V.M., M.S., Assistant Adjunct Professor
(Health Informatics)
Fred Gorin, M.D., Ph.D., Professor (Neurology)
Bernd Hamman, Ph.D., Professor
(Computer Science)
Donald Hilty, M.D., Associate Professor (Psychiatry)
Michael Hogarth, M.D., Associate Professor
(Pathology and Laboratory Medicine)
Christine Hota, D.V.M., M.S., Assistant Adjunct Professor
(Health Informatics)
Janet Ilkii, B.V.Sc., Ph.D., Professor
(Surgical and Radiological Sciences)
Anthony Jerant, M.D., Associate Professor
(Family and Community Medicine)
Patrice Koehl, Ph.D., Associate Professor
(Computer Science)
Bertram Laderach, Ph.D., Associate Professor
(Computer Science)
Kwan-Liu Ma, Ph.D., Professor (Computer Science)
Wasyl Malych, Ph.D., Director
(Bioinformatics Core-NIH NHGRI Center of Excellence in Nutritional Genomics)
James Markin, M.D., M.P.H., Associate Professor
(Pediatrics)
Michael Miner, Chief Information Officer
(UCDHS)
Thomas Nesbitt, M.D., M.P.H., Professor
(Family and Community Medicine)
Alberto Odor, M.V., Assistant Professor
(Anesthesiology and Pain Medicine)
Oliver Staadt, Ph.D., Assistant Professor
(Computer Science)
Peter Yellowlees, M.B.B.S., M.D., Professor
(Psychiatry)

Emeriti Faculty
Richard Walters, Ph.D., Professor Emeritus
(Computer Science)

Affiliated Faculty
Cecil Lynch, M.D., M.S., Volunteer Clinical Faculty
(Health Informatics)

Graduate Study.
The Group currently offers an M.S. degree in Health Informatics. The program is aimed at health care professionals who hold advanced degrees, including, but not limited to, M.D., D.O., D.V.M., V.M.D., M.P.H., and R.N. with Bachelor’s degree. The course of study provides research-oriented training that spans the use of computer systems in medicine today, including methods for clinical data acquisition, storage, and retrieval, the development, use, and implementation of the electronic medical record, management of clinical data, and the use of medical decision support systems. A research project and thesis are mandatory degree requirements.

Preparation.
The Group encourages applications from health professionals who have had experience in the manipulation of clinical information. Basic qualifications include an advanced degree in a health-related field or the equivalent in work experience. Proof of proficiency in a programming language is required. Applicants with extensive computer science or information technology background but little knowledge of clinical informatics would need to gain considerable practical experience in dealing with clinical information to be competitive in applying to the program.

Honors Program.
Candidates for the honors program enroll for two consecutive quarters in EAS 196A and 196B to work with a faculty member on a project or a research paper of a recommended length of 25-50 pages. The project will carry a minimum of 6 units and entrance into the honors program requires completion of at least 12 units with a minimum GPA of 3.500 in courses counted toward the major. The program recommends that interested students consult with faculty in their field of interest in their junior year and proceed to work on their project during the first two quarters of their senior year. All exceptions must be authorized by the EAS Program Chair or Academic Advisor.

Graduate Advisors.
M. Hogarth (Pathology and Laboratory Medicine), C. Hota (Health Informatics), P. Yellowlees (Psychiatry)

Courses in Health Informatics (MHI, formerly MDI)

Graduate Courses

202. Computer-Based Patient Records (4)
Lecture/discussion—3 hours; discussion—1 hour. Prerequisite: current enrollment within the Health Informatics graduate program or consent of instructor. Introduction and overview of computer-based clinical record systems. Topics include data modeling, health system standards and terminologies; security, privacy and confidentiality; workflow modeling; data visualization; legal; decision support; public health; and evidence-based practice. — III. (III) Turner, Hogarth

207. Decision Support System (4)
Lecture/discussion—2 hours; laboratory—2 hours, independent study—2 hours. Prerequisite: consent of instructor. Decision support system for medical application. Knowledge and computer representation, review of existing decision support system. — II. (II) Holt, Christopher

208. Electronic Medical Data (4)
Lecture/discussion—2 hours; laboratory—4 hours. Prerequisite: consent of instructor. Electronic resources for medical practice, review of existing resources and development of materials. — III. (III) Gobor, Lynch
20. Data Acquisition in Medicine and Veterinary Medicine (4)
Lecture/discussion—2 hours; laboratory/discussion—6 hours. Prerequisite: basic proficiency in computer operation. Overview of the nature of medical/veterinary data, methods for capturing and storing data in electronic formats. Data validation, retrieval considerations.—I. (I) Maloy

210. Introduction to Medical Informatics (4)
Lecture—3 hours; discussion—1 hour. Overview course to give the student a broad exposure to the field of Health Informatics. Topics covered include, but are not limited to, networking, information systems, coding, HIV/Security, and HIPPA.—I. (I) Galvez, Hotz

211. Telemedicine (4)
Web virtual lecture—3 hours; web electronic discussion—1 hour. Issues for the development and maintenance of a successful telemedicine program with focus on strategic planning, clinical applications, project management, risk management and legal issues; reimbursement and contracting. human resources and program sustainability.—I, II, III. (I, II, III) Yellowles, Hilfy

215. Beginning and Intermediate Programming in M (MUMPS) (2)

289A-1. Special Topics in Medical Informatics (1-2)
Seminar—1 hour. Discussion of current graduate research and topics in Medical Informatics. Oral presentations of individual study. Limited enrollment. (S/U grading only)—I, II, III. (I, II, III)

290. Seminar in Medical Informatics (1)
Seminar—1 hour. Discussion of current graduate research and topics in Medical Informatics. Oral presentations of individual study. Limited enrollment. (S/U grading only)—I, II, III. (I, II, III)

299. Research in Medical Informatics (1-12)
Independent research in Medical Informatics. (S/U grading only)—I, II, III. (I, II, III)

Edward Dickinson, Ph.D., Associate Professor Omnia El Shafyky, Ph.D., Associate Professor William W. Hageman, Ph.D., Professor A. Katie Harris, Ph.D., Associate Professor Ellen Hartigan-O'Conner, Ph.D., Assistant Professor Thomas H. Hickle, Ph.D., Associate Professor Ari Kelmans, Ph.D., Associate Professor Kyu H. Kim, Ph.D., Associate Professor Catherine J. Kudlick, Ph.D., Professor Norma B. Landau, Ph.D., Professor Victoria Langland, Ph.D., Assistant Professor Benjamin Lawrance, Ph.D., Assistant Professor Susan L. Mann, Ph.D., Professor Ted W. Margulies, Ph.D., Professor Lisa Materson, Ph.D., Assistant Professor Sally McKee, Ph.D., Associate Professor Kathryn S. Olimsted, Ph.D., Professor Academic Senates Distinguished Teaching Award Lorena Oropeza, Ph.D., Associate Professor Don C. Price, Ph.D., Professor Eric Rauchway, Ph.D., Professor Andres Resendes, Ph.D., Assistant Professor Michael Saler, Ph.D., Professor Academic Senate Distinguished Teaching Award Sudipta Sen, Ph.D., Professor John Smolik, Ph.D., Assistant Professor Stylianos Spyrakdis, Ph.D., Professor Academic Senate Distinguished Teaching Award Daniel Stolzenberg, Ph.D., Assistant Professor Kathleen Suter, Ph.D., Assistant Professor Alan S. Taylor, Ph.D., Professor UC Davis Prize for Teaching and Scholarship Achievement Kalebi Tezcan, Ph.D., Assistant Professor Cecilia Tso, Ph.D., Assistant Professor Charles Walker, Ph.D., Professor Clarence E. Walker, Ph.D., Professor Louis S. Warren, Ph.D., Professor Emeriti Faculty Arnold J. Bauer, Ph.D., Professor Emeritus William M. Bock, Ph.D., Professor Emeritus David Brody, Ph.D., Professor Emeritus Joan Cadden, Ph.D., Professor Emerita Daniel H. Callhoun, Ph.D., Professor Emeritus Robert O. Couvillon, Ph.D., Professor Emeritus Manfred P. Fleischer, Ph.D., Professor Emeritus David J. Jacobson, Ph.D., Professor Emeritus Barbara Metcalf, Ph.D., Professor Emerita Rannie E. Pappino, Ph.D., Professor Emeritus Ruth E. Rosen, Ph.D., Professor Emerita, Academic Senate Distinguished Teaching Award Morton Rothstein, Ph.D., Professor Emeritus Richard N. Schwartz, Ph.D., Professor Emeritus Wilson Smith, Ph.D., Professor Emeritus F. Roy Willis, Ph.D., Professor Emeritus UC Davis Prize for Teaching and Scholarship Achievement The Major Program The History major develops critical intelligence and fosters an understanding of ourselves and our world through the study of the past—both remote and recent. The Program. A student electing a major in History may complete Plan I or Plan II. Plan I enables students to receive a broad education in histories of several geographic areas. Plan II encourages interested students, including those preparing for graduate work in history, to enroll in a seminar, to undertake independent work, and to study the history of historical thought as part of the major. Students preferring more active engagement in research and writing are encouraged to follow Plan II. Career Alternatives. A degree in history is excellent preparation for a successful career such as teaching, law, journalism, public administration, or business management. Professional schools in these and related fields are looking for students who can weigh conflicting evidence, evaluate alternative courses of action or divergent points of view, and express conclusions logically in everyday language. These analytical skills are stressed in history classes, and their mastery gives the history student a solid preparation for subsequent training in a specialized career.

A.B. Major Requirements:

Preparatory Subject Matter

Plan I or II .............................................. 20

Five lower division courses chosen from the following six fields, including at least two from one field, one from a second field, and one from a third field. The fifth course can be taken from any field.

(a) African and Middle East History: History 6, 15
(b) Asian History: History 6, 8, 9A, 9B
(c) European History: History 3, 4A, 4B, 4C
(d) Latin American History: History 7A, 7B, 7C
(e) U.S. History: History 17A, 17B, 72A, 72B
(f) World History: History 10A, 10B, 10C

Depth Subject Matter—Plan I .......................... 40-41

Four upper division courses from one of the fields of concentration listed below........... 16

Three upper division courses from one of the other fields of concentration listed below.................................................. 12

Two upper division courses from a field or fields other than those listed above and satisfy two preceding requirements............................................... 8

One course from the following: History 101 or 102 or 103 (in field of concentration).............. 4

Total Units for the Major, Plan I ................. 60-61

Depth Subject Matter—Plan II .................. 42

Four upper division courses from one of the fields of concentration listed below. Include a two-quarter sequence of courses ........... 16

Three upper division courses from one of the other fields listed................................. 12

History 101 .................................................. 5

History 102 in field of concentration (in exceptional circumstances, a student may, with the permission of an adviser, take the seminar in another field)................................. 5

History 103 in field of concentration .............. 4

Total Units for the Major, Plan II .............. 62

Fields of Concentration


(g) Within broad fields, a student may wish to concentrate some of the courses on a particular area or period such as China or Great Britain or Medieval Europe. Special approval is not required.

Quarter Offered: I—Fall, II—Winter, III—Spring, IV—Summer; 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum—Art and Humanities; ScienEng—Science and Engineering; SocSci—Social Sciences; DivW—Social-Cultural Diversity; Wrt—Writing Experience

See Religious Studies, on page 465.

See Middle East/South Asia Studies, on page 402.

History

(College of Letters and Science)

Susan L. Mann, Ph.D., Chairperson of the Department

Department Office. 2216 Social Sciences and Humanities Building

(530) 752-0776; http://history.ucdavis.edu

Faculty

David Biale, Ph.D., Professor Robert Borgens, Ph.D., Professor Beverly Bossler, Ph.D., Professor Cynthia L. Bramley, Ph.D., Professor

Hebrew

See Religious Studies, on page 465.

Hindi

See Middle East/South Asia Studies, on page 402.
Honors Minor Advisers. Courses from the History and Philosophy of Science program may count toward the History major. History and Philosophy of Science 130A fulfills upper division requirements, and one course is in another field. History and Philosophy of Science 130B, 150, and 180 fulfill upper division requirements in either the U.S. or Modern European field.

Students can create a field in the History of Science upon consultation with a faculty adviser. They may draw upon the relevant History courses (History 85, 135A, 135B, 139A, 139B, 185A, and 185B) as well as History and Philosophy of Science offerings to do so.

Consult the History and Philosophy of Science program for a more detailed description of course offerings this area and the minor in History and Philosophy of Science.

Minor Program Requirements:

The minor in History consists of five upper division courses chosen so that at least three courses are in one field and one course is in another field. The two fields shall be chosen from among those defined in the catalog for the major. However, students may also, in consultation with and with the authorization of a faculty adviser, define other thematic fields.

Minors

At least 20 units of upper division history courses are required. Exemption from upper division courses with thematic emphasis: Pre-Law (British and American Political and Constitutional Development), The Twentieth Century; The History of Ideas in Society.

Minor Advisers. Same as major advisers.

Honors and Honors Program. A student becomes eligible for participation in honors by meeting the minimum GPA (usually 3.500) and course requirements established by the College of Letters and Science. To qualify for high or honors honors, undergraduate must complete the History Department honors program with a GPA of 3.500 or above and write a thesis that meets the criteria for high honors. Students apply to participate in the honors program during the Latter part of their junior year. Admission to the program is based on GPA, a thesis proposal example of previous writing, and the recommendation of a faculty member to sponsor the student's project, interviews, and faculty recommendations. Students admitted to the program must complete the History 104A, 104B, 104C sequence of courses which requires the completion of a senior honors thesis. Students who anticipate seeking admission to the honors program are urged to complete at least one History 102 (undergraduate seminar) before the end of their junior year. Interested students are urged to consult with faculty in their field early in their junior year. Students may follow either Plan I or Plan II described above, and may substitute History 104B and 104C for any courses in their program other than History 102.

Students who anticipate pursuing graduate work in history or a teaching credential, and who do not wish to opt for the research emphasis embodied in the honors program, are encouraged to select Plan II of the major.

Study Abroad and the History Major. The department strongly encourages interested students to pursue their studies abroad. While there are no specific requirements or prerequisites, students are urged to take at least one history course that touches upon the geographic area where they plan to study abroad before departing. To receive a history degree from UC Davis, students must complete at least 18 upper division units in the history major at UC Davis (which can also include History 101, 102, 103). The remaining major requirements can be fulfilled abroad provided that (a) the course should be evaluated as at least four UC Davis units, (b) the course should be considered upper division by the standards set forth by the Education Abroad Program, or (c) the student provides copies of the course work, syllabus, and writing assignments to the department's liaison person with the EAP office and approval is granted.

Note: Students who wish to receive credit for courses taken abroad under programs other than EAP may petition the Undergraduate Program Committee to do so.

Teaching Credential Subject Representative. See the Teaching Credential/M.A. Program on page 109.

Waiver Program for Single-Subject Teaching Credential in History. The Department of History is currently working with the School of Education to develop a program of study to satisfy the California Teaching Commission's Subject Matter Competency requirement for the single subject credential in history/social science. For more information, contact Pamela Tindall at the Area 3 History and Cultures Project in 175 Kerr Hall.

Graduate Study. The Department of History offers programs of study and research leading to the M.A. and Ph.D. degrees in history. Detailed information may be obtained by writing to the Graduate Adviser, Department of History.

Graduate Advisers. See the department's Web site for updated information.

American History and Institutions. This University requirement can be satisfied by passing one of the following courses: History 17A, 17B, 172A, 172B, 170A, 170B, 170C, 171A, 171B, 172, 173, 174A, 174B, 174C, 174D, 175, 176A, 176B, 177A, 177B, 178A, 178B, 180A, 180B, 181, 183A, 183B, 184, 189. The upper division courses may be used only with the consent of the instructor; see also Undergraduate requirements.

Courses in History (HIS)

Lower Division Courses

3. Cities: A Survey of Western Civilization


4A. History of Western Civilization

Lecture—3 hours; discussion—1 hour. The growth of western civilization from late antiquity to the Renaissance. GE credit: ArtHum, Wrt.—II. (II.)

4B. History of Western Civilization

Lecture—3 hours; discussion—1 hour. Development of western civilization from the Renaissance to the Eighteenth Century. GE credit: ArtHum, Wrt.—II, Ill. (II, Ill.)

4C. History of Western Civilization

Lecture—3 hours; discussion—1 hour. Development of Western Civilization from the Eighteenth Century to the present. GE credit: ArtHum, Wrt.—II, Ill. (II, Ill.)

6. Introduction to the Middle East

Lecture—3 hours; discussion—1 hour. Survey of the major social, economic, political and cultural transformations in the Middle East from the rise of Islam (c. 600 A.D.) to the present. GE credit: ArtHum or SocSci, Div, Wrt.—I. El Shakry, Seccia.

7A. History of Latin America to 1700

Lecture—3 hours; discussion—1 hour. Introduction to the history of Spanish and Portuguese America from the late pre-Columbian period through the initial phase and consolidation of a colonial regime (circa 1700). Topics include colonialism, racial mixture, gender, and labor systems. GE credit: ArtHum or SocSci, Div, Wrt.—II. (II.)

7B. History of Latin America, 1700-1900

Lecture—3 hours; discussion—1 hour. Latin America from colony to republic. The nature of Iberian colonialism, the causes for independence, the creation of nation states, the difficulties in consolidating these nations, and the rise of Liberalism and export economies in the nineteenth century. GE credit: ArtHum or SocSci, Div, Wrt.—II. (II.)

7C. History of Latin America, 1900-present

Lecture—3 hours; discussion—1 hour. Latin America since the beginning of the 20th century. Themes include export economies, oligarchic rule, crises of depression and war, corporatism, populist revolution and reform movements, cultural and ethnic issues, U.S.-Latin American relations, neo-liberal restructuring. GE credit: ArtHum or SocSci, Div, Wrt.—III. (III.)

8. History of Indian Civilization

Lecture—3 hours; discussion—1 hour; written reports. Survey of Indian civilization from the rise of cities (ca. 2000 B.C.) to the present, emphasizing themes in religion, social and political organization, and art and literature that reflect cultural interaction and change. GE credit: ArtHum, Div, Wrt.—II, Ill. (II, III.)

9A. History of East Asia Civilization

Lecture—3 hours; discussion—1 hour. Surveys traditional Chinese civilization and its modern transformation. Emphasis is on thought and religion, political and social life, art and literature. Perspectives on contemporary China are provided. GE credit: ArtHum, Div, Wrt.—II, Ill. (II, Ill.)

9B. History of East Asia Civilization

Lecture—3 hours; discussion—1 hour. Surveys traditional Japanese civilization and its modern transformation. Emphasis is on thought and religion, political and social life, art and literature. Perspectives on contemporary Japan are provided. GE credit: ArtHum, Div, Wrt.—II, Ill. (II, Ill.)

10A. World History to 1350

Lecture—3 hours; discussion—1 hour. Historical examination of the changing relationship of human societies to one another and to their natural settings through the year 1350, with particular attention to long-term trends and to periodic crises that reshaped the links of culture and nature on a global scale. GE credit: ArtHum or SocSci, Div, Wrt.—II, I. Lawrence.

10B. World History, c. 1350-1850

Lecture—3 hours; discussion—1 hour. Major topics in world history from the 14th century to the beginning of the 19th century. Topics will vary but may include oceans as systems of human communication and conflict, the global consequences of "industrial revolutions" in Europe and Asia, etc. GE credit: ArtHum, Wrt.—II.

10C. World History III

Lecture—3 hours; discussion—1 hour. Major topics from world history of the 19th and 20th centuries, emphasizing the rise and fall of Western colonial empires; Cold War and the superpowers; the spread of the nation-states; and process of globalization. GE credit: ArtHum, Wrt.—III. (III.)

15. Introduction to African History

Lecture—3 hours; discussion—1 hour. Examination of the long-range historical context as background to current conditions in Africa. Includes the early development of African civilizations, the slave trade and its abolition, 20th century colonization, and African independent states. GE credit: ArtHum, Div, Wrt.—I. (I.) Lowrance.

17A. History of the United States

Lecture—3 hours; discussion—1 hour. The experience of the American people from the Colonial Era to the Civil War. GE credit: ArtHum, Div, Wrt.—I, II. (II, Ill.)

17B. History of the United States

Lecture—3 hours; discussion—1 hour. The experience of the American people from the Civil War to the end of the Cold War. Not open for credit to students who have completed course 17C. GE credit: ArtHum, Div, Wrt.—II, III. (II, III.)
72A. Social History of American Women and the Family (4)
Lecture—3 hours; discussion—1 hour. Social and cultural history of women, sex roles and the family from colonial America until the late nineteenth century emphasizing changes resulting from the secularization, commercialization, and industrialization of American society. GE credit: ArtHum, Div, Wrt.—I. (I.) Hartigan-O’Connor

72B. Social History of American Women and the Family (4)
Lecture—3 hours; discussion—1 hour. Social and cultural history of women, sex roles, and the family in twentieth-century America, emphasizing female revolutionaries and revolutionaries, working-class women, status, the role of media, the “feminine mystique,” changes in family life, and the emergent women’s movement. GE credit: ArtHum, Div, Wrt.—II. (II.) Materson

Seminar—4 hours; term paper. Prerequisite: consent of instructor. History of the attitudes and behavior of Americans toward their natural environment and their technological times to the present. No final examination. Limited enrollment. GE credit: ArtHum.

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. For lower division students. No final examination. (P/NP grading only)

99. Special Study for Undergraduates (1-5)
(P/NP grading only)

Upper Division Courses

101. Introduction to Historical Thought and Writing (5)
Lecture/discussion—4 hours; term paper. Prerequisite: consent of instructor. Study of the history of historical thought and writing, analysis of critical and specific historical writings. GE credit: ArtHum, Div, Wrt.—I. McKee

102A-S, X. Undergraduate Proseminar in History (5)
Seminar—3 hours; term paper. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history: (A) Ancient; (B) Medieval; (C) Modern to 1815; (E) Europe since 1815; (F) Russia; (G) China to 1800; (H) China since 1800; (I) Britain; (J) Latin America since 1810; (K) American History to 1877; (L) United States, 1787-1896; (M) United States since 1896; (N) Japan; (O) Africa; (P) Christianity and Culture in Europe, 50-1850; (Q) India; (R) Muslim Societies; (S) Education Abroad Programs. May be repeated once for credit. GE credit: ArtHum, Div, Wrt.—II. (II.) McKee

103. Topics in Historical Research (4)
Discussion—3 hours; individual consultation with instructor; term paper. Prerequisite: consent of instructor. Individual research resulting in a research paper on a specific topic in one of various fields of history. May be repeated for credit.

104A. Introduction to Historical Research and Interpretation (4)
Seminar—3 hours; term paper. Prerequisite: accep-
tance into Department Honors Program. Directed reading and research aimed at preparing students to select appropriate topics and methodologies for a senior honors essay and to write their topic in a broad, meaningful, and broad context of histori-
ical interpretations. Culminates in the submission of a full prospectus for an honors essay.—I. (I.) Oropesa

104B. Honors Thesis (4)
Tutorial—4 hours. Prerequisite: course 104A. Research in preparation of a senior honors thesis under the direction of a faculty adviser. (Deferred grading only, pending completion of sequence.)—II.

104C. Honors Thesis (4)
Tutorial—4 hours. Prerequisite: course 104A and 104B. Completion of a senior honors thesis under the direction of a faculty adviser. (Deferred grading only, pending completion of sequence.)—III.

110. Themes in World History (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing covering at least 8 units in history. Issues in world history from 1400 to the present. Top-
ics will emphasize the interaction of diverse regions of the world as well as common patterns of historical change. GE credit: ArtHum.

111A. Ancient History (4)
Lecture—3 hours; discussion or paper (student option). History of ancient empires of the Near East and of their historical legacy to the Western world. GE credit: ArtHum, Div, Wrt.—III. (III.) Spirodkas

111B. Ancient History (4)
Lecture—3 hours; discussion or paper (student option). Political, cultural and intellectual study of the Greek world from Minoan-Mycenaean period to the end of Hellenistic Age. GE credit: ArtHum, Div, Wrt.—III. (III.) Spirodkas

111C. Ancient History (4)
Lecture—3 hours; discussion or paper (student option). Development of Rome from earliest times. Rise and fall of the Roman Republic, the Empire, 476 A.D. GE credit: ArtHum, Wrt.—II. (II.) Spirodkas

112A. Topics in Pre-Modern Jewish History (4)
Lecture—3 hours; term paper. Topics in the history of Jews from the Biblical era to the era of Jewish emancipation. Topics can be framed chronologically (e.g., medieval Jewry) or thematically (e.g., trade and Jewish commerce) and may be repeated once for credit. GE credit: ArtHum, Div, Wrt.—I. (I.) Kaplan

112B. Topics in Modern Jewish History (4)
Lecture—3 hours; term paper. Topics in the history of Jews from the era of Jewish emancipation to the present. Topics can be framed chronologically or thematically (e.g. Zionism, assimilation, the post Holocaust Diaspora). May be repeated once for credit. GE credit: ArtHum, Div, Wrt.—III. (III.) Spirodkas

113. History of Modern Israel (4)
Lecture—3 hours; term paper. Topics include the rise and fall of utopian Zionism, the century-long struggle between Jews and Arabs, the development of modern Hebrew culture, the conflict between religious and secular Jewish organizations, and the nature of Israel’s multi-

115A. History of West Africa (4)
Lecture—3 hours; written reports. Prerequisite: courses 4A, 4B, 4C recommended. Introductory survey of the history of West Africa and the Congolese region from the earliest times to the present. GE credit: ArtHum, Div, Wrt.—I. (I.) Lawrence

115B. History of East and Central Africa (4)
Lecture—3 hours; written reports. Prerequisite: course 115A recommended. Introductory survey of the history of east and central Africa from 1000 to the present. This course is a part of an interdiscipli-

115C. History of Southern Africa, Swaziland, Lesotho, and Botswana from 1500 to the Present (4)
Lecture—3 hours; written reports. Prerequisite: courses 115A and 115B recommended. Introduc-
tory survey of the history of Southern Africa, including South Africa, Swaziland, Lesotho, and Botswana from 1500 to the present. GE credit: ArtHum, Div, Wrt.—II. (II.)

115D. History and Legacy of Colonialism in Africa (4)
Lecture—3 hours; term paper. Prerequisite: course 115A, 115B or 115C recommended. History of the implementation, development, and legacy of Euro-

115E. The African Slave Trade (4)
Lecture—3 hours; writing—1 hour. History of the African Slave trades, from the early Egyptian and Sudanese in the trans-Atlantic period to the trans-Atlantic trade (15th-19th century) and the con-
temporary trafficking of humans. GE credit: ArtHum, Div, Wrt.—III. (III.) Lawrence

115F. History of North, Horn, Sudan, and Nile Valley (North and North-East Africa) (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 12 or course 6 recommended. History of the north-east region of continental Africa, encompassing the Horn of Africa the Nile Valley and the Sudan, covering the ancient period to the present. May be repeated for credit up to four units. GE Credit: ArtHum, Div, SocSci, Wrt.—III. (III.)

116. African History: Special Themes (4)
Lecture—3 hours; term paper. Prerequisite: courses 115A and 115B recommended. Themes of African history, such as African states and empires, trade, relationship of Egypt to rest of Africa, Bantu origins and migrations, and French policy of Assimi-
lation and Association. GE credit: ArtHum.

121A. Medieval History (4)
Lecture/discussion and panel presentations—3 hours. European history from the "fall of the Roman Empire" to the eighth century. GE credit: ArtHum, Wrt.—I. (I.)

121B. Medieval History (4)
Lecture/discussion and panel presentations—3 hours. Medieval history from Charlemagne to the twelfth century. GE credit: ArtHum, Wrt.—III. (III.) McKee

121C. Medieval History (4)
Lecture/discussion and panel presentations—3 hours. European history from the Crusades to the Renaissance. GE credit: ArtHum, Wrt.—I. (I.) McKee

122. Selected Themes in Medieval History (4)
Lecture—3 hours; term paper. Each offering will focus on single major theme, such as medieval agrarian history, feudalism, the family, medieval Italy, or the Crusades. Readings include original sources in English translation and modern works. May be repeated for credit. GE credit: ArtHum.—III. (III.)

125. Topics in Early Modern European History (4)
Lecture/discussion—3 hours; term paper. Prerequi-
tise: course 4B recommended. Social and cultural history, 1300-1800. Topics such as medieval and Renaissance Italy, early modern Italy, Ancient Regime France, family and sexuality, and material culture and daily life. May be repeated for credit. GE credit: ArtHum, Wrt.—III. (III.)

130A. Christianity and Culture in Europe: 50-1450 (4)
Lecture—3 hours; written report or research paper. A history of the ideas and institutions of Christianity and their impact on the late Roman Empire and medieval Europe in terms of outlook on life, art, poli-
tics and economics. GE credit: ArtHum, Div, Wrt.—I. (I.)

130B. Christianity and Culture in Europe: 1450-1600 (4)
Lecture—3 hours; written report or research paper. A history of the Lutheran, Zwinglian-Calvinist, Rad-ical, Anglican, and Catholic Reformations as founda-
tion stones of a new culture in Europe, with special attention to the interconnections between the revival of antiquity and the different reform movements. GE credit: ArtHum.—II. (II.)

130C. Christianity and Culture in Europe: 1600-1850 (4)
Lecture—3 hours; written report or research paper. A survey of the intellectual, cultural and political reorienta-
tion of European society in the aftermath of the Wars of Religion. “Secularization” will be dis-
cussed in the context of the Enlightenment and Romanticism. GE credit: ArtHum.
131A. Early Modern European History (4) Lecture—3 hours, written reports. Prerequisite: course 135B recommended. Western European history from about 1350 to about 1500. GE credit: ArtHum.—Stuart

131B. European History During the Renaissance and Reformation (4) Lecture—3 hours, paper. Survey of European society, politics, and culture from the late 15th through the early 17th centuries, with particular focus on the Italian and Northern Renaissance, the Protestant Reformation, and the Catholic Counter-Reformation. GE credit: ArtHum, Wrt.—II. (II.) Stuart

131C. The Old Regime: Absolution, Enlightenment and Revolution in Europe (4) Lecture—3 hours, term paper. Survey of European society, politics, and culture in the 17th and 18th centuries, focusing on religious warfare, absolutism, Scientific Revolution, Enlightenment and the growth of religious tolerance, the French Revolution and the collapse of the old regime. GE credit: ArtHum, Wrt.—II. (II.) Stuart

132. Crime and Punishment in Early Modern Europe (4) Lecture—3 hours, term paper. Deviance and crime in early modern Europe, including imaginary crimes, e.g. witchcraft, with “real” crimes such as highway robbery and infanticide. Examines impact of gender, sexual orientation, ethnicity, and class in processes of criminalization. GE credit: SocSci, Div, Wrt.—II. (II.) Stuart

133. The Age of Ideas (4) Lecture—3 hours; written reports. The Enlightenment and its background in the seventeenth century. GE credit: ArtHum.—Stolzenberg

134A. The Age of Revolution (4) Lecture—3 hours; written reports. Ideas and institutions during the French Revolution and the Napoleonic era. GE credit: ArtHum.—I. (I.) Margadant

135A. History of Science to the 18th Century (4) Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing. Survey of the historical development of science, technology, and medicine from the ancient world to the eighteenth century, with special emphasis on Isaac Newton as the culminant of the seventeenth century scientific revolution. GE credit: ArtHum.—Stolzenberg

135B. History of Science, 18th to 20th Centuries (4) Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing. Survey of the historical development of scientific thought in geology, biology, chemistry, physics, and cosmology from the eighteenth to the twentieth century, with special emphasis on emergence of broad explanatory principles that serve more than one science. GE credit: ArtHum.—I. (I.)

136. Scientific Revolution (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 135A or 135B recommended. History of science in Western Europe (1400-1750). Investigates the changing definitions of science in the age of Copernicus, Vesalius, Harvey, Galileo and Newton. Considers the evolution of new ideas about nature, experiment, observation, and scientific theory. GE credit: ArtHum.—I. (I.) Stolzenberg

138A. Russian History: The Rise of the First Empire, 1500-1881 (4) Lecture—3 hours; term paper. Prerequisite: courses 4B and 4C recommended. Expansion of the Russian state in Muscovy, increased imperial emphasis on autocratic rule, the incorporation of non-Russian peoples, and emergence of Russia as a Great Power. Only two units of credit will be allowed to students who have received former course 137B. GE credit: ArtHum, Wrt.—II. (II.)

138B. Russian History: The Russian Revolution, 1880-1917 (4) Lecture—3 hours; term paper. Prerequisite: courses 4B and 4C recommended. History of the fall of the Russian Empire and of the Revolution of 1917. Not open for credit to students who have received credit for former course 138. GE credit: ArtHum, Wrt.—I. (I.)

138C. Russian History: The Rise and Fall of the Soviet Union, 1917 to the Present (4) Lecture—2 hours; term paper. Prerequisite: courses 4B and 4C recommended. The emergence of the Soviet Union as a socialist system and a Great Power; the decline and collapse of the Soviet Union and the formation of independent nation states in its place. Not open for credit to students who have completed former course 137C. GE credit: ArtHum, Wrt.—I. (I.)

138D. Russian History: The Rise and Fall of the Soviet Union, 1917 to the Present (4) Lecture—2 hours; term paper. Prerequisite: courses 4B and 4C recommended. The emergence of the Soviet Union as a socialist system and a Great Power; the decline and collapse of the Soviet Union and the formation of independent nation states in its place. Not open for credit to students who have completed former course 137C. GE credit: ArtHum, Wrt.—I. (I.)

139A. Medieval and Renaissance Medicine (4) Laboratory/discussion—3 hours; term paper. The history of medicine, circa 1000-1700. Revival of ancient medicine, role of the universities; development of anatomy, chemistry and natural history; ideas about the body, cultural understanding of disease, hospital and the public health system. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt.

139B. Medicine, Society, and Culture in Modern Europe (4) Lecture—2 hours; discussion—1 hour; term paper. History of European medicine, 18th to 20th centuries, by examining the development of medical knowledge in epidemiology and anatomy, function of this knowledge in relation to technological breakthroughs and professionalization; and role of medicine in attitudes toward poverty, women, race, disease. Offered in alternate years. GE credit: ArtHum or SocSci.

140. The Rise of Capitalism in Europe (4) Lecture—3 hours; term paper. Prerequisite: course 4B or 4C. Comparative analysis of major interpretations of the rise of merchant capitalism during the Middle Ages and Renaissance; European expansion overseas, 1450-1815; the transition to modern capitalism via industrial revolution. Interplay of social, political, cultural, and economic history. Offered in alternate years. GE credit: ArtHum or SocSci.

141. France Since 1815 (4) Lecture—3 hours; term paper. GE credit: ArtHum, Wrt.—II. (II.) Margadant

142A. History of the Holocaust (4) Lecture—3 hours, term paper. Prerequisite: upper division standing. Examination of the literary, philosophical and historical impact of the Holocaust on European Jewry. Exploration of how memory is constructed, by whom and for what purposes. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—I. Biale

142B. The Memory of the Holocaust (4) Lecture—3 hours, term paper. Prerequisite: upper division standing. Examination of the literary, philosophical, and historical impact of the Holocaust on European Jewry. Exploration of how memory is constructed, by whom and for what purposes. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II. Biale

143. History of Eastern Europe and the Balkans (4) Lecture—3 hours; essays. History of the Baltic, Danubian, and Balkan states, Middle Ages, National cultures and conflicts in the Polish Commonwealth and the Habsburg and Ottoman Empires; nationalist movements, 1789-1914; the twentieth century, including an analysis of the contemporary scene. GE credit: ArtHum, Div, Wrt.—II. (II.) Hagen

144A. History of Germany, 1450 to 1789 (4) Lecture—3 hours; extensive writing. Survey of early modern Germany, 1450 to 1789, covering the theological and social history of the Reformation, the Peasants War of 1525, religious warfare, state building and absolutism, the Seven Years War, the French Revolution, and the Napoleonic era. Not open for credit to students who have completed former course 144A. GE credit: ArtHum, Div, Wrt.—II. (II.) Hagen

145. War and Revolution in Europe, 1789-1918 (4) Lecture—3 hours, term paper. Survey of revolution and political movements, international crises, and wars in Europe from the French Revolution to World War I. GE credit: ArtHum, Div, Wrt.—II. (II.) Hagen

146A. Europe in the Twentieth Century (4) Lecture—3 hours, term paper. Survey of the history of Europe from 1919 to 1939. GE credit: ArtHum, Wrt.—II. (II.) Dickinson

146B. Europe in the Twentieth Century (4) Lecture—3 hours, term paper. Survey of the history of Europe since 1939. GE credit: ArtHum, Wrt.—III. (III.) Dickinson

147A. European Intellectual History, 600-1700 (4) Lecture—3 hours, term paper. European thought in the early industrial era. Shifting cultural frameworks, from romanticism to science; liberal and socialist reactions to social change. Focus on the work of Goethe, Hegel, J.S. Mill, Marx, Darwin and Flaubert. GE credit: ArtHum or SocSci, Wrt.—II. (II.) Saler


147C. European Intellectual History, 1920-1970 (4) Lecture—3 hours, term paper. European thought and culture since World War II. Coverage includes: literature and politics; Communist and Western Marxism; Fascism, Existentialism, Structuralism, Feminism. Particular attention to Lenin, Brecht, Hitler, Sartre, Camus, Beckett, Marcuse, Foucault, Woolf and de Beauvoir. GE credit: ArtHum or SocSci, Div, Wrt.—III. (III.) Saler

148A. Women and Society in Europe: 1500-1789 (4) Lecture—3 hours, term paper. Prerequisite: course 4B recommended. Roles and perceptions of women from the Renaissance to the French Revolution. Emphasis on social and economic factors as well as on discussions of women in the writings of political theorists and social commentators. GE credit: ArtHum, Div, Wrt.—II. (II.) Kudlick

148B. Women and Society in Europe: 1789-1920 (4) Lecture—3 hours, term paper. Prerequisite: course 4C and 148A recommended. Roles and perceptions of women from the French Revolution to World War I, primarily in France and England. Emphasis on social and economic developments within a loosely chronological and comparative framework. GE credit: ArtHum, Div, Wrt.—II. (II.) Kudlick

148C. Women and Society in Europe: 1914-Present (4) Lecture—3 hours, term paper. Prerequisite: course 148B recommended. The history of twentieth century Europe from the perspective of the women and the family, and of sexual and gender relations. Emphasis on the impact on women of major events and movements, such as World War I, Fascism, Soviet communism, World War II, the welfare state, feminism, and mass culture. GE credit: ArtHum, Div, Wrt.—III. (III.)
149. Comparative Cultural History of Modern Britain and France, 1880-1914 (4) Lecture—3 hours; term paper. Cultural comparison of the histories of Britain and France during the fin de siècle. Addresses cultural debates of the period (including gender, race, class) and the practices of cultural history. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—II. 151A. England: The Middle Ages (4) Lecture—3 hours; term paper. Prerequisite: course 4A recommended. Origins of England to the accession of Edward I. Survey includes: impact of Norman Conquest on Anglo-Saxon institutions; rise of the Church, common law, parliament, and the economy; thought, arts, and literature to the age of Chaucer and Wyndham. GE credit: ArtHum, Wrt.—III. 151B. England: The Early Modern Centuries (4) Lecture—3 hours; term paper. Prerequisite: courses 4A, 4B; course 151A recommended. From Lancaster and York to the Glorious Revolution. Includes growth of the Church of England; beginnings of modern worldwide economy; rise of the gentry and parliaments; and literature in the times of More, Shakespeare, Hobbes, Wren, and Newton. GE credit: ArtHum, Wrt. 151C. Eighteenth-Century England (4) Lecture—3 hours; term paper. English history from the French Revolution to the French Revolution. Examination of the transformation of one of Europe’s most politically unstable kingdoms into the firmly established constitutional monarchy which provided an environment fit to engender the industrial revolution. GE credit: ArtHum, Wrt.—I. (I.) Landau 151D. Industrial England (4) Lecture—3 hours; term paper. English history from Waterloo to the Battle of Britain; the rise and continuance of the first industrial nation, examining the transformation of landed to class society, oligarchy to democracy and bureaucracy, Bentham to Bloomsbury, empire to commonwealth. GE credit: ArtHum, Div, Wrt.—Landau 159. Women and Gender in Latin American History (4) Lecture—3 hours; extensive writing. Prerequisite: one course either on Latin American or in women’s history in another world area. Roles of women and men in the history of Latin America, with an emphasis on the intersection of gender with racial and class categories. Introduction to the theoretical premises of women’s and gender history. GE credit: ArtHum, Div, Wrt.—III. (III.) Langston 160. Spain and America in the 16th Century (4) Lecture—3 hours; term paper. Prerequisite: upper division standing. The Atlantic world in the 16th century, particularly the transcultural and reciprocal social and economic relations between Spain and America in the course of colonization. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—III. (III.) Harris 161A. History of Colonial Spanish America (4) Lecture/discussion—3 hours; term paper. Pre-Columbian societies, The Atlantic world and the Andean region (mainly Aztec and Inca); the impact of European conquest and colonization; the formation of a hybrid culture. Extensive use of photographic slides. GE credit: ArtHum, Div, Wrt.—I. (I.) Lecture/discussion—3 hours; written reports. Evolu- tion of modern Latin America: export economies; oli- garchic rule; reform and revolution; the difficulties of the transition. Emphasis on Mexico, Cuba, the Andean region, Chile, and Argentina. Photographic slides. GE credit: ArtHum, Div, Wrt.—II. (II.) 161B. Latin American History (4) Lecture/discussion—3 hours; written reports. Revolu- tion and social change. Thematic surveys of Latin America. The revolutions of 1820, 1840, 1850, and 1860. GE credit: ArtHum, Div, Wrt.—I. (I.) Lecture/discussion—3 hours; written reports. Revolu- tion and social change. Thematic surveys of Latin America. The revolutions of 1820, 1840, 1850, and 1860. GE credit: ArtHum, Div, Wrt.—II. (II.) 162. History of the Andean Region (4) Lecture/discussion—3 hours; written and/or oral reports. History of the Andes: the region that now comprises modern Peru, Bolivia, and Chile from the beginning of human settlement to the pres- ent. GE credit: ArtHum, Div, Wrt.—III. (III.) C. Walker 163A. History of Brazil (4) Lecture—3 hours; written reports. The history of colo- nial and imperial Brazil from 1500 to 1889. GE credit: ArtHum, Div, Wrt.—III. 163B. History of Brazil (4) Lecture—3 hours; written reports. The history of the Brazilian republic from 1889 to the present. GE credit: ArtHum.—III. 164. History of Chile (4) Lecture—3 hours; term paper. Prerequisite: course 161A, 161B, 163A recommended. Emphasis on the history of Chilean political economy from 1930 to the present. Various strategies of develop- ment (modernization, Marxism, Neo-Liberalism); the rise of mass politics; the course of foreign relations; and the richness of Chilean literature. Offered in alternate years. GE credit: ArtHum.—III. 165. Latin American Social Revolutions (4) Lecture—3 hours; written reports. Major social upheavals since 1900 in selected Latin American nations; similarities and differences in cause, course, and consequence. GE credit: ArtHum.—II. (II.) 166A. History of Mexico to 1848 (4) Lecture/discussion—3 hours; written and/or oral reports. Political, economic, and social development of pre-Columbian, colonial and national Mexico to 1848. GE credit: ArtHum.—(III.) Reséndez 166B. History of Mexico Since 1848 (4) Lecture/discussion—3 hours; written and/or oral reports. History of Mexico from 1848 to the present. GE credit: ArtHum.—I. (I.) Reséndez 167. Modern Latin American Cultural and Intellectual History (4) Lecture—3 hours; term paper. Prerequisite: upper division standing. Introduction to the cultural and intellectual history of modern Latin America including architecture, cinema, painting, music, and litera- ture. GE credit: ArtHum, Wrt.—I. Walker, Reséndez 168. History of Inter-American Relations (4) Lecture—3 hours; written reports. Diplomatic history of Latin America since independence, intra-Latin American relations, relations with the United States, participation in international organizations, and communism in Latin America. GE credit: ArtHum.—III. (III.) 169A. Mexican-American History (4) Lecture/discussion—3 hours; written and/or oral reports. Economic, social, religious, cultural and political development of the Spanish-speaking popu- lation of the Southwestern United States from about 1800 to 1910. GE credit: ArtHum, Div, Wrt.—II. (II.) Oropeza 169B. Mexican-American History (4) Lecture/discussion—3 hours; written and/or oral reports. Role of the Mexican and Mexican-American or Chicano in the economy, politics, religion, culture and society of the Southwestern United States since 1910. GE credit: ArtHum, Div, Wrt.—I. (I.) Oropeza 170A. Colonial America (4) Lecture—3 hours; term paper. Colonial society from 1607 to the American Revolution, with emphasis on European expansion, political, social and economic foundations, colonial, and inter- national rivalry. GE credit: ArtHum, Div, Wrt.—Smolen- ski, Taylor 170B. The American Revolution (4) Lecture—3 hours; term paper. Analysis of the Revolu- tionary epoch: the American Revolution, the War for Independence and its con- sequences, and the Constitution period. GE credit: ArtHum, Div, Wrt.—Smolen- ski, Taylor 170C. The Early National Period, 1789-1815 (4) Lecture—3 hours. Political and social history of the American republic from the adoption of the Constitu- tion through the War of 1812 and its consequences. GE credit: ArtHum.—III. (III.) 171A. Jacksonian America (4) Lecture—3 hours; term paper. Prerequisite: upper division standing. The political and social history of the United States from the end of the War of 1812 to the Compromise of 1850. How the market revolution transformed American life, and led the nation towards war. GE credit: ArtHum, Div, Wrt.—II. (II.) 171B. Civil War and Reconstruction (4) Lecture—3 hours; term paper. Prerequisite: upper division standing. Examination of the political and social history of the United States from the Compro- mise of 1850 to the end of the Civil War in 1865. Causes of the war, the war itself, and the problems of reconstruction after the war. GE credit: ArtHum, Div, Wrt.—III. (III.) 171F. The Civil War in American Film (1) Discussion—1 hour; film viewing. Prerequisite: course 171B concurrently. Viewing and discussion of films with short writing assignments. (P/NP grading only)—II. (II.) 171D. Selected Themes in 19th Century American History (4) Lecture—3 hours; term paper. Prerequisite: upper division standing. Interpretive overview of a single topic in the history of the United States in the 19th century. Sample topics include: social history, the 1850s, and southern history. May be repeated once for credit when topic differs. Offered in alternate years. GE credit: ArtHum, Wrt.—III. 172. American Environmental History (4) Lecture—3 hours; term paper. Prerequisite: course 17A. Examination of changing relations between people and nature in the area of the current United States from pre-Columbian times to the present. Top- ics include ecological change; perceptions of nature; social conflicts over “proper” uses of nature; environment- mental movement. Offered in alternate years. GE credit: ArtHum, Wrt.—III. Warren 173. Becoming an American: Immigration and American Culture (4) Lecture—3 hours; term paper. Prerequisite: course 17B or 72B recommended. An introduction to the wide range of immigrant experiences and cycles of nativism that have shaped American culture in the twentieth century. From novels, memoirs and films, students will explore how external and internal immi- gration has created a multicultural society. Offered alternate years. GE credit: ArtHum, Div, Wrt.—III. (III.) Tu 174A. The Gilded Age and Progressive Era: United States, 1876-1917 (4) Lecture—3 hours; term paper. Prerequisite: course 17B. U.S. history and the construction of modern America from the end of Reconstruction to U.S. entry into World War I. Includes Southern redemption, Western incorporation, electoral corruption, labor movements, Populism, Progressivism, women’s suffrage, U.S. imperial expansion, and immigration restriction. Offered in alternate years. GE credit: ArtHum, Wrt.—I. Rauchway 174AD. Emergence of Modern America: Discussion (1) Discussion—1 hour; short papers. Prerequisite: course 174A concurrently. Intensive discussion of topics and readings for course 174A. (P/NP grading only)—I. (I.) 174B. War, Prosperity, and Depression: United States, 1917-1945 (4) Lecture—3 hours; term paper. Prerequisite: course 17B. America’s emergence as a world power, the business culture of the 1920s, the New Deal and World War II. Emphasis on such issues as govern- ment regulation of the economy, welfare capitalism, and class, racial, ethnic, and gender conflicts. Offered in alternate years. GE credit: ArtHum, Wrt.—II. Olmedo 174BD. America in War, Prosperity and Depression: Discussion (1) Discussion—1 hour; short papers. Prerequisite: course 174B concurrently. Intensive discussion of topics and readings for course 174B. (P/NP grading only)—II. (II.)
174C. The United States Since World War II, 1945 to the Present (4)
Lecture—3 hours; term paper. America’s struggle to respond to new complexities in foreign relations, social tensions, family changes and media. Emphasis on such topics as: Cold War; anticommunist crusade; civil rights; feminism; environmentalist movement; New Left; counterculture; Vietnam; Watergate; and the moral majority. GE credit: ArtHum, Wrt.—III. (III.)

174CD. The United States Since World War II: Discussion (1)
Discussion—1 hour; short papers. Prerequisite: course 174C concurrently. Intensive discussion of topics and readings for course 174C. (P/NP grading only)—III. (III.)

174D. Selected Themes in 20th Century American History (4)
Lecture—3 hours; term paper. Prerequisite: course 17B or the equivalent. Interpretive overview of a single topic in the history of the United States in the 20th century with attention to the phases and processes of historical change. May be repeated once for credit when topic differs. Offered in alternate years. GE credit: ArtHum, Wrt.—III. (III.)

174DD. Selected Themes in 20th Century American History: Discussion (1)
Discussion—1 hour; short papers. Prerequisite: course 174D concurrently. Intensive discussion of topics and readings for course 174D. May be repeated for credit. (P/NP grading only)—I, II, III, (I, II, III)

175. American Intellectual History (4)
Lecture—3 hours; term paper. Prerequisite: course 17B and either division standing. Ideas that have shaped politics and society in the United States from colonial times to the present. Topics include American liberalism, republicanism, democracy, constitutionalism, communitarianism, utopianism, pragmatism, feminism, Darwinism, nationalism, conservatism, and economics. Offered in alternate years. GE credit: ArtHum, Wrt.—I. Rauchway

176A. Cultural and Social History of the United States (6)
Lecture—3 hours; term paper. Study of social and cultural forces in American society in the nineteenth century with emphasis on social structure, work and leisure, socialization and the family, social reform movements and changes in cultural values. GE credit: ArtHum.—I. (I)

176B. Cultural and Social History of the United States (4)
Lecture—3 hours; term paper. Study of social and cultural forces in American society in the twentieth century with emphasis on social structure, work and leisure, socialization and the family, social reform movements and changes in cultural values. GE credit: ArtHum.—II. (II) Smolenski

177A. History of Black People and American Race Relations (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 17A or 17B. History of black people in the United States from the African background to Reconstruction. GE credit: ArtHum, Div, Wrt.—I. (I) C.E. Walker

177B. History of Black People and American Race Relations (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 17A or 17B. History of black people in the United States from the African background to Reconstruction. GE credit: ArtHum, Div, Wrt.—C.E. Walker

178A. Race in America, 1492-1865 (4)
Lecture—4 hours. Prerequisite: course 17A or 17B or 177A or 177B. Racial formation during the Age of Discovery and settlement, Early National and Antebellum periods up to the Civil War. Not open for credit to students who have completed course 17B. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—III. C.E. Walker

178B. Race in America 1865-present (4)
Lecture/discussion—4 hours. Prerequisite: course 17A or 17B or 177A or 177B. Development of political participation in the Post Civil War United States from 1860 to the present. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II. C.E. Walker

180AN. American Political History, 1789-1896 (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing. Growth of American politics from the birth of the republic to the end of the nineteenth century. Development of political parties and the expanding electorate, and how social issues such as slavery shaped the political process. Not open for credit to students who have completed course 180A. Offered in alternate years. GE credit: ArtHum, Wrt.—II.

180BN. American Political History, 1896-present (4)
Lecture—3 hours; term paper. Prerequisite: course 17A. American religious history from colonization through the Gilded Age. Topics include religious diversity in America; native American religion; Protestant-evangelicalism; Catholicism; Judaism; and religion and politics. May be repeated for credit. GE credit: ArtHum, Wrt.—III. (III.) Rauchway, Olmsted

181. Religion in American History to 1890 (4)
Lecture—3 hours; term paper. Prerequisite: course 17A. American religious history from colonization through the Gilded Age. Topics include religion's role in society and politics from the 1600s to 1890. GE credit: ArtHum, Wrt.—III. Smolenski

183A. The Frontier Experience: Trans-Mississippian West (4)
Lecture—3 hours; written and/or oral reports. The fur trade, western exploration and transportation, the Oregon Country, the Gadsden Southwest and the Mexican War, the Mormons, mining discovery, and the West during the Civil War. GE credit: ArtHum, Div, Wrt.—I. (I) Taylor

183B. The Frontier Experience: Trans-Mississippi West (4)
Lecture—3 hours; written and/or oral reports. The fur trade, western exploration and transportation, the Oregon Country, the Gadsden Southwest and the Mexican War, the Mormons, mining discovery, and the West during the Civil War. GE credit: ArtHum, Div, Wrt.—II. (I) Price

184. History of Sexuality in America (4)
Lecture—3 hours; extensive writing. History of sexuality in America. A comprehensive survey of the literature since the 1960s that reveals the dramatic changes in social norms concerning sex and sexuality over the last hundred years. GE credit: ArtHum, Wrt.—II. Warren

185A. History of Science in America (4)
Lecture—3 hours; research paper. Survey of the European background. Study of American scientific institutions, ideas, personalities, creative processes in science, and of relationships between society and science from colonial times to present. GE credit: ArtHum, Wrt.

185B. History of Technology in America (4)
Lecture—3 hours; research paper. Study of American technology, emphasizing biographical approaches to technology, technological change, creative processes, institutions, ideas, and relationships between technology and society from colonial times to present. GE credit: ArtHum, Wrt.

189. California History (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing. California history from the pre-colonial period to the present including diseases of California’s Indians, political economy of the Spanish and Mexican periods, Gold Rush, industrialization, Hollywood, environmental politics, World War II, Proposion 13, and the emergence of the Silicon Valley. Not open for credit to students who have completed two courses of course 189A, 189B, 189C. GE credit: ArtHum, Wrt.—II. Warren, Tsu

190A. Middle Eastern History I: The Rise of Islam, 600-1000 (4)
Lecture—3 hours; extensive writing. Prerequisite: course 6 recommended. Middle Eastern history from the rise of Islam to the dissolution of the Rabbid Caliphate, the formative centuries of a civilization. Politics and religion, conquest and conversion, arts and sciences, Christians, Jews and Muslims, gender and sexuality, orthodoxy and heterodoxy. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—I. Tezcan

190B. Middle Eastern History II: The Age of the Crusades, 1000-1400 (4)
Lecture—3 hours; extensive writing. Prerequisite: course 6 recommended. Middle Eastern history during the age of the Crusades and Mongol invasions. The idea of holy war, the Crusades, the Mongols as the bearers of Chinese arts, nomads and sedentary life, feudalism, mysticism, slavery, women in the medieval Middle East. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—II. Tezcan

190C. Middle Eastern History III: The Ottomans, 1401-1730 (4)
Lecture—3 hours; extensive writing. Prerequisite: course 6 recommended. Middle Eastern history from the foundation of the Ottoman Empire on the borderlands of Byzantine Anatolia through its expansion into Europe, Asia, and Africa, creating a new cultural synthesis including the Arab, Greek, Islamic, Mongol, Persian, Slavic, and Turkish traditions. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—II. Tezcan

191A. Classical China (4)
Lecture—3 hours; term paper. History of Chinese civilization from its origins through the establishment of city states and the flowering of classical philosophy, to the rise and fall of the First Empire. GE credit: ArtHum, Div, Wrt.—I, II, III (II, III)

191B. High Imperial China (4)
Lecture—3 hours; term paper. Political disunion and the influx of Buddhism; reunification under the great dynasties of T’ang, Sung, and Ming with analysis of society, culture and thought. GE credit: ArtHum, Div, Wrt.—II. (II) Bosler

191C. Late Imperial China (4)
Lecture—2 hours; discussion—1 hour; two long papers. Prerequisite: course 9A or upper division standing. Patterns and problems of Chinese life traced through the Ming and Ch’ing dynasties (c. 1500-1800) prior to the confrontation with the West in the Opium War. Readings include primary sources and novels portraying elite ethos as well as popular culture. GE credit: ArtHum, Div, Wrt.—II. Mann

191D. Nineteenth Century China: The Empire Confronts the West (4)
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: course 9A or upper division standing. The decline and fall of the Chinese Empire, with particular attention to the social and political crises of the 19th century, and the response of government officials, intellectuals, and ordinary people to the increasing pressures of Western influence. GE credit: ArtHum, Div, Wrt.—II. (I) Bosler

191E. The Chinese Revolution (4)
Lecture—2 hours; discussion—1 hour; extensive writing. Prerequisite: upper division standing. Analysis of China’s cultural and political transformation from Confucian empire into Communist state. Emphasis on emergence and triumph of peasant revolutionary strategy (to 1949), with some attention to its implications for post-revolutionary culture and politics. GE credit: ArtHum, Div, Wrt.—II. (II) Price
191F. History of the People's Republic of China (4)
Lecture—3 hours; discussion—1 hour; extensive writing. Prerequisite: upper division standing. Comprehensive analysis of recent Chinese history, including post-1949 events, the consequences of the new economic policies of the 1980s. Not open for credit to students who have completed course 190C. GE credit: ArtHum, Div, Wrt.—Ill. Mann

192. Internship in History (1-12)
Prerequisite: senior standing. Independent work under the supervision of the instructor. Open to students with a substantial research project on history. May be repeated for credit. (Deferred grading only, pending completion of sequence. —I, II, III.) McKee

193A. History of the Modern Middle East, 1750-1914 (4)
Lecture—3 hours; term paper. Prerequisite: course 6 recommended. The Middle East from the turn of the 20th century to the First World War. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II. El Shaky

193B. History of the Modern Middle East from 1914 (4)
Lecture—3 hours; term paper. Prerequisite: course 6 recommended. The Middle East from the turn of the 20th century to the First World War. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—III. El Shaky

194A. Aristocratic and Feudal Japan (4)
Lecture—3 hours; term paper and/or discussion. Survey of the cultural, social, religious, and political aspects of Japanese history from the eighth century within the Middle East from 1750 to 1914 under pressure of the changing world economy and European imperialism. Themes include colonialism, Orientalism, Arab intellectual renaissance, Islamic reform, state-formation, role of subaltern groups. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—II. El Shaky

194B. Early Modern Japan (4)
Lecture—3 hours; term paper and/or discussion. Survey of the cultural, social, economic, and political aspects of Japanese history from the eighteenth century emphasizing labor and social movements, militarism and the Pacific war, and the emergence of Japan as a major economic power. GE credit: ArtHum, Div, Wrt.—II. I. Kim

194C. Modern Japan (4)
Lecture—3 hours; term paper and/or discussion. Survey of the cultural, social, economic, and political aspects of Japanese history from the eighteenth century emphasizing labor and social movements, militarism and the Pacific war, and the emergence of Japan as a major economic power. GE credit: ArtHum, Div, Wrt.—II. I. Kim

194D. Business and Labor in Modern Japan (4)
Lecture—3 hours; term paper or papers. Survey of labor and management relations in Japan from the mid-nineteenth century to the present. Offered in alternate years. GE credit: ArtHum.—I.

194E. Education and Technology in Modern Japan (4)
Lecture—3 hours; term papers. Survey of education and technology from the mid-eleventh century to the present. Offered in alternate years. GE credit: ArtHum.—I.

195A. History of Modern Korea (4)
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: upper division standing. History of Modern Korea, from Yi dynasty period to 1990s. Political and socioeconomic changes in 19th century, modernization under Japanese colonialism, postwar economic growth and effects of the Cold War. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II. Kim

195B. History of Modern Korea (4)
Lecture—3 hours; discussion—1 hour; written reports. Survey of modern history of Korea in the millennium preceding arrival of British in the eighteenth century, focusing on interaction of the civilizations of Hindu-ism and Islam and on the changing nature of the state. GE credit: SocSci, Div, Wrt.—II. Sen

1971. Tutorial History (2)
Discussion—1 hour; laboratory—3 hours. Prerequisite: enrolled as a History major with senior standing and consent of department chairperson. Tutoring of students in lower division courses. Weekly meeting with instructor to discuss charge of courses. Written reports on methods and materials required. May be repeated once for credit. No final examination. (P/ NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor; upper division standing. (P/ NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/ NP grading only.)

Graduate Courses

201A-L, N, P-Q, S-T, W, X. Sources and General Literature of History (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. (A) Ancient; (B) Medieval; (C) Renaissance and Reformation; (D) Early Modern Europe; (E) Europe since 1815; (F) China since 1800; (G) China; (H) Britain; (I) Latin America since 1810; (J) American History to 1787; (K) Victorian Britain; (L) United States since 1896; (M) Japan; (P) African Historiography; (Q) Cross-Cultural Women's History; (R) History of Science and Medicine; (S) Jewish Historical; (T) Women and Gender History; (U) United States; (V) Latin America. Readings, papers, and class reports may be repeated for credit when different subject area is studied.

202A-I. Major Issues in Historical Interpretation (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Fundamental issues and debates in the study of history. (A) Ancient; (B) Medieval Europe; (C) Modern Europe; (D) India; (E) Africa; (F) China; (G) Japan; (H) United States; (I) Latin America. Readings, papers, and class reports may be repeated for credit when different subject area is studied.—I, II, III, (I, II, III)

203A. Research Seminar (4)
Seminar—3 hours; laboratory—1 hour. Designed for students preparing for higher degrees in history. Individual research and analysis resulting in substantial research paper of publishable quality. Completion required of all Ph.D. candidates. The three courses must be taken in continuous sequence, ordinarily during second year.—I. McKee

203B-203C. Research Seminar (4-4)
Seminar—3 hours; tutorial—1 hour. Prerequisite: course 203A. Designed for students preparing for higher degrees in history. Individual research and analysis resulting in substantial research paper of publishable quality. Completion required of all Ph.D. candidates. The three courses must be taken in continuous sequence, ordinarily during second year. (Deferred grading only, pending completion of sequence.)—I, II, III.

204. Historiography (4)
Seminar—3 hours; term paper. Major issues in the philosophy and methodology of history.—I. (I) Sen

221. Medieval History (4)
Seminar—3 hours. Prerequisite: courses 121A, 121B, 121C recommended. Topics in the history of medieval and early Renaissance Europe.

245. Modern European History (4)
Seminar—3 hours. Prerequisite: course 201E. Primary sources and research methodologies in the history of modern France and Germany. May be repeated once for credit.—III. (III)

261. Latin American History (4)
Seminar—3 hours. Prerequisite: two courses in Latin American history; reading knowledge of Spanish or Portuguese.—I, II, III, (I, II, III)

271A-271B. United States History (4-8)
Seminar—3 hours; term paper. Prerequisite: course 201L or 202H. Research in literature, methods, and sources on aspects of United States history, culminating in each student completing a research paper in the field of the student's specialization. May be repeated for credit. (Deferred grading only, pending completion of sequence.)—I, II. (I, II)

291A. Chinese History (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor. Research on topics to be chosen by the students for the purpose of writing article-length papers. May be repeated for credit. (Deferred grading only, pending completion of sequence.)—Price, Mann, Bossler.

291B. Chinese History (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor. Completion of article-length papers on topics chosen by students. May be repeated for credit. (Deferred grading only, pending completion of sequence.)—Price, Mann, Bossler.

291C. Methods and Issues in Chinese History (4)
Seminar—2 hours; tutorial—1 hour. Prerequisite: reading knowledge of Chinese; consent of instructor. Readings in Chinese historical materials. Training in the use of Chinese reference works (including on-line resources). May be repeated for credit.—I. (I) Bossler, Price, Mann.

292. College Teaching Internship (4)
Internship—4 hours. Prerequisite: course 300 may be taken concurrently. Student prepares and teaches one lower division history course in a nearby community college under the supervision of a UC Davis instructor and a community college instructor. (S/U grading only)

298. Group Study (1-5)

299. Research (1-12)

300. Individual Study (1-12)
(S/U grading only)

Professional Courses

399. Introductory Seminar for Teaching Assistants (1)
Seminar—1 hour. Prerequisite: must be enrolled in course 390. An introduction to the broad comparative and theoretical issues of teaching methods and techniques in history. (S/U grading only.—I, II, III, (I, II, III)

390. Teaching History in College (2)
Discussion—2 hours. Designed for teaching assistants with emphasis on problems and procedures encountered by teachers of lower division classes at the university. (S/U grading only)—I, II, III, (I, II, III)
History and Philosophy of Science

[College of Letters and Science]

Joseph Dumit, Ph.D., Program Director

Program Office. 1241 Social Sciences and Humanities Building (530) 752-9621
Committee in Charge

Thomas Beamish, Ph.D. (Sociology)
Joan Cadden, Ph.D. (History)
Patrick Carroll, Ph.D. (Sociology)
Timothy Choy, Ph.D. (Anthropology, Science and Technology Studies)
Carolyn de la Pena, Ph.D. (American Studies)
Joseph Dumit, Ph.D. (Anthropology, Science and Technology Studies)
James Griesemer, Ph.D. (Philosophy)
Roberta Millstein, Ph.D. (Philosophy)
Calin Milburn, Ph.D. (English)
Benjamin S. Orlove, Ph.D. (Environmental Science and Policy)
Daniel Stolzenberg, Ph.D. (History)

Minor Program Requirements:
The interdisciplinary minor in the history and philosophy of science invites students to examine historical and contemporary problems in a variety of scientific disciplines, and to explore concepts and procedures basic to science and how they have evolved. The minor is sponsored by the Program in Science and Technology Studies.

UNITS

History and Philosophy of Science ....... 24
Philosophy 30........................................... 4
Five courses from those listed below. One course must be from each of three areas: (a) history, (b) philosophy, and (c) science and technology studies
(a) History 102, 135A, 135B, 136, 139A, 139B, 185A, 185B, 188A, 188B;
(b) Philosophy 106, 107, 108, 109, 110, 111; (c) Science and Technology Studies 20, 130A, 130B, 131, 150, 180.

Minor Adviser. P. Carroll in 2272 Social Sciences and Humanities Building (530) 752-5388

Honors Challenge

Lollita Nelson-Adkins, Program Manager
Program Office. 580 Kerr Hall (530) 752-2315; http://www.dhc.ucdavis.edu

The Program of Study

The Davis Honors Challenge (DHC) is a program for highly motivated students interested in enhancing their education through special courses, closer contact with faculty, and dynamic interaction with academic peers. Interested students apply in the spring quarter for the following year. First- and second-year students participating in the DHC take two honors courses and one problem oriented interdisciplinary seminar per academic year. Second-year students have the option to form a honors contract for an honors course. Third-year students are required to complete two honors contracts and one upper division honors seminar. Fourth-year students participate in a capstone project. Transfer students complete the second or third-year program requirements depending on their class standing. All students who successfully complete the program receive transcript notation for each year of participation.

Lower division departmental Honors courses, special DHC sections of regular courses, DHC seminars, and special study opportunities constitute the course offerings of the Davis Honors Challenge. A complete list of these courses, with course registration numbers, is made available to admitted students through the Davis Honors Challenge office.

Lower division seminars are offered each year during winter and spring quarters. The seminars are designed to foster critical thinking and analytical interpretation, improve written and technical communication skills, enhance research skills, and provide experience with group dynamics and collaborative exploration of problems. Enrollment in each seminar is limited to 20 students. Updated program information is available at our Web site. Students not admitted to the program may not register for Davis Honors Challenge sections, seminars, or special study opportunities.

Courses in Davis Honors Challenge (HNR)

Lower Division Courses

90X. Honors Discussion Section (1)
Discussion—1 hour. Prerequisite: open only to students in the Davis Honors Challenge. Examination of special topics in selected lower division courses through additional readings, discussions, term papers, collaborative work, or special activities, including projects, field and laboratory experiences, computer simulations, creative works. May be repeated for credit.

92. Internship (1-12)
Internship—3.6 hours. Prerequisite: open only to students in the Davis Honors Challenge. Supervised work experience under the auspices of the Davis Honors Challenge. May be repeated for credit for a total of 12 units. (P/NP grading only.)

94. Honors Seminar (4)
Seminar—4 hours. Prerequisite: open only to students in the Davis Honors Challenge. Collaborative, multidisciplinary exploration of complex contemporary problems. Focus on critical thinking and analytical interpretation, oral and written communication, and the use of electronic media in gathering information. May be repeated for credit. GE credit: Wrt.

98. Directed Group Study (1-5)
Directed Group Study—1 hour. Prerequisite: open only to students in the Davis Honors Challenge. May be repeated for credit. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Independent study—1-5 hours. Prerequisite: student in the Davis Honors Challenge. May be repeated for credit. (P/NP grading only.)

Upper Division Courses

190X. Honors Contract (1)
Independent study or discussion—3 hours. Prerequisite: open only to students in the Davis Honors Challenge Proposal submitted by the student. Contract must be approved by the instructor and the Honors Council of the Academic Senate. May be repeated for credit.

192. Internship (1-12)
Internship—3.6 hours. Prerequisite: open only to students in the Davis Honors Challenge. Supervised work experience under the auspices of the Davis Honors Challenge. May be repeated for credit for a total of 12 units. (P/NP grading only.)

194. Honors Seminar (3)
Seminar—3 hours. Open only to students in the Davis Honors Challenge. Team-based work on actual problems drawn from the public or private sector. Focus on critical thinking and analytical interpretation, oral and written communication skills, and development of practical solutions to real-world problems. GE credit: Wrt. —II, III, III.

195. Honors Thesis/Honors Project (1-3)
Independent Study—3-9 hours. Prerequisite: Open only to students in the Davis Honors Challenge. Guided independent study of a selected topic leading to the presentation of an honors thesis/honors project. May be repeated for credit up to 9 units.

198. Directed Group Study (1-5)
Discussion—1-5 hours. Prerequisite: open only to students in the Davis Honors Challenge. May be repeated for credit. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Independent study—1-5 hours. Prerequisite: open only to students in the Davis Honors Challenge. May be repeated for credit. (P/NP grading only.)

Horticulture and Agronomy

(A Graduate Group)

M. Andrew Walker, Ph.D., Chairperson of the Group

Group Office. 1224 Plant and Environmental Sciences Building (530) 752-7738; http://ggha.ucdavis.edu

Faculty

Douglas O. Adams, Ph.D., Associate Professor (Viticulture and Enology)
 Lars W. J. Anderson, Ph.D., Research Leader, USDA (Plant Sciences)
 Shane Ball, Ph.D., Cooperative Extension Specialist (Plant Sciences)
 Michael G. Barbour, Ph.D., Professor Academic Senate Distinguished Teaching Award (Plant Sciences)
 Kendra Baumgartner, Ph.D., Lecturer and Research Plant Pathologist (Plant Pathology)
 Allison M. Berry, Ph.D., Professor (Plant Sciences)
 Arnold J. Bloom, Ph.D., Professor (Plant Sciences)
 Eduardo Blumwald, Ph.D., Professor (Plant Sciences)
 Kent J. Bradford, Ph.D., Professor (Plant Sciences)
 Patrick H. Brown, Ph.D., Professor (Plant Sciences)
 David W. Burger, Ph.D., Professor (Plant Sciences)
 Marita Cantwell, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences)
 Roger T. Chetelat, Ph.D., Lecturer and Associate Geneticist (Plant Sciences)
 Carlos H. Crisosto, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences)
 Abhayaa M. Dandekar, Ph.D., Professor (Plant Sciences)
 Theodore M. Delong, Ph.D., Professor (Plant Sciences)
 Joseph M. DiTomasso, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences)
 Jorge Dubrovsky, Ph.D., Ph.D., Professor (Plant Sciences)
 Don J. Durzan, Ph.D., Professor (Plant Sciences)
 Jan Dvorak, Ph.D., Professor (Plant Sciences)
 Richard Y. Evans, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences)
 Valerie E.Evner, Ph.D., Assistant Professor (Plant Sciences)
 Steven A. Fennimore, Ph.D., Lecturer and Associate Specialist in Cooperative Extension (Plant Sciences)
 Louise Ferguson, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences)
 Matthew W. Fribidus, Ph.D., Extension Viticulturist (Viticulture & Enology)
 Albert J. Fischer, Ph.D., Associate Professor (Plant Sciences)
 Mark Francis, M.L.A., Professor (Landscape Architecture)
 Shu Geng, Ph.D., Professor (Plant Sciences)
 Paul L. Geps, Ph.D., Professor (Plant Sciences)
 Sham S. Goyal, Ph.D., Lecturer and Project Scientist (Plant Sciences)
 Thomas M. Gnadzioel, Ph.D., Professor (Plant Sciences)
 W. Douglas Gubler, Ph.D., Lecturer and Extension Plant Pathologist (Plant Pathology)
 James A. Harding, Ph.D., Professor (Plant Sciences)
 Timothy K. Hartz, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences)
 James E. Hill, Ph.D., Lecturer and Specialist in Cooperative Extension (Plant Sciences)
Human Anatomy
See Courses in Cell Biology and Human Anatomy (CHA), on page 379.

Human and Community Development

[College of Agricultural and Environmental Sciences]
Zheng Chen, Ph.D., Chairperson of the Department
Michael P. Smith, Ph.D., Associate Chairperson of the Department
Community Studies and Development, Human Development and Family Studies, and International Agricultural Development
Department Advising Office. 1303 Hart Hall (530) 752-2244, 752-1805; http://hcd.ucdavis.edu

Faculty—Community Studies and Development
Christopher Bennet, Ph.D., Associate Professor
Stephen B. Brush, Ph.D., Professor
Ryan Galt, Ph.D., Assistant Professor
Luis E. Guarnizo, Ph.D., Associate Professor
Frank Hirtz, Ph.D., Professor
Martin F. Kenney, Ph.D., Professor
William Lacy, Ph.D., Professor
Michael P. Smith, Ph.D., Professor
Thomas Tamich, Ph.D., Professor
Miriam J. Wells, Ph.D., Professor

Emeriti Faculty
Isao Fujimoto, M.A., Lecturer SOE Emeritus
Alvin D. Sokolow, Ph.D., Extension Specialist Emeritus
Janel Moomen, Ph.D. Professor Emeritus

Distinguished Graduate Mentoring Award
Joan Wright, Ph.D., Extension Specialist Emeritus

Affiliated Faculty
David Campbell, Ph.D., Associate Extension Specialist
Jim Grieshop, Ph.D., Extension Specialist
Laurie Lippin, Ph.D., Continuing Appointment Lecturer

Paul Marcotte, Ph.D., Continuing Appointment Lecturer
Robert Wiener, Ph.D., Continuing Appointment Lecturer

Faculty—Human Development and Family Studies
Brenda K. Bryant, Ph.D., Professor
Zhe Chen, Ph.D., Professor
Katherine Conger, Ph.D., Professor
Rand Conger, Ph.D., Professor
Lawrence V. Harper, Ph.D., Professor
Rosemarie Kraft, Ph.D., Lecturer SOE
Katherine Maysn, Ph.D., Assistant Professor
Lisa Miller, Ph.D., Associate Professor
Adrienne Nishina, Ph.D., Assistant Professor
Beth A. Ober, Ph.D., Professor

Emeriti Faculty
Keith Barton, Ph.D., Professor Emeritus
Emmy E. Werner, Ph.D., Professor Emeritus

Affiliated Faculty
Julia Luckenbill, Child Development Demonstration Lecturer
Ann Mastergeorge, Ph.D., Assistant Adjunct Professor/Assistant Researcher
Lenna Ontai-Grzebik, Ph.D., Extension Specialist

Richard Ponzio, Ph.D., Extension Specialist
Cynthia Duke, Ph.D., Child Development Demonstration Lecturer

Kelly Twibell, Child Development Demonstration Lecturer

Quarter Offered: I-Tall; II-Winter, III-Spring; IV-Summer; 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Social-Cultural Diversity; Wrt=Writing Experience

Truman P. Young, Ph.D., Professor (Plant Sciences)

Graduate Study. The Graduate Group in Horticulture and Agronomy offers programs of study leading to the M.S. and Ph.D. degrees for students interested in the science and management of agricultural crops, including their ecology, pathology, genetics, and post-harvest management, as well as the interaction of agricultural crops with the environment. These programs are designed to focus on a cropping system, such as agronomy, environmental horticulture, pomology, vegetable crops, viticulture and weed science. Within that cropping system, the student can specialize in one of a number of areas, including agroecology, biotechnology, breeding and crop improvement, crop physiology, crop production, floriculture, landscape horticulture, mineral nutrition, modeling, nursery production, pest management, plant growth and development, postharvest physiology, revegetation/restoration, and water relations. Research may be conducted within these areas with an applied or basic focus, but in association with a cropping system.

Preparation. For both the M.S. and Ph.D. programs, a level of competence equivalent to that of a sound undergraduate program in Plant Science is required. This includes coursework in general biology, chemistry, organic chemistry, physics, statistics, genetics, introductory plant physiology, and soil science. A few limited deficiencies in any of these areas can be made up after admission to the graduate program. Specific requirements are outlined in detail on the group's Web page. The graduate adviser, the major professor, and the student will design a program of advanced courses to meet individual academic needs within one of the specializations.

Graduate Advisers. Consult the Group Office.

Courses in Horticulture (HRT)

Graduate Courses

203. Research Perspectives in Horticulture (3)
Lecture—1 hour; lecture/discussion—2 hours. Prerequisite: Plant Biology 111 and 112, or Environmental Horticulture 102 or the equivalent. Following lectures/discussions of scientific methodology, students develop research proposals aided by classroom discussions and individual interactions with instructors. Lectures and critiques of "classical papers" provide a sense of the evolution of the current concepts in perennial plant biology. Offered in alternate years. [I] Delwin Kessel

251. Modeling Horticultural Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Plant Biology 142, calculus, or consent of instructor. Development and application of models. Emphasis on physiological and ecological models, with examples from areas of interest to class participants. Applications to horticultural systems. —II. [II.] Lieth

290. Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing at UC Davis. Seminars presented by invited speakers, students, or faculty on selected topics in horticulture. (S/U grading only.)—I. [I]

298. Group Study (1-5)

Human Anatomy

[College of Agricultural and Environmental Sciences]
Human Development

(University of California, Davis)

Department of Human and Community Development

Human Development Major

Majors Program

The Program

Human development is the developmental process in humans throughout the life cycle, biological, cognitive, and personality/sociocultural aspects of development are studied.

Internships and Career Alternatives

At least one practice course is required. A second practicum or supervised internship can be used to fulfill the required elective requirement for the major. In addition, students can intern in schools, early childhood education or senior centers, hospitals, rehabilitation centers, probation offices, group foster homes, mental health clinics, or tutors for handicapped or bilingual students. Human development graduates fill a wide variety of positions in preschools, elementary and special educational settings, programs designed for parents, families, and the elderly, as well as governmental jobs related to social services for people of all ages. Students who emphasize biological aspects of human development can apply to medical school or pursue training in positions in the health sciences. Human development prepares students to pursue advanced degrees in behavioral and social sciences, education, social work, family law, or health sciences.

Preparatory Requirements

UC Davis students who wish to change their major to Human Development must complete the following courses with a combined grade point average of at least 2.500. All of the following courses must be taken for a letter grade:

Psychology 1
Statistics 10 or 13 or Psychology 41 or Sociology 46A and 46B

One course from Anthropology 1, 2 or 15
One course from Biological Sciences 2A, 10, 101, Microbiology 10, Molecular and Cellular Biology 10, or Neurobiology, Physiology, and Behavior 10, 12 or 101

B.S. Major Requirements

English Composition Requirement

Two courses from: Anthropology 1, 2, or 15...

One course from: Biological Sciences 2A, 10, Microbiology 10, or Neurobiology, Physiology, and Behavior 12...

One course from: Molecular and Cellular Biology 10 or Biological Sciences 101...

One course from: History 17A, 17B, 72A, 72B, or Political Science 1...

Two courses from Philosophy 3, 30, 31, 32, or 38...

One course from: Neurobiology, Physiology, and Behavior 10, 101, or Psychology 101...

One course from: Psychology 41 or Sociology 46A and 46B, or Statistics 10 or 13...

Breadth/General Education Requirement

Depth Subject Matter

Human Development 100A, 100B, 100C...

Human Development 120 or 121...

One course from: Biological Sciences 101...

One course from: Human Development 117, Nutrition 111AV, or Psychology 121...

One course from: Human Development 102, 110, 130, 160, or 162...

One course from: Human Development 101, 103, 132, or 163...

One course from: Human Development 140, 140L, or 141 or 142 or 143...

Five additional upper division courses chosen from among Human Development courses or a list of restricted electives in consultation with faculty adviser. May include only one practicum course.

Unrestricted Electives

Total Units for the Degree

Aging and Adult Development

Human Development 100C, 117, 143, 160, 162, or 163...

Select two of the following courses from the major: Theories, methods, evidence, and debates in the field of cognitive development, such as nature/nurture, constraints on learning, and the role of plasticity. Topics include attention, memory, concepts about the physical and social world, and language. (Same course as Psychology 141.) GE credit: Writ.—I, II, III. (I, II, III.) Chen, Gibbs, Goodman, Graff-Guerrero, Lagattuta, Rivera.

Minor Program Requirements

The Department of Human and Community Development offers two minors.

Minor Adviser: L. Harper

Human Development

Human Development 100A and 100B...

Human Development 100C or 110...

Two courses from Human Development 101, 102, 103, 130, 132, or 163...

Minor Adviser: L. Harper, R. Kraft

Graduate Study

Graduate study is available through a Master of Science degree in child development, and a Ph.D. degree in human development. See Child Development (A Graduate Group), on page 182, and Human Development (A Graduate Group), on page 326. See also Graduate Studies, on page 104.

Courses in Human Development (HDE)

Questions pertaining to the following courses should be directed to the Human and Community Development Advising office in 1303 Hart Hall (530) 752-2244.
110. Contemporary American Family (4)  Lecture—4 hours. Prerequisite: introductory psychol-
yogy. Current theory and research affecting human families including changing economic conditions, changing sex roles, divorce, and parenthood; theories and research on family interaction.—II, III. K. Conger

117. Longevity (4)  Lecture—3 hours. Term paper. Prerequisite: upper division standing or consent of instructor. French study with children who have lived to an advanced age, focusing on the social, family, and cultural contexts and processes. Emphasis on multi-level mechanisms underlying ad-

203. Adolescent Behavioral and Emotional Development (4)  Lecture/discussion—4 hours. Prerequisite: course 200A. Analysis of recent theories, research methods, and major findings on adolescent behavioral and emotional development, including contextual and genetic influences on adolescent development and transitions, and social/family contexts and processes. Emphasis on multi-level mechanisms underlying ado-

210. Theories of Behavioral Development (3)  Lecture—2 hours; discussion—1 hour. Prerequisite: course 100A or 100B. Study of the development of behaviors over the life span, including changing economic conditions, changing social policy, culture, and adaptation. Oral histories of class projects. Offered in alternate years. GE credit: Div.-II.

120. Research Methods in Human Development (4)  Lecture—3 hours; laboratory—3 hours. Prerequisite: course 100A or 100B, and Statistics 13 or Education 114 or Psychology 41 or Sociology 46A and 46B. Topics include scientific view of human develop-
 ment; origins of scientific inquiry; research strategies; preparation for conducting research; determining statistics and statistical inference (hypothesis testing); statistical analysis and understanding results. Major emphasis on experimentation, collect-
ing data and analyzing results.—I, II. Maysyn, Nishina

121. Psychological Assessment (4)  Lecture—4 hours. Prerequisite: courses 100A-100B; ele-
mentary statistics. Current issues and methodol-
y related to the psychological assessment of child-
ren.—I, II, III. Bryant, Mastergeorge

130. Emotionally Disturbed Children (4)  Lecture—3 hours; discussion—1 hour. Prerequisite: courses 100A and 100B or consent of instructor. Dis-
cussion of psychosis, neurosis, behavior disorders, and learning difficulties in children.—II, III. Bryant, Mastergeorge

132. Individual Differences in Cognition (4)  Lecture—4 hours. Individual differences in cognition, including learning disabilities and giftedness. Educa-
tion implications and neurodevelopmental sub-
 strates of individual differences in cognition.—I, II, III, IV. Craft

140. Communication and Interaction with Young Children (2)  Lecture—2 hours. Prerequisite: courses 30, 100A, and 140L (concurrent enrollment recommended). Theory and practice in the area of effective interac-
 tion with young children. Humanistic, child-centered approaches; awareness of goals, beliefs, and values as these affect interactions. To enroll, students must sign up for laboratory at the Child and Family Studies Center.—I, II, III, IV. Craft

140L. Laboratory in Early Childhood (3-6)  Discussion—3 hours; laboratory—6-15 hours. Pre-
 requisite: course 140 (may be taken concurrently). Application of theories of learning and development to interaction with children six months to five years at Early Childhood Laboratory. Applied skills in com-
munication, discipline and curriculum. May be re-
peated for credit for a total of 12 units. (P/NP grading only.)—I, II, III, IV. Craft

141. Field Study With Children and Adolescents (4-6)  Lecture—2 hours, fieldwork—6-12 hours. Prerequi-
tive: course 100A or 100B; consent of instructor. Study of children's affective, cognitive and social development within the context of family/school environments, hospitals and foster group homes. May be repeated for credit for a total of 12 units.—I, II, III, IV. Kraft, Fonzo

142. Field Study with Emotionally Disturbed Children and Adolescents (4-6)  Discussion—1.5 hours; fieldwork—6-12 hours. Prerequi-
tive: course 130 (may be taken concurrently); consent of instructor. Field study with children who are identified emotionally disturbed, including those with internalizing and externalizing behavior problems. May be repeated for credit for a total of 12 units following consultation with and consent of instructor.—II, III. Bryant

143. Field Studies of the Elderly (4-6)  Discussion—2 hours; field work—6-12 hours. Prere-
quisite: course 100C or 160 may be taken concur-
rently. To apply theory and research on adult development and aging with older adults in a variety of settings, and to develop skills relevant to that application. Students will also develop a small research project.—II, III. Miller, Ober

160. Social Aspects of Aging (4)  Lecture—4 hours. Prerequisite: course 100C or Psycho-

logy 115. How the social context affects adult development and aging. Emphasis on demography, social policy, culture, and adaptation. Oral histories of class projects. Offered in alternate years. GE credit: Div.-II.

162. Issues in Aging (3)  Lecture—2 hours; lecture/discussion—1 hour. Prerequisite: course 100C or 160. Research and policy issues concerning the elderly and aging in contem-
porary society. Offered in alternate years.

163. Cognitive Neuropsychology in Adulthood and Aging (4)  Lecture/discussion—4 hours. Prerequisite: Psychol-
ogy 1; course 100C recommended. Theories, meth-
ods, and findings concerning the relationship between cognitive processes and brain functioning. Readings, lectures, and in-class discussions cover research on normal older adults, neu-
ropsychological case studies, and selected patient groups (e.g., amnesia, schizophrenia, Alzheimer's disease).—I, II. Kraft

190C. Introductory Research Conference (1)  Discussion—1 hour. Prerequisite: involvement in ongoing research. Instructors lead discussions with undergraduate students who involve themselves in a research project. Research papers are reviewed and aspects of project proposals developed out of class are presented and evaluated. May be repeated for credit. (P/NP grading only.)—I, II, III, IV. Craft

192. Internship (1-12)  Internship—3-36 hours. Prerequisite: upper division standing and consent of instructor. Supervised intern-
ship off and on campus, in community, and institu-
tional settings. (P/NP grading only.)

198. Directed Group Study (1-5)  (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)  (P/NP grading only)

Graduate Courses

200A. Early Development (4)  Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing; basic biology or psychology; one upper division course in psychology or a related field; one upper division or graduate course in develop-
mental psychology (may be taken concurrently). Theory and research on the biological, social, cogni-
tive, and cultural aspects of development from con-
ception to the age of five years.—I, CHEN, HARP

200B. Middle Childhood and Adolescence (4)  Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing; basic biology or psychology, and at least two upper division or graduate-level courses in psychology or related fields. Theory and research on biological, cognitive, social, and cultural influ-
ences on behavioral development from age five years until late adolescence.—II, III. CHEN, HARP

200C. Development in Adulthood (4)  Lecture/discussion—4 hours. Prerequisite: courses 200A and 200B. Theory and research focusing on social, personality, cognitive, and biological devel-
omp from early to late adulthood. Emphasis is on theory and research on change and continuity.—III. OBER, MILLER

203. Adolescent Behavioral and Emotional Development (4)  Lecture/discussion—4 hours. Prerequisite: course 200A. Analysis of recent theories, research methods, and major findings on adolescent behavioral and emotional development, including contextual and genetic influences on adolescent development and transitions, and social/family contexts and processes. Emphasis on multi-level mechanisms underlying ado-

210. Theories of Behavioral Development (3)  Seminar—3 hours. Prerequisite: consent of instructor. An overview of mechanisms of organismic develop-
ment and the implications of developmental biology for the analysis of behavioral ontology; consider-
ation of parallels between processes of organismic development and behavioral development in chil-

217. Development of Cortical and Perceptual Laterality (3)  Seminar—3 hours. Prerequisite: grade standing in child or human development or consent of instruc-

tor. Current theory and research regarding the devel-
omp of human cortical and perceptual laterality—
emphasis on the relationship of this development to thinking and behavior. Offered in alternate years. KRAFT

220. Research Methods in Human Growth and Development (4)  Lecture—4 hours. Prerequisite: Statistics 13 or the equivalent and at least two upper division courses in Human Biology or Developmental Psychology. Over-

view of qualitative and quantitative approaches to empirical inquiry in the social sciences, with a focus on theory and research methods in biological growth and cognitive and social/ emotional develop-
ment from prenatal period to death.—III. KRAFT

231. Issues in Cognitive and Linguistic Development (3)  Seminar—3 hours. Prerequisite: consent of instructor. Study and evaluation of key issues in the theoretical and empirical literature on cognitive and linguistic develop-
ment.—III. KRAFT

232. Cognition and Aging (3)  Lecture/discussion—3 hours. Prerequisite: course 200C. The manner in which cognitive processes are affected by aging as well as an understanding of the changes in the central nervous system occurring with aging. Offered in alternate years. OBER

234. Children's Learning and Thinking (3)  Seminar—3 hours. Prerequisite: course 200A or Psychol-

ogy 212 recommended. Analysis of theories, research methods, and major findings of children's higher order cognition, including origins of knowl-
edge, development of problem solving skills, reason-
ing strategies, and scientific reasoning, with an emphasis on the underlying mechanism involved in children's thinking and learning processes. Offered in alternate years.—I, CHEN

238. The Context of Individual Development (3)  Lecture/discussion—3 hours. Prerequisite: graduate standing in Human Development, Child Develop-
ment, Education, Psychology, Anthropology, Sociol-
ogy, or consent of instructor. Study of human development within the context of daily life. Context-
ualizing theories and methods of developmental psychology will be distinguished from contextual the-
ories and methods. Developmental psychology mod-
el will be distinguished from child psychology models. Offered in alternate years. BRYANT
Human Development

(A Graduate Group)

Lawrence V. Harper, Ph.D., Group Chairperson

Group Office. 1337 Hart Hall

http://humandevelopment.ucdavis.edu

Faculty

Thomas F. Anders, M.D., Professor Emeritus

Psychiatry

Brenda K. Bryant, Ph.D., Professor

(Human and Community Development)

Zhe Chen, Ph.D., Professor

(Human and Community Development)

Katherine J. Conger, Ph.D., Assistant Professor

(Human and Community Development)

Rand Conger, Ph.D., Professor

(Human and Community Development)

Kathryn G. Dewey, Ph.D., Professor (Nutrition)

Emilio Ferrer, Ph.D., Assistant Professor (Psychology)

Lorena Garcia, M.P.H., Dr.P.H., Assistant Professor

(Chicana Studies)

Beth Goodlin-Jones, Ph.D., Associate Professor

Psychiatry

Gail Goodman, Ph.D., Professor (Psychology)

Rangy Hagerman, M.D., Professor, Director

(M.I.N.D. Institute)

Robin L. Hansen, M.D., Professor

(Pediatrics)

Lawrence V. Harper, Ph.D., Professor

(Human and Community Development)

David Hess, Ph.D, Assistant Professor (Psychiatry)

Suad Joseph, Ph.D., Professor

(Anthropology and Gender Studies)

Penelope Knopp, M.D., Professor (Psychiatry)

Rosemarie H. Kraft, Ph.D., Lecturer SE

(Human and Community Development)

Seymour Levine, Ph.D., Adjunct Professor

Psychiatry

Ann Mastergeorge, Ph.D., Assistant Adjunct Professor

(Human and Community Development)

Katherine Massyn, Ph.D., Assistant Professor

(Human and Community Development)

Elizabeth Miller, M.D., Ph.D., Assistant Professor

(Pediatrics)

Lisa Miller, Ph.D., Associate Professor

(Human and Community Development)

Adrienne Nishina, Ph.D., Assistant Professor

(Human and Community Development)

Lisa Oakes, Ph.D., Professor (Psychology)

Beth A. Ober, Ph.D., Professor

(Human and Community Development)

Lenna Ontai, Ph.D. Assistant Specialist in Cooperative Extension Specialist

(Human and Community Development)

Richard Ponzi, Ph.D., 4H Youth Development Specialist in Cooperative Extension (Human and Community Development)

Susan Rivera, Ph.D., Assistant Professor (Psychology)

Richard W. Robins, Ph.D., Professor (Psychology)

Sally Rogers, Ph.D., Professor (Psychiatry)

Julie Schweitzer, Ph.D., Associate Professor

Psychiatry

Phillip Shaver, Ph.D., Professor (Psychology)

Ross A. Thompson, Ph.D., Professor (Psychology)

Susan Timmer, Ph.D., Clinical Specialist (Pediatrics)

Anthony Uriquiza, Ph.D., Associate Professor

(Pediatrics)

Karen Watson-G Gegena, Ph.D., Professor (Education)

Distinguished Graduate Mentoring Award

Keith Widaman, Ph.D., Professor (Psychology)

Affiliated Faculty

Kristin Alexander, Ph.D., Assistant Professor

(California State University, Sacramento)

Anne Driscoll, Ph.D., Assistant Researcher

(School of Education)

Graduate Study. The interdisciplinary and inter-departmental Graduate Group in Human Develop-

ment offers a program of study leading to the Ph.D. degree. The program provides lifespan study of human behavioral development, with a balance of emphasis on biological, cognitive, and socio-emotional development in context. Requirements of the degree will be prepared to teach, research, and to be actively involved in public service in human behavioral development.

Applicants seeking consideration for admissions and fellowships must submit all materials by January 1.

Graduate Adviser. Contact the Group office.

Humanities

[College of Letters and Science]

Carolyn de la Peña, Ph.D., Program Director

Program Office. 176 Voorhies

(S) (303) 752-2257, http://humanities.ucdavis.edu

Committee in Charge

Moradewun Adejunmobi, Ph.D.

(African American and African Studies)

Miroslava Chavez-Garcia, Ph.D.

(Chicana/o Studies)

Carolyn Thomas de la Peña, Ph.D.

(American Studies)

Ines Hernandez-Avila, Ph.D.

(Native American Studies)

Robert Irwin, Ph.D. (Spanish)

Caren Kaplan, Ph.D. (Cultural Studies)

Christopher A. Reynolds, Ph.D. (Music)

Barbara Sellers Young, Ph.D. (Theatre and Dance)

Brenda Schildgen, Ph.D. (Comparative Literature)

Blake Stimson, Ph.D. (Art History)

Claire Waters, Ph.D. (English)

The Program of Study

The Humanities program offers courses in the Humanities proper and also sponsors the minor in Global and International Studies. Courses in the Humanities proper are interdisciplinary in scope and aim to develop critical thinking and writing skills (most courses fulfill partial or complete GE requirements) in three areas: major authors and texts, major periods, major themes in world culture.

Courses in Humanities (HUM)

Lower Division Courses

1. Humanities Forum (2)

Lecture—2 hours. Reading and discussion of a single work representative of a particular culture, historical period, or genre and significant for its ongoing cultural impact in the humanities, sciences, social sciences, and human experience. Offered in alternate years. (I, II, III.)

2. Issues and Concepts in the Humanities (2)

Discussion—2 hours. Prerequisite: course 1 concurrently. Small group discussions and preparation of short papers for course 1. May be repeated once for credit if topic differs. GE credit with concurrent enrollment in HUM 1D—I, II, III, (I, II, III)

3. Medicine and Humanities (4)

Lecture/discussion—3 hours. Extensive writing. Prerequisites: completion of Subject A requirement. Evolution of the "medical arts" into the "science of medicine." The culture of medicine in the context of society, medical ethics. GE credit: SocSci, Wrt.—III.

4. Animals and Human Culture (2)

Lecture—2 hours. The meaning of human relations with animals studied across a variety of historical periods and culture and from a variety of humanistic perspectives. Offered in alternate years—II.
4D. Animals and Human Culture Discussion (2)
Discussion—2 hours. Prerequisite: concurrent enrollment in course 4. Small group discussions and preparation of short papers for course 4. Offered in alternate years. GE credit with concurrent enrollment in course 4: ArtHum, Wrt.—II.

5. Representation of the Law in Literature and Film (4)

6. Wagner and Star Wars (4)
Lecture/discussion—3 hours; extensive writing. Wagner’s Ring and Lucas’ Star Wars, as examples of 19th and 20th centuries approaches to the arts and their relationship with the society. GE credit: ArtHum or SocSci, Wrt.

7. Travel and Travel Literature (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: Subject A requirement. History of travel from (Land, Air, and Exploration to the modern era. Contemporary trends in travel, including mass tourism, adventure travel, and ecotourism. Social, economic, and cultural issues related to modern trends in travel. Analysis of literary representations of travel. GE credit: ArtHum, Div, Wrt.—II.

8. Introduction to Perspectivities on Narrative (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: completion of Subject A requirement. Interdisciplinary approach to the use of story across time, culture, and discipline. How the telling and retelling of particular stories reflect the values, concerns, and assumptions of their original audiences and genres. GE credit: ArtHum or SocSci, Div, Wrt.

9. Don Quixote and the Modern World (2)
Lecture—2 hours. Reading Don Quixote as emblem of modernity in the West. Issues of reality versus illusion, heroism, freedom and self-fulfillment, racial tolerance and love. Don Quixote in other cultural and popular media: film, dance, art, musical drama, and television. Offered in alternate years. GE credit with concurrent enrollment course in 9D: ArtHum, Wrt.—II.

9D. Don Quixote and the Modern World Discussion (2)
Discussion—2 hours. Prerequisite: course 9 concurrently. Simultaneous discussions and preparation of short papers for course 9. Offered in alternate years.

11. Shakespeare in Performance (4)
Lecture/discussion—4 hours. Reading, viewing, and discussion of one or two Shakespeare plays with focus on the relationship between text and performance (on stage and on film); analysis of the relationship between presentation of Shakespeare and cultural world view, meaning, and aesthetics. GE credit: ArtHum, Wrt.

12. History of the Book (4)
Lecture/discussion—3 hours; extensive writing. The invention and impact of writing systems on cultures; including the invention of paper, the introduction of the printing press, the book-buying client, and the history of censorship and book burning and their connection to the technology of the word. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt.

13. Witchess: Myth and Historical Reality (4)
Lecture—3 hours; extensive writing. This course examines the historical construction of the witch. The four areas covered are: European pagan religions and the spread of Christianity; the “burning Times” in England and New England; the Salem witch trials; and fairytales. GE Credit: ArtHum, Div, Wrt.—II. (III.)

15. Language and Identity (4)
Lecture/discussion—3 hours; extensive writing. Introduction to the construction of identity through language use, including geographical and social factors affecting language groups. Language ideology affecting linguistic groups, including bilinguals and non-native speakers of English. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II.

18. Performance and the 21st Century (4)

40. Introduction to Computing in the Humanities (4)
Lecture—3 hours; laboratory—3 hours. Survey of current approaches to use of computers in such fields as language, literature, history, art, music, and drama. Laboratory in text creation and analysis.

60. Narrative and Argumentative Approaches to Major Current Issues in the Media, Culture, and Society (4)
Lecture/discussion—3 hours; term paper. Prerequisite: English A or the equivalent. Interdisciplinary approach to contemporary issues (abortion, AIDS, civil rights, war and peace, welfare state) around which individuals, communities and institutions define themselves in modern society, by applying principles of narrative theory to the narratives where these issues are embedded. GE credit: ArtHum or SocSci, Div, Wrt.

92. Internship (1-12)
Internship—3-36 hours. Internships in fields where students can practice their skills. May be repeated for credit. (P/NP grading only.)

Upper Division Courses

113. Goethe’s Faust (4)
Discussion—3 hours; term paper. Knowledge of German not required. Intensive study of Goethe’s Faust in its entirety. Discussions and readings in English; reading the text in the original is encouraged. Some course as German 113 offered in alternate years. GE credit: ArtHum, Div, Wrt.—II.

140. Advanced Computing in the Humanities (4)
Lecture—3 hours; laboratory—3 hours; research project. Prerequisite: course 40 or consent of instructor. The computer as support for the humanities. Topics include advanced technical analysis, editing, vocabulary control, and data base management (design, application and evaluation, and search strategies).

144. Marx, Nietzsche, Freud (4)
Lecture/discussion—3 hours; term paper. Study of major texts of these thinkers, selected with an eye to their impact on 20th-century economics, ethics, and attitudes toward eros. Particular focus on conceptions of the self and the individual’s relation to society. Offered in alternate years. GE credit: ArtHum, Wrt.—II.

145. The Literature of Deviance: Mann, Hesse, Kafka (4)
Lecture—3 hours; term paper. Close study of selected prose works of Mann, Hesse, and Kafka as representatives of modernism’s fascination with social, sexual, and psychological alienation. Attention to the growth of the portrayal of deviancy through formal innovations in fiction. Offered in alternate years.

180. Topics in the Humanities (4)
Lecture/discussion—3 hours; term paper. Analysis of interdisciplinary issues in the humanities. Topics will vary. May be repeated one time for credit. GE credit: ArtHum, Wrt.

192. Internship (1-12)
Internship—3-36 hours. Internships in fields where students can practice their skills. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-4)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-4)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

250. Topics in the Humanities (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Topics in the humanities, selected by the instructor. May be repeated once for credit.—I, II, III. (II, III.)

292. Graduate Internship (1-15)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: consent of instructor required. Individually designed supervised internship, off campus, in community or institutional setting. Developed with advice of faculty mentor. May be repeated for credit up to 15 units. (S/U grading only.)

298. Directed Group Study (1-5)
(S/U grading only.)

299. Individual Research (1-4)
Individual research in the humanities resulting in a formal written research report. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. (S/U grading only.)

Hydrologic Sciences (A Graduate Group)

Graham Fogg, Ph.D., Chairperson of the Group
Group Office, 113 Veihmeyer Hall or 1152 Plant and Environmental Sciences Building; (530) 752-1669; http://lawr.ucdavis.edu/graduate_hyd.htm or http://lawr.ucdavis.edu/hsgg/index.htm

Faculty

Roger Bales, Ph.D., Professor
(U.C. Merced School of Engineering)
Fabio Bombardelli, Ph.D., Assistant Professor
(Civil and Environmental Engineering)
William Casey, Ph.D., Professor (Chemistry)
Randy Dahlgren, Ph.D., Professor
(Land, Air, and Water Resources)
Harrison Dunning, Ph.D., Professor (School of Law)
Graham Fogg, Ph.D., Professor
(Land, Air, and Water Resources)
Timothy Ginn, Ph.D., Professor
(Civil and Environmental Engineering)
Mark Grismer, Ph.D., Professor
(Land, Air, and Water Resources)
Thomas Harmon, Ph.D., Professor
(U.C. Merced Environmental Systems School of Engineering)
Peter Hermes, Ph.D., Assistant Professor
(Land, Air, and Water Resources)
Brit Holmen, Assistant Researcher
(Crocker Nuclear Laboratory)
Jan Hopmans, Ph.D., Professor
(Land, Air, and Water Resources)
William Horwath, Ph.D., Professor
(Land, Air, and Water Resources)
Michael Johnson, Ph.D., Director
(Aquatic Ecosystem Analysis Laboratory)
M. Levent Kavvas, Ph.D., Professor
(Civil and Environmental Engineering)
Bruce Kutter, Ph.D., Professor
(Civil and Environmental Engineering)
John Largier, Ph.D., Professor
(Bodega Marine Laboratory)
Mark Lubell, Ph.D., Professor
(Environmental Science and Policy)
Jay Lund, Ph.D., Professor
(Civil and Environmental Engineering)
Douglas Mackay, Ph.D., Adjunct Professor
(Land, Air, and Water Resources)
James McClain, Ph.D., Professor (Geology)

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer. 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Social-Cultural Diversity; Wrt—Writing Experience
Hydrologic Sciences (A Graduate Group)

Miguel Marino, Ph.D., Professor
[(Land, Air, and Water Resources)]

Jeffrey Markos, Ph.D., Professor (Geology)
[(Land, Air, and Water Resources)]

Alexandra Navrotsky, Ph.D., Professor
[(Land, Air, and Water Resources)]

Gregory Kachuck, Ph.D., Associate Professor
[(Land, Air, and Water Resources)]

Kyaw Tha Paw U, Ph.D., Professor
[(Land, Air, and Water Resources)]

Carlos Puente, Ph.D., Professor
[(Land, Air, and Water Resources)]

Elissa Rejmankova, Ph.D., Professor
[(Environmental Science and Policy)]

Paul Sabatier, Ph.D., Professor
[(Civil and Environmental Engineering)]

Jeffrey Mount, Ph.D., Professor
[(Civil and Environmental Engineering)]

Terry Prichard, M.S., Water Management Specialist
[(Land, Air, and Water Resources)]

Howard S. Thomas, Ph.D., Professor
[(Civil and Environmental Engineering)]

Tom Young, Associate Professor
[(Civil and Environmental Engineering)]

Kate Scow, Ph.D., Professor
[(Land, Air, and Water Resources)]

Takashi Horibe, Ph.D., Professor
[(Land, Air, and Water Resources)]

Tom Fogg, Ph.D., Professor
[(Civil and Environmental Engineering)]

Charles Goldman, Ph.D., Professor Emeritus
[(Environmental Science and Policy)]

Jeffrey Markos, Ph.D., Professor Emeritus
[(Geology)]

Carlos Puente, Ph.D., Professor Emeritus
[(Geology)]

Jeffrey Mount, Ph.D., Professor Emeritus
[(Civil and Environmental Engineering)]

Terry Prichard, M.S., Water Management Specialist Emeritus
[(Land, Air, and Water Resources)]

Robert Zierrenberg, Ph.D., Professor Emeritus
[(Geology)]

Charles Goldman, Ph.D., Professor Emeritus
[(Geology)]

Distinguished Graduate Mentoring Award

Theodore Hisao, Ph.D., Professor Emeritus

Dennis Bolton, Ph.D., Professor Emeritus

Joan Flarsheim, Ph.D., Associate Research Geologist
[(Geology)]

David Goldhammer, Ph.D., Irrigation Specialist
[(Land, Air, and Water Resources)]

Stephen Grattan, Ph.D., Water Relations Specialist
[(Land, Air, and Water Resources)]

Blaine Hanson, Ph.D., Irrigation Specialist
[(Land, Air, and Water Resources)]

Thomas Harter, Ph.D., Cooperative Extension Specialist
[(Land, Air, and Water Resources)]

Terry Prichard, M.S., Water Management Specialist
[(Land, Air, and Water Resources)]

Lawrence Schwankl, Ph.D., Irrigation Specialist
[(Land, Air, and Water Resources)]

Richard Snyder, Ph.D., Biometeorologist Specialist
[(Land, Air, and Water Resources)]

Kenneth Tate, Extension Rangeland Specialist
[(Plant Sciences)]

Graduate Study. The Graduate Group in Hydrologic Sciences is an interdisciplinary program offering M.S. and Ph.D. degrees. Course work is available in many programs, including Hydrologic Sciences, Land, Air, and Water Resources, Civil and Environmental Engineering, Geology, and Soil Science. Education in the group broadens the skills and knowledge of the physical science or engineering student interested in the occurrence, distribution, circulation, and properties of water on earth. Because of water’s ubiquity and importance to physical, chemical and biological processes, hydrologic sciences involve the geologic, atmospheric, and oceanic sciences, as well as engineering and other applied physical sciences. Basic to the program are core courses in fluid dynamics, hydrologic phenomena, hydrobiogeochemistry, hydrologic theory and processes, and hydrologic policy. Students can pursue specializations in hydrogeochemistry, surface hydrology, subsurface hydrology, irrigation and drainage, watershed hydrology and water resources management. The subsurface hydrology specialization includes hydrogeology and vadose-zone hydrology.

Preparation. Applicants to the program are expected to have completed or be completing an undergraduate degree in environmental or physical sciences, mathematics, or engineering. Undergraduate study must include one year each of calculus, of physics with calculus, and of chemistry. A second year of vector calculus and differential equations is recommended and will be required, before completion of graduate work. Additional courses in applied mathematics, computer programming, and geology are recommended.

Specialization. Each student will pursue an individual program of advanced study under the direction of a group of faculty members with similar interests but diverse backgrounds. Course work in addition to the above is typically taken in the most appropriate departments.

Graduate Adviser. Mark E. Grismer (Land, Air, and Water Resources)

Courses in Hydrologic Sciences (HYD)

Graduate Courses

200. Survey of Hydrologic Sciences (1)
Seminar—1 hour; term paper. Prerequisite: open to students in the Hydrologic Sciences program. Seminar course exposes students to the diversity of science involved in the program. Students prepare a paper and presentation in their area of research interest. May be repeated twice for credit. (S/U grading only)—I, II, III. (II, III.) Grismer

205. Continuum Mechanics of Natural Systems (4)
Lecture-discussion—4 hours. Prerequisite: Mathematics 241 and 242, Programming language, or consent of instructor. Principles and modeling of water flow and chemical transport in the vadose zone, with specific applications to soils. Topics include hydraulic properties, finite difference approximation to unsaturated water flow, parameter optimization, diffusive and convective transport in gaseous and liquid phases. Offered in alternate years.—II. Hopmans

243. Water Resource Planning and Management (4)
Lecture—3 hours. Prerequisite: course 141 or Civil and Environmental Engineering 142. Applications of deterministic and stochastic mathematical programming techniques to water resource planning, analysis, design and management. Water allocation, capacity expansion, and reservoir operation. Conjoint use of surface water and groundwater. Water quality management. Irrigation planning and operation models. (Same course as Biological Systems Engineering 203.)—I. Wallender

210. Vadose Zone Transport Processes and Modeling (3)
Lecture-discussion—3 hours. Prerequisite: Soil Science 107, Mathematics 228, programming language, or consent of instructor. Principles and modeling of water flow and chemical transport in the vadose zone, with specific applications to soils. Topics include hydraulic properties, finite difference approximation to unsaturated water flow, parameter optimization, diffusive and convective transport in gaseous and liquid phases. Offered in alternate years.—II. Hopmans

424. Water Resource Planning and Management (4)
Lecture—3 hours. Prerequisite: course 141 or Civil and Environmental Engineering 142. Applications of deterministic and stochastic mathematical programming techniques to water resource planning, analysis, design and management. Water allocation, capacity expansion, and reservoir operation. Conjoint use of surface water and groundwater. Water quality management. Irrigation planning and operation models. (Same course as Biological Systems Engineering 243.)—I. (I.) Marino

252. Hillslope Geomorphology and Sediment Budgets (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 141 or Geology 35 or Civil and Environmental Engineering 142 or consent of instructor. Exploration of topographical and empirical foundations of sediment production, transport and budget modeling. Use of computer models and field experiments to promote an understanding of how watersheds evolve naturally and with human impacts. Offered in alternate years.—III. Pasternack

256. Geomorphology of Estuaries and Deltas (4)
Lecture—3 hours; fieldwork—3 hours. Prerequisite: course 141 or Geology 35 or Civil and Environmental Engineering 142 or consent of instructor. Survey of the processes and landforms associated with sediment deposition in the coastal zone. Application of geomorphic principles to coastal management issues. Offered in alternate years.—III. Pasternack

264. Modeling of Hydrologic Processes (3)
Lecture—3 hours. Prerequisite: course 141 or the equivalent and Statistics 102 or the equivalent. Techniques used to model the spatio-temporal structure of rainfall and runoff are introduced. Procedures studied include those based on stochastic point processes, chaos theory, fractal geometry, and fractional noises. Offered in alternate years.—(III.) Puente

269. Numerical Modeling of Groundwater Systems (3)
Lecture—3 hours. Prerequisite: course 145A or Civil Engineering 144 and course 145B, Mathematics 228. Finite difference and finite element techniques in modeling groundwater flow and transport. Fundamentals of constructing and calibrating models with hands-on applications. Methods and limitations of numerical solution of transport equations. Model interpretation and ethics.—(III.) Fogg

273. Introduction to Geostatistics (3)
Lecture—3 hours. Prerequisite: Statistics 130A and 130B, or the equivalent. Statistical treatment of spatial data with emphasis on hydrologic problems. Topics include theory of random functions, variogram analysis, Kriging, co-Kriging, indicator geostatistics, and stochastic simulation of spatial variability. Demonstration and use of interactive geostatistical software included. Offered in alternate years.—(I.) Fogg

275. Analysis of Spatial Processes (3)
Lecture—3 hours. Prerequisite: Statistics 102 or the equivalent; course 273 or Statistics 273A recommended. Characterization of homogeneous random fields; extremes and spectral parameters; geometry of excitations, local averaging; scale of fluctuation; non-Gaussian and irregular random fields; geostatistical applications. Offered in alternate years.—(III.) Puente

86. Selected Topics in Environmental Remote Sensing (3)
Discussion—2 hours; lecture—1 hour; project; Prerequisite: consent on instructor; Environmental and Resource Sciences 186 or equivalent required; Environmental and Resource Sciences 186 recommended. In depth investigation of advanced topics in remote sensing applications, measurements, and theory. May be repeated for credit. Not offered every year.—Ustin

290. Seminar in Hydrologic Science (1)
Seminar—1 hour. Prerequisite: graduate standing and background in Hydrologic Science, consent of instructor. Students and critical review of problems, issues, and research in hydrologic sciences. Oral presentations of research. Topics will vary. May be repeated for credit. (S/U grading only)—III. (III.)

298. Group Study (1-5)
Prerequisite: graduate standing and consent of instructor. (S/U grading only)

299. Research (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—I, II, III. (II, III.)

Professional Courses

410. OSHA HAZWOPER Refresher Course (1)
Lecture—1 hour. Updates hazardous materials handling information for purposes of keeping certification current. Certification lapsed before the refresher course is complete. (P/NP grading only)—II. (III.)

440. Hazardous Waste Operations Training (3)
Lecture—2 hours; laboratory—2 hours. Prerequisite: upper division standing in College of Agricultural and Environmental Sciences. Three hour course designed to meet the requirements of Federal OSHA regulation CFR 1910.120. Covers the health, regu-
Hydrology

(College of Agricultural and Environmental Sciences)

Faculty. See under Department of Land, Air, and Water Resources, on page 342, Hydrology Section.

The Major Program

Hydrology is the study of the occurrence, distribution, circulation, and behavior of water and waterborne materials in the environment of Earth. It includes practical measurement and technical analysis of water phenomena underground, on the Earth’s surface, and in the atmosphere. Contemporary hydrologic problems costing society $100-100 billion per year include environmental restoration, sustainability of groundwater and surface water resources, water pollution, and natural disasters such as floods, droughts, landslides, avalanches, and land subsidence. The management of these problems demands hydrologists who understand the comprehensive, interdisciplinary education embodied in this program. Beyond its societal utility, hydrology can be an exciting science for the curious-minded. Hydrologists explore natural phenomena such as climate change, waterfalls, health of coral reefs, biogeochemical cycles, and aquifers.

The Program. A hydrologist needs a strong background across the basic sciences of physics, mathematics, chemistry, and biology. Breadth of understanding comes from exposure to ecology, geology, engineering, policy, and law. Depth of experience is provided by core hydrology courses, internship opportunities, and practical outdoor training. Students choose electives to match their interests and career goals. Internship should have completed as much as possible of the preparatory subject matter listed below. Internships and Career Alternatives. Job opportunities in hydrology exceed the available supply of trained hydrologists. Students commonly obtain internships and jobs with state and federal agencies, private consulting firms, environmental interest groups, irrigation districts, and utility companies. Federal agencies hiring hydrologists include the U.S. Geological Survey, U.S. Department of Agriculture (Forest Service), Agricultural Research Service, Forest Service, and National Resource Conservation Service). Environmental Protection Agency, and national research laboratories (Lawrence Livermore National Laboratory, Oak Ridge National Laboratory). State and local agency employers include California’s Departments of Water Resources, Conservation, and Fish and Game, and Toxic Substances as well as the Water Resources Control Board and Regional Water Quality Control Boards. To obtain higher levels of responsibility and salary, hydrologists often seek advanced degrees, and the hydrology major is designed to provide students with a highly competitive education to get into graduate school.

B.S. Major Requirements:

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<th>UNITS</th>
<th>Written/Oral Expression</th>
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<tr>
<td></td>
<td>Preparatory Subject Matter</td>
<td>67</td>
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<tr>
<td></td>
<td>Biological Sciences 1A, 1C, or 2A, 2B, 2C</td>
<td>9-10</td>
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<td>Chemistry 2A, 2B, 2C</td>
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<td>Physics 9A, 9B, 9C</td>
<td>15</td>
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<td>Mathematics 21A, 21B, 21C, 21D, 22A, 22B</td>
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<td>Geology 50, 50G</td>
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<td>Engineering 6 or the equivalent</td>
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<td>Breadth/General Education</td>
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<td>Depth Subject Matter</td>
<td>46-55</td>
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<tr>
<td></td>
<td>Hydrologic Science 103N or Engineering 103 or equivalent</td>
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<td>Civil and Environmental Engineering 114 or Statistics 130A and 130B</td>
<td>4-6</td>
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<td>Hydrologic Science 134, 141, 142, 144, 151</td>
<td>21</td>
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<td>Soil Science 107</td>
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<td>Select one of Hydrologic Science 150, Agricultural and Resource Economics 143, Environmental Science 161</td>
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<td>Hydrologic Science 110, 122 124, 143, 146, Civil and Environmental Policy 141</td>
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<td></td>
<td>Applied Biological Systems Technology 165</td>
<td>9-13</td>
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<td></td>
<td>Restricted Electives</td>
<td>16-26</td>
</tr>
</tbody>
</table>

To supplement or expand areas of student interest selected with approval of adviser

| UNITS | Unrestricted Electives | 6-20 |

Including units earned from 192 and 199 courses.

Total Units for the Degree: 180

Major Adviser. Greg Pasternak (Land, Air, and Water Resources)

Minor Program Requirements:

Hydrology

The Hydrology Section of the Department of Land, Air, and Water Resources offers the minor in Hydrology for environmental or natural science students who have an interest in water/environmental issues. The interested student should have completed prerequisite course work in calculus (Mathematics 16B) and chemistry (Chemistry 2A; Chemistry 2B recommended), physics (Physics 5A), and biology (Biological Sciences 1A). Course work in the minor provides fundamental skills and knowledge of the hydrologic sciences. The program is sufficiently flexible for students to pursue particular water issues or problems of interest to them.

Upper Division Courses

| UNITS | Hydrology | 20-23 |

| Hydrologic Science 103N or Engineering 103 | 4 |
| Hydrologic Science 141 or Environmental and Resource Sciences 100 | 4 |
| Hydrologic Science 144 | 4 |
| Soil Science 122 | 5 |
| Hydrologic Science 134, Chemistry 100, Soil Science 111, or Environmental and Resource Policy 151 | 3-6 |

Watershed Science

The Hydrology Program of the Department of Land, Air, and Water Resources offers the minor in Watershed Science. This minor is intended for environmental, natural, or social science students who have an interest in the interfaces between hydrology, ecology, policy, and management. The interested student should have completed prerequisite course work in calculus (Mathematics 16B), chemistry (Chemistry 2A; Chemistry 2B recommended), physics (Physics 7A), and biology (Biological Sciences 1A). Course work in the minor provides fundamental skills and knowledge on science and management of watersheds in the context of current water resources and ecological problems.

Minor Program Requirements:

| UNITS | Watershed Science | 21-26 |

Hydrologic Science 141 or Environmental and Resource Science 165 | 4 |
| Soil Science 100 or 118 | 4-5 |
| Hydrologic Science 144 or Soil Science 107 | 4-5 |
| Environmental and Resource Science 136, Hydrologic Science 124, or Hydrologic Science 151 | 4 |
| Hydrologic Science 143, Environmental and Resource Sciences 144, or Environmental Science and Policy 151 | 3-4 |
| Hydrologic Science 150, Environmental and Resource Sciences 121, or Environmental Science and Policy 161 | 3-4 |

Minor Advisor. Graham Fogg (530) 752-6810; gefogg@ucdavis.edu

Advising Center. 1152 FES Building

Courses in Hydrologic Science (HYD)

Questions pertaining to the following courses should be directed to the instructor or to the Resource Science Teaching Center in 113 Velhuyser Hall or in 1152 Plant and Environmental Sciences Building, (530) 752-1669.

Lower Division Courses

10. Water, Power, Society (3)

Lecture—2 hours; discussion—1 hour. Water resources issues. How water has been used to gain and wield sociopolitical power. Water resources development in California as related to current and future sustainability of water quantity and quality. Rules of science and policy in water problems. [Same course as Science and Society 10] GE credit: SciEng, SocSci, Wrt-I (III) Fogg

47. Watershed Processes and Water Quality in the Tahoe Basin (2)

Lecture—1 hour; laboratory—2-3 hours; workshop—9 hours; discussion—3 hours; term paper. Prerequisite: basic knowledge of environmental, soil, or hydrologic sciences. Course involves 3 days of instruction in Tahoe City. Watershed processes, runoff water quality management, and restoration in the Lake Tahoe Basin. Soils, precipitation-runoff, vegetation and adaptive management related to erosion control, effective solutions, and development of restoration strategies. Students develop and initiate field restoration. [Same course as Environmental and Resource Sciences 47.]—IV (IV) Grismer

92. Hydrologic Science Internship (1-12)

Internship—3-36 hours. Prerequisite: lower division student, consent of instructor. Work experience off and on campus in Hydrologic Science. Internship supervised by a member of the faculty. (P/NP grading only)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only)

Upper Division Courses

103N. Fluid Mechanics Fundamentals (4)

Lecture—4 hours. Prerequisite: Physics 98. Fluid mechanics axioms, fluid statics, kinematics, velocity fields for one-dimensional incompressible flow and boundary layers, turbulent flow time averaging, potential flow, dimensional analysis, and macroscopic balances to solve a range of practical problems. [Same course as Basic Systems Engineering 103.]—I. Wallender

110. Irrigation Principles and Practices (3)

Lecture—2 hours, laboratory—3 hours. Prerequisite: Physics 5A; Soil Science 100 recommended. General course for agricultural and engineering students dealing with soil and plant aspects of irrigation and drainage. Soil-water movement and storage, plant responses to irrigation regimes, water use by crops; procedures for determining frequency and depth of irrigation drainage. Not open for credit to students who have completed Water Science 110.—II. Schawankl, Grattan, Goldhamer

110A. Irrigation Principles and Practices (3)

Lecture—2 hours, laboratory—3 hours. Prerequisite: Physics 7A; Soil Science 100 recommended. General course for agricultural and engineering students dealing with soil and plant aspects of irrigation and drainage. Course covers soil-water principles including water movement, plant responses to irrigation regimes, water use by crops, also irrigation systems

Quarter Offered: I-Tall, II-Winter, III-Spring, IV-Summer, 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Social-Cultural Diversity; Wrt—Writing Experience
146. Hydrogeology and Contaminant Transport (5)  
Lecture—3 hours; laboratory—2 hours; term paper. Prerequisite: course 144 or Civil and Environmental Engineering 144 or the equivalent. Physical and chemical processes affecting groundwater flow and contaminant transport, with emphasis on realistic hydrogeologic examples. Groundwater geology and chemistry. Fundamentals of groundwater flow and transport analysis. Laboratory includes field pumping tests and work with physical and computer models. [Same course as Geology 156]=I.—II. [Fogg 147]  

147. Runoff, Erosion and Water Quality Management in the Tahoe Basin (3)  
Lecture/laboratory—30 hours; fieldwork—15 hours; discussion—10 hours; term paper. Prerequisite: Physics 78 or 98, Mathematics 16C or 21C, Civil and Environmental Engineering 142 or course 141 or Environmental and Resource Sciences 100. 5 days of instruction in Tahoe City. Practical hydrology and runoff water quality management from Tahoe Basin slopes. Development of hillside and riparian restoration concepts, modeling and applications from physical science perspectives including precipitation-runoff and surface transport and water retention ponds. [Same course as Biological Systems Engineering 147.]—IV. (IV) Grismer  

150. Water Law (3)  
Lecture—3 hours; prerequisite: Environmental and Resource Sciences 100 or 121 or consent of instructor. Principles and issues of California Water Law. Types of water rights, groundwater rights and management, and protection of instream uses. Water projects, role of federal government and federal/state relations. Basic water quality acts, endangered species act, water transfers and current water issues.—II.  

151. Field Methods in Hydrology (4)  
Lecture—2 hours; laboratory—3 hours; fieldwork—3 hours. Prerequisite: Environmental and Resource Sciences 100 or course 141. Measurement methods and data analysis for evaluation of water storage, movement and contamination in the field. Equipment such as data loggers, water and sediment samplers, pressure transducers, weather stations, surveying equipment, and flow meters will be used.—II. (Pasternack)  

182. Environmental Analysis using GIS (4)  
Lecture—2 hours; laboratory—4 hours. Prerequisite: Applied Biological Systems Technology 180 or the equivalent GIS experience and skills; general biology and/or biology foundation course recommended. Ecotone and landscape modeling with emphasis on hydrology and solute transport. Spatial analysis of environmental risk analysis including ecological risk assessment, natural resource management. Spatial database structures, scripting, data models, and error analysis in GIS. [Same course as Applied Biological Systems Technology 182.] Offered in alternate years.—III. Zhang  

192. Hydrologic Science Internship (1-12)  
Internship—3-40 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in water science. Internship supervised by a member of the faculty. [P/NP grading only.]  

198. Directed Group Study (1-5)  
[P/NP grading only.]  

199. Special Study for Advanced Undergraduates (1-5)  
Prerequisite: senior standing. [P/NP grading only.]  

Immunology (A Graduate Group)  

Nicole Baumgartner, D.V.M., Ph.D., Chairperson of the Group  

Group Office. 5217 Vet Med 3A (530) 754-0103  

Faculty  
Kristina Abel, Ph.D., Assistant Adjunct Professor [California National Primate Research Centre]  
Alaa Afify, M.D., Associate Professor and Director (Pathology)  
Paul Ashwood, Ph.D., Professor (Medical Microbiology and Immunology)  
Stephen Barhold, D.V.M., Ph.D., Professor and Director (Center for Comparative Pathology and Pathobiology, Microbiology and Immunology)  
Nicolae Baumgartner, D.V.M., Ph.D., Associate Professor (Center for Comparative Pathology and Pathobiology, Microbiology, and Immunology)  
Andrew Baumler, Ph.D., Professor (Medical Microbiology and Immunology)  
Charles Bevis, M.D., Ph.D., Professor (Medical Microbiology and Immunology)  
Christopher L. Boulus, M.D., Associate Professor (Gastroenterology)  
Camie Chan, Ph.D., Assistant Professor (Cell Biology and Human Anatomy)  

Anthony T. Cheung, Ph.D., Professor Emeritus (Pathology and Laboratory Medicine)  
Kiko Cho, Ph.D., Associate Adjunct Professor (Surgery)  
Satya Dandekar, Ph.D., Professor and Chair (Medical Microbiology and Immunology)  
Kent L. Erickson, Ph.D., Professor (Cell Biology and Human Anatomy)  
Urula Esser, Ph.D., Assistant Adjunct Professor (Pathology)  
Laurel J. Gerstwin, D.V.M., Ph.D., Professor (Pathology, Microbiology, and Immunology)  
M. Eric Gerstwin, M.D., Professor and Chief (Medical Microbiology and Immunology)  
Tzepora Goldkorn, Ph.D., Professor (Pulmonary and Critical Care Medicine)  
Daniel Hwang, Ph.D., Adjunct Professor (Nutrition)  
Kirk C. Klassing, Ph.D., Professor (Animal Science)  
Hsing-Jien Kung, Ph.D., Professor and Deputy Director (Cancer Center Basic Science)  
Kit S. Lam, M.D., Ph.D., Professor and Chief (Hematology and Oncology)  
Bill Lasley, Ph.D., Professor Emeritus (Population, Health and Reproduction)  
Patrick S.C. Leung, Associate Adjunct Professor (Rheumatology, Allergy and Clinical Immunology)  
Fa-Tong Liu, M.D., Ph.D., Professor and Chair (Dermatology)  
Grace A. Loreda, Assistant Adjunct Professor (Sacramento VA Medical Center)  
Shirley Luckhart, Ph.D., Associate Professor (Medical Microbiology, and Immunology)  
Melinda H. MacDonald, D.V.M., Ph.D., Associate Professor (Medical Microbiology, and Immunology)  
Emanuel Mavakis, M.D., Associate Professor (Dermatology)  
Lisa Miller, Ph.D., Associate Adjunct Professor (Anatomy, Physiology and Cell Biology)  
Robert T. O’Donnell, M.D., Ph.D., Associate Professor (Pathology and Oncology)  
John Peters, Ph.D., Associate Professor-In-Residence (Internal Medicine)  
Kent F. Pientka, Ph.D., and Director (Anatomy, Physiology and Cell Biology)  
Distinguished Teaching Award-Graduate/Professional  
Siba Raychaudhuri, M.D., Clinical Assistant Professor and Chief Rheumatologist (Sacramento VA Medical Center)  
Subhadip Raychaudhuri, Ph.D., Assistant Professor (Biomedical Engineering)  
Gary Rhodes, Ph.D., Professor Emeritus (Pathology)  
Dick L. Robbins, M.D., Professor (Rheumatology, Allergy and Clinical Immunology)  
Grace L. Rosenquist, Ph.D., Assistant Adjunct Professor (Neurobiology, Physiology, and Behavior)  
Barbara Shacklett, Ph.D., Associate Professor (Medical Microbiology, and Immunology)  
Scott I. Simon, Ph.D., Professor (Biomedical Engineering)  
Ellen E. Sparger, D.V.M., Ph.D., Associate Adjunct Professor (Medicine and Epidemiology)  
Charles B. Stephensen, Ph.D., Associate Adjunct Professor (Western Human Nutrition Research Center)  
Jeffrey L. Stott, Ph.D., Professor (Pathology, Microbiology, and Immunology)  
Yoshikazu S. Takada, M.D., Ph.D., Professor (Pathology, Microbiology, and Immunology)  
Suzanne S. Teuber, M.D., Associate Professor (Rheumatology, Allergy and Clinical Immunology)  
Jose V. Torres, Ph.D., Professor (Medical Microbiology, and Immunology)  
Allfonso Tramontano, Ph.D., Adjunct Professor (Nephrology)  
Renée M. Tsai, Ph.D., Assistant Professor (Medical Microbiology, and Immunology)  
Joseph M. Tuscano, M.D., Associate Professor (Pathology and Oncology)  
Judy Van de Water, Ph.D., Professor-In-Residence (Rheumatology, Allergy and Clinical Immunology)  
Andrew Vaughan, Ph.D., Professor (Radiation Oncology)
Robert H. Weiss, M.D., Associate Professor (Nephrology)
Jean Wiedeman, Associate Professor (Pediatrics)
Reen Wu, Ph.D., Professor (Anatomy, Physiology and Cell Biology)
Helen Wull, Ph.D., Assistant Professor (Pharmacology)
Tilahun D. Yilma, D.V.M., Ph.D., Director and Heike Wulff, Ph.D., Assistant Professor (Medical Microbiology and Immunology and Pathology, Microbiology, and Immunology)

Graduate Study. The Graduate Group in Immunology is a multidisciplinary group offering programs of study leading to the M.S. and Ph.D. degree in various aspects of immunology. Possible areas of specialization include molecular immunology, immunochemistry, immunogenetics, cellular immunology, clinical immunology, tumor and developmental immunology, arthritis and inflammation, autoimmunity and virology.

Preparation. Applicants for candidacy to these programs should have completed undergraduate preparation in mathematics, physics, chemistry, biochemistry, molecular and cellular biology or related biological and medical sciences.

For work leading to the Ph.D. degree, the requirements include cell biology, chemical immunology, cellular immunology, immunohematology, and advanced immunology. In addition to these general requirements, more specialized preparation in at least one of the following is required: (a) microbiological specialties (bacteriology, virology, parasitology, medical microbiology), (b) zoological specialties (cell biology, endocrinology, embryology, protozoology, histology, cytology, physiology), (c) medical specialties (pathology, anatomy, pharmacology, clinical pathology, reproduction, hematology, epidemiology), (d) biochemistry/biophysics specialties (biologically active molecules, control mechanisms); (e) genetic specialties (developmental genetics, population genetics, cytogenetics, molecular genetics).

Graduate Adviser. Contact the Group office.

Courses in Immunology (IMM)

Additional courses are available and listed under the individual sponsoring departments. Contact the Group office for information.

Lower Division Course
94. Introduction to Undergraduate Research (1)
Seminar—1 hour. Prerequisite: course 9, consent of instructor and completion of 45 units with a minimum GPA of 3.5. Offered to sophomores who participated in the Integrated Studies Honors Program during their freshman year and other students by consent of instructor. The nature of research at the undergraduate level. Limited enrollment. (P/NP grading only)—II. (II). Miller

Graduate Courses
201. Introductory Immunology (4)
Lecture—4 hours. Prerequisite: graduate standing. Comprehensive introduction to the principles of immunology. Limited enrollment.—I. (I.) Miller

201L. Advanced Immunology Laboratory Rotations
Lecture/discussion—1.5 hours. Two five-week assign- ments in immunology research laboratories. Individual research problems with emphasis on methodological/procedural experience and experimental design. May be repeated two times for credit. (S/U grading only)—I., II. (I., II.) Baumler

292. Immunotoxidology Seminar (2)
Seminar—2 hours. Prerequisite: graduate standing in Pharmacology/Toxicology, Immunology, Physi- ology, Anatomy, Pathology. Seminar presentations dealing with principles of xenobiotic effects on immune sys- tem functions and specific examples of drugs and environmental chemicals exerting toxic effects on the immune system are offered in alternate years. (S/U grading only)—I. Golub

293. Current Concepts in Immunology (4)
Lecture/discussion—4 hours. Prerequisite: Pathol- ogy, Microbiology, and Immunology 126 or consent of instructor. Innate and acquired immunity as defense mechanisms against disease. Mechanisms regulating the distinct cell types driving these responses are current concepts in the literature.—II. Baumgarth

294. Comparative Clinical Immunology (4)
Lecture/discussion—4 hours. Prerequisite: Pathol- ogy, Microbiology, and Immunology 126 or consent of instructor. Clinical immunology in animals and man. Pathogenesis of representative infectious diseases, hypersensitive reactions, and autoimmunity. Emphasis on specific and nonspecific immune effector mechanisms to viral infections or mediated pathology. Not open for credit to students who have completed course 294A. Offered in alternate years.—Gershwin, Van de Water

295. Cytokines (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 293 or consent of instructor. Cytokines and their involvement in human and animal physiology/disease, molecular mechanisms and receptor signaling. Immune and non-immune actions. Overlapping/redundant functions (referred to as the "cyokine network").—III. Luckhart

296. Advanced Topics in Immunology (2)
Seminar—2 hours. Prerequisite: graduate standing or consent of instructor. Presentation, discussion, and analysis of faculty research topics in immunology. Required for Immunology Graduate Students every year until they have passed their qualifying exam. May be repeated for credit. (S/U grading only)—I. (I.) Maverakis

297. Mucosal Immunology (2)
Lecture—1 hour; discussion—1 hour; term paper. Prerequisite: course 201 or equivalent. Basic concepts and current research topics in the field of mucosal immunology, with an emphasis on human immunology. Major emphases include innate and adaptive mucosal immunity, the gastrointestinal tract, the lung, lymphocyte trafficking, and mucosal vaccina- tion. Not offered every year.—II. Shocklett

Independent Study Program

Information. Chairperson, Committee on Courses of Instruction, 111 Academic Senate Office (530) 752-2231

The Independent Study Program provides an oppor- tunity for upper division students to design and purs- ue a full quarter (12-15 units) of individual study in an area of special interest.

A program qualifying as Independent Study will consist of one or more courses in the 190-199 series. While the theme of such a program may be reason- ably broad, a recognizable common thread should unite all the academic work you undertake during an independent study quarter. Regularly offered formal courses will only be acceptable as a part of such a program if they clearly fit its theme and contribute something essential toward the realization of its objectives. The program is not to be considered a way to take more variable-unit courses than normally permitted.

The procedure for enrolling in an Independent Study Program is as follows:
(1) Develop, in general terms, a plan of study;
(2) Locate a faculty sponsor or panel of sponsors and with their help and approval develop a detailed plan with a formal proposal form (obtained from the Academic Senate office) and submit it to the Academic Senate Committee on Courses of Instruction.

The deadline for applications is the tenth day of instruction of the term before; see the Academic Cal- endar, on page 1, for specific dates.

You must report the completion or termination of the project to the Committee on Courses of Instruction.

Individual Major

[College of Agricultural and Environmental Sciences, College of Biological Sciences, and College of Let- ters and Science]

The Major Program

The Individual Major, an integrated program com- posed of courses from two or more disciplines, is designed by the student and is subject to approval by faculty advisers and appropriate college commit- tees. This major enables a student to pursue a spe- cific interest that cannot be accommodated within the framework of an existing major. It must clearly and specifically meet the student’s educational goals as well as meet university and college academic standards.

College of Agricultural and Environmental Sciences

Program Office. 150 Mrak Hall (530) 752-0108
http://caes.ucdavis.edu/StudInfo/Advising/undergraduate-advising

Student Proposal. An Individual Major may be organized by a student having a specific academic interest not represented by an established major. Each student wishing an Individual Major should submit a proposal to the Dean’s Office, prior to reaching 120 units, for review by the Student Actions and Individual Major Subcommittee. This proposal must include (1) an essay describing the special educational aims of the student, including a statement indicating why the educational objectives cannot be met by existing majors; (2) a list of planned courses; and (3) faculty adviser recommen- dations. It is critical that students contact a college counselor in the Dean’s Office for consultation and development of the proposal.

English Composition requirement...........4-8
See College requirement.

Preparatory Subject Matter............(variable)
Lower division courses basic to the program or needed to satisfy prerequisites for upper division requirements.

Breadth/General Education...............18-24
Satisfaction of General Education requirement

Depth Subject Matter....................45-54
Upper division course work must include:
(a) interrelated courses of 45 upper division units from two or more areas of study;
(b) at least one of the two or more areas of study must be within the College of Agricultural and Environmental Sciences;
(c) at least 30 of the 45 upper division units that are required in the degree must be taken from courses provided by the College of Agricultural and Environmental Sciences.

Unrestricted Electives....................(variable)
Total Units for the Degree..................180

Master Adviser. Thomas Gordon, Ph.D. (Plant Pathology)

College of Biological Sciences

Program Office. 202 Life Sciences (530) 752-0410

Student Proposal. A student who wishes to pro- pose an individual major must submit a proposal to the Committee on Undergraduate Student Petitions prior to reaching 120 units. It is important for the stu- dent to make arrangements to speak with a coun-
Integrated Pest Management (A Graduate Group)

Adviser: a faculty member from secondary area of interest.

Howard Ferris, Ph.D., Chairperson of the Group

Program Office. 367 Briggs Hall (530) 752-0475
Faculty. Includes faculty members from the Colleges of Agricultural and Environmental Sciences and Letters and Science.

Graduate Study. The Graduate Group in Integrated Pest Management offers programs of study and research leading to the M.S. degree. Students may conduct independent research or participate in ongoing projects on integrated crop management and sustainable agriculture. Weeds, insects, plant pathogens, nematodes, rodents, and other pests are treated as parts of complex ecosystems and not as isolated problems. Courses include concepts and systems of plant protection and pest management, diagnosis and control of plant pest problems, toxicological and legal ramifications, and equipment for pest control operations. Detailed information can be obtained from the Group Chairperson and the application for Graduate Admission and Fellowship.

Graduate Adviser. Jay Rosenheim (Entomology)

Courses in Integrated Pest Management (IPM)

Graduate Courses

201. Concepts and Systems of Plant Protection and Pest Management (4)
Lecture—2 hours; discussion—1 hour; laboratory—2 hours. Prerequisite: Agricultural Systems and Environment 120, Entomology 110, Plant Pathology 120, Plant Biology 120 (may be taken concurrently), Nematology 100, Plant Biology 127 or Evolution and Ecology 101 recommended. Ecological perspectives of agricultural systems, the role of pests and pest management in these systems, and the monitoring and modeling of the systems. Offered in alternate years.

202A-202B. Diagnosis of Plant Pest Problems and the Control of Causal Agents (4-4)
Discussion—1 hour; fieldwork—9 hours. Prerequisite: Entomology 110, Plant Pathology 120, Plant Biology 120, Nematology 100 (may be taken concurrently). Problems and assessment of losses caused by in-sects, pathogens, weeds, nematodes, and other pests. Methods of determining infestations and establishing economic thresholds, and control of these pests with emphasis on integration of available management practices into programs. —III. (III.) Rosenheim.

Integrated Studies Honors Program

James F. Shackelford, Ph.D., Program Director
Program Office. 162 Everson Hall (530) 752-9760
http://integratedstudies.ucdavis.edu

Faculty

David Biale, Ph.D., Professor (History)
John Boe, Ph.D., Lecturer
(University Writing Program)
Simone Clay, Ph.D., Lecturer (French & Italian)
Evan Fletcher, Ph.D., Lecturer
(Center for Neuroscience)
Howard Ferris, Ph.D., Chair
(American Studies)
Karen Holshouser, Ph.D., Professor
(Art and Art History)
Nomi Janowitz, Ph.D., Professor (Religious Studies)
Alexis Johns, Ph.D., Associate Professor (English)
Winder McConnell, Ph.D., Professor
(German and Russian)
Robin Hill, B.F.A., Associate Professor
(Journalism)
Sally McKeel, Ph.D., Associate Professor (History)
Jay Meckling, Ph.D., Professor (American Studies)
Marco Molinaro, Ph.D., Lecturer
(Center for Biophotonics)
Terrence Murphy, Ph.D., Professor (Plant Biology)
Martina Newell-McGlaughlin, D.Sc., Lecturer
(UC Systemwide Biotechnology Research and Education Program)
Pablo Ortiz, D.M.A., Professor (Music)
Heanne Pardee, M.F.A., Assistant Professor (Music)
Eric Rauchway, Ph.D., Professor (History)
Christopher A. Reynolds, Ph.D., Professor (Music)
Eric J. Schroeder, Ph.D., Lecturer
(University Writing Program)
Kenneth A. Shackel, Ph.D., Professor (Pomology)
Keith Waterpauw, Ph.D., Associate Professor (Religious Studies)
Gina Werfel, M.F.A., Professor (Art and Art History)

The Program of Study

The Integrated Studies Honors Program is an invitation, first-year, residential honors program. Course offerings oriented toward undergraduate research opportunities are also offered beyond the freshman year. Established in 1969, the program aims to help high-achieving students integrate knowledge gained from their study of the humanities, natural sciences, and social sciences and expand their learning experiences through interdisciplinary or multidisciplinary courses. Enrollment is limited to 25 students per class, and program membership is limited to the top 3% of the entering class.

Freshmen enroll in three Integrated Studies Honors Program courses and two seminars during the year. Students not admitted to the Program may not register for Integrated Studies Honors Program courses or seminars. Sophomores and Regents Scholars who receive that award as a junior enroll in three seminars during the year (IST 90, IST 94, and IST 190). Juniors and Seniors enroll in IST 194HA, HB and IST 190.

Courses in Integrated Studies (IST)

Lower Division Courses

8. Colloquium (1)
Discussion—1 hour. Lectures, films, and readings on the interaction between the arts and sciences. May be repeated for credit. (S/U grading only.)—I, II (III.)
Interior Design

See Design, on page 200.

Internal Medicine

See Medicine, School of, on page 367.

International Agricultural Development

(College of Agricultural and Environmental Sciences) International Agricultural Development is an interdisciplinary major in the Human and Community Development department.

Faculty. Includes members from various departments across colleges.

The Major Program

The goal of international agricultural development is to improve food production, nutrition, marketing, and health in less technically advanced countries. Students in this major are trained in technical areas of agriculture that can be applied to the problems of world hunger and health.

The Program. Principle subjects of study within the major are Agricultural Production, Economic Development, Environmental Issues, Nutrition, Rural Communities, and Trade and Commodity Development. Courses are in social sciences, humanities, and economic environments in which agriculture operates in countries outside the United States.

Career Alternatives. The study of international agricultural development prepares a student for a variety of careers. Some students choose service through the Peace Corps. Others seek employment in international trade, while others choose to work for a governmental or private agency in a foreign nation. Religious groups and organizations also employ university-trained individuals for agricultural work in conjunction with missions and other types of human service work overseas. The major is also preparation for further graduate work in agricultural development.

B.S. Major Requirements:

UNITS

English Composition Requirement............0-8

See College requirement.

International Agricultural Development Abroad..........................................................0-20

A maximum of five courses abroad, selected with approval of an adviser, may be applied toward the 12 upper division courses in the major.

Preparatory Subject Matter......................47

Choose 47 units from either the Social Science or Natural Science core in consultation with an adviser.

Social Sciences core:

Agricultural and Resource Economics 15; Plant Sciences 1; Animal Science 41 and 41L or Plant Sciences 2; Biological Sciences 2A and 2B or 2A and 2C; Chemistry 2A and 2B; Chemistry 8A and 8B or Physics 1A and 1B; Economics 1A or Agricultural and Resource Economics 15; International Agricultural Development 10; Mathematics 16A and 16B; Nutrition 10 or 20; Sociology 1 or Anthropology 2; Soil Science 10; Statistics 13 or Sociology 46B

Natural science core:

Animal Science 41 and 41L or Plant Sciences 2; Biological Sciences 2A and 2B or 2A and 2C; Chemistry 2A and 2B; Chemistry 8A and 8B or Physics 1A and 1B; Economics 1A or Agricultural and Resource Economics 15; International Agricultural Development 10; Mathematics 16A and 16B; Nutrition 10 or 20; Soil Science 10 or 100; Statistics 13

Breadth/General Education Requirement........6-24

Satisfaction of General Education requirement

Depth Subject Matter..........................36-37

Agricultural and Resource Economics 147 or Plant Sciences 101 or Geography 161 .............................................4

Economics 115A ..................................4

International Agricultural Development 142 or 160 ..................................2-3

International Agricultural Development 102 and International Agricultural Development 170 ........................................8

Sociology 170 ....................................4

Plant Sciences 110A, 110C, or 135; Plant Sciences 142 ........................................3-4

Community and Regional Development 142 or 152 ........................................4

Political Science 123 or 124 or Sociology 145A ........................................4

Textiles and Clothing 174 ........................3

Foreign Language Requirement..............0-15

Students must complete 15-unit level in one language or pass the foreign language proficiency examination. A score of 2, 3, or 4 on a foreign language, the SAT II: Subject Test will also satisfy this requirement.

Internship Requirement..........................4-8

Students must complete at least 4 units of internship and may use up to 8 units toward major requirements. Internships can be chosen in consultation with an adviser. Internship requirement waived for students enrolled in the UC Education Abroad Program.

Areas of Specialization.........................30-35

Agricultural Production Option:

Agricultural and Resource Economics 140; Plant Sciences 101 and 105 or Animal Genetics 107

Additional 14-15 units of restricted electives in consultation with an adviser.

Economic Development Option:

Agricultural and Resource Economics 100A and 100B, Economics 115B

Agricultural and Resource Economics 120, 130, 140, 175 and International Agricultural Development 195A or 195B

Environmental Issues Option:

Students must consult with a faculty adviser to identify an emphasis within the option and to select suitable courses.

Economic Science and Policy 100 or 110, 160, 171 and Plant Biology 151

Agricultural and Resource Economics 147, Plant Sciences 101, Environmental Horticulture 150, Environmental Science and Policy 126, 161, 175 and International Agricultural Development 195A

Rural Communities Option:

Community and Regional Development 140, 151, 151L, 152, 154

Community and Regional Development 164 or 172, International Agricultural Development 195A, additional restricted electives chosen in consultation with an adviser.

Quarter Offered: I—Fall, II—Winter, III—Spring, IV—Summer, 2009-2010 offering in parentheses
Trade and Development in Agricultural Commodities Options
Agricultural and Resource Economics 100A, 113, 130, Plant Biology 172

Total Units for the Degree................. 180

Specialization Advisers
A listing of faculty in the various areas of specialization and the International Agricultural Development is available from the Major Adviser.

Major Adviser. S.B. Brush (Human and Community Development)

Minor Program Requirements:

UNITs
International Agricultural Development...........................................21-23
International Agricultural Development 10 and Agricultural and Resource Economics 115A, 115B, 115C.................................................... 8
Plant Sciences 101, 110A, 110C, 112............................................. 6-7
International Agricultural Development 103, 170, 195A or Community and Regional Development 142........................................... 7-8

Minor Adviser S.B. Brush in 1331 Hart Hall

Graduate Study. A program of study and research leading to the M.S. degree is available in International Agricultural Development. Detailed information regarding graduate study may be obtained by writing to the Coordinator of Graduate Recruitment (I.A.D.), Graduate Studies, UC Davis.

Graduate Advisers. J. Hill (Agronomy and Range Science), F.W. Hirtz (Human and Community Development), J.S. Jarvis (Agricultural and Resource Economics), J.D. Momson (Human and Community Development), D.E. Rains (Agronomy and Range Science)


Courses in International Agricultural Development (IAD)

Questions pertaining to the following courses should be directed to the instructor or to the Department of Human and Development Advising Center in 1303 Hart Hall [S30] 752-2244.

Lower Division Courses

10. Introduction to International Agricultural Development (4)
Lecture—3 hours; discussion—1 hour. Theories, practices and institutions relating to agricultural development; the interaction of changing social, cultural and economic organization through successive stages of economic development; impact of new agricultural technology on underdeveloped regions. GE credit. SocSci, Div. III—Brush

92. Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Supervised internship, off and on campus, in community and institutional settings. (P/NP grading only)

Upper Division Courses

103. Social Change and Agricultural Development (4)
Lecture/discussion—4 hours. Prerequisite: introductory social science course (Anthropology, Sociology, Economics, International Agricultural Development). How social and cultural factors influence technological change in agriculture; the role of diffusion of innovations; social impact analysis and technology assessment. GE credit. SocSci, Div.—II—Brush

142. Equipment and Technology for Small Farms (3)
Lecture—1 hour; laboratory—3 hours. Types and characteristics of agricultural equipment and technologies appropriate for small commercial farming. Adjustment and calibration of equipment. Selection of and budgeting for equipment. (Same course as Applied Biological Systems Technology 142.)

160. Agroforestry: Global and Local Perspectives (3)
Lecture/discussion—3 hours. Prerequisite: Plant Sciences 2 or Biological Sciences 1C, Plant Biology 142 or a general ecology course (Environmental Science and Policy 100). Traditional and evolving uses of trees in agricultural ecosystems; their multiple roles in environmental production and production of food, fuel, and fiber; and socioeconomic barriers to the adoption and implementation of agroforestry practices. Not open for credit to students who have taken Agricultural Management and Rangeland Resources 160. (Same course as Plant Sciences 160.) Offered in alternate years.—I. Gradziel

162. Field Course in Tropical Ecology and Sustainable Agricultural Development (8)
Lecture—20 hours; discussion—10 hours; fieldwork—30 hours. Prerequisite: consent of the instructor; Biological Sciences 1C required; Biological Sciences 1A or 1B or course 10 recommended; limited enrollment, accepted based on academic merit, personal experience, and academic discipline in order to provide a multidisciplinary atmosphere. International Field Course. Tropical Ecology of various ecosystems; agricultural systems in the tropics. Sustainable agriculture uniting ecology and agriculture, language and culture, trips to field research stations and ecotourism field trips required. No credit given to students who have taken Agricultural Management and Rangeland Resources 160. GE credit: Div, SciEng, Wrt.—IV.—IV.

170. Program Development for International Agriculture (4)
Lecture/discussion—4 hours. Prerequisite: course 10. Principles of leadership and management for international agricultural development. Organizations and organizational behavior, and the implications for planning and administering organizations involved in the global development effort.—II.—III. Marcotte

190. Proseminar in International Agricultural Development (1)
Seminar—1 hour. Presentation and discussion of current topics in international agricultural development by visiting lecturers, staff and students. May be repeated for credit. (P/NP grading only)

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Supervised internship, off and on campus, in community and institutional settings. (P/NP grading only)

195A. Field Study in Agricultural Development—California (3)
Lecture—2 hours total; seminar—8 hours total; fieldwork—four 2-day visits. Prerequisite: consent of instructor. Students will incur travel expenses. Observation of agricultural development strategies and effects on rural communities. Discussion with farmers, workers and organizational staff members. Study of farm commodities, institutions and experiences in dealing with agricultural development problems. International influence on U.S. agriculture. (P/NP grading only)—I—III. Marcotte

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)

Graduate Courses

200N. Philosophy and Practice of Agricultural Development (5)
Lecture/discussion—5 hours; term paper. Introduction to key elements of the philosophy and practice of agricultural development in less developed countries.

Tries. Introduction to the major paradigms of development, the historical context in which these paradigms have operated, and the various development techniques and initiatives that have emerged from agricultural production to institutional capacity building and management. Not open for credit to students who have completed former course 200.—I. (I) Marcotte

201. The Economics of Small Farms and Farming Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural and Resource Economics 100A. Economic perspective on small farm development. Establishes a basis for predicting farmers’ responses to changes in the economic environment, including government policies to increase small farm production and improve farmer and national welfare.—II. (II) Vosti

202N. Analysis and Determinants of Farming Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Plant Sciences 150 or the equivalent. The unifying concepts of cropping systems in temperate and tropical climatic zones; agroecosystems stability, diversity and sustainability; management strategies, resource use efficiency and their interactions; the role of animals, their impact on energy use efficiency, nutrient cycling, and providing food. Not open for credit to students who have completed former course 200.—III. (III) Van Kessel, Pittroff

203N. Project Planning and Evaluation (4)
Discussion—1 hour; workshop—3 hours. Prerequisite: courses 200N (formerly courses 202), 201, 202N (or former course 200). Interdisciplinary setting for application of student skills and specialization to a “real world” development project. Focus on team-building and interdisciplinary problem-solving methods, with the objective of producing a project document and presentation within a specified deadline. Not open for credit to students who have completed former course 203.—III. (III) Brown, Gepts, Pederson

217. Conservation and Sustainable Development in Third World Nations (4)
Lecture/discussion—3 hours; fieldwork—2 hours. Prerequisite: at least one course from three groups of Environmental Science and Policy 160, 161, 168A, 168B; Environmental Science and Policy 101, 133, International Agricultural Development 103, Geography 142; a) Anthropology 126, 127, Geography 141, 144, 145A, 145B. Examination of the patterns of resource ownership, control and management in agricultural lands, extractive industries and agriculture (fisher forests and wildlands, with emphasis on conservation and sustainability. Comparison of industrial democracies and poorer nations. (Same course as Ecology 217.) Offered in alternate years. —I—III. (III) Brown, December

220. Food and Nutrition Strategies in Developing Countries (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural and Resource Economics 100A. Identifies important problems in food and nutrition policy, develops theoretical frameworks suitable for their analysis, examines the empirical information relevant to the problems and, using theory data, draws appropriate policy implications. Offered in alternate years.—III. Jarvis

290. Seminar in International Agricultural Development (1-2)
Seminar—1-2 hours. Prerequisite: consent of instructor. Discussion and critical evaluation of advanced topics and issues in international agricultural development. May be repeated for credit. (S/U grading only)—I—III. Brown, Van Horn

291. Topics in International Agricultural Development (1-3)
Lecture/discussion—1-3 hours. Prerequisite: consent of instructor. Selected topics dealing with current issues in agricultural development in lesser developed nations. Variable content. May be repeated once for credit.
International Agricultural Development (A Graduate Group)

Patrick H. Brown, Chairperson of the Group

Group Office, 205 Hunt Hall
(530) 754-4424; http://ag.ucdavis.edu

Faculty

Diane M. Barrett, Ph.D., Specialist in Cooperative Extension (Food Science and Technology)
Stephen Boucher, Ph.D., Assistant Professor (Agricultural and Resource Economics)
Kenneth H. Brown, Ph.D., Professor (Food Science and Technology)
Patrick H. Brown, Ph.D., Professor (Food Science and Technology)
Stephen B. Brush, Ph.D., Professor (Human and Community Development)
Marita Cantwell, Ph.D., Specialist in Cooperative Extension, and Lecturer (Food Science and Technology)
Tim E. Carpenter, Ph.D., Professor (Medicine and Epidemiology)
Colin A. Carter, Ph.D., Professor (Agricultural and Resource Economics)
Patricia A. Conrad, D.V.M., Ph.D., Professor (Human and Community Development)
Sandra Dekeyser, Ph.D., Professor (Nutrition)
Sergei Doroshov, Ph.D., Professor (Animal Science)
James Fadel, Ph.D., Professor (Animal Science)
Louise Ferguson, Ph.D., Specialist in Cooperative Extension (Plant Sciences)
Howard Ferris, Ph.D., Professor (Nematology)
Albert Fischer, Ph.D., Professor (Plant Sciences)
Theodore C. Foin, Ph.D., Professor (Plant Sciences)
Shu Geng, Ph.D., Professor (Plant Sciences)
Paul L. Gepts, Ph.D., Professor (Plant Sciences)
Robert Gilbertson, Ph.D., Professor (Plant Pathology)
John S. Glenn, D.V.M., Ph.D., Extension Veterinarian (Veterinary Medicine)
Barbara G. Goldman, Ph.D., Lecturer (Education)
Thomas Gradziel, Ph.D., Professor (Plant Sciences)
Richard D. Green, Ph.D., Professor (Agricultural and Resource Economics)
James I. Greshop, Ph.D., Specialist in Cooperative Extension (Human and Community Development)
Luis E. Guzman, Ph.D., Associate Professor (Human and Community Development)
Bruce R. Hartsough, Ph.D., Professor (Biological and Agricultural Engineering)
Timothy K. Hartz, Ph.D., Specialist in Cooperative Extension and Lecturer (Plant Sciences)
James Hill, Ph.D., Specialist in Cooperative Extension and Lecturer (Plant Sciences)

International Commercial Law (A Graduate Group)

Daniel L. Simmons, J.D., Chairperson of the Group
Beth Greenwood, J.D., Director, International Programs, UC Davis School of Law

Group Office, International Law Programs, School of Law & UC Davis Extension, 1333 Research Park Drive, Davis, CA 95616; (530) 757-8569; illn@law.ucdavis.edu
http://www.law.ucdavis.edu/interprogram/graduate.shtml

Graduate Adviser. Contact the Group office.

International Agricultural Development (A Graduate Group)
**Graduate Study**

The Graduate Group in International Commercial Law offers a program of study and research leading to the M.A. degree through a Summer only program. Students are required to take 36 quarter units of study over three, four, or five summers. Thirty of the units must be UC Davis courses. Six units may be completed in another country with the approval of the Director of the ICL program. The classes are taught in an intensive format of 20 hours per week or four hours per day, two hours of lecture in the morning, two hours in the afternoon. Students complete four core courses, starting with the Orientation to U.S.A. Law and followed by three specialized core courses in international commercial law. Elective courses then follow in depth study of focus topics such as private international law, conflicts of laws, intellectual property, business associations, antitrust, tax, securities and finance and the like. Students also complete a research paper.

**Preparation**

Foreign applicants must present satisfactory evidence of the completion of legal academic training at an accredited educational institution. Domestic applicants must have completed at least six years of resident study at accredited colleges and law schools, and must hold a professional degree from a law school approved by the American Bar Association.

**Graduate Advisors.** Beth Greenwood (International Programs, School of Law), Dan Simmons (School of Law)

**Courses in International Commercial Law (ICL)**

ICL courses are taught in an intensive format during the summer quarter. For more information, contact the International Law Program at (530) 757-8569 or email at ilim@unexmail.ucdavis.edu.

201. Orientation in United States Law (7)
   Lecture/discussion—20 hours. Prerequisite: law school education or the equivalent. Investigation of the Common Law System of the United States. Includes structure of the U.S. government, Constitutional law, contracts, torts, real property, consumer law, securities law, intellectual property, antitrust, taxation, labor law, environmental law, ethics, remedies, legal research and trial practice. —Johnson

204. International Joint Ventures (3)
   Lecture/discussion—20 hours. Prerequisite: course 201, law school education or the equivalent. International and U.S. business and legal transactions. Legal planning, problem solving, decision-making and negotiations related to the break-up and dissolution of joint ventures. U.S. laws including finance, tax, bankruptcy, labor, antitrust, environmental, corporate structures and intellectual property. Offered every three years. —Smith

211. Negotiations and Alternative Dispute Resolution (1)
   Lecture/discussion—10 hours. Prerequisite: course 201, law school education or the equivalent. Mechanisms for resolving disputes including the alternatives to litigation such as negotiation, mediation, and arbitration. Advantages and disadvantages of each approach. Offered in alternate years. —Smith

215. Business Transactions (2)
   Lecture/discussion—20 hours. Prerequisite: course 201, law school education or the equivalent. Legal problems in international business transactions. Focus on international sales contracts, choice of law, forum selection clauses, letters of credit, transfers of technology, regulation of bribery, development of joint ventures, repatriation of profits, foreign exchange problems, and national efforts to control imports. Offered in alternate years. —Chander

219. Advanced Writing Project (4)
   Project. Prerequisite: course 201, law school education or the equivalent. The completion of a written research project under the active supervision of a faculty member in satisfaction of the research-writing requirement. (S/U grading only.)

220. United States Taxation of Multinational Investments (20)
   Lecture/discussion—20 hours. Prerequisite: course 201, law school education or the equivalent. An analysis of the United States taxation of multinational investments including jurisdiction of tax, the U.S. tax system, foreign tax credits, treaties, and transfer pricing. Offered in alternate years. —Simmons

236. United States Securities Law and Regulation (2)
   Lecture/discussion—20 hours. Prerequisite: course 201, law school education or the equivalent. Structural and jurisdictional issues associated with securities practice. Topics include the regulation of public offerings, transactions by corporate insiders, regulation of corporate disclosure and conduct, and the liabilities of corporations and individuals under anti-fraud provisions. Offered in alternate years. —Chander

242. Private International Law (2)
   Lecture/discussion—20 hours. Prerequisite: course 201, law school education or the equivalent. How law operates across national borders; emphasis on methods of resolving international disputes. International aspects of jurisdiction, choice of law, enforcement of judgments, choice of forum, service of process, taking of evidence, foreign sovereign immunity, extra-territorial regulation of antitrust, securities and other national laws. Offered in alternate years. —Bjorklund

247. Banking (1)
   Lecture/discussion—10 hours. Prerequisite: course 201, law school education or the equivalent. Institutional features of international banking transactions, the structure of a large financial deal, and the mechanics of overseeing large loans. Emphasis on negotiable instruments such as bills of lading, letters of credit, standby letters of credit, and interbank transactions. Offered in alternate years. —Simmons

249. Comparative Law (1)
   Lecture/discussion—10 hours. Prerequisite: course 201 and law school education or the equivalent. A comparative study of the development of schools of legal thought, chiefly Common law systems and Civil law traditions. Attention to the historical reasons for their divergence, contemporary approaches to universal problems such as succession, torts, and contracts, the cross-fertilization of laws and difficulties commonly associated with importing foreign law into new territory. Offered in alternate years. —Johnson

250. International Trade Law (3)
   Lecture/discussion—20 hours. Prerequisite: course 201, law school education or the equivalent. An investigation of international trading systems including international trade agreements and services, exchange, international intellectual property, international tax planning and investment. Includes substantive and procedural provisions of the World Trade Organization (WTO) and the North American Free Trade Agreement (NAFTA). Offered every three years. —Smith

251. United States Litigation Issues (1)
   Lecture/discussion—10 hours. Prerequisite: course 201, law school education or the equivalent. Preparation and resolution of disputes in international commerce. Emphasis on preparing for a trial in the United States. Includes the study of pretrial motions, jury selection, opening statements, rules of evidence, closing arguments, and the selection of appropriate strategies. Offered in alternate years. —Smith

262. Antitrust (1)
   Lecture/discussion—10 hours. Prerequisite: course 201, law school education or the equivalent. Histori- cal and institutional background of antitrust law in the United States. The statutory framework including price fixing, limits on distribution, monopolization and mergers, and reporting requirements. Offered in alternate years. —Johnson

270. Financing International Transactions (3)
   Lecture/discussion—20 hours. Prerequisite: course 201 and law school education or the equivalent. How capital is raised in international markets. Investment strategies for U.S. markets. Taxation of financial investments, international currency regulation, and assessing rates of return in international investments. Offered every three years. —Simmons

274. Intellectual Property (2)
   Lecture/discussion—20 hours. Prerequisite: course 201, law school education or the equivalent. An intensive study of intellectual property law. Areas covered include copyright, trademark and patent law and unfair competition. Offered in alternate years. —Kurtz

289. Antitrust and the Legal Rule System Seminar (1)
   Seminar—5 hours. Prerequisite: course 201, law school education or the equivalent. The American legal system and its structure. Legal research methodologies and presentation with an emphasis on analysis, synthesis, organization, and editing techniques common to legal writing. (S/U grading only.) —Simmons

291C. International Commercial Law Seminar (4)
   Seminar—20 hours. Prerequisite: course 201, law school education or the equivalent. Advanced seminar on a current topic in International Commercial Law. Offered at the University of Cologne in Cologne, Germany for two weeks each summer. The topic will change each year.

299. Advanced Research in Legal Problems (1-4)
   Prerequisite: course 201, law school education or the equivalent. Student individualized research project under faculty supervision. (S/U grading only.)

**International Nutrition**

Kathryn G. Dewey, Ph.D., Program Director

Program Office. 3253 Meyer Hall
(530) 752-1993
http://www.nutrition.ucdavis.edu/pin/

**Faculty**

Monique Borgerhoff Mulder, Ph.D., Professor (Anthropology)
Kenneth H. Brown, M.D., Professor (Nutrition)
Chancellor Emerita, UC Santa Cruz
Lois S. Jarvis, Ph.D., Professor (Agricultural and Resource Economics)
Bo L. Oerland, Ph.D., Professor (Nutrition)

Emeriti Faculty

Lindsay H. Allen, Ph.D., Professor Emeritus
Louis E. Grivetti, Ph.D., Professor Emeritus
Charles H. Halsted, M.D., Professor Emeritus
Janet King, Ph.D., Professor Emeritus
Ernesto Pollitt, Ph.D., Professor Emeritus
Fernando E. Viteri, M.D., Ph.D., Professor Emeritus

**Affiliated Faculty**

Marjorie Haskell, Ph.D., Associate Researcher (Nutrition)
Lucia Kaiser, Ph.D., Specialist in Cooperative Extension (Nutrition)
Joshua W. Miller, Ph.D., Associate Adjunct Professor (Pathology)
Charles B. Stephens, Ph.D., Adjunct Professor (Nutrition)
Marta Van Loan, Ph.D., Associate Adjunct Professor (Nutrition)
Steven A. Vosti, Ph.D., Associate Adjunct Professor (Agricultural and Resource Economics)

Graduate Study. The Program in International and Community Nutrition, an organized research unit located in the Department of Nutrition, coordinates specialized course work and research leading to the designated emphasis in International and Community Nutrition for students in various graduate programs. The program focuses on both theoretical and practical issues concerning the identification, treatment, and prevention of human nutritional problems in low-income countries and in disadvantaged ethnic minority groups in the United States. Students enrolled in the designated emphasis are expected to (1) complete the course requirements already established by their respective graduate programs, (2) participate in a weekly advanced seminar in international nutrition, (3) complete additional core courses in international nutrition (Nutrition 219A, 219B, 219C), and (4) conduct their dissertation research under the supervision of a professor who is a member of the Program in International and Community Nutrition.

Students accepted into the following doctoral programs are automatically eligible to participate in the designated emphasis: Nutrition, Agricultural and Resource Economics, Epidemiology, Anthropology, and Human Development. Students from other programs may also be accepted by special request to the Program Director. Upon graduation, students receive a Ph.D. in their major field, with specific recognition for the designated emphasis in International and Community Nutrition.

Graduate Adviser. Contact the Program office.

International Relations

(Home of Letters and Science)
Zeen Mroz, Ph.D., Program Director
Program Office, 1327 Social Sciences and Humanities
Building 5520-5063

Committee in Charge
Josephine Andrews, Ph.D. (Political Science)
James R. Carey, Ph.D. (Entomology)
Scott S. Gartner, Ph.D. (Political Science)
Charles E. Lesher, Ph.D.
(Geology, Education Abroad Program)
Kathryn S. Olimsted, Ph.D. (History)
Deborah Swenson, Ph.D. (Political Science)

The Major Program
Problems of security, development, ethnic conflict, human rights, health, and the environment are increasingly confronted at a global rather than a national level. With its theoretical models and real-world application, the study of international relations is an exciting and highly relevant interdisciplinary major.

The Program. Graduation with a major in International Relations requires completion of introductory and advanced courses in political science, economics, statistics, and history. The major also requires fluency in English and a working knowledge (approximately 24 to 30 units of course credits or equivalent fluency) of one modern language. Students choose one of four tracks that encompass major topical areas in combination with area studies emphasis:

1. World Trade and Development
2. Peace and Security
3. Global Environment, Health, and Natural Resources
4. Peoples and Nationalities. Upper division course work for Tracks I, II, and III is composed of twelve courses. Students choosing Track IV, Peoples and Nationalities, are required to study or work abroad for a minimum of one quarter; upper division course work is reduced to nine classes in recognition of the experience gained through education abroad.

Programs, Internships, and Career Alternatives. One program of special interest to international relations majors is the Education Abroad Program, which provides insights into the life and culture of other countries. At UC Davis, the Internship and Career Center assists students in obtaining legislative, legal, and business internships. In addition, the UC Davis Washington Center arranges internships and runs a full-credit academic program in Washington, D.C., with a full range of opportunities for International Relations majors (see also University of California, Davis Washington Program, on page 499). International relations graduates are prepared for employment in governmental agencies (such as the Foreign Service), state agencies, international or non-governmental organizations (such as the United Nations), foundations, and companies having interests in international trade, finance, or development.

The stringent language requirement of the major program enhances career prospects in jobs which demand knowledge of the language and culture of other countries.

International Relations Abroad. International Relations strongly encourages all students to participate in the UC Education Abroad Program; those who choose to study Track IV, Peoples and Nationalities, must study or work abroad for a minimum of one quarter. A maximum of five courses taken abroad may be applied toward the 12 upper division courses in Tracks I, II, and III of the International Relations major. In Track IV, the four Area Studies courses may be done abroad. Courses are selected with the approval of an adviser for the International Relations program.

Preparatory Requirements. Before declaring a major in International Relations, students must complete the following courses with a combined GPA of at least 2.500 at the University of California or other four-year school (at least 3.000 for similar courses taken at community college). All courses must be taken for a letter grade.

Economics 1A or Anthropology 2 4 units
Economics 1B 4 units
History 4C or 10C 4 units
International Relations 1 or Political Science 3 4 units
Statistics 13 or Sociology 46B 4 units

A.B. Major Requirements:

UNITS
Preparatory Subject Matter........23-54
Economics 1A or Anthropology 2 4 units
Economics 1B 4 units
History 4C or 10C 4 units
International Relations 1 or Political Science 3 4 units
Statistics 13 or Sociology 46B 4 units
Plus one course from: 3-4
Anthropology 2 4 units
Environmental Science and Policy 10 3 units
Economics 102, 110B, 116, International Agricultural Development 10 3 units
Political Science 2 4 units
Science and Society 2 4 units
Sociology 4 4 units
Sociology 5 4 units
Note: Economics 1A, Mathematics 16A and 16B are prerequisites for some courses.
Anthropology 2 may be used only once in satisfaction of lower division major requirements.

Foreign Language ......................................0-30
One of the following series in a single language, or certified fluency at the highest level required below:

Arabic 4 units
Chinese 1, 2, 3, 4, 5 4 units
Chinese 1A, 4, 5 4 units
Chinese 1CN, 2CN, 3CN 15 units
Chinese 1BL, 2BL, 3BL 15 units
French 1, 2, 3, 4, 5 24 units
German 1, 2, 3, 20, 21 23 units
Hebrew 1, 2, 3, 21, 22, 23 30 units
Hindi/Urdu 30 units
Italian 1, 2, 3, 4, 5 21 units
Italian 1, 2, 3, 8A, 8B 21 units
Japanese 1, 2, 3, 4, 5, 6 30 units
Japanese 1A, 4, 5, 6 30 units
Russian 1, 2, 3, 4, 5, 6 23 units
Spanish 1, 2, 3, 21, 22 25 units
Spanish 31, 32, 33 15 units

Note: The language curricula are subject to change; please check with an adviser for the major. A language not listed above may be substituted only with prior written approval of the International Relations Program Committee.

Depth Subject Matter ..................................36-48
Tracks I, II and II: Twelve upper division courses
Track IV: Nine upper division courses

Choose one track below:

Track I: World Trade and Development

Emphasizes contemporary economic relations of industrialized and developing countries.

For Advanced Industrialized Focus:
Economics 100, 101, 160A-160B, Political Science 123 20 units
Two courses selected from Group A 8
One course selected from Group B 4
Four courses to fulfill Area Studies Requirement 16

For Developing Countries Focus:
Economics 115A-115B, 162 12 units
Political Science 123, 124 8
One course selected from Group A 4
Two courses selected from Group B 8
Four courses to fulfill Area Studies Requirement 16

Group A (courses Advanced Industrialized Countries):
Agricultural and Resource Economics 138, Anthropology 127, Community and Regional Development 118, 141, 142, Economics 102, 110B, 116, International Relations 104, Political Science 130, 140, Sociology 138, 139, 141, 183

Group B (courses Developing Countries):

Track II: Peace and Security

Focuses on political and security relationships among states and non-state actors, examining questions of war, peace, alliances, and diplomacy.

Economics 162 4
Political Science 123, 130, 132 12
Political Science 120 or 121 4
Three additional courses from at least two departments selected from Anthropology 123B, Comparative Literature 157, Economics 116, 122, 145, 146A, 146B, Philosophy 118, Political Science 112, 124, 131, 140, Sociology 100, 118, 157, Women’s Studies 102 12
Four courses to fulfill Area Studies Requirement 16
Track III: Global Environment, Health, and Natural Resources
Familiarizes students with new sources of global interdependence such as biodiversity, natural resource conflicts, population growth, and world health.

Note: Some courses shown below have additional prerequisites.
Economics 162 ......................... 4
Anthropology 101 ............................. 4
Political Science 123 ....................... 4
Environmental Science and Policy 161 or Political Science 122 ................................. 4
Select two from the following groups:
- Atmospheric and marine environments: Atmospheric Science 116, 149, Environmental and Resource Sciences 121, 131, Geology 116, International Relations 131

Health and human populations:
- Anthropology 102, Environmental Science and Policy 121, 122, Environmental Toxicology 101, Internal Medicine-Infectious Diseases 141, Nutrition 111AV, 111B, 118, Sociology 170, Epidemiology and Preventive Medicine 198 and 199 may be taken with the director’s prior approval.

Four courses to fulfill Area Studies Requirement ................................. 16

Track IV: Peoples and Nationalities
Examines social and cultural foundations of national development and international relations.
Select one course from Anthropology 123AN, Sociology 118, 156, 181 ................................. 4
Select one course from Anthropology 130A, 102 ................................................. 4
Select one course each from the following four groups ................................. 12
- The Mixing of Peoples: Anthropology 123BN, 130BN; Community and Regional Development 176; International Relations 104, Political Science 122, Women’s Studies 121, 126; Human Development 103; Sociology 145B; Women’s Studies 102, 182
- Religion: Anthropology 124; Philosophy 105; Religious Studies 170; Sociology 146 Development and its Impact on Social Cleavages: Anthropology 122B, 126A, 126B, Political Science 124, 142A, Sociology 142B

Four courses to fulfill Area Studies Requirement ................................. 16
Education/Internship Abroad for a minimum of one semester

Area Studies Requirement
Four courses: Courses must incorporate at least two of three groups (History, Social Analysis, Culture and Literature); we encourage students to take all four courses from one region, but will accept a minimum of three from one region and one from a different region if course offerings within the region of choice are insufficient. Tracks I, II and III students who choose to take advantage of an Education Abroad experience may fulfill the Area Studies requirement by completing three courses instead of four; all three courses must be from one region.

Africa and the Middle East
- Culture and Literature: African American and African Studies 157, 162, Art History 160, Comparative Literature 147, 166, Dramatic Art 155A, French 124

East and South Asia

Latin America
- History: 162, 163B, 164, 165, 166B, 167, 168
- Social Analysis: African American and African Studies 107C, 180, Anthropology 144, 146, Chicanas/o Studies 130, Native American Studies 120, 133, Political Science 143A

Russian and East/Central Europe
- History: History 138B, 138C, 143
- Social Analysis: Political Science 144
- Culture and Literature: Russian 123, 129, 130, 131, 132, 143, 151

Western Europe
- History: History 140, 141, 142A, 144B, 145, 146A, 146B, 147B, 147C, 151D
- Social Analysis: African American and African Studies 107C, Political Science 137, 147A, 147B, 147C, 161

Total units for the major ................................. 59-102

Major Adviser. Zeew Maoz (Political Science)

Courses in International Relations (IRE)

Lower Division Courses

1. Global Interdependence (4)
   Lecture—3 hours, discussion—1 hour. Development of the concept of global interdependence among its political, economic, demographic, cultural, technological, and environmental dimensions. Focus on the ways societies are connected. Course provides the foundation for upper division multidisciplinary work in international relations. —II. [II]

98. Directed Group Study (1-5)
   Prerequisite: consent of instructor. [P/NP grading only]

99. Special Study for Undergraduates (1-5)
   Prerequisite: consent of instructor. [P/NP grading only]

Upper Division Courses

104. The Political Economy of International Migration (4)
   Lecture—3 hours, term paper or discussion—1 hour. Prerequisite: upper division standing. Analysis of worldwide migration patterns, and social scientific theories of international and transnational migration. Focus in economical, political, and social impact of immigration and potential for international and regional cooperation. (Same course as Sociology 104.)

131. Ocean Politics (4)
   Lecture—3 hours, term paper. Prerequisite: course 1 or Political Science 3; Political Science 123 recommended. The political, economic, security and environmental aspects of the world’s oceans. Focus on the international dimensions of ocean economic resources, and on the means—both cooperative and conflictual—by which these resources have been, and are likely to be, managed.

190. Topics in International Relations (4)
   Lecture/discussion—4 hours. Prerequisite: consent of instructor. Selected topics in international relations. Variable content. May be repeated for credit when topic differs.

192. International Relations Internship (1-12)
   Internship—3-36 hours (to be arranged). Prerequisite: upper division standing and consent of instructor. Work experience in international relations, with term paper summarizing the practical experience of the student. [P/NP grading only]

194HA-194HB. Special Study for Honors Students (4-4)
   Seminar—2 hours, term paper. Prerequisite: open only to majors of senior standing who qualify for honors program. Directed reading, research, and writing on topics selected by students and instructor culminating in preparation of a senior honors thesis under direction of a faculty adviser. (Deferred grading only, pending completion of sequence)—I, II, [II]

198. Directed Group Study (1-5)
   Prerequisite: upper division standing and consent of instructor. [P/NP grading only]

199. Special Study for Advanced Undergraduates (1-5)
   Prerequisite: upper division standing and consent of instructor. [P/NP grading only]

Internship

See Internship Program, below; and University of California, Davis Washington Program, on page 499.

Internship Program

Subhash H. Risbud, Ph.D., Director
Jeanne B. Shelby, Associate Director and Project Manager
Chris Dito, Project Manager
Marcie Kirk Holland, Project Manager
Janice Morand, Project Manager
The Internship and Career Center 2nd and 3rd Floors, South Hall (530) 752-2855; Buehler Alumni and Visitors Center (530) 752-2286

Program Areas
Agricultural and Environmental Sciences, Career Recruiting Programs, Engineering and Physical Sciences, Graduate Student and Job Career Services, Health and Biological Sciences and Liberal Arts and Business
Internship Experience

The Internship and Career Center facilitates a campus-wide internship program. All internships, both credit and non-credit, can be taken for Transcript Notation with completion of required evaluation reports. The notation briefly describes the nature and location of the internship experience. Questions pertaining to academic credit and Transcript Notation may be directed to The Internship and Career Center.

Course Credit. Internship courses (numbered 92 and 192) are available for credit on a variable-unit and Pass/No Pass grading basis. A maximum of 12 units of 92 and/or 192 courses may be counted toward the 180-unit minimum needed for graduation. To qualify for the 192 course, students must have acquired 84 units of credit. All credited internships require approval and sponsorship by a faculty member from an appropriate discipline. Arrangements may be made through the department of the sponsoring faculty member and facilitated by The Internship and Career Center Staff.

Italian

(College of Letters and Science)
Julia Simon, Ph.D., Chairperson of the Department
Department Office, 522 Sproul Hall (530) 752-1219; http://italian.ucdavis.edu

Faculty
JoAnn Cannon, Ph.D., Professor Gustavo Foscarini, M.A., Senior Lecturer Margherita Heyer-Caput, Ph.D., Professor Juliana Schiesari, Ph.D., Professor

(ITALIAN, COMPARATIVE LITERATURE)

Affiliated Faculty
Antonella Bassi, M.A., Lecturer Jay Grossi, M.A., Lecturer

The Major Program

The major in Italian provides a solid language background which will enable the student to develop an appreciation for Italian language and culture. The Program. The Italian program is small and geared to the individual needs of the student. The use of Italian is stressed on all levels and a knowledge of Italian is required for literature courses that are taught only in Italian. The Italian program actively participates in the Education Abroad Program, the Quarter Abroad Program, the International Internships Program, and the Summer Sessions International (Rome), all of which offer opportunities for travel and study in Italy.

Career Alternatives. Specific career opportunities for those students who have a background in foreign languages are abundant. In addition to the Foreign Service, jobs are available in business and education, both overseas and in the U.S. For example, those wishing to live (for brief or longer periods of time) and work in Italy have a choice of cities: Milan for business, Rome for international concerns in agriculture and nutrition in the F.A.O., and Florence for retail commerce and the arts, just to name a few. In the U.S., foreign-owned companies or American companies with interests in the foreign market need qualified people who are also fluent in a foreign language.

A.B. Major Requirements:

<table>
<thead>
<tr>
<th>Preparatory Subject Matter</th>
<th>0-24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Italian 1, 2, 3, 4, 5, and 9 (or the equivalent)</td>
<td>0-24</td>
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</table>

<table>
<thead>
<tr>
<th>Depth Subject Matter</th>
<th>36</th>
</tr>
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<tbody>
<tr>
<td>Italian 101 and 105</td>
<td>8</td>
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</tbody>
</table>

Upper division courses in literature, taught in the language: ................................................... 28

Must include at least one course from two of the following major emphasis areas:

(a) Early Italian
(b) Renaissance and Baroque
(c) Eighteenth through Twentieth Centuries

Upper division General Education courses in Italian may fulfill this requirement with approval of the major adviser. A total of 8 units in literature may be replaced by Italian 107 (highly recommended) or/or by courses in related fields such as history, art history, music, comparative literature, English, critical theory, classics, and linguistics. Note: All upper division courses are to be chosen in consultation with the major adviser.

Total Units for the Major .................................. 36-60

Recommended

One year or one quarter of study abroad with the Education Abroad Program or college Latin or a Romance language.

Major Adviser. J. Cannon

Minor Program Requirements:

<table>
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<tr>
<th>Italian</th>
<th>20</th>
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<tbody>
<tr>
<td>Italian 101 and 103</td>
<td>8</td>
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</tbody>
</table>

Three upper division courses in literature chosen in consultation with major adviser: .................................................. 12

Prerequisite: course 1 or 2 is required.

Honors and Honors Program. The honors program comprises two quarters of study under course 194H (3 units) and course 195H (3 units), which will include a research paper and a comprehensive examination. See also Academic Information, on page 67.

Education Abroad Program. Applicable courses taken on EAP are accepted for credit in the major or the minor programs.

Teaching Credential Subject Representative. See Major Adviser above; see the Teaching Credential/M.A. Program, page 109.

Prerequisite Credit. Credit will normally be given for a course if it is a prerequisite of a course already successfully completed. Exceptions can be made only by the Program Director.

Short Term Language and Culture Program. The Italian program offers an exciting study abroad program of Italian language and culture at the Mediterranean Center for Arts and Sciences in Syracuse, Sicily. The spring quarter program is directed and taught in part by a faculty member of the Italian program. All students in good standing at UC Davis are eligible to apply. There is no language requirement to participate. Language and culture instruction is offered at all levels, and students are able to earn up to 20 units of credit. The courses may be used for credit towards the Italian major or minor. For information, contact the director of the Italian program or the Education Abroad Center.

Courses in Italian (ITA)

Lower Division Courses

Students offering high school language preparation as a prerequisite must take a placement test.

1. Elementary Italian (5)

Discussion—5 hours. Introductions to Italian grammar and development of all language skills in a cultural context with special emphasis on communication. (Students who have successfully completed Italian 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, graduation is required. All other students will receive a letter grade unless a P/NP petition is filed.)—I, II, (I, II)

1A. Accelerated Intensive Elementary Italian (15)

Lecture-discussion—15 hours. Special 12-week accelerated, intensive summer session course that combines the work of courses 1, 2, and 3. Introduction to Italian grammar and development of all language skills in a cultural context with emphasis on communicative ability. Not open for credit to students who have completed courses 1, 2, or 3.—IV (IV) Bassi, Grossi

15. Elementary Italian (5)

Discussion/lab—5 hours. Introduction to Italian grammar and development of all language skills in a cultural context with special emphasis on communication. This course is taught abroad. Not open for credit to students who have completed course 1.—III

2. Elementary Italian (5)

Discussion—5 hours. Laboratory—1 hour. Prerequisite: course 1. Continuation of course 1 in areas of grammar and basic language skills.—II, III (II, III)

25. Elementary Italian (5)

Discussion/lab—5 hours. Prerequisite: course 1. Continuation of course 1 in the area of grammar and basic language skills. This course is taught abroad. Not open for credit to students who have completed course 2.—III

3. Elementary Italian (5)

Lecture-discussion—5 hours. Prerequisite: course 2. Completion of grammar sequence and practice of all language skills through cultural texts.—I, II, III (I, II, III)

35. Elementary Italian (5)

Lecture-discussion—5 hours. Prerequisite: course 2. Review of grammar and syntax through written exercises and short prose works. Intended to develop the linguistic foundations of students who have completed the first year language classes.—I, II, III (I, II, III)

4. Intermediate Italian (4)

Lecture-discussion—3 hours. Laboratory—3 hours. Prerequisite: course 3. Review of grammar and syntax through written exercises and short prose works. Intended to develop the linguistic foundations of students who have completed the first year language classes. and to prepare students to read, understand, and discuss modern Italian.—I, II, III (I, II, III)

45. Intermediate Italian (3)

Lecture-discussion—3 hours. Prerequisite: course 3 or the equivalent. Review of grammar and syntax through written exercises and readings of short prose works. Intended to develop the linguistic foundations of students who have completed the first year language classes. This course is taught abroad. Not open for credit to students who have completed course 4.—III

5. Intermediate Italian (4)

Lecture-discussion—3 hours. Laboratory—3 hours. Prerequisite: course 4. Review and study of grammar and syntax, readings of short prose works, and written exercises. Intended to prepare students to read, understand, and discuss modern Italian.—I, II, III (I, II, III)

55. Intermediate Italian (3)

Lecture-discussion—3 hours. Prerequisite: course 4. Preparation to read, understand, and discuss texts written in Italian. Transition between course 4 and 10. This course is taught abroad. Not open for credit to students who have completed course 5.—III

8A. Italian Conversation (3)

Discussion—3 hours. Prerequisite: course 3 or the equivalent. Course designed to offer practice in speaking Italian. May be repeated once for credit. (P/NP grading only.)—I, II, III (I, II, III)
8A5. Italian Conversation (3)
Discussion—3 hours. Prerequisite: course 3 or the equivalent, or the permission of the instructor. Course is taught abroad. May be repeated for up to 6 units of credit. Not open for credit to students who have completed course 8B. (P/NP grading only.)—III.

8B. Italian Conversation (3)
Discussion—3 hours. Prerequisite: course 8A. Course designed to offer practice in speaking Italian. (P/NP grading only.)—II. (II.)

8BS. Italian Conversation (3)
Discussion—3 hours. Prerequisite: course 8A. Course designed to offer practice in speaking Italian. Course is taught abroad. May be repeated for up to 6 units of credit. Not open for credit to students who have completed course 8B. (P/NP grading only.)—III.

9. Reading Italian (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 5. Reading and discussion of modern Italian prose, including selections from creative, scientific and journalistic writings. Introduction to contemporary Italian literature and culture. Strengthening the student’s command of the Italian language.—I, II, III, (II, III). (III) Cannon

95. Reading Italian (3)
Lecture/discussion—3 hours. Prerequisite: course 5. Reading and discussion of modern Italian prose, including selections from creative, scientific and journalistic writings. Introduction to contemporary Italian literature and culture as well as strengthening the student’s command of the language. This course is taught abroad. Not open for credit to students who have completed course 9.—III.

50. Studies in Italian Cinema (4)
Lecture—2 hours; discussion—1 hour; term paper. Introduction to Italian cinema through its genres. Focus is on cinema as a reflection of and a comment on modern Italian history. Film will be studied as an artistic medium and as a form of mass communication. GE credit.—I, II. (II.)

90X. Lower Division Seminar (1-2)
Seminar—1-2 hours. Prerequisite: lower division standing and consent of instructor. Examination of a special topic in Italian language or culture [such as Italian cinema seen through film, Italian feminism, literature, or politics] through shared readings, discussions, written assignments, or special activities such as film screening or laboratory work.

98. Directed Group Study (1-5)
Primarily intended for lower division students. (P/NP grading only.)

Upper Division Courses

101. Advanced Conversation, Composition, and Grammar (4)
Lecture—3 hours; weekly essays. Prerequisite: course 9 or consent of instructor.—I. (II.) Heyer-Caput, Cannon

1015. Advanced Composition, Conversation and Grammar (4)
Lecture—3 hours; extensive writing. Prerequisite: course 9. Instruction and practice in expository writing in Italian, with emphasis on advanced grammar, organization, and vocabulary building. Course will be taught in Italy. Not open for credit to students who have completed course 101.—III.

104. Italian Translation and Style (4)
Lecture/discussion—3 hours; two research papers; term paper. Prerequisite: course 101 or consent of instructor. Practice in translation from Italian to English and English to Italian, using literary and non-literary texts of different styles. Analysis of linguistic problems and elements of style contained in the translation material. Course will be taught abroad. Not open for credit to students who have completed course 8B. (P/NP grading only.)—III.

105. Introduction to Italian Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101 or consent of instructor. Introduction to the study of the principal authors, works, and movements of the Medieval, Renaissance, and Early Modern periods in Italy. GE credit: ArtHum.—II. (II.) Schiesari

105S. Introduction to Italian Literature (4)
Lecture/discussion—3 hours, term paper. Prerequisite: course 101 or consent of instructor. Introduction to the study of the principal authors, works, and movements of the Medieval, Renaissance and Early Modern periods in Italy. This course is taught abroad. Not open for credit to students who have completed course 105. GE credit: ArtHum, Div, Wrt.—III.

107. Survey of Italian Culture and Institutions (4)
Lecture—3 hours; term paper. Assessment of the impact of regional autonomy on Italian cultural life from the Middle Ages to the present. Special emphasis will be placed upon achievements in literature, the arts, philosophy, and the social sciences. Taught in English. GE credit: ArtHum.—III. (III.) Foscari

107S. Survey of Italian Culture and Institutions (4)
Lecture/discussion—3 hours; term paper. Assessment of the impact of regional autonomy on Italian cultural life from the Middle Ages to the present. Special emphasis will be placed upon achievements in literature, the arts, philosophy, and the social sciences. Taught in English. GE credit: ArtHum.—III. (III.) Foscari

110. Contemporary Issues in Italian Culture and Society (4)
Lecture/discussion—3 hours; term paper. Analysis of cultural issues in contemporary Italy: Myth and reality of imagined Italies, Italian identities; immigration and race relations; the media and popular culture. Taught in English. GE credit: ArtHum, Div, Wrt.—I. (I.) Bassi

108S. Contemporary Issues in Italian Culture and Society (4)
Lecture/discussion—3 hours; term paper. Analysis of cultural issues in contemporary Italy: Myth and reality of imagined Italies, Italian identities; immigration and race relations; the media and popular culture. Taught in Italian. GE credit: ArtHum.—I. (I.) Bassi

112. Medieval and Renaissance Poetry: St. Francis to Petrarch (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Study of the origins of Italian religious and secular poetry of the 13th and 14th centuries. A diversified poetry is illustrated in works of St. Francis, Dante, Cavalcanti, Petrarch, the Sicilian School, the Sweet New Style Poets, and other authors. Offered in alternate years. GE credit: ArtHum.—II.

113. Dante Alighieri, Divina Commedia (Inferno, Purgatorio, Paradiso) (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Study of Dante Alighieri's Divina Commedia, and its role in the development of the Italian language and literature. Emphasis will be placed on reading the whole poem within the historical context of the Middle Ages. GE credit: ArtHum.—II. (II.)

114. Boccaccio, Decameron, and the Renaissance Novella (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Study of the development of the short story in Italy, as exemplified in Giovanni Boccaccio's Decameron, in his predecessors and Renaissance followers. Offered in alternate years. GE credit: ArtHum.—II.

115A. Studies in the Cinquecento (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Analysis of key texts from the high moment of the Italian Renaissance. The political and aesthetic legacy of humanism will be foregrounded in relation to authors such as Ficino, Ariosto, Machiavelli, Castiglione, and Tasso. Offered in alternate years. GE credit: ArtHum.—III. (III.) Schiesari

115B. Italian Literature of the Renaissance and the Baroque: From Cellini to Marino (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 115A. Continued examination into the loss of an ideal. Emphasis on the conflicts in Michelangelo and Tasso leading to Marino, with an excursion on Galilei's role in the formation of a modern literary standard. GE credit: ArtHum.—III. (III.) Schiesari

115C. Drama from Machiavelli to the Enlightenment (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Development of comic and tragic forms as critical representations of their societal and historical contexts, i.e. Machiavelli and the logic of power. Baroque dramatics in the service of counter-reformation Italy. Goldoni's comedies and bourgeois social consciousness. Offered in alternate years. GE credit: ArtHum.—I. Schiesari

115D. Early Modern Italian Lyric (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Examination of the poetic tradition influenced by Petrarch. Consideration of the relation between gender and genre in such poets as Petrarch, Bembo, della Casa, Tasso, Marino, Gasparo Stampa, Veronica Franco, Isabella di Morra. Offered in alternate years. GE credit: ArtHum.—I. (I.)

118. Italian Literature of the Eighteenth Century (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Development of modern Italian literature. Emphasis on the work of Goldoni, Bettinelli, Baretti, Panini, Alfieri and Vico. GE credit: ArtHum.—II.

119. Italian Literature of the Nineteenth Century (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Romanticism in Italy, including Manzoni, Verga, and Verismo. GE credit: ArtHum.—II. (II.) Heyer-Caput

120A. Italian Literature of the Twentieth Century: The Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Development of the novel from Svevo to the present. Emphasis on the work of Svevo, Levi, Montale, and Vittorini. GE credit: ArtHum.—III. (III.) Cannon, Heyer-Caput

120B. Italian Literature of the Twentieth Century: Poetry and Drama (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Italian poetry with emphasis on Hermeticism; the theater of Luigi Pirandello and its role in the development of contemporary Italian drama. GE credit: ArtHum.—II.

137. Italian Literature in English: Boccaccio, Petrarch and the Renaissance (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or consent of instructor. Italian literature, with emphasis on Petrarch, Boccaccio and their relations to the Middle Ages and the Renaissance; the Renaissance, with
195H. Honors Thesis (3)  
Independent study—3 hours. Prerequisite: course 194H. Writing of an honors thesis on a topic in Italian literature, civilization, or language studies under the direction of a faculty member. (P/NP grading only.)

197. Tutoring in Italian (1-4)  
Seminar—1-2 hours; laboratory—1-2 hours. Prerequisite: upper division standing and consent of instructor. Tutoring in undergraduate courses, including leadership in small voluntary discussion groups affiliated with departmental courses. May be repeated for credit for a total of 6 units. (P/NP grading only.)

197C. Community Tutoring in Italian (1-5)  
Discussion—1-2 hours; laboratory—2-4 hours. Prerequisite: consent of instructor. Field experience as Italian tutors or teacher's aides. May be repeated for credit for a total of 10 units. (P/NP grading only.) — Foscarini

198. Directed Group Study (1-4)  
Prerequisite: consent of instructor. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)  
Prerequisite: consent of instructor. (P/NP grading only)

Graduate Courses

297. Individual Study (1-5)  
Prerequisite: graduate standing or consent of instructor.

298. Group Study (1-5)  
Prerequisite: graduate standing or consent of instructor.

299. Research (1-12)  
Prerequisite: graduate standing or consent of instructor. (S/U grading only)

399B. Dissertation Research (1-12)  
Prerequisite: graduate standing or consent of instructor. (S/U grading only)

Japanese

See East Asian Languages and Cultures, on page 204.

Jewish Studies

Graduate Courses

101. Topics in Jewish Thought (4)  
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 10 or Religious Studies 23 or consent of instructor. May be repeated for credit when topic differs. GE credit: ArtHum, Div, Wrt.—II.

111. Israeli Writing Since 1960 (4)  
Lecture/laboratory—3 hours; extensive writing. Prerequisite: one course in American or European literature. Contemporary Hebrew literature, in translation, in relation to post-independence debates about religious, social, and political identity of the Jewish state; literary reflections of Israeli ethnic diversity and changing gender relations; modern Hebrew poetry and postmodern experiments in fiction. Not open for credit to students who have completed Humanities 119. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II.

112. Readings in Jewish Writing and Thought in German Culture (4)  
Lecture/discussion—3 hours; term paper. Prerequisite: Religious Studies 23 or consent of instructor. Historical tradition of Jewish thought in the German cultural context; unique contributions of Jewish writers to the culture of the German speaking world; what it means to be “other” in the mainstream culture. May be repeated for credit twice when topic differs. Not
Land, Air, and Water Resources

[College of Agricultural and Environmental Sciences]  
William R. Harworth, Ph.D., Vice Chairperson  
Department Office. 1110 Plant and Environmental Sciences Building (530) 752-1406; http://lawr.ucdavis.edu

Faculty—Hydrology
Office. 1110 Plant and Environmental Sciences Building (530) 752-1406; http://lda.ucdavis.edu

Affiliated Faculty
A. Toby O’Geen, Ph.D., Assistant Specialist in Cooperative Extension  
G. Stuart Pettigrew, Ph.D., Specialist in Cooperative Extension

Faculty—Atmospheric Science
Office. 1110 Plant and Environmental Sciences Building (530) 752-1406

Affiliated Faculty
A. Toby O’Geen, Ph.D., Assistant Specialist in Cooperative Extension  
G. Stuart Pettigrew, Ph.D., Specialist in Cooperative Extension

Faculty—Soils and Biogeochemistry
Office. 1110 Plant and Environmental Sciences Building (530) 752-1406

Affiliated Faculty
Richard L. Snyder, Ph.D., Lecturer (Atmospheric Science) and Specialist in Cooperative Extension

Land, Air, and Water Resources

open for credit to students who have completed Humanities 121. Offered in alternate years. GE credit: ArtHum, Div. Wrt.—II.

116. Readings in Jewish Writing and Thought in German Culture (4)

Lecture—3 hours; term paper. Prerequisite: Religious Studies 25 or consent of instructor. Historical tradition of Jews in each nation in the German cultural context; unique contributions of Jewish writers to culture of the German-speaking world; what it means to be “other” in the mainstream culture. No credit will be given to those students who have completed Humanities 121. May be repeated two times for credit if topic differs. Offered in alternate years. (Same course as German 116.) GE credit: ArtHum, Div. Wrt.—II.

120. Cinema and the American Jewish Experience (4)

Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 10 recommended. Examination of American cinema to reveal how Jewish identity is expressed and submerged, tracing the relations between religion, identity, race, politics, and art. Not open for credit to students who have completed Humanities 122. Offered in alternate years. GE credit: ArtHum, Div. Wrt.—I.

121. Oral History and Jewish Life (4)

Lecture/discussion—3 hours; term paper. Oral history methodologies and application to an in-depth oral history interview about Jewish life. Topics include oral history practices and ethics, immigration, migration, religious practice, ethnic relations, and community organization structures. Not open for credit to students who have completed Humanities 123. GE credit: SocSci, Wrt.—III.

122. Germanic Studies (4)

Lecture—3 hours; term paper. Examination of migration, religious practice, ethnic relations, and community organization structures. Not open for credit to students who have completed Humanities 123. GE credit: SocSci, Wrt.—III.

Lawrence J. Schwankl, Ph.D., Lecturer (Hydrologic Science) and Specialist in Cooperative Extension  
Land, Air, and Water Resources is a multidisciplinary department with faculty who specialize in atmospheric, plant, environmental resource, soil, hydrology, and water engineering. Teaching and research focus on both agricultural forestry, natural ecosystems, climate change and environmental science. The faculty contribute to numerous other undergraduate and graduate programs in the Colleges of Letters and Science, Engineering, and Agricultural and Environmental Sciences.

Major Programs. Undergraduates in the department major in Atmospheric Science, Environmental and Resources Sciences, Environmental and Management, and Hydrology, and Soil and Water Science; see http://lawr.ucdavis.edu/academic_programs.htm.

Advising Center. Located in 1152 Plant and Environmental Sciences Building (530) 752-1669.

Graduate Study. Graduate work is offered in the area of Atmospheric Science, Hydrologic Sciences, and Soils and Biogeochemistry. Detailed information can be obtained from graduate advisers for these areas, from the Graduate Announcement, and at http://lawr.ucdavis.edu/academic_programs.htm.

Courses. See courses listed under Atmospheric Science, Hydrologic Sciences, and Soils and Biogeochemistry. See also the Web sites listed above.

Landscape Architecture

[College of Agricultural and Environmental Sciences]  
Edward S. McNiel, M.L.A., Chairperson, Landscape Architecture Program  
Department Office. 131 Hunt Hall (530) 752-3907; http://lda.ucdavis.edu

Faculty
Mark Francis, M.L.A., Professor  
Steve E. Greco, Ph.D., Assistant Professor  
Eric Larsen, Ph.D., Assistant Research Scientist  
Jeff Loux, Ph.D., Assistant Professor  
E. Byron McCulley, B.S.L.A., Lecturer  
Edward S. McNiel, M.L.A., Lecturer  
Lorenz Oki, Ph.D., Cooperative Extension Specialist  
Patsy Eubanks Owens, M.L.A., Associate Professor  
Michael Rios, Ph.D., Assistant Professor  
Heath Schenker, M.A., Associate Professor  
Stephen Wheeler, Ph.D., Assistant Professor

Emeriti Faculty
Nigel J.R. Allan, Ph.D., Professor Emeritus  
Dean MacCannell, Ph.D., Professor Emeritus  
Heather Canyon, Ph.D., Professor Emeritus  
Robert L. Thayer, Jr., M.A., Professor Emeritus

The Major Program

Landscape architecture is the planning and design of land areas where human use requires adaptation or conservation of the environment. Students who study landscape architecture are concerned about the welfare of the environment and the people who use it. They are capable of solving physical problems and are able to visualize and “think in” terms of spaces and three-dimensional concepts. The program is fully accredited by the American Society of Landscape Architects, which is the only organization professionally sanctioned to grant landscape architectural accreditations in the United States. The program was last reviewed in 2006.

The Program. The curriculum balances creativity and visual and spatial skills with technological expertise and a thorough background in physical, natural, and social sciences. Students develop proficiency at problem solving relating to design of parks, urban open spaces, energy-efficient neighborhood, land reclamation projects, and landscape...
planning for wilderness and scenic regions, coastal and riparian environments, and other sensitive land areas. The program addresses a process-oriented approach to design and emphasizes environmental and community values.

Preparatory Requirements. Students are admitted to the landscape architecture major only after submitting a portfolio for review and selection by the faculty. Contact the Landscape Architecture Advising Office for further information in 135 Hunt Hall (530) 754-8628.

Career Alternatives. Graduates may find jobs in private landscape architectural firms or public agencies and corporations employing landscape architects. The landscape architecture major provides the student with excellent preparation for graduate school or career development in a wide range of environmental and design-related fields.

B.S. Major Requirements:

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<tr>
<th>UNITS</th>
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<tbody>
<tr>
<td>English Composition Requirement</td>
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<tr>
<td>Physical Education</td>
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<tr>
<td>Biological Sciences</td>
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<td>Plant Sciences</td>
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<td>Environmental Studies</td>
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<td>Landscaping</td>
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<td>Social Science</td>
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<td>Economics</td>
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<td>Communication</td>
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Preparatory Subject Matter | 61-70 |

<table>
<thead>
<tr>
<th>COURSES</th>
<th>UNITS</th>
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<tbody>
<tr>
<td>Biological Sciences 1A, 2A, 1C, 10</td>
<td>8</td>
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<tr>
<td>or Plant Sciences 2</td>
<td>4</td>
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<tr>
<td>Environmental Studies</td>
<td>4</td>
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<tr>
<td>Sociology = 16A</td>
<td>1</td>
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<tr>
<td>Computer Science 10</td>
<td>3</td>
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<tr>
<td>One course from Chemistry 2A, 10</td>
<td>1</td>
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<tr>
<td>Physical Education 2</td>
<td>3</td>
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<tr>
<td>Geology 1</td>
<td>1</td>
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<td>Geographer 2, 3, 4, 5, 7, 8</td>
<td>10</td>
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<tr>
<td>Sociology 1, 2</td>
<td>3</td>
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<tr>
<td>Geography 2</td>
<td>10</td>
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<tr>
<td>Economics 1A, 1B, Psychology 1, Political Science 1, 2, 3, 4, 5, 7, Sociology 1, 2, 3, 4, 5, 25</td>
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<tr>
<td>Two courses from Art Studio 2, 5, 7, 8, 16</td>
<td>10</td>
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<td>or one course from History, Music, Dramatic Art, Philosophy, Art History, language, or cultural studies</td>
<td>10</td>
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<tr>
<td>Landscape Architecture 1, 21, 23, 30, 50, 60, 61, 70</td>
<td>32</td>
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Breadth/General Education | 0-24 |

See General Education requirement.

Depth Subject Matter | 44-47 |

| LANDSCAPE ARCHITECTURE | 160, 161, 170, 193A, 193B | 16 |
| Four courses from Landscape Architecture | 180 | 4 |
| or Landscape Architecture 181 | 1 |
| or Landscape Architecture 182 | 1 |
| or Landscape Architecture 183 | 1 |
| or Landscape Architecture 184 | 1 |
| or Landscape Architecture 185 | 1 |
| or Landscape Architecture 186 | 1 |
| or Landscape Architecture 187 | 1 |
| or Landscape Architecture 188 | 1 |
| or Landscape Architecture 189 | 1 |
| or Landscape Architecture 190 | 1 |
| or Landscape Architecture 191 | 1 |
| or Landscape Architecture 192 | 1 |

Restricted Electives | 32 |

| PSYCHOLOGY | 155 | 4 |
| Two courses from Environmental Horticulture 101, 102, Plant Biology 147, Plant Biology 102, Wildlife, Fish, and Conservation Biology 156 | 8 |
| or one course from Environmental Horticulture 105 or Plant Biology 102 | 8 |
| or Select 20 units of upper division courses in consultation with adviser | 20 |

Unrestricted Electives | 0-32 |

Total Units for the Major | 180 |

Major Adviser. Mark Francis

Advising Center is located in 135 Hunt Hall (530) 754-8628.

Graduate Study. Graduate-level landscape architecture courses are available to students pursuing graduate programs or those interested in career-oriented studies. Department faculty are active members of various graduate groups: Community Development, Geography, Transportation Technology and Policy and Ecology. Faculty members have expertise in many areas, including landscape history, social theory, prehistory, urban planning, bioregionalism, and regenerative landscape systems. Graduate students pursue more focused interests, expanding their professional expertise in landscape architecture or related disciplines.

Courses in Landscape Architecture (LDA)

Lower Division Courses

1. Place, Culture and Community (4)
   Lecture—4 hours. Introduction to the relationship of social and spatial arrangements. Basic social-scientific concepts as well as culture, status, role, kinship, ritual, myth, alienation, etc. through the specific case studies of both historical and contemporary communities. GE credit: SocSci, Wrt.—III. (III) MacCannell

2. Sustainable Development: Theory and Practice (4)
   Lecture—2 hours; discussion—2 hours. Origins, theoretical perspectives, and practical applications of the concept of sustainable development as it is implemented at a number of scales (site, building, neighborhood, city, region, and nation) through lectures, sketch exercises, student projects, walking tours. GE credit: SocSci, Wrt.—II. (II) Martin

Landscape Drafting and Visualization (4)

Studio—8 hours; two all-day field trips. Prerequisite: course in free-hand drafting recommended. Development of ability to think through graphic media and the use of drafting techniques for visual representation, including plan, section, and axonometric drawing. Includes an introduction to computerized drafting and drafter's equipment and software.


Studio—8 hours; two all-day field trips. Prerequisite: course 21. Landscape architectural communications explored through computer. Includes computerized drafting, drawing, rendering, desktop publishing, and photorealistic simulation. GE credit: SocSci, III. (III) MacCannell

30. History of Landscape Architecture (4)

Lecture—3 hours; discussion—1 hour. Introduction to the history of landscape architecture, emphasizing landscape design as a product of cultural, political, social, and environmental factors. Topics include the history of gardens, parks, community design and environmental planning. GE credit: SocSci, Wrt.—II. (II) Schneker, McNiel

50. Site Ecology (4)

Lecture—3 hours; laboratory—2 hours. Prerequisite: Biological Sciences 1A, 2A or 10 or an introductory course, in biology, botany, or plant science, prior to admission to Landscape Architecture majors. Introduction to ecological concepts, including nutrient dynamics, population regulation, community structure, ecosystem function. Principles will be applied to human activities such as biological conservation, ecological restoration, landscape planning, and management. Weekly laboratory and field exercises in local ecosystems. GE credit: SciEng. III. (III) Greco

60. Technology I: Grading and Drainage (4)

Studio—8 hours. Prerequisite: courses 21 and 23 or consent of instructor. Priority given to Landscape Architecture majors. Technology I provides a broad foundation in landscape design methodologies and skills necessary to create environmentally and socially responsible landscape designs. Not open for credit to students who have taken course 132. GE credit: ArtHum or SocSci, Wrt.—II. (II) McCue

61. AutoCAD for Landscape Architects (4)

Lecture—2 hours; laboratory—4 hours. Prerequisite: Agricultural Management and Range Resources 21 or equivalent with consent of instructor. Priority given to Landscape Architecture majors. Introduction of computer-aided drafting [CAD] techniques and their application to landscape design. Drawing setup, layout, control, basic drawing commands, dimensioning and text styles, symbol libraries, and display commands used in the creation of landscape architectural drawings. GE credit: SocSci, IV, V, VI. (III) Greco

70. Basic Landscape Design Studio (4)

Studio—8 hours; field trips. Prerequisite: courses 1, 21, 30 or consent of instructor. Priority given to Landscape Architecture majors. Introduction to basic aesthetic, functional, social, and environmental considerations in landscape design. Provides a broad foundation in landscape design methodologies and skills necessary to create environmentally and socially responsible landscape designs. Not open for credit to students who have taken course 1. GE credit: ArtHum or SocSci, Wrt.—II. (II) Owens

98. Directed Group Study in Landscape Architecture (1-5)

Prerequisite: consent of instructor. Directed group study. (P/NP grading only.)

99. Special Study for Undergraduates in Landscape Architecture (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

120. Advanced Computer Applications (4)

Studio—8 hours; two all-day trips. Prerequisite: course 23; open to major or Architecture majors only. Studio work using computer-aided design, geographic information systems, and other advanced computer programs. GE credit: SocSci, Wrt.—II. (II) McNiel

150. Geographic Information Systems for Land Planners (3)

Lecture—2 hours; laboratory—3 hours. Prerequisite: Agricultural Management and Range Resources 21 or equivalent with consent of instructor. Priority given to Landscape Architecture majors. Basic concepts, principles, and methods of GIS in relation to land planning applications. Data structures, database design, GIS data creation, and spatial analysis techniques are emphasized. Lab topics include: online data sources, aerial photography, cartographic design, and graphic communication. Not open to credit for students who have completed Applied Biological Systems Technology 180 or 185 or course 50 or 185 (in spring 2004 or 2005). GE credit: SocSci, Wrt.—II. (II) Greco

160. Technology 2: Construction Materials and Detailing (4)

Studio—8 hours. Prerequisite: courses 21, 23, and 60. Priority given to Landscape Architecture majors. Introduction to materials and methods in landscape construction, including properties of common construction materials (stone, concrete and wood) and detailing, preparation of cost estimates and specifications, design of drainage systems, foundations and roof decks. Not open for credit to students who have taken course 133. GE credit: ArtHum or SocSci, Wrt.—II. (II) Greco

161. Technology 3: Professional Practice and Construction Documents (4)

Studio—8 hours. Prerequisite: courses 21, 23, 60 and 160. Legal and professional aspects of landscape architecture practice. Topics in negotiation, drafting, preparation of contract documents [drawings and specifications], proposal writing, fee calculations, project management, cost estimation, and insurance. GE credit: SocSci, Wrt.—II. (II) Greco

168. Mountain Landscapes and Life (3)

Lecture—3 hours. Prerequisite: an introductory course in cultural geography, cultural anthropology or landscape theory. Course provides knowledge of mountain landscapes, explains why different mountain societies exploit and reject resources available, examines myths about mountain landscapes that influence individual and collective behavior of residents and visitors. Examines Andes, Alps, and Rockies. GE credit: ArtHum or SocSci, Wrt.—II. (III) Greco
170. Field Studio in Landscape Architecture (5) Lecture—2 hours; workshop—6 hours. Prerequisite: courses 1, 21, 23, 30, 50, 60 and 70 or consent of instructor. Field study and problem solving experience for juniors in the landscape architecture major. Analysis of complex landscape design and planning problems. Two all-day, weekend field trips required.—I.

180A. Special Topics in Landscape Architecture: Postmodern Landscapes (2) Lecture—2 hours. Prerequisite: upper division standing. Basic principles of critical theory and postmodern modes of analysis. Application to interpretation and change of designed environment. Offered in alternate years. Not open for credit to students who have taken course 185. (b)

180C. Special Topics in Landscape Architecture: Art of the Environment (2) Lecture—2 hours. Prerequisite: courses 1 and 30. Priority given to Landscape Architecture and Design majors. Introduction to environmental art. Encouragement of critical thinking about the intersection of art, landscape and environmental issues. Offered in alternate years.—S. Schenker

180G. Special Topics in Landscape Architecture: Landscape and Regional Land Planning (2) Lecture—2 hours. Prerequisite: upper division standing. Theories, laws, and sustainable communities. Traditional master planning vs. participatory planning and design approaches. Offered in alternate years.—McNiel, Wheeler

180H. Special Topics in Landscape Architecture: The Bioregional Landscape (2) Lecture—2 hours. Prerequisite: courses 1 and 30. Priority given to Landscape Architecture majors. Emerging concepts of bioregionalism and community-based ecological regional landscape planning. Extensive examples from within the Sacramento Valley Bioregion. Offered in alternate years.

180I. Special Topics in Landscape Architecture: Regenerative Landscape Systems (2) Lecture—2 hours. Prerequisite: courses 1 and 30. Priority given to Landscape Architecture majors. Theories, basic techniques and applications for various systems in which landscapes regenerate and sustain life (both human and non-human) and culture over time. Offered in alternate years.—McNiel

180J. Special Topics in Landscape Architecture: Community Participation in Design (3) Lecture—2 hours. Prerequisite: upper division standing. History and role of community participation in landscape design; methods of community involvement, including workshop techniques. Introduction to design processes, including public participation. Offered in alternate years.—Owens

180K. Special Topics in Landscape Architecture: Social Factors in Landscape Architecture (2) Lecture—2 hours. Prerequisite: Psychology 155 and upper division standing. Concepts in environmental psychology as they relate to landscape architecture. Discussion at issue for user groups of a land area. Introduction to post occupancy evaluations. Offered in alternate years.—Owens

180L. Special Topics in Landscape Architecture: Public Open Space (2) Lecture—2 hours. Prerequisite: upper division standing. Intensive study of public open spaces, including parks, plazas, playgrounds, greenways and community gardens. Current issues associated with design and management of public environment of cities. Offered in alternate years.—Francis

180M. Special Topics in Landscape Architecture: Urban and Community Design (2) Lecture—2 hours. Prerequisite: upper division standing. Theories and methods of community and neighborhood design. Past and contemporary approaches in urbanism, planned unit development, mixed use, pedestrian and transit-oriented development. Issues of open space and community form. Offered in alternate years.—Francis

180N. Special Topics in Landscape Architecture: Planning Design (2) Lecture—2 hours. Prerequisite: upper division standing and Environmental Horticulture 6. Develop an understanding of the sensory, visual and functional importance of plants in the landscape. Visualization and design of planted landscapes. Development of planting plans. Offered in alternate years. Not open for credit to students who have taken course 156.

180Q. Special Topics in Landscape Architecture: Recent Issues in Landscape Architecture (2) Lecture—2 hours. Prerequisite: course 1 and 30. Priority will be given to Landscape Architecture and Design majors. Study of current issues in landscape architecture with emphasis on design and/or design history. Offered in alternate years.

180P. Special Topics in Landscape Architecture: Water in Community Planning and Design (2) Lecture—2 hours. Prerequisite: course 50 or equivalent with consent of instructor. Upper division standing or above. Priority given to Landscape Architecture majors. Theories, policies, methods, and resources related to the integration of water resources management with urban/community planning and landscape design including water use/demand, quality, treatment, conservation, and storm water/drainage. Offered in alternate years.—Loux

180Q. Special Topics in Landscape Architecture: Historic Preservation (2) Lecture—2 hours. Prerequisite: upper division standing. Roots and present focus of historic preservation movement; current philosophies and laws governing preservation, restoration, and revitalization as they affect landscape architects. Offered in alternate years.—McNiel

181A. Postmodern Landscapes Design and Planning Studio (3) Studio—6 hours; one field trip required. Prerequisite: course 170; course 180 concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180. Offered in alternate years.—Francis

181B. Urban and Community Design: Design and Planning Studio (3) Studio—6 hours; one field trip required. Prerequisite: course 170 and Environmental Horticulture 6; course 180N concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180. Offered in alternate years.—Owens

181C. Current Issues Design and Planning Studio (3) Studio—6 hours; one field trip required. Prerequisite: course 170 and Environmental Horticulture 6; course 180N concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180. Offered in alternate years.—Owens

181D. Current Issues Design and Planning Studio (3) Studio—6 hours; one field trip required. Prerequisite: course 170 and Environmental Horticulture 6; course 180N concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180. Offered in alternate years.—Owens

181E. Current Issues Design and Planning Studio (3) Studio—6 hours; one field trip required. Prerequisite: course 170 and Environmental Horticulture 6; course 180N concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180. Offered in alternate years.—Owens

181F. Special Topics in Landscape Architecture: Water in Community Planning and Design Studio (3) Studio—6 hours. Prerequisite: courses 21, 23, 50, 60, and 170; 180F concurrently. Design theory and methods to real-world projects in ecology. Ecological principles and their applications in biological conservation, ecological restoration, and landscape planning, design, and management. Field trip required. Offered in alternate years.—I. Greco

181G. Special Topics in Landscape Architecture: Landscape and Regional Land Planning Studio (3) Studio—6 hours. Prerequisite: course 170; course 181G concurrently. Applications of recent models and practices of ecological design to create livable and sustainable cities, towns, villages, rural, and natural landscapes. Testing of models by creating plans and designs for new communities, and for urban infill, restoration or redevelopment projects. Field trip required. Offered in alternate years.—Loux, McNiel, Wheeler

181H. The Bioregional Landscape Design and Planning Studio (3) Studio—6 hours; one field trip required. Prerequisite: course 170; course 180H concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180H. Offered in alternate years.

181I. Regenerative Landscape Systems Design and Planning Studio (3) Studio—6 hours; one field trip required. Prerequisite: course 170; course 180I concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180I. Offered in alternate years.

181J. Community Participation in Design: Design and Planning Studio (3) Studio—6 hours; one field trip required. Prerequisite: course 170; course 180J concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180J. Offered in alternate years.—Owens

181K. Special Topics in Landscape Architecture: Social Factors in Landscape Architecture (2) Studio—6 hours. Prerequisite: Psychology 155, course 170, 180K concurrently; upper division standing. Application of design theory and methods to real-world projects. Familiarize students with the major concepts in environmental psychology as they relate to landscape architecture; to discuss the needs of various user groups; and to post occupancy evaluations. Open to Landscape Architecture majors only. Offered in alternate years.—Francis

181L. Public Open Space Design and Planning Studio (3) Studio—6 hours; one field trip required. Prerequisite: course 170; course 180L concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180L. Offered in alternate years.—Francis

181M. Urban and Community Design: Design and Planning Studio (3) Studio—6 hours; one field trip required. Prerequisite: course 170 and Environmental Horticulture 6; course 180M concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180M. Offered in alternate years.—Owens

Quarter Offered: I=Fall, II=Winter, III=Spring, IV=Summer; 2009-2010 offering in parenthesis

General Education (GE) credit: Arts and Humanities =ArHum--; Science and Engineering =SciEng--; Social Sciences =SocSci--; Social/Cultural Diversity =Diverse-- Writing Experience

Writing Requirement
190. Prosemin in Landscape Architecture (1)
Seminar—1 hour. Lectures and discussion of critical issues in landscape architecture. May be repeated three times for credit. (P/NP grading only)—I, II, III.

191. Workshop in Landscape Architecture (2-12)
Seminar—1 hour; workshop—3 hours. Prerequisite: courses 1, 70, and 170 or consent of instructor. Priority to Landscape Architecture majors. Faculty initiated workshops featuring advanced studies and applications of original work in landscape architecture. May be repeated for up to 20 units of credit. — I, II, III.

192. Internship in Landscape Architecture (1-12)
Internship. Prerequisite: senior standing in Landscape Architecture. Professional field experience in landscape architecture. May be repeated for a total of 12 units. (P/NP grading only.)

193A. Senior Project in Landscape Architecture (3)
Studio—6 hours. Prerequisite: senior standing in Landscape Architecture. Projects will focus on a critical area of landscape architectural design, planning, analysis, communication or research. Limited enrollment. Required of all Landscape Architecture majors. (P/NP grading only.)—II, (II)

193B. Senior Project in Landscape Architecture (4)
Studio—8 hours. Prerequisite: course 193A and senior standing in Landscape Architecture. Projects will focus on a critical area of landscape architectural design. Planning, analysis, communication, or research. Limited enrollment. Required of all Landscape Architecture majors. (P/NP grading only.)—III, (III)

197T. Tutoring in Landscape Architecture (1-5)
Tutoring—3 to 15 hours. Prerequisite: consent of instructor. Tutoring in Landscape Architecture courses. (P/NP grading only.)

198. Directed Group Study in Landscape Architecture (1-5)
Prerequisite: consent of instructor. Directed group study. (P/NP grading only.)

199. Special Study for Advanced Undergraduates in Landscape Architecture (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

201. Theory and Philosophy of the Designed Environment (4)
Seminar—4 hours. Prerequisite: course 140 or the equivalent; graduate standing or consent of instructor. Examines the major theories of environmental design. Epistemology of design serves as framework to examine modern landscape architecture, architecture, urban design and planning. Normative theories of design are reviewed along with the social and environmental sciences. Offered in alternate years. — Francis

202. Methods in Design and Landscape Research (4)
Seminar—4 hours. Prerequisite: Statistics 102 or the equivalent; graduate standing or consent of instructor. Explores many of the research and advanced design and planning methods employed in landscape architecture. Exercises provide the student with a vehicle for designing independent landscape research and creative activities. Lectures provide an historical overview of research methodology. Offered in alternate years. — Owens

204. Case Studies in Landscape Design and Research (4)
Seminar—4 hours; field trip required. Prerequisite: graduate standing in Landscape Architecture, Ecology, Geography or Community Development or consent of instructor. Real-world designed environment situations where creative activity and/or basic research is the primary product. May be repeated for credit for a total of 12 units. Offered in alternate years.—1, II, III.

205. Physical Planning and Design (4)
Lecture—2 hours; discussion—2 hours. Regulation, design, and development of the built landscape, planning and land development processes, zoning and subdivision regulation, site planning, urban design goals and methods, public participation strategies, creatively designing landscapes to meet community and ecological goals. Limited to graduate students. Not offered every year.—Wheeler

210. Advanced Landscape Architecture Studio (4)
Laboratory—8 hours. Prerequisite: course 113 or the equivalent; graduate standing or consent of instructor. Examines the major theories of landscape design, planning, analysis, history and philosophy of the landscape architect. Applications of original work in landscape architecture. May be repeated for credit beyond the confines of the course. — Owens

215T. Studio/Lecture—3 hours. Prerequisite: consent of instructor. Theories of memory from other fields (critical theory, psychoanalysis, history) applied to landscape design, especially heritage and tourist sites. The relationships between place, memory, and event. Offered in alternate years.

220. Public Space and Culture (3)
Seminar—3 hours. Prerequisite: course 182 or the equivalent; graduate standing or consent of instructor. Explores the public environment of cities including their streets, parks, and squares. Public life and culture of American cities is examined and design responses to this culture evaluated. Typology is used to identify spaces. Offered in alternate years. — Francis

230. Landscape and Memory (4)
Seminar—4 hours, term paper. Prerequisite: graduate standing or consent of instructor. Theories of memory from other fields (critical theory, psychoanalysis, history) applied to landscape design, especially heritage and tourist sites. The relationships between place, memory, and event. Offered in alternate years.

240. Historic, Cultural Landscapes: Concept, Perception, Preservation (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Historic cultural landscapes, as defined by the National Register of Historic Places. Identification and analysis of aerial extent, structure, scale, integrity, and historical significance using common and emerging methods and tools. Offered in alternate years. —McNiel

250. Life-Place: Bioregional Theory and Principles (4)
Seminar—3 hours; tutorial—1 hour. Prerequisite: graduate standing or consent of instructor. The emerging concept of bioregionalism as a hypothesis for environmental quality; theoretical structures and practical methods by which individuals and groups identify with naturally-bounded “life-places” or “bioregions” and strive to live respectfully and reciprocally within them. Offered in alternate years.

260. Landscape and Power (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. How various representations of landscape have historically worked as agents of cultural power. Course framework is interdisciplinary, including studies of landscape representation in literature, art, photography, cartography, cinema, and landscape architecture. — Schenker

270. Environment and Behavior (4)
Seminar—3 hours; tutorial—1 hour. Prerequisite: graduate standing or consent of instructor, Psychology 144 recommended. Factors that influence human’s interaction with their surroundings and the mechanisms used for recognizing and addressing general and specific human needs in community design and development decisions. Offered in alternate years. — Owens

280. Landscape Conservation (3)
Seminar—3 hours. Prerequisite: contact department for prerequisite courses; graduate standing or consent of instructor. Focus is on land planning, design, and management techniques to further the goal of resource preservation. Examines current critical theory in the establishment and management of conservation areas. Offered in alternate years. — Greco

290. Graduate Seminar in Landscape Architecture (2)
Seminar—2 hours. Prerequisite: graduate standing and consent of instructor. Seminar on selected topics in landscape architecture research, analysis, planning, design, communication, or education. May be repeated for credit. (S/U grading only.)

297. Practicum in Landscape Architecture (1-10)
Independent study—1 to 10 hours. Prerequisite: graduate standing and consent of instructor. Opportunity for students to work directly in the field with academic advisors at other institutions or with professionals in an office setting. Gives experience beyond the confines of the campus and allows direct interaction with the community. (S/U grading only.)

298. Group Study (1-5)
Prerequisite: graduate standing and consent of instructor. (S/U grading only)

299. Directed Individual Research for Graduate Students (1-12)
Requires consent of instructor. May be repeated for credit. (S/U grading only)

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III, (I, II, III)

Landscape Restoration

[College of Agricultural and Environmental Sciences]
This minor is of particular interest to students majoring in Wildlife, Fish, and Conservation Biology, Environmental Biology and Management, Environmental and Resource Sciences, Landscape Architecture, Biological Sciences, Evolution and Ecology and Plant Biology. Biological Sciences 1C or Plant Sciences 2 is a prerequisite to some courses in the minor. The minor is sponsored by the Department of Plant Sciences.

Minor Program Requirements:

UNITS
Landscape Restoration ....................... 19-25
Select one of Environmental Science and Policy 155, Plant Biology 102, 117, 147, Plant Sciences 144 ...................................... 4-5
Select one of Environmental Horticulture 100, 130, 133, Plant Biology 119, Plant Sciences 176 ...................................... 3-4
Soil Science 10 or 100 ............................. 3-5
Environmental Horticulture 160 and 160D .............................................................. 4
Select one of Environmental Horticulture 150, Environmental Science and Policy 155, Landscape Architecture 180F, 180H, 180P, Plant Sciences 130, Wildlife, Fish, and Conservation Biology 155 .................... 2-4
Plant Sciences 192 .................................... 3

Minor Adviser: T.P. Young (Plant Sciences)
Advising Center is located in 1224 Plant and Environmental Sciences (530) 752-7738.
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Second and Third Year Courses

(a) General/Topical Survey Courses: 273, 347
(c) Constitutional Law: 216A, 218, 240, 288, 288A
(e) Estate Planning: 214, 223, 221
(g) Family Law: 225, 242, 272, 435
(k) Labor and Employment Law: 248F, 251, 251A, 285A
(l) Legal Theories and Ethics: 237, 250, 258, 259, 284, 286C, 286D
(n) Procedure and Jurisdiction: 242, 246, 283
(r) Clinical Programs—Externships: 425, 430, 445, 450, 455, 460, 470
(s) Clinical Programs—in House Clinicals: 420, 435, 440, 480
(t) Individual and Group Study: 411, 411B, 416, 417, 418, 419, 495, 499

209A. Patent Law (3)
Discussion—3 hours. Prerequisite: course 274 or consent of instructor. This course covers all essential aspects of patent law. Important patent subject matter, novelty, utility, nonobviousness, enablement, prosecution, infringement, and remedies.

210. Criminal Justice Administration Seminar (2)
Seminar—2 hours. This course compares U.S. criminal procedural with that of other countries, particularly the differing roles of the prosecutor, defense counsel, and the judge. Limited enrollment.

210A. Privatization of Criminal Justice Seminar (2)
Seminar—2 hours. Prerequisite: Prior social theory or criminal procedure knowledge not required; completion of course 227A strongly recommended. Analyzes the legal, historical, and sociological aspects of the growing private sector provision of criminal justice services traditionally assumed by government, including prisons, policing, and adjudication. Limited enrollment.

211. Negotiation (2)
Discussion—2 hours. Theoretical and empirical approaches to negotiation for the purposes of making deals and resolving legal disputes. Limited enrollment.

212. Law and the Mental Health System (3)
Discussion—3 hours. Mental illness, the regulation of mental health professionals, the patient-professional relationship, mental health professionals as expert witnesses, and deprivation of liberty and property based upon mental disorder. With the prior written approval of the instructor, the advanced legal writing requirement may be satisfied by the research paper required for this course.

212A. Medical Liability Law and Policy (2)
Discussion—2 hours. This course will consider the many ways in which society seeks to establish and maintain quality in health care, and the role of the medical community in that process.

213A. Transnational Criminal Law (3)
Discussion—3 hours. Prerequisite: course 205; course 206. Will examine the laws responses to a particular aspect of globalization, transnational crime. The course will examine the phenomenon of transnationality and how it affects the power of nation-states, acting alone or together, to prosecute criminals.

213B. Estate and Gift Tax (3)
Discussion—3 hours. Prerequisite: course 220; course 221 recommended. Fundamentals of federal transfer taxation, including the estate tax, the gift tax, and the generation-skipping transfer tax.

215. Business Associations (4)
Discussion—4 hours. Legal rules and concepts applicable to business associations, both public and closely held. Corporate form of organization, partnerships and other associations forms.

215A. The Law of Corporate Governance Seminar (2)
Seminar—2 hours. Prerequisite: course 215. Advanced issues in the governance of publicly held corporations. Separation of ownership and control and how the law has addressed this issue at the theoretical level and in the context of topics such as the duties of corporate directors, shareholder voting rights, and competition among states to attract corporate charters.

215S. Special Session Business Associations (4)
Discussion—4 hours. This course provides a broad survey of the legal rules and concepts applicable to business associations, both public and closely held. Principal attention is given the corporate form of organization, although partnerships are also treated briefly. Topics surveyed include the planning of business transactions, the process of incorporation, the financing of corporations, and role of managements and shareholders, the federal securities laws, and social responsibility.

216A. Law and Religion (2)
Discussion—2 hours. Federal constitutional law relating to religion. Interpretation and application of the Free Exercise Clause and the Establishment Clause of the First Amendment. State constitutional law. Federal and state statutes and regulations. The definition of disability, entities subject to the A.D.A., the "otherwise qualified" requirement, forms of discrimination, reasonable accommodation, and defenses.

217. Telecommunications Law (3)
Discussion—3 hours. Economic and administrative regulation of telephone, radio and television broadcasting, and video technologies such as cable and direct broadcast satellites. Emphasis on the recently enacted Telecommunications Reform Act and the role of the Federal Communications Commission, as well as other sources of regulation such as related anti-trust law and state public utility regulation.

218. Constitutional Law II (4)
Discussion—4 hours. This course principally covers the First Amendment and the Equal Protection Clause.

219. Evidence (4)
Discussion—4 hours. Covers rules regarding the admissibility of testimonial and documentary proof during the trial of civil and criminal cases, including rules governing relevancy, hearsay, the examination and impeachment of witnesses, expert opinion, and constitutional and statutory privileges.

220. Federal Income Taxation (4)
Discussion—4 hours. Introduction to the basic principles of federal income taxation. Topics include identification of income subject to tax, gains and losses from property transactions, deductions from income, the timing of income and deductions (tax accounting), and the identity of persons subject to tax on particular items of income.

220S. Special Session Federal Income Taxation (2)
Discussion—2 hours. Introduction to the basic principles of federal income taxation using the American federal tax model. Topics include identification of income subject to tax, gains and losses from property transactions, the estate tax, and deductions and the identity of people subject to tax on particular items of income.

221. Trusts, Wills and Decedent’s Estates (3)
Discussion—3 hours. The law of decedent’s estates, wills and trusts. Topics include testamentary succession, family protection and limits on the power of testamentation; executors and revocation of wills; will substitutes; intestate and testamentary private trusts. Topics may include contributions to make wills; class gifts; powers of appointment; the Rule against Perpetuities; and introduction to the administration of estates and trusts, including powers, duties, rights, and liabilities of fiduciaries and the management of assets.

222. Critical Race Theory Seminar (2)
Discussion—2 hours. Examines race relations and racial discrimination in America through the perspectives of proponents of the Critical Race Theory movement (“CRT”), a collection of legal scholars who challenge both conservative and liberal political orthodoxies.

223A. Latinos and Latinas and the Law (2)
Seminar—2 hours. Seminar analyzes some of the legal issues of particular relevance to the Latino community in the United States, including racial identity, immigration, language regulation, national and transnational identity issues, affirmative action, and civil rights.

223. Estate Planning Seminar (2)
Seminar—2 hours. Prerequisite: course 221. Selected topics in the estates and trusts area. Content varies with instructor. Selected topics in the advanced legal writing requirement. Limited enrollment.

224. Animal Law Seminar (2)
Seminar—2 hours. An introduction to legal principles affecting animals and their use.

225. Marital Property (2)
Discussion—2 hours. The California community property system, including the rights of marital and domestic partners during the ongoing relationship, and upon the end of the relationship by death or divorce.

226. Disability Rights (2)
Discussion—2 hours. The Americans with Disabilities Act (A.D.A.) as it applies to employment, higher education, public accommodations, and government services and programs. The definition of disability, entities subject to the A.D.A., the "otherwise qualified" requirement, forms of discrimination, reasonable accommodation, and defenses.

227A. Criminal Procedure (3)
Discussion—3 hours. Federal constitutional limits on government authority to gather evidence and investigate crime. Topics include Fourth Amendment limits on search, seizure, and arrest; the Fifth Amendment privilege against self-incrimination; and the Sixth Amendment right to counsel.

227B. Advanced Criminal Procedure (3)
Discussion—3 hours. Examines a range of issues, including bail, charging decisions, preliminary hearings, discovery, statute of limitations, venue, joinder and severance, pleas, plea bargaining, assistance of counsel, trial, double jeopardy, sentencing, appeal and collateral matters.

228. Business Planning and Drafting (3)
Discussion—3 hours. Prerequisite: course 215 or consent of instructor; course 220 or consent of instructor; prerequisites for this class are rarely waived, do not register for the course unless you have satisfied them or received advance approval from the professor waiving them with you to register. Acquaints students with a range of business transac-
and development.

233. Refugee Law Seminar (2)
Seminar—2 hours. Prerequisite: course 292 recommended. Focus on the law concerning the admission of refugees to the United States. Detailed study of the Refugee Act of 1980, which is the major piece of legislation dealing with refugee admission, the international law regarding the rights of an alien, and the various regulations promulgated by the Attorney General implementing the law. Analysis of the implementation of the Refugee Act and examination of some of the criticism of the implementation bureaucracy's implementation of the law. Some topical issues of refugee law, such as gender-based persecution, persecution based on the exercise of reproductive rights, and the persecution of lesbians and gay men. The advanced legal writing requirement may be satisfied at the discretion of the instructor. Limited enrollment.

235. Administrative Law (3)
Discussion—3 hours. Examines how the U.S. Constitution and the federal Administrative Procedure Act constrain and regulate decision making by government agencies and officials.

235A. Seminar in Administrative Law (2)
Seminar—2 hours. Prerequisite: One environmental or administrative law course strongly recommended. Provides in-depth coverage of one or more topical issues in administrative law and policy, such as the relationship between public participation and expert oversight in guiding administrative agency decision making. Limited enrollment.

235T. Public Regulatory Law (3)
Discussion—3 hours. Provides an introduction to techniques of government regulation, principles of statutory interpretation, and judicial review of administrative agency rulemaking.

236A. Securities Regulation I (2)
Discussion—4 hours. Prerequisite: course 215 or consent of instructor. Legal rules and concepts applicable to business associations, both public and closely held. Corporate form of organization, partnerships and other associational forms. Topics include the plan of organization, the process of incorporation, the financing of corporations, and role of management and shareholders, the federal securities laws, and social responsibility.

236B. Securities Regulation II (2)
Discussion—2 hours. Prerequisite: course 215 or consent of instructor; course 236A recommended. Securities Exchange Act of 1934 and the regulation of securities markets. Topics covered include regulation of securities markets, and securities transactions, responsibilities of securities lawyers, continuous reporting, transnational securities fraud, and enforcement of the securities acts. A study of the development of legal institutions, such as courts and juries, as well as on doctrines of substantive law.

238. Tax Strategies of Business (2)

239. Mediation, Theory and Practice (3)
Discussion—3 hours. Prerequisite: course 211, 297. The basic, practical knowledge necessary to begin a mediation practice. Detailed understanding of the mediation process to counsel clients knowledgeable about the mediation option and represent clients ably in mediation. Communication skills, development of the ability to analyze disputes to understand why negotiations succeed or fail, and understanding of the advantages and limitations of mediation as a method of resolving disputes. The stages of a mediation: contracting (establishing contact with the parties and explaining the process), developing the issues, working the conflict, resolving the conflict, and closure. Limited enrollment.

240. Elections and Political Campaigns (2)
Discussion—2 hours. Covers selected constitutional and statutory aspects of federal and state elections, including campaign finance, candidates, and other topical issues. Limited enrollment.

240A. Law of the Political Process (3)
Discussion—3 hours. Covers many of the foundational issues in the “law of democracy,” as that body of statutory and constitutional law has developed in the United States.

241. Law and Psychiatry (2)
Seminar—2 hours. Prerequisite: course 212. Open to medical students who are participating in the program offered by the Forensic Center of Excellence at the UC Davis School of Medicine, and to law students at the UC Davis School of Law. Focus on forensic psychiatry for medical and legal professionals. Psychiatric trainees and fellows are paired with law students to work in tandem as a forensic team. Each case is assigned to actual cases that have been adjudicated, although the teams will approach each client as if the adjudication has not yet taken place. Each case is assessed from a psychiatric and a legal perspective so that both team members will confront the legal and psychiatric issues presented. Students are provided a broad array of legal/psychiatric problems and raise specific critical issues around which psychiatrists and lawyers interact and at times collide. Course is graded on the basis of attendance in the seminar sessions and on the instructor's evaluation of the written assessment of the cases prepared by the team to which the student belongs.

242. Conflict of Laws (3)
Discussion—3 hours. A study of how law operates across state and national borders. Topics covered include choice of applicable law in transactions involving multiple jurisdictions, recognition of judgments, and the exercise of jurisdiction.

242G. Special Session Conflict of Laws (2)
Discussion—2 hours. Study of transactions with multi-state and international contracts. Topics include jurisdiction, recognition of foreign judgments, and choice of applicable law. Addresses problems that international lawyers encounter in a wide variety of deals with the emphasis on international commercial deals.

243. Commercial and Bankruptcy Law (4)
Discussion—4 hours. The business debtor who doesn’t have enough money is unwilling to pay his debts. Remedies available to creditors to force payment, along with devices that creditors may use to give themselves priority against limited assets. Examination of the role of bankruptcy. Bankruptcy both as a means for providing funds for creditors, and as a device for maximizing asset value.

245. White Collar Crime (2)
Discussion—2 hours. The law of conspiracy, corporate criminal liability, mail and wire fraud, money laundering, and other business and environmental crimes and associated defenses.

245H. Death Penalty Seminar (2)
Seminar—2 hours. Offers overview of the constitutional law governing the death penalty in the United States. Limited enrollment.

246. Federal Jurisdiction (3)
Discussion—3 hours. Prerequisite: course 205. A study of subject-matter jurisdiction of federal courts.

247. Taxation of Partnerships and LLCs (3)
Discussion—2 hours. Prerequisite: course 220. The federal income taxation of business entities whose owners are taxed on the income, deductions and losses of the entity on a pass-through basis.

247B. Corporate Tax (3)
Discussion/lab—3 hours. Federal income tax relationship between corporations and federal income tax relationship between corporations’ owners.

248. Public International Law (3)
Discussion—3 hours. Introductory course covers basic international law concepts and the law-making process.

248A. Jurisdiction in Cyberspace Seminar (2)
Seminar—2 hours. Review concepts in international law, conflicts of law, cyberlaw, and federal jurisdic- tion to address the growing multi-jurisdictional conflicts created by the Internet. Examine European efforts at crafting intra-EU jurisdictional rules, as well as other international jurisdiction treaty projects such as those at the Hague. Limited enrollment. GE Credit: Wri.

248B. International Human Rights (2)
Discussion—2 hours. Prerequisite: course 205. This course examines laws, theories, and institutions relating to international human rights.

248F. Labor and Global Economy Seminar (2)
Labor and social studies, and the social sciences to examine the problem of whether and how core labor standard standards are developed in the global economy, and to assess the application of the standards in current or proposed national, international and private sector settings.

248T. Is International Law Democratic? (2)
Seminar—2 hours. We will examine the international law-making legal process, theories of democracy, and the relationship of international and national tribunals. Limited enrollment.

249. Comparative Law (3)
Discussion—3 hours. The uses of comparative method, principal differences between common law and civil law and the styles of legal reasoning that prevail in these two great legal cultures. Topics
include the evolution of the civil law, the phenomenon of codification, the structure of European civil codes and the interpretation of their provisions, the respective roles of counsel, judges and law teachers, civil law procedure, and the analysis of selected areas of substantive law. Knowledge of a foreign language is not required.

2495. Special Session Comparative Law (1) Discussion—1 hour. This course will provide a comparative perspective for students of American law. After an initial look at the uses of the comparative method, discussions will be centered around the main differences between common law and civil law and the different styles of legal thinking. Topics to be covered will be the evolution of the civil law and the ideal original conception, the structure of European civil codes and the interpretation of their provisions, the personnel of the law and procedure in civil law countries, and the analysis of selected problems of substantive law. Knowledge of a foreign language will not be required.

250. Jurisprudence Seminar (2) Seminar—2 hours. This is a seminar about theories of constitutional adjudication. Limited enrollment.

250A. Asian American Jurisprudence (3) Discussion—3 hours. Legal, social, and political discourse on race relations has traditionally been framed in Black-White terms. This course disrupts the traditional view by taking Asian Americans seriously.

251. Labor Law (2) Discussion—2 hours. Survey of the legislative, administrative, and judicial regulation of labor relations under federal law. Historical development of labor law, the scope of national legislation, union organization and recognition, the legality of strikes, picketing, and the negotiation of collective bargaining agreements.

252. International Litigation and Arbitration (3) Discussion—3 hours. Current developments in international law, conflict of laws, civil procedure, arbitration, and comparative law in the context of international disputes and disputes that cut across national boundaries.

253. Products Liability (3) Discussion—3 hours. Civil action for harm to the consumer resulting from defective products. Includes manufacturing defects, warning defects and design defects.

254. Housing Law (2) Discussion—2 hours. This survey course covers legal and policy issues related to developing, protecting and preserving affordable, safe and accessible housing and sustaining viable, diverse communities.

254T. Law and Rural Livelihoods Seminar (2) Seminar—2 hours. Provides a broad overview of law as it relates and applies to rural people and places.

255. Pension and Employee Benefit Law (3) Discussion—3 hours. Prerequisite: course 220. The federal regulation and taxation of private pensions and employee benefits. The Employee Retirement Income Security Act (ERISA), including such topics as coverage, forfeitures, spousal rights, creditor access, fiduciary duties, preemption of state law, remedies, and federal preemption of state provisions. Internal Revenue Code issues such as discrimination in favor of the highly compensated, limitations on contributions and benefits, rollovers, IRAs, early distribution penalties, and minimum distribution rules.

256. Land Use (2) Discussion—2 hours. Local agencies, developers, environmental interest groups, and others who regularly deal with the administrative and legislative applications of land use planning and development laws. Topics include zoning, general plans, local government land use regulation, and related areas of litigation. The expanding role of the California Environmental Quality Act.

257. Legislative Process (2) Discussion—2 hours. Fundamental elements of the legislative process, including legislative process states; the legislature as an institution; lobbying; statutory interpretation, legislative-executive relations; and the legislature’s constitutional powers and limitations.

257A. Legislative Intent Seminar (2) Seminar—2 hours. Theories and principles of statutory and constitutional interpretation. Original intent versus living constitution; permissible kinds of evidence for determining legislative intent; canons of construction; extent to which initiatives should be interpreted similarly to legislative enactments.

257B. Statutory Interpretation (2) Seminar—2 hours. This course addresses the process of statutory interpretation, commercial and public interest, and statutory construction. The course covers legal and political science theories, and the practicalities of the legislative process, which bear on interpretation of statutes and regulations.

258. Professional Responsibility (2) Discussion—2 hours. The American Bar Association’s Model Rules of Professional Conduct and the Code of Judicial Conduct, which are tested on the Multistate Professional Responsibility Examination, and the California Rules of Professional Conduct, which are tested on the California Bar Examination. Issues affecting the legal profession, including lawyers’ ethical responsibilities and duties to clients, the courts, third parties, and the legal system.

259. Feminist Legal Theory (2) Discussion—2 hours. Provides an overview of feminist legal theory and considers how its various strands inform legislative and judicial law making. Satisfies Advanced Writing Requirement.

259A. Women, Islam and the Law (2) Seminar—2 hours. This course will study legal and religious reform movements for women’s rights within Muslim societies in the context of current scholarly and political debates about fundamentalism, democracy, equality, secularism, universalism, and multiculturalism. This is a limited enrollment seminar.

259P. Women and the Law Practicum (1) Discussion/lecture. Prerequisite: prior or concurrent enrollment in course 259. Complements the content of the feminist legal theory course by providing students the opportunity to consider how feminist theory may be used to inform law-making.

259T. Women, Islam and the Law (2) Seminar—2 hours. This course will study legal and religious reform movements for women’s rights within Muslim societies in the context of current scholarly and political debates about fundamentalism, democracy, equality, secularism, universalism, and multiculturalism. This is a limited enrollment seminar.

260. Employment Discrimination (3) Discussion—3 hours. Examination of federal and California laws prohibiting employment discrimination, including Title VII of the Civil Rights Act of 1964, Equal Pay Act, Age Discrimination in Employment Act, the ADA, the Rehabilitation Act, and the California Fair Employment and Housing Act.

261. Judicial Process (2) Discussion—2 hours. Examines a variety of issues concerning the judicial process. Focus is on judge’s role in the legal process, the administration of justice, ethical issues, decision making, bias, and critical examination of the strengths and weaknesses in our current system.

262. Antitrust (3) Discussion—3 hours. A study of the federal antitrust laws, including the rules against price fixing, market division, limits on distribution, tying arrangements, monopolization and mergers.

262A. Special Session Antitrust (1) Discussion—1 hour. A study of the federal antitrust laws including price fixing, limits on distribution, tying arrangements, monopolization and mergers.

263A. Trial Practice (1) Discussion—2 hours; laboratory—1 hour. Prerequisites: course 219, may be taken concurrently. Introductions to the preparation and trial of cases, featuring lectures, videotapes, demonstrations, assigned readings and forensic drills. Laboratory held on Tuesday, Wednesday, and Thursday evening. Limited enrollment.

264. Water Law (3) Discussion—3 hours. Property rights in surface waters, including riparianism, prior appropriation and federal reserved rights; water administration institutions, including the federal reclamation program; the law of interstate waters and property rights in ground water. Emphasis on California water law and policy.

264A. Ocean and Coastal Law (2) Discussion—2 hours. Introduction to the goals and challenges of coastal and ocean policy.

265. Natural Resources Law Seminar (2) Seminar—2 hours. Prerequisite: course 256 or course 285 useful but not required. In-depth coverage of a specific topic in natural resources law. This topic varies from year to year. Limited enrollment.

266. Law of E-Commerce (2) Discussion—2 hours. The legal issues that are emerging as crucial to the use of e-commerce in cyberspace. Discussion of the evolution and current administration of the Internet and the World Wide Web.

267. Civil Rights Law Discussion—4 hours. Civil remedies for civil rights violations under the primary United States civil rights statute. Specifically, covers actions for constitutional and statutory violations under 42 USC §1983, affirmative defenses, and affirmative doctrines. The history of civil rights movement.

267B. Civil Rights Seminar (2) Seminar—2 hours. The social, political, legal, and historical factors which led to the creation of the United States Commission on Civil Rights (USCCR) in 1957. The United States Commission on Civil Rights is a bipartisan, independent agency established by the Civil Rights Act. It is directed to investigate complaints alleging deprivation of the right to vote and voter fraud, to study and collect information relating to discrimination and the denial of equal protection of the laws under the Constitution on the basis of race, color, religion, sex, age, disability, or national origin; and submit reports, findings and recommendations to the President and to Congress. The role that the USCCR has played and continues to play in American politics, legislative enactments and the national dialogue on equality, fairness and justice in the context of civil and human rights. Satisfies Advanced Legal Writing Requirement. Limited enrollment.

268. Jewish Law Seminar (2) Seminar—2 hours. The term “Jewish Law” refers to those subjects that would normally be taught in an American law school as they have been approached by the Jewish legal system. This system is based primarily on the Talmud and on the commentaries and decisions that are derived from it. Jewish law is of interest to American law students not for its immediacy, but primarily for its potential to shed light on the operation of a foreign legal system that is one of the oldest in the world, and one that has faced many of the problems now facing American law. Specifically, although Jewish law is purportedly based on immutable natural law, there are changing conditions over the centuries that have encouraged methods of adaptation that are reminiscent of American constitutional law. Each student will be required to coordinate and prepare a paper that would fulfill the advanced legal writing requirement. Neither a knowledge of foreign languages nor a previous exposure to Jewish law is necessary. Limited enrollment.

269A. Basic Finance (3) Discussion—3 hours. Students with a non-law basic finance course must have instructor’s permission. Basic techniques of analysis that are part of the core curriculum of a good business school are studied.
Purpose is to give you background necessary for understanding and advising clients and for understanding other business-related law courses.

269C. Corporate Finance (3)
Discussion—3 hours. How corporations raise money, i.e., stocks and bonds, IPOs, how deals are structured. Under Chapter 1 of the Bankruptcy Code. Intended for those who intend to practice in a firm where clients raise money in securities markets or invest in deals.

270. International Business Transactions (2)
Discussion—2 hours. Select legal problems arising from international business transactions. Topics include the international sales contract, letters of credit, transfers of technology, regulation of bribery, development of joint ventures, repatriation of profits, and foreign exchange problems.

270S. Special Session International Business Transactions (2)
Discussion—2 hours. A consideration of selected legal problems arising from international business transactions. Topics include the international sales contract, letters of credit, transfers of technology, regulation of bribery, repatriation of profits, and national efforts to control imports.

271. Nonprofit Organizations (4)
Discussion—4 hours. Prerequisite: course 215 or consent of instructor. The legal rules and concepts applicable to nonprofit organizations. Limited enrollment.

271A. Nonprofit Organizations: State and Local Government Issues (2)
Discussion—2 hours. Prerequisite: course 215 (may be taken concurrently) or consent of instructor. State and local laws applicable to nonprofit organizations, i.e., public, social, cultural, religious, educational, and other non-for-profit entities. Federal tax exempt status of nonprofit, state and local laws impacting nonprofits with respect to incorporation or charter, franchise tax, operation and governance, dissolution, fiduciary duties of trustees and officers and directors, management and investment obligations of trustees, and private use, neglect and crime, generally for the non-Western developed world.

271B. Nonprofit Organizations: Tax Exempt Organizations Focus (2)
Discussion—2 hours. Prerequisite: course 215 or consent of instructor; course 220 recommended. Conceptual and substantive law criteria for the federal and state income tax exemption of nonprofit organizations, the requirements to preserve charitable status of organizations, and the differences between private foundations and public charities, special excise taxes, the application examination process and reporting and disclosure requirements. Topics may include non-profit accounting issues, local property tax and other local taxes, and public/private partnerships.

272. Family Law (3)
Discussion—3 hours. An introduction to the legal regulation of the family.

278. Elder Law (2)
Discussion—2 hours. The legal practice and policy relating to aging individuals and an older society. Examination of the roots of legal ethics and the role of the lawyer as problem solver and advisor, and the uses of law in relationships between people over life’s course. The traditional divisions of tort, contract and property and examination of issues such as age discrimination in employment, eligibility for public benefits, long-term care, housing options of the elderly, health care, guardianship, health care decision-making for the incapacitated client, disability law issues, property management, euthanasia, elder abuse, neglect and crime, general torts, the civil law values of autonomy versus protection, and a host of other matters. Students lead discussions of interdisciplinary assigned read- ing and guest lectures.

273N. Advanced Torts (3)

274. Intellectual Property (3)
Discussion—3 hours. Provides a broad survey of intellectual property law.

274A. International Intellectual Property (2)
Discussion—2 hours. Prerequisite: course 274 or 296 or 209A or consent of instructor. International aspects of copyright, patent, and trademark law, including a look at basic international instruments such as the Paris Convention, the Berne Convention, and Trade-Related Aspects of Intellectual Property Rights of the World Trade Organization. Topics include approaches to patent protection for pharma- ceuticals and agricultural products in developing nations, and copyright protection in a digital world.

274AS. Summer Session Intellectual Property (2)
Discussion—2 hours. This course provides a broad survey of the field of intellectual property. Areas covered will include copyright and trade secret, idea protection, unfair competition, and copyright.

274C. Intellectual Property in Cyberspace Seminar (2)
Seminar—2 hours. Prerequisite: course 274. The recent expansion of IP laws emerging to meet the growth of Internet and digital technologies that enhance human abilities to access, copy, store, manipulate, and transmit vast amounts of informa- tion.

274D. Intellectual Property in Historical Context Seminar (2)
Seminar—2 hours. How the legal system has adapted to earlier periods of rapid change by creat- ing, delimiting, and defining intellectual property rights [IPRs]. Required paper satisfies advanced writing require- ment.

275. Complex Litigation (2)
Discussion—2 hours. Issues that frequently arise in large complex litigation involving multiple parties and multiple claims.

276. Juvenile Justice Seminar (2)
Seminar—2 hours. Legal and philosophical bases of a separate juvenile justice process for crimes commit- ted by minors; police investigation, apprehension and diversion, probation intake and detention; juve- nile court hearing and disposition; juvenile correc- tions. The role of counsel at each phase of the process is examined.

277. Native American Law (2)
Seminar—2 hours. Legal relations between Native American tribes and the federal and state govern- ments. Topics include the basic jurisdictional con- flicts, which determine this area of law and its contours, specific areas such as land rights, hunting and fish- ing rights, water rights, domestic relations law, and environmental protection. Religious freedom, repatriation. Issues regarding termination and non-recog- nized tribes are also addressed.

277T. Indian Gaming Law Seminar (2)
Seminar—2 hours. Examines unique historical, politi- cal and legal context in which Indian tribes operate casinos, including tribal sovereignty, relations between tribes and states and local governments and changing relationships among the tribes them- selves members, with particular reference to experi- ence of California.

280. Advocacy (4)
Discussion—2 hours. Seminar on how to write a variety of legal documents in plain English. Writing exercises and outside readings will be assigned weekly. Each stu- dent completes an individual writing project in lieu of final examination. The writing project will satisfy the law school’s advanced legal writing require- ments. Limited enrollment. (S/U grading only.)

280. Advocacy (4)
Discussion—2 hours. The history, law, and public pol- icy of energy regulation in the United States with an emphasis on economic and environmental regula- tion. Competitive restructuring of the natural gas and electric utility industries, implementation of the regu- latory schemes for other energy sources such as hydroelectric power, coal, oil, and nuclear power explored. Recommended to anyone who has an interest in the energy sector, various models of eco- nomic regulation, or regulated industries.

280T. Indian Law and Policy (2)
Discussion—2 hours. Survey of modern American Indian civil remedies law in both private and public law contexts. Topics addressed include equitable reme- dies, equitable defenses, contempt power, injunctive relief, restitution, and money damages in torts and contracts.

282. Law and Economics (3)
Discussion—3 hours. Introduces students to the eco- nomic analysis of law. We will explore several eco- nomic methods and concepts, including rational choice theory, behavioral economics, and utilitarianism. We will apply these tools to analyze and crit- que familiar areas of law, including property, contracts, torts, criminal law, and civil procedure. Prior study of economics is not required.

282A. Law and Economic Development (2)
Discussion—2 hours. The relationship between law and economic development in transition economies. Western assumptions about whether the role of law and legal institutions in economic development hold true for the non-Western developing nations of Asia and Africa.

285. Environmental Law (3)
Discussion—3 hours. An introduction to federal and state environmental law, including coverage of his- torical development of environmental law; the role of courts, the legislature and the executive branch in the development and implementation of environmen- tal policy; allocation of authority among different lev- els of government; the role of market forces in environmental decisions; the major regulatory strate- gies that have been applied to control environmental harm, and enforcement of environmental law. Major statutes considered include the National Environmental Policy Act, Endangered Species Act, Clean Air Act and Clean Water Act.

285B. Environmental Practice (3)
Discussion—3 hours. Prerequisite: course 285 recom- mended. Examines underlying theory and prac- tice in securing compliance in environmental laws.
285C. Agricultural Law and Policy (3) Discussion—3 hours. An introduction to agricultural law, constitutional legal principles, and international aspects of agricultural law at the forefront of contemporary debates about agriculture in society.

285D. Farmworkers and the Law (2) Discussion—2 hours. Provides an overview of California and federal laws impacting farmworkers and how such laws have been applied to regulate working conditions in agriculture.

286. Public Health Law (2) Seminar—2 hours. Public health law as the government’s power and responsibility to ensure the conditions for the population’s health. The use of this power and the individual’s interests in liberty and property.

286A. Topical Issues in Health Law (2) Discussion—2 hours. The course focuses on fourteen issues at the interface of law, medicine, bioethics, and health policy that are currently the subject of major litigation, legislation, and/or contentious debates in the domains of bioethics and public policy. Limited enrollment.

286B. Health Law (3) Discussion—3 hours. The course addresses legal issues raised in three general areas access to health care, health care financing, and quality of care.

286C. Bioethics (3) Discussion—3 hours. Course examines the ethical and legal issues that arise from biomedical research and use of medical technologies. Limited enrollment. GE Credit: Writing.

286D. Legal Psychology Seminar (2) Seminar—2 hours. Examine how psychological theory and research can be used to shape laws and policies to make them better reflect what we know or believe about how individuals process information, make decisions and behavior.

286E. Reproductive Health Law and Policy (2) Seminar—2 hours. Addresses a variety of laws and practices that affect reproductive health and proactive decision making. Limited enrollment.

287. Public Land Law (3) Discussion—3 hours. Legal aspects of federal land management, including the history of public land law, the organization of federal lands and specialized law dealing with particular natural resources and uses found on federal lands (minerals, timber, range, wildlife, recreation and preservation).

287A. Public Benefits Law (2) Seminar—2 hours. Will explore the theory and practice of law pertaining to the enactment and administration of public benefits programs for poor and other disadvantaged persons in our society. Limited enrollment.

287T. Law and Society Seminar (2) Seminar—2 hours. Study of law and society challenges traditional legal scholarship by exploring multiple ways in which law both shapes and is shaped by societies and social interactions. Seminar will introduce students to important literature and debates in the field. Limited enrollment.

288. Advanced Constitutional Law Seminar (2) Seminar—2 hours. Prerequisite: course 218A. In-depth selected topics or problems in constitutional law and theory. The current focus is on the interpretation and application of the religion clauses of the First Amendment. Limited enrollment.


288B. Supreme Court Simulation Seminar (2) Seminar—2 hours. Consideration in depth of approximately nine cases involving constitutional law that will be decided during the present term of the U.S. Supreme Court. Limited enrollment.

289A. Biotechnology Law and Policy (3) Seminar—2 hours. Coverage includes the regulation of biotechnology research, including restrictions on cloning and fetal stem cell research; regulation of the products of biotechnology to protect human health or the environment, including restrictions on use or distribution of genetically modified organisms; the availability and scope of intellectual property protection for biotechnology products, including genes and engineered organisms, and the international governing accord to harmonize standards that require the starting materials for biotechnology and trade in bioengineered organisms or their products. Limited enrollment.

290. International Trade Dispute Seminar (2) Seminar—2 hours. The WTO and other regional trading agreements, particularly the NAFTA, provide mechanisms for resolution of trade disputes. Students are introduced to economic, political, and legal theories underlying establishment of such bodies.

291A. International Finance (3) Discussion—3 hours. How a framework of national and international laws and institutions regulates and fails to regulate flows around the world.

291B. International Investment Dispute Seminar (2) Seminar—2 hours. This seminar will examine the law of investor-State dispute resolution.


293. Public Interest Law Seminar (2) Seminar—2 hours. This class will examine the issues and problems associated with providing civil legal services to persons in a legal aid organization that typically have been unable to afford or otherwise obtain representation from the private bar.

294A. Law and Popular Culture (2) Seminar—2 hours. This course examines works of popular culture. Each session will focus on a particular film and its cultural implications, particular problem or problems of law, law practice, legal ethics, traditional ethics, or public policy. —I (1)

295A. Trademark and Unfair Competition Law (2) Discussion—2 hours. Prerequisite: course 274 recommended. We will take an intensive look at selected issues in Trademark Law, including the concepts of trademarks and unfair competition, acquisition and loss of trademark rights, infringement, trademarks as speech, and international aspects of trademark protection.

296. Copyright (3) Discussion—3 hours. Thorough examination of the law of copyright, including its application to literature, music, films, television, art, computer programs, and the Internet. Includes copyright protection, the copyright owner’s rights, the term of protection, copyright ownership and transfer, infringement, and defenses to infringement.

296A. Advanced Copyright and Related Doctrines (2) Discussion/laboratory—2 hours. Prerequisite: course 296 or 274 or consent of instructor. Intensive look at selected issues in copyright, including the fair use doctrine, the application of copyright principles in the context of the Internet and digital technology, and international aspects of copyright law. Examination of some doctrines related to copyright, as well as to entertainment law, including protection for fictional characters and titles, and the right of publicity.

296T. Right of Publicity and Related Doctrines (2) Discussion—2 hours. Intensive look at the right of publicity, which, generally, involves the right of an individual, especially a celebrity, to control the commercial value and exploitation of his or her name, likeness or other indicia of identity.

297. Alternative Dispute Resolution (3) Discussion—3 hours. Introduces students to a wide variety of alternative dispute resolution procedures, with an emphasis on negotiation, mediation and arbitration. Limited enrollment.


Professional Courses

408. Community Education Seminar (3) Seminar—clinic—3 hours. Trains students to educate the community about basic legal rights and responsibilities. Students attend an initial four-hour orientation, followed by weekly 3-hour seminar that will prepare students to teach in a local high school at least two times per week. Paper or journal required, to be determined by instructor. Limited enrollment. (S/U grading only.)

408A. Educational Policy and the Law Seminar (2) Seminar—2 hours. Prerequisite: course 235 recommended. Examines the interaction between policy and the law of various educational issues such as the “right” to an education, financial equalization, merit and testing, privatization of education, and educational access. Limited enrollment.

409. Environmental Law Moot Court Competition (1) During the first eight weeks of fall semester, students research and submit briefs as appellants, respondents, or third parties on a problem of environmental law that is prepared by the National Environmental Law Moot Court Board. Students attend four to six classes (including guest lectures) on aspects of appellate advocacy, legal writing, and environmental law. Members of the spring environmental law moot court team will be selected on the basis of performance in class. (S/U grading only.)

410A. Moot Court (2) Discussion/laboratory—2 hours. Basic appellate practice and procedure. From the development of effective appellate brief writing skills and the refinement of oral advocacy skills and an opportunity to practice these skills in front of a moot court. Students compete in two rounds of oral arguments which, combined with the second semester of the program, determine the rankings for selecting participants in the annual Neu- miller Competition and other interschool competition teams and for membership on the Moot Court Board. Both courses 410A and 410B must be taken in order to qualify for most interschool competitions. Limited enrollment. (S/U grading only.)

410B. Appellate Advocacy (Moot Court) (2) Practice—2 hours. Continuation of course 410A. Focuses on the development of effective appellate brief writing skills and the refinement of oral advocacy skills. Limited enrollment. (S/U grading only.)

411. Journal of International Law and Policy (1-2) The Journal is a biannual journal produced by King Hall students with an interest in international law. The editor-in-chief of the journal receives two units of credit each semester. The managing editor receives one unit of credit each semester. (S/U grading only.)

411A. International Law Journal (1-2) The Editor in Chief of the Journal of International Law and Immigration receives two credits for each semester of service. Only one person may receive this credit. 

Quarter Offered: I=Fall; II=Winter, III=Spring; IV=Summer. 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Social-Cultural Diversity; Wrt=Writing Experience
credit in any one semester as editor in chief. Managing and executive editors receive one unit. (S/U grading only.)

411B. Journal of Juvenile Law and Policy (1-2)
A biannual publication of the UC Davis School of Law that addresses the unique concerns of children in the American legal system. The editor-in-chief of the journal receives two credits each semester. Managing editors receive two credit each semester. (S/U grading only.)

411C. UC Davis Business Law Journal (1-2) Run by dedicated law students who are committed to providing current and valuable legal and business analysis. The Journal addresses a broad spectrum of issues that fall within the intersection of business and the law. May be repeated two times for credit. (S/U grading only.)

412. Carr Intraschol Trial Advocacy Competition (1) Competition—1 hour. Named after the late Justice Frances Carr, this competition is open to second- and third-year students. A preliminary round is followed by quarter-finals, semi-finals, and a final round. Students participate in mock trials presided over by student judges with real-life experience. Limited enrollment. (S/U grading only.)

413. Interschool Competition (1-3) Prerequisite: consent of appropriate faculty adviser. Participation in interschool moot court and lawyering skills competition is limited to students actually representing the School in the interschool competitions. Competition must be authorized by the appropriate faculty adviser. The faculty adviser must be a member of faculty, and must be experienced in the area of arbitration for which the student is seeking credit. For any particular competition on the performance of such additional work as may be reasonable to justify the credit. May satisfy advanced legal writing requirement. (S/U grading only.)

414. Moot Court Board (1) Prerequisite: courses 410A-410B. Members of Moot Court Board may receive one credit for each semester of service on the board, up to a maximum of two. Credit awarded upon fulfillment by Moot Court Board and approval of the faculty advisers to Moot Court Board. Limited enrollment. (S/U grading only.)

415. Trial Practice Honors Board (1) Members of the Trial Practice Honors Board administer the Frances Carr competition. Members are nominated by their individual Trial Practice I adjutants. Students receive one credit for serving on the Board, awarded upon completion of the faculty adviser. (S/U grading only.)

416. Law Review Writer (1-2) Writing of an editorship quality law review article under the editorial supervision of editors of the Law Review. Minimum of 40 hours contribution to the Review’s publication is also required. Credit may be obtained only upon achieving status as a member of the Law Review, which requires that the student have made substantial progress toward completing an editorship article. Credit is awarded only after certification by the editor-in-chief of the Law Review and approval of the faculty advisers to the Law Review. One unit is awarded for the first semester and one unit is awarded for the second semester upon completion of an editorship draft. One unit is earned second semester if only a membership draft is completed. (S/U grading only.)

417. Law Review Editor (1-2) Editors must have completed an editorship article and must perform editorial duties requiring a substantial time commitment. Credit awarded only after certification by the editor-in-chief of the Law Review and approval of the faculty advisers to the Law Review. Students may receive four credits over two semesters for service as an editor. (In exceptional cases, students may be permitted to participate for one semester only and receive two credits.) (S/U grading only. Deferred grading pending only, pending completion of sequence.)

418. Environmental Law and Policy Journal (1-2) Independent study. Each year nearly 100 King Hall students work together to publish Enviros. Getting involved with the journal will provide you with the chance to develop essential skills that will benefit you throughout your career and education. (S/U grading only.)

419. Advanced Writing Project (1-4) The completion of a writing requirement project under the active and regular supervision of a faculty member is required for satisfactory fulfillment of the legal writing requirement. The writing project must be an individually authorized work of rigorous intellectual effort of at least 15,000 words. The project must be in several forms, for example, a drafted brief, a memorandum of law, a proposed statute, a statute or set of administrative regulations (with explanatory comments), a will or agreement (with explanatory comments). The advanced writing project may also be undertaken in connection with another course or seminar to satisfy the legal writing requirements. The number of units shall be approved by the faculty supervisor and will depend upon the scope of the writing effort. (S/U grading only.)

419A. Advanced Writing Project (1-4) The completion of a writing requirement project under the active and regular supervision of a faculty member is required for satisfactory fulfillment of the legal writing requirement. The writing project must be an individually authorized work of rigorous intellectual effort of at least 15,000 words. The project must be in several forms, for example, a drafted brief, a memorandum of law, a proposed statute, a statute or set of administrative regulations (with explanatory comments), a will or agreement (with explanatory comments). The advanced writing project may also be undertaken in connection with another course or seminar to satisfy the legal writing requirements. The number of units shall be approved by the faculty supervisor and will depend upon the scope of the writing effort. (S/U grading only.)

419B. Speci-Sem Session Advanced Writing Project (1-4) The completion of a writing requirement project under the active and regular supervision of a faculty member is required for satisfactory fulfillment of the legal writing requirement. The writing project must be an individually authorized work of rigorous intellectual effort of at least 15,000 words. The project must be in several forms, for example, a drafted brief, a memorandum of law, a proposed statute, a statute or set of administrative regulations (with explanatory comments), a will or agreement (with explanatory comments). The advanced writing project may also be undertaken in connection with another course or seminar to satisfy the legal writing requirements. The number of units shall be approved by the faculty supervisor and will depend upon the scope of the writing effort. (S/U grading only.)

420. Civil Rights Clinic (2-6) Clinical program. Prerequisite: prior or concurrent enrollment in course 219; priority given to students enrolled in one of the UC Davis human rights or civil clinic programs. The clinic provides practical experience in providing legal services to indigent clients who have filed civil rights actions in state and federal trial and appellate courts. Students must be approved by the director of the clinic. Limited enrollment. May be repeated for credit. Students may receive a maximum of 14 units for the civil rights offerings (substantive course credit; 2 units) may be earned over more than one semester. (S/U grading only.)

425. Judicial Clinical (2 to 6 or 12) Clinical program. Prerequisite: course 261 required for full-time clinical students and recommended for part-time clinical students. Students may arrange judicial clerkship clinical programs with an approved list of state and federal judges through the Clinic office and under the sponsorship of the faculty member in charge. All students must complete weekly time records and bi-weekly journals. Full-time clinical students must complete a final paper of approximately 10 pages. (S/U grading only.)

430. Clinical Program in Federal Taxation (2) Clinical program. Prerequisite: course 220. Students will have the opportunity to work with the Internal Revenue Service or other governmental tax agency. Journals and attendance at group meetings are required. (S/U grading only.)

435. Family Protection Clinic (4) Clinical activity. Prerequisite: course 219 (may be taken concurrently). Representation of low-income persons in family law related matters arising out of situations involving family violence. Students are supervised by the staff attorney at the clinic’s office located in Woodland at the Sexual Assault and Domestic Violence Center of Yolo County. (S/U grading only.)

440. Immigration Law Clinical (2 to 6 or 12) Clinical program. Students may represent clients in administrative law hearings in San Francisco. Minimum units for the course are 4 and maximum is 12. Each unit requires four hours of supervised participation in the seminar, conference, and case research and development. Students who have completed course 292 may take the clinic for a minimum of 2 units. Limited enrollment. (S/U grading only.)

445. Legislative Process Externship (2-5) Clinical activity. Prerequisite: course 240 (may be taken concurrently) or consent of instructor. Practical experience in the operation of the State Assembly or a legislative committee. The major thrust of the program is to enable students to become familiar with the give and take realities of making laws, as contrasted with their interpretation and enforcement. Journals are required. (S/U grading only.)

450. Environmental Law Internship (2-6) Clinical activity—6 hours. Prerequisite: course 285 or consent of instructor. Practical experience in environmental law. Students will work in an approved government, non-profit or private law office engaged in some form of environmental law work for a minimum of 8 hours per week. Students must prepare a journal describing and reflecting upon their clinical experience, and meet periodically with the instructor.

455. Employment Relations Externship (2-6) Clinical activity. Prerequisite: course 251 or 260 (may be taken concurrently). Practical experience in employment relations, including employment discrimination and public sector labor law. Work under the direction of an experienced attorney. Opportunity to participate in a range of with emphasis on observation and participation in actual investigation, interviewing, drafting pleadings, and attendance at hearings. (S/U grading only.)

460. Public Interest Law Clinical (2-6) Clinical activity. Prerequisite: prior or concurrent enrollment in course 293 recommended. Students work with a public interest practitioner in a nonprofit organization. Journals and attendance at group meetings are required. Clinical students must complete an evaluative final paper of approximately 8 pages. Hours completed in public interest setting may be applied toward the clinical requirement for the Public Interest Law Program. (S/U grading only.)

465. Clinical Program in Administrative Law (2-6) Clinical activity—2-6 hours. Prerequisite: course 235 (may be taken concurrently) or consent of instructor. For students interested in a work experience in an administrative law setting. Students will work under the direct supervision of an administrative law judge, hearing officer, or government attorney. Placement assistance will be provided by the instructor. A goal of this clinical will be a breadth of experience in the areas of formal adjudication, informal
adjudication, rulemaking, and judicial review. Students will be required to meet monthly as a group to share experiences and maintain observational journals. (S/U grading only.)

470. Administration of Criminal Justice Externship (2-6 or 12)
Clinical activity—2–12 hours. Prerequisite: Completion of or concurrent enrollment in courses 219 and 227; course 263A recommended. Gain practical experience working full or part time in a District Attorney’s or Public Defender’s office in one of several surrounding counties or in a federal Public Defender or U.S. Attorney’s office. Students participate in the many activities associated with the office for which they exist, including observation, interviewing, research, counseling, motion practice, and trials under State Bar rules. Limited enrollment. (S/U grading only.)

480. Clinical Program in Prison Law (2-6)
Clinical program. Provides practical experience in providing legal services to real clients who have various problems related to their incarceration in state prison. The services require analysis and application of Constitutional law, state statutory law, agency regulations, and the rules of professional responsibility. Students will work under the direct supervision of the Prison Law clinical director and will be assigned a particular caseload. Students will be required to follow the law office procedure of the clinic and employ skills such as interviewing, research, writing, negotiating, and possibly, the preparation of legal documents to be filed in court. (S/U grading only.)

495. Instruction in Legal Research and Legal Writing Skills (1-2)
Participants will assist in instructing legal research and writing for first-year students under the direction of the legal research and writing instructors. Approval of the research and writing instructors is required for enrollment. Participants may assist in the legal research program and once in the legal writing program. One unit will be given in the fall semester for legal research instruction and two units in the spring for legal writing instruction. (S/U grading only.)

498. Group Study (1-4)
Groups of students (not fewer than 4 or more than 10) with common interest in studying a stated legal problem may plan and conduct their own research and seminar program, subject to the following regulations: (1) the program may extend over no more than two semesters; (2) each participant must conduct a weekly seminar session to be arranged by them; (6) each member of the group must submit an individual paper or an approved alternative growing out of the seminar subject to the faculty board; (7) S/U grading only unless the entire group requests letter grades in advance.

499. Independent Research Project (1-4)
Students may receive credit for individual projects, subject to the following regulations: (1) the project may extend over no more than two semesters; (2) each participant will be under the supervision of a faculty member; (3) an outline of the project must be approved by the supervising faculty member; (4) normally, no faculty member will be permitted to supervise more than five students working on individual programs during any semester; and (5) each student must submit an individual paper or approved alternative to the supervising faculty member. (S/U grading only.)

499A. Independent Research Project (1-4)
Students may receive credit for individual projects, subject to the following regulations: (1) the project may extend over no more than two semesters; (2) each participant will be under the supervision of a faculty member; (3) an outline of the project must be approved by the supervising faculty member; (4) normally, no faculty member will be permitted to supervise more than five students working on individual programs during any semester; and (5) each student must submit an individual paper or approved alternative to the supervising faculty member. (Deferred grading only, pending completion of sequence.)

499S. Special Session Independent Research Project (1-4)
Students may receive credit for individual projects, subject to the following regulations: (1) the project may extend over no more than two semesters; (2) each participant will be under the supervision of a faculty member; (3) an outline of the project must be approved by the supervising faculty member; (4) normally, no faculty member will be permitted to supervise more than five students working on individual programs during any semester; and (5) each student must submit an individual paper or approved alternative to the supervising faculty member.

Affiliated Faculty
Stephanie Cross, M.A., Lecturer
Angela Folin, M.A., Lecturer
Janet Lane, M.A., Lecturer
Ellen Lange, M.A., Lecturer
John Samuel, M.A., Lecturer
Kathleen Ward, Ph.D., Lecturer

499B. Clinical Program in Law (1-4)
Clinical program. Provides practical experience in providing legal services to real clients who have various problems related to their incarceration in state prison. The services require analysis and application of Constitutional law, state statutory law, agency regulations, and the rules of professional responsibility. Students will work under the direct supervision of the Prison Law clinical director and will be assigned a particular caseload. Students will be required to follow the law office procedure of the clinic and employ skills such as interviewing, research, writing, negotiating, and possibly, the preparation of legal documents to be filed in court. (S/U grading only.)

499D. Summer Internship (1-4)
Summer session program may extend over no more than two semesters; (2) the program must conduct a weekly seminar session to be arranged by the student, and normally will be approved only prior to a semester involved; (3) a course in the program and the amount of credit sought; (4) changes in the program or in membership of the group must be approved by the faculty board and normally will be approved only prior to a semester involved; (5) group members must conduct a weekly seminar session to be arranged by them; (6) each member of the group must submit an individual paper or an approved alternative growing out of the seminar subject to the faculty board; (7) S/U grading only unless the entire group requests letter grades in advance.

Linguistics
[College of Letters and Science]
Patrick Farrell, Ph.D. Chairman of the Department
Department Office, 108 Sproul Hall (530) 752-9933; http://linguistics.ucdavis.edu

Faculty
Rao Aranovich, Ph.D., Associate Professor
Robert J. Bayley, Ph.D., Professor
David Corina, Ph.D., Professor
Patrick Farrell, Ph.D., Professor
John A. Hawkins, Ph.D., Associate Professor
Julia Menard-Warwick, Ph.D., Assistant Professor
Almerindo Ojeda, Ph.D., Professor
C. Ortan Orgun, Ph.D., Associate Professor
Ira Ramanathan, Ph.D., Professor
Lena A. Timm, Ph.D., Professor

Emeriti Faculty
Wilbur A. Benware, Ph.D., Professor Emeritus
Maria I. Manoll, Ph.D., Professor Emerita
David L. Olmsted, Ph.D., Professor Emeritus
Benjamin E. Wallacker, Ph.D., Professor Emeritus
Mary Schleppegrell, Ph.D., Professor Emerita
Gwendolyn Schwabe, M.A., Senior Lecturer Emerita
Marina Torreblanca, Ph.D., Professor Emeritus

Affiliated Faculty
Stephanie Cross, M.A., Lecturer
Angela Folin, M.A., Lecturer
Janet Lane, M.A., Lecturer
Ellen Lange, M.A., Lecturer
John Samuel, M.A., Lecturer
Kathleen Ward, Ph.D., Lecturer

The Major Program
Linguistics is the systematic study of human language. It focuses on theories of language structure, variation, and use, description of contemporary languages, and the examination of language change through time. Because of the pervasive influence of language in our everyday lives, work in linguistics interacts in important ways with studies carried out in many other fields, including psychology, anthropology, neuroscience, philosophy, computer science, sociology, literature, language teaching, communication and education.

The Program. An introductory lower division course provides students with basic concepts and some of the methods needed to analyze language in a systematic way. Upper division courses probe more deeply into specific aspects of language structure, language use, and the relationship of language to other realms of human activity.

Career Alternatives. Majors in linguistics find practical outlets for their linguistic training in a variety of fields: the computer science industry (software development); teaching English as a second language; foreign language teaching; elementary and secondary level bilingual-bicultural programs; language-oriented missionary work; bilingual-bicultural curriculum development (e.g., for publishing houses); legal work; speech therapy; lexicography (preparation of dictionaries). All these and many other types of employment share an interest in persons skilled in the analysis of language, spoken and/or written—linguistics equips students with just such skills.

A.B. Major Requirements:

UNITS
Preparatory Subject Matter.................4-24

Linguistics 1 ...........................................4
Foreign language beyond the introductory level (e.g., for schools overseas), or an introductory upper division course through the 15-unit requirement of the College of Letters and Science in the same language used to fulfill the college requirement.................0-20

Depth Subject Matter.......................44

Linguistics 103A, 103B, 111, 113, 114, 115, 116
Any three Linguistics courses from among those numbered from 110 to 159.................12
One Linguistics course from among those numbered from 160 to 169.................4
One Linguistics course from among those numbered from 170 to 189.................4
At least eight upper division units from the following courses.........................8
Total Units for the Major......................48-68

Major Adviser: R. Aranovich
Minor Program Requirements:

Linguistics offers two minor programs:

1. **General linguistics**, which provides the student with basic knowledge of language structure and linguistic analysis.
2. **Linguistics for language teachers**, which especially complements the major in English with the Teaching Area of emphasis; it is also of relevance to students interested in teaching foreign languages.

### General Linguistics

- Linguistics 103A, 103B, 103C, 103D, 103E (12 units)
- One course from Linguistics 111, 112, 121, 131, 141, 151, 152 (4 units)

### Linguistics for Language Teachers

- Linguistics 101, 106, 165 (12 units)
- English 105 (4 units)
- Linguistics 160 or 163 (4 units)
- Linguistics 173 or Education 151 (4 units)

### Minor Adviser

Same as Major adviser

### Graduation Recommendation

Although not required, it is recommended that all courses offered in satisfaction of the Linguistics major be taken for a letter grade.

### Honors and Honors Programs

The honors program consists of six units of 194H credit normally taken in the fall and winter quarters of the senior year. Completion of the program is a prerequisite for High or Highest Honors at graduation. Specific eligibility criteria may be obtained from the major adviser. For general information regarding graduation with honors and Dean’s Honor Lists, please see Academic Information, on page 67.

### Graduate Study

The Linguistics Graduate Program offers study and research leading to the M.A. and Ph.D. degrees. Please see Linguistics (A Graduate Program), on page 356; more detailed information may be obtained from the Graduate Adviser or from the Chairperson of the Linguistics Group.

### Graduate Adviser

R. J. Bayley

### Courses in Linguistics (LIN)

#### Lower Division Courses

1. **Introduction to Linguistics (4)**
   - Lecture/discussion—1 hour. Introduction to the study of language; its nature, diversity, and structure. GE credit: ArtHum or SocSci, Wrt—I, II, III, II, III

2. **Language and Society (4)**
   - Lecture—3 hours; discussion—1 hour. Language as a social phenomenon. Topics include linguistic diversity, language policy, language and identity, language and social structure, speech communities and social networks, the effect of social factors on language variation, linguistic consequences of language contact. GE Credit: Div, SocSci, Wrt—I, II, III (II, III)

3. **Oral English for Undergraduate ESL Students (3)**
   - Lecture/discussion—3 hours. Prerequisite: consent of instructor; limited primarily to students who have fulfilled their Subject A requirement or have completed course 23. Intensive practice in oral English for undergraduate ESL students. Students will learn to identify and modify features of their pronunciation which limit their ability to communicate clearly. Students will also learn and practice strategies for effective participation in academic tasks. May be repeated once for credit with consent of coordinator. (P/NP grading only.)

4. **Reading in Scientific and Technical Subjects for ESL Students (4)**
   - Lecture/discussion—4 hours. Prerequisite: consent of Subject A requirement. Reading in scientific and technical subjects. (P/NP grading only.)

5. **English Studies for Foreign Language Teachers (4)**
   - Lecture/discussion—4 hours. Prerequisite: admission by placement examination. Provides undergraduate students whose native language is not English with intensive work in reading and in writing organized, coherent English composition. Includes reading and writing of properly structured paragraphs and short academic essays. (P/NP grading only.)

6. **English for Academic Purposes (4)**
   - Lecture—4 hours. Prerequisite: admission by placement examination, by successful completion of course 21, or by consent of instructor. Provides undergraduate students whose native language is not English with experience in writing essays in recognized rhetorical modes. Students will also learn to develop fluency and critical thinking and will study grammar needed for academic writing. (P/NP grading only.)

7. **Advanced Reading and Composition for Non-Native Speakers (4)**
   - Lecture—4 hours. Prerequisite: admission by placement examination, by successful completion of course 22, or by consent of instructor. Provides undergraduate students whose native language is not English with experience writing persuasive essays related to reading passages. Students will also learn to develop critical fluency and critical thinking and will study grammar needed for persuasive essays. (P/NP grading only.)

8. **English Structures and Strategies in Academic Writing (4)**
   - Lecture/discussion—4 hours. Prerequisite: course 23. Practice in academic writing designed to prepare undergraduate students from language backgrounds other than English for successful academic work. Development of academic writing, critical thinking, and reading skills. Development of clear, accurate language for presenting an effective argument. Open to students from language backgrounds other than English. I, II, III, II, III

9. **English for International/ESL Graduate Students (4)**
   - Lecture/discussion—4 hours. Prerequisite: admission by placement examination or consent of instructor. Open to international and ESL graduate students and limited status international undergraduates (Education Abroad Program participants). A multi-skills ESL course designed to prepare international/ESL students improve their English language skills for successful academic study. Emphasis on writing, speaking, listening, reading, and academic culture. (P/NP grading only.)

10. **Writing for International Graduate Students (3)**
    - Lecture—3 hours. Prerequisite: satisfactory completion of course 25 if held for it, or consent of instructor. Admission limited to international graduate students. Focuses on writing needed for academic work, including summaries, critiques, research and grant proposals, memos, resumes, and research papers. Includes a review of grammar needed for writing and some focus on reading skills and American vocabulary and idioms. (P/NP grading only.)

11. **Academic Writing for ESL Students (4)**
    - Lecture/discussion—4 hours. Prerequisite: completion of Subject A requirement. Writing skills necessary for upper division courses, including skills crucial to writing lab and project reports, summaries, critiques, abstracts, and responses to exam questions. Includes practice with the syntax, grammar, and vocabulary characteristic of academic writing. (P/NP grading only.)

12. **Reading in Scientific and Technical Subjects for ESL Students (4)**
    - Lecture/discussion—4 hours. Instruction and practice in reading scientific and technical texts. Techniques for comprehending and analyzing grammatical and organizational patterns. Notetaking skills, summarizing, vocabulary enrichment. (P/NP grading only.)

13. **Directed Group Study (1-5)**
    - Lecture—4 hours. Prerequisite: consent of instructor. Directed group study of any field of linguistics. (P/NP grading only.)

14. **Special Study for Undergraduates (1-5)**
    - Lecture—4 hours. Prerequisite: consent of instructor. Intended for lower division students. (P/NP grading only.)

### Upper Division Courses

103A. **Linguistic Analysis I: Phonetics, Phonology, Morphology (4)**
   - Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Introduction to fundamental methods and concepts used in linguistic analysis, focusing on phonetic, phonological, and morphological phenomena. Emphasizes development of analytical skills and appreciation of structural regularities and differences among languages. Not open for credit to students who have completed courses 139—II, I, Orgun

103B. **Linguistic Analysis II: Morphology, Syntax, Semantics (4)**
   - Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Introduction to fundamental methods and concepts used in linguistic analysis, focusing on morphological, syntactic, and semantic phenomena. Emphasizes development of analytical skills and appreciation of structural regularities and differences among languages. Not open for credit to students who have completed course 140—II, Farrell

105. **Topics in Language and Linguistics (4)**
   - Lecture—3 hours; term paper. Prerequisite: course 1 and consent of instructor. Detailed examination of a major contemporary linguistic theory, a major contemporary issue or related set of issues in linguistics, or the structure of a particular language or language family. May be repeated for credit when topic differs. Offered in alternate years.

106. **English Grammar (4)**
   - Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or English 3 or University Writing Program 1 or consent of instructor. Survey of present day English grammar as informed by contemporary linguistic theories. The major syntactic structures of English; their variation across dialects, styles, and registers, their development, and their usefulness in describing the conventions of English. (Same course as English 106.) Not open for credit to students who have completed course 104. GE credit: ArtHum—I, I-Ward

111. **Introduction to Phonological Theory (4)**
   - Lecture—3 hours; discussion—1 hour. Prerequisite: course 103A. Contemporary phonological theory with emphasis on syllable structure, metrical structure, phonological-morphological interaction, and typological variation in these areas, from the perspective of optimality-theoretic approaches. II, Orgun

112. **Phonetics (4)**
   - Lecture—3 hours; term paper. Prerequisite: course 1. Detailed examination of articulatory and acoustic phonetics. I, I, Orgun

121. **Morphology (4)**
   - Lecture—3 hours; discussion—1 hour. Prerequisite: courses 103A, 103B. Introduction to the analysis of word structure and the relation of word structure to the lexicon and other grammatical components. II, Aranovich

131. **Introduction to Syntactic Theory (4)**
   - Lecture—3 hours; discussion—1 hour. Prerequisite: course 103B. Introduction to syntactic theory, primarily through the exercises of a major theory of syntax, emphasizing theoretical reasoning, argumentation, and problems of theory building in syntax. I, Aranovich, Farrell
141. Semantics (4) Lecture—3 hours; term paper. Prerequisite: courses 103A, 103B. An introduction to the linguistic study of the meanings of words and phrases. Survey of the meanings expressed by lexical items and derivational and inflectional morphology, as well as the contribution of meaning to syntactic structure, quantification, and coordination to meaning. GE credit: Wrt.—I. Ojeda

150. Languages of the World (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Anthro 141. Sem introduction to course 1; courses 103A, 103B recommended. Introduction to the linguistic study of the varieties of the Spanish language, including the sound system, grammatical systems, and basic semantic categories. (Same course as Education 172.)—III. Uchitokoshi

175. Biological Basis of Language (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or consent of instructor. Overview of issues in the field of biological linguistics and techniques used to explore representation of language in the human brain. GE credit: SciEng—I. Corina

177. Computational Linguistics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or consent of instructor. Understanding the nature of language through computer modeling of linguistic abilities. Relationships between human cognition and computer representations of cognitive processing. Not open for credit to students who have completed course 7. GE credit: SocSci.—II. Ojeda

182. Multilingualism (4) Lecture/discussion—4 hours. Issues in multilingualism from a global perspective: e.g., multilingual communities; multilingualism and identity (gender, ethnicity, nationality); language ideologies and educational and sociopolitical policies surrounding multilingualism; acquisition of multilingualism; discursive practices of multilingualism. Limited enrollment. GE credit: ArtHum, SocSci, Div, Wrt.—III. (III.) Ramathan, Timm

192. Internship in Linguistics (1-12) Internship—3-36 hours; two written reports. Prerequisite: course 1 or the equivalent. Internship applying linguistic-related skills to a fieldwork project in areas such as media, law, or industry, in approved organizations or institutions. Maximum of 4 units applicable toward major; (P/NP grading only.)

194H. Special Study for Honors Students (1-5) Independent study—1-5 hours. Prerequisite: open only to linguistics majors of senior standing who qualify for honors programs. Guided research, under the direction of a faculty member approved by the Program Director, leading to a senior honors thesis. May be repeated for credit for up to 6 units. (P/NP grading only.)

197T. Tutoring in Linguistics (1-4) Discussion—1-4 hours. Prerequisite: upper division standing, consent of instructor, and consent of departmental chairperson. Leading of small voluntary discussion groups affiliated with one of the department's regular courses. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-5) Prerequisite: consent of instructor. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5) (P/NP grading only)

Graduate Courses

200A. Foundations of Linguistics I (4) Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing. Survey of fundamental issues raised by generative linguistics in the twentieth century. Topics include issues crucial to applications of linguistics. Not open for credit to students who have completed course 203A.

200B. Foundations of Linguistics II (4) Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing. Survey of fundamental issues raised by generative linguistics, with emphasis on issues crucial to applications of linguistics. Not open for credit to students who have completed course 203B.

200C. Foundations of Linguistics III (4) Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing. Survey of fundamental issues raised by contemporary linguistic theories lying outside the generative grammar orthodoxy, with emphasis on issues crucial to applications of linguistics.

205A-205B-205C-205D. Topics in Linguistic Theory and Methods (4) Seminar—3 hours; term paper. Prerequisite: consent of instructor. Advanced study of current problems in linguistic theory and methodology. May be repeated for credit when topic differs.—I. II.

211. Advanced Phonological Theory and Analysis (4) Lecture—3 hours; term paper. Prerequisite: course 111. Critical examination of current phonological theories. Offered in alternate years.—Orgun

212. Advanced Phonetics (4) Lecture—3 hours; term paper. Prerequisite: course 112. Advanced investigation of the physiological basis of speech articulation and acoustic phonetics. Offered in alternate years.—II. Orgun

231. Advanced Syntactic Theory and Analysis (4) Lecture—3 hours; term paper. Prerequisite: course 121. Critical survey of contemporary theories of syntax. Offered in alternate years.—III. Aranovich

241. Advanced Semantic Theory and Analysis (4) Lecture—3 hours; term paper. Prerequisite: course 141 or consent of instructor. Advanced critical exploration of contemporary theories of linguistic semantics. Offered in alternate years.—II. Ojeda

251. Principles of Historical Linguistics (4) Lecture—3 hours; term paper. Prerequisite course 151. Advanced analysis of the theory and methods of historical linguistics. Offered in alternate years.—III.

252. Romance Linguistics (4) Lecture—3 hours; term paper. Prerequisite: course 152. Examination of the development of the Romance languages from Proto-Romance to the modern era. Application and critical examination of methods of historical and comparative linguistics in particular areas of structural change in Romance. Offered in alternate years.—III.

260. Variation in Speech Communities (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 281 or consent of instructor. Linguistic variability in time, space, and society. Theoretical issues related to social and linguistic constraints in variation; issues and methods in the quantitative analysis of variation. Speech community, quantitative analytic methods, and the scope of sociolinguistic competence.—I. Bayley

263. Discourse Analysis: Text in Context (4) Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing. Introduction to and applications of leading theoretical approaches to the analysis of discourse. Approaches to the analysis of (spoken and written) text in context, tools for analyzing different types of texts (narration, conversation, etc.), theme/genre, given/new, anaphora, discourse markers, and other lexical/grammatical features.—II.

264. Current Issues in Language and Gender (4) Seminar—3 hours; term paper; project. Prerequisite: graduate standing; prior coursework in Linguistics, Gender Studies, or Cultural Studies is desirable; no expectation of bilingual proficiency. Exploration of the construction and performance of gender through language in cross-cultural perspective and in a variety of contexts: informal conversations, narratives, workplaces, schools, households, the mass media. Special topics may include: bilingualism; multilingualism; ecotourism; queer theory. May be repeated for credit one time when topic differs. Offered in alternate years.—(I.) Menard-Warwick, Timm

265. Language, Performance, and Power (4) Seminar—3 hours; term paper. Graduate standing or consent of instructor. Exploration of the intersection between linguistic and social theories in the lan-
302. Recent Research and Special Projects in TESOL (4) Lecture—4 hours. Prerequisite: courses 300 and 301. Review of recent research in second language acquisition and the teaching of English to speakers of other languages. Continued teaching and tutoring in the UC Davis ESL program. Each student also designs and reports on a classroom research project.

281. Rese—3 hours; term paper. Prerequisite: admission to Ph.D. degree. May be repeated for credit. (S/U grading only.)—I, II, III. Menard-Warwick

301. Teaching Academic Literacy (4) Seminar—3 hours; tutorial; project; practice. Prerequisite: graduate standing; admission to MA in Applied Linguistics program or consent of instructor. Methods of teaching second languages to native speakers, stressing particularly recent linguistic methodology, and techniques. Teaching and tutoring in the UC Davis ESL program.—II, III. Menard-Warwick

280. Directed Group Study (1-5)

Professional Courses

300. Language Pedagogy (4) Lecture—3 hours; tutorial; project; practice. Prerequisite: graduate standing; admission to MA in Applied Linguistics program or consent of instructor. Methods of teaching second languages to native speakers, stressing particularly recent linguistic methodology, and techniques. Teaching and tutoring in the UC Davis ESL program.—II, III. Menard-Warwick

280. Research (1-12)

Linguistics (A Graduate Group)

Linguistics (A Graduate Group)

Literature in Translation

The following courses are open to students throughout the campus. The reading can be in English. See departmental listing for the course description.

Chinese

10. Modern Chinese literature (in English)
11. Great Books of China (in English)
50. Introduction to the Literature of China and Japan (in English)

100A. Daoist Traditions
101. Chinese Film
102. Chinese American Film
103. Modern Chinese Drama
104. Twentieth-Century Chinese Fiction (in English)
105. Western Influences on Twentieth-Century Chinese literature (in English)
106. Chinese Poetry (in English)
Comparative Literature

Classics

1. Great Books of Western Culture: The Ancient World
2. Great Books of Western Culture: From the Middle Ages to the Enlightenment
3. Great Books of Western Culture: The Modern Crisis
4. Major Books of the Contemporary World
5. Fairy Tales, Fables and Parables
6. Myths and Legends
7. Literature of Fantasy and the Supernatural
8. Utopias and Their Transformations
9. The Short Story and Novella
10. Great Writers of China: Texts and Context (in English)
11. Traditional Chinese Fiction (in English)
12. Introduction to Women Writers
13. Myths and Legends
14. The Short Story and Novella
15. The Novel
16. Contemporary Experimental Theatre and Drama
17. Homer and Ancient Greek Mythology
18. The Modern Novel
19. The Historical Novel
20. Humans and the Natural World
21. The Enlightenment
22. The Renaissance
23. The Middle Ages
24. The Modern World
25. Ethnic Minority Writers in World Literature
26. The Enlightenment
27. The Renaissance
28. The Middle Ages
29. The Modern World
30. Elie Wiesel: A Foreword to the Twentieth Century
31. The United States
32. Native American Studies
33. Latin America
34. Africa
35. The Middle East
36. Korea and Japan
37. India and Southeast Asia
38. Literature of the Islamic World
39. World Cinema
40. Writing Nature: 1750 to the Present
41. Survey of Nineteenth-Century Russian Literature
42. Survey of Twentieth-Century Russian Literature
43. Children's Literature in Russia
44. Russian Fantasy
45. Nineteenth-Century Russian Prose
46. Twentieth-Century Russian Prose
47. The Russian Theater
48. Contemporary Soviet Culture
49. Literature of Revolution
50. Nature and Culture in the Soviet Union
51. Soviet Writers and Censorship
52. Russian Folklore
53. Representations of Sexuality in Russian Literature

Spanish

1. Latin-American Literature in Translation

Management, Graduate School of

Nicole W. Biggart, Ph.D., Dean
Donald A. Palmer, Ph.D., Associate Dean
David L. Woodruff, Ph.D., Associate Dean
James Stevens, M.B.A., Assistant Dean

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Faculty

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Eyal Biyologorsky, Ph.D., Associate Professor
David S. Bunch, Ph.D., Professor
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Katrina Ellis, Ph.D., Associate Professor
Kimberly D. Elsbach, Ph.D., Professor
Paul A. Griffin, Ph.D., Professor
Andrew Hargadon, Ph.D., Associate Professor
Greta Hsu, Ph.D., Assistant Professor
Michael Maher, Ph.D., Professor
Prasad Naik, Ph.D., Professor
Siobhan O'Mahony, Ph.D., Assistant Professor
N.V. Ramanan, Ph.D., Assistant Professor
Anna Scherhina, Ph.D., Assistant Professor
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Chih-Ling Tsai, Ph.D., Professor
Yinghui Yang, Ph.D., Assistant Professor
Michelle Yetman, Ph.D., Assistant Professor
Robert Yetman, Ph.D., Associate Professor
Ning Zhu, Ph.D., Associate Professor

Emeriti Faculty

Richard P. Castanias, Ph.D., Professor Emeritus
Peter Clark, Ph.D., Professor Emeritus
Richard C. Dorf, Ph.D., Professor Emeritus
Eitan Gersten, Ph.D., Professor
Michael R. Hagar, Ph.D., Professor Emeritus
Alexander F. McColla, Ph.D., Professor Emeritus
Jerome J. Suran, B.S., Ph.D. (Hon.), Senior Lecturer Emeritus
Donald Topkis, Ph.D., Professor Emeritus

The Graduate School of Management offers a minor in Technology Management to undergraduate students with majors in engineering, agricultural, biological and physical sciences. This minor complements students' undergraduate studies with courses in the ways in which engineering and science-based industrial enterprises manage and use knowledge from science, engineering and technology. The minor also provides students with business and management skills that should enable them to use their engineering and science education more effectively in a technology environment.

Quarter Offered: I=Fall, II=Winter, III=Spring, IV=Summer, 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; DivL=Sociocultural Diversity; Wrt=Writing Experience
170. Managing Costs and Quality (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A, Mathematics 168, 178, or 218. Statistics 100, 102, 103, or 108. Designing cost systems in high technology organizations and managing operations to maximize quality and minimize costs. Topics include activity-based costing and management, managing quality and time to create value, ethical issues in cost assignment, and differential choice for decision making. — I. Maher

180. Supply Chain Planning and Management (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A, Mathematics 168, 178, or 218, Statistics 100, 102, 103, or 108. Quantitative techniques for analysis and management support for the production and delivery of goods and services. — I. Woodruff

Graduate Courses—Core Courses

200A. Financial Accounting (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management. Introduction to the concepts and objectives underlying the preparation of financial statements. Topics include understanding the accounting cycle, measurement and valuation problems associated with financial statement components, and the role of financial reporting in the analysis of a corporation's operations. — I. (I.) Rangan

200B. Managerial Accounting (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management. Information managers should know to be effective, including: product costing, motivating people, and differential analysis for decision making. Includes team projects and written and oral presentations. — I. (II.) Maher

201A. The Individual and Group Dynamics (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management. Examines basic psychological processes shaping human behavior and applies knowledge of these processes to the following organizational problems: motivation, job design, commitment, socialization, culture, individual and group decision making, and team building. — I. (I.) Palmer

201B. Organizational Structure and Strategy (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management. Analysis of structural properties of organizations including differentiation and vertical and horizontal integration. Alternative strategies including functional, divisionalized, matrix, and hybrid structures. Relationship between environment, structure, and strategic objectives. Organization life cycle and changes. — I. (II.) Biggart, Swaminathan

202A. Markets and the Firm (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management. Examines the interaction of consumers, firms and government, and the effect this interaction has on the use of resources and firm profitability. Fundamental economic concepts such as marginal analysis, opportunity cost, pricing, and externalities are introduced and applied. — I. (I.)

202B. Business, Government, and the International Economy (3)
Lecture—3 hours. Prerequisite: course 202A. Examines the influence of government and international factors on business strategy in the life cycle of income, business cycles, inflation and interest rates, the federal debt, monetary policy and international trade and finance. — I. (II.)

203A. Data Analysis for Managers (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management MBA program or consent of instructor. Introduction to statistical and data analysis for managerial decision making. Descriptive statistics, principles of data collection, sampling, quality control, statistical inference. Application of data analytic methods to problems in marketing, finance, accounting, production, operations, and public policy. — I. (I.)

203B. Forecasting and Managerial Research Methods (3)
Lecture—3 hours. Prerequisite: course 203A. Practical statistical methods for managerial decision making. Covers regression analysis, time series analysis and forecasting, design and analysis of experiments in managerial research and contingency table analysis. Application of these methods to marketing, finance, accounting, production, operations, and public policy. — II. (II.)

204. Marketing Management (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management. Analysis of market opportunities, elements of market research, development of marketing strategies, market planning and implementations, and control systems. Consumer and industrial markets, market segmentation, pricing strategies, distribution channels, promotion, and sales. — III. (III.) Hagerby

205. Financial Theory and Policy (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management. Corporate financial policy and investment management. Covers capital budgeting, optimal financial structure, cost-of-capital determination, risk measurement. Develops basic valuation principles for investments with long-lived and risky cash flows, and extends these to derivative securities, asset portfolios, investment management and hedging. — III. (III.) Barber

206. Decision Making and Management Science (3)
Lecture—3 hours. Prerequisite: graduate student in the Graduate School of Management MBA program or consent of instructor. Develops decision-making and problem-solving skills in conjunction with a quantitative model-building approach. Emphasizes how structured modeling techniques, probability forecasts, simulations, and computer optimization models are used in the overall process of making decisions in an uncertain environment. — II. Topkis

207. Management Information Systems (3)
Lecture—3 hours. Prerequisite: graduate student or consent of instructor. Introduction to computer programming and data handling skills. Use of computer in organizations, emphasis on managerial aspects of computing. Standard and nonstandard uses of data files, centralization versus decentralization of computing, office automation, computer security. — II. (II.) Woodruff

Elective Courses
Students must complete the Management core course requirement before enrolling in any of the following courses, or petition with consent of the instructor.

215. Business Law (3)
Lecture—3 hours. Prerequisite: completion of Administration core requirements or petition with consent of instructor. Introduction to law and legal process in the United States. Sources of law. Structure and operation of courts, federal-state relationships, fundamentals of administrative law, fundamentals of business law.

216. Managing Professionals, Budgets, Contracts and Ethics (3)
Lecture—3 hours. Prerequisite: graduate standing. Performance measures, budgetary controls and ethical pressures which occur at middle management level in service-type operations. Addresses such organizations as engineering, medical groups, law offices, management consultants. — I. (I.) Suran

220. Management of Social Networks (3)
Lecture/discussion—3 hours. Prerequisite: course 203A. Principles and applications of social network theory: coordinating divergent interests to create value for individuals and organizations. Emphasis on conceptual models, Web-based diagnostic tools, and practical applications. — I. (I.) 

Quarter Offered: I—Fall, II—Winter, III—Spring, IV—Summer; 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div=Social-Cultural Diversity; Wrt=Writing Experience
223. Power and Influence in Management (3) Lecture/discussion—3 hours. Prerequisite: consent of instructor. Investigation of the bases of power in organizations and the tactics used to translate power into influence. Topics include the control of resources (including financial, material, and psychological processes), organizational power (including commitment), the construction of meaning, and ethics.—Palmer

224. Managing People in Modern Organizations (3) Lecture/discussion—3 hours. Modern systems for managing people. Examination of the changing workforce and workplace, emphasizing high-technology and knowledge-intensive organizations. The implications of this movement (competition, product market, regulations) on choices for managing people. The consequences of these choices for firms and managers.—II. (II.) Bechky

240. Management Policy and Strategy (3) Lecture—3 hours. Prerequisite: freshman year core courses of M.B.A. program. Examines the scope of missions, objectives strategies, policies, structures, measurement and incentives which bear on the management of an organization. Real "client" organizations, in the private and public sectors, are assigned to student teams as the subjects of study.—I. (I.) Suran, Hagerty

241. New Product Development (3) Lecture—3 hours. Prerequisite: course 249 or consent of instructor. Open to students in the Graduate School of Management. State of the art concepts and methods to enhance the effectiveness of new product development activities. Focus on the understanding of managerial issues and acquiring the ability to solve problems.—III. Naik

242. Marketing Communications (3) Lecture—3 hours. Issues in designing a marketing communications strategy. Topics include mass and direct communications, institutional aspects of advertising consumer behavior, evaluating ad effectiveness, determining ad budget, creative strategy, and use and abuse of promotions.—Naim

244. New and Small Business Ventures (3) Lecture—3 hours. Emphasizes starting a new business venture or managing a small, ongoing business during its formative stages. The business plan. Legal forms, financial considerations, the management team. The entrepreneur. Students develop a detailed business plan.—Dorf

246. Negotiation and Team Building (3) Lecture—3 hours. Prerequisite: courses 202, 205. Focuses on basic negotiation; applies theory to process of building teams to achieve business purposes. Covers integrative and distributive strategies of claiming value, how to recognize bargaining tricks, uncovering agendas, brainstorming to extend Pareto frontier.—II. (II.) Elsbach

247. Customer Service as a Marketing Tool (3) Lecture—3 hours. Understanding the distinct features of services, how to create value through service, methods of building strong relationships with customers, methods of measuring and building customer satisfaction, and measuring the financial impact of service improvement.—II. (II.) Gerstner

248. Marketing Strategies (3) Lecture—3 hours. Examines process by which organizations develop strategic marketing plans. Includes definition of activities and products, marketing audits, appraising market opportunities, design of new activities and products, and organizing marketing planning function. Applications to problems in private and public sector marketing.—Gerstner

249. Marketing Research (3) Lecture—3 hours. Course addresses the managerial issues and problems of systematically gathering and analyzing information for making private and public marketing decisions. Covers the cost and value of information, design, information collection, measuring instruments, data analysis, and marketing research applications.—Hagerty


251. Management of Innovation (3) Lecture—3 hours. Managing innovative enterprise in changing and uncertain environments. Covers technology forecasting and assessment, project selection and control, financial management, regulation, and ethics.—Biggert

252. Production and Operations Management (3) Lecture—3 hours. Explores methods of increasing operational efficiency in production and service organizations through planning and scheduling, materials management, inventory control, quality control, and distribution. Methodologies employed include such techniques as programming, simulation, systems analysis, queueing, and network models.—Woodruff

260. Financial Management (3) Lecture—3 hours. Focuses on planning, acquiring, and managing a company’s financial resources. Includes discussion of financial aspects of mergers and other forms of reorganization; analysis of investment, financial, and dividend policies; and theories of optimal capital structure.—CASTANIAS

261. Investment Analysis (3) Lecture—3 hours. Examines asset pricing theories and relevant evidence, including the investment performance of stocks and bonds. Topics include the efficiency of markets, market imperfections, and international portfolio diversification, factors influencing the value of stocks and other investments, and portfolio management and performance.—Odean

262. Money and Security Markets (3) Lecture—3 hours. Prerequisite: course 201A and 207. Focus on the financial and operational activities of commercial agencies, which operate in the public sector. To cover the activities involved in the acquisition, land development, and construction, and project lending.—I. (I.) Suran

271. Incentives and Controls (3) Lecture/discussion—3 hours. Prerequisite: course 2008. Concepts and techniques of accounting and budgeting for management decision making in the private sector. Topics include strategy, organizational structure, market-based incentives, performance evaluation and ethical issues.—Mehler

272. Evaluation of Financial Information (3) Lecture—3 hours. Studies how investors, creditors, or users accounting and other information in making rational investment, lending decisions. Emphasis is placed on the analysis and interpretation in a variety of contexts. Where applicable, recent research in finance and economics is discussed.—Griffin

273. Accounting and Reporting for Government Nonprofit Entities (3) Lecture—3 hours. Concepts, methods, and uses of accounting and financial reporting by governmental and nonprofit entities. Introduction to budgeting and performance evaluation, and accounting for entities such as hospitals, universities, and welfare agencies.—Sandoval

274. Auditing, Internal Control, and Public Accounting (3) Lecture—3 hours. Concentrates on role of the independent public accountant as auditor and consultant, from the perspective of an enterprise manager. Auditing standards, auditing procedures, and auditing techniques are discussed. Emphasis is also given to current issues confronting the accounting profession.—I. (I.) Suran

276. Real Estate, Finance and Development (3) Lecture—3 hours. Prerequisite: courses 201A and 207. Focus on a single family, attached, detached, multi-family, and light commercial development. Students will study factors which make up successful real estate developments. Course will consider financial aspects involved in land acquisition, land development, construction, and project lending.—CASTANIAS

281. Systems Analysis and Design (3) Lecture—3 hours. Design and specification of computer-based information systems. Applications systems development life cycle, feasibility assessment, logical and physical design, program development and testing, conversion and implementation.—I. (I.) Suran

282. Applied Linear Models for Management (3) Lecture—3 hours. Covers regression, analysis of variance, and multivariate analysis. Topics will focus on applications to management and policy problems.—Tsiang

285. Time Series Analysis and Forecasting (3) Lecture—3 hours. Consideration of time series methods to evaluate and forecasting problems. Covers univariate and multivariate Arima models and transfer function models. Applications will be in such areas as economics, finance, budgeting, program evaluation, and industrial process control.—Tsiang

286. Telecommunications and Computer Networks (3) Lecture—3 hours. Prerequisite: course 280. Communication system components; common carrier services; design and control of communications networks; network management and distributed environment; local area networks; data security in computer networks.—Toptis


288. Special Topics in Management of Information Systems (3) Lecture—3 hours. Managerial aspects of information systems. Topics stressing applications in organizations chosen from: economics of computers and information systems, decision systems, management of computer-based information systems, office automation.—Toptis

Quarter Offered: I- Fall, II-Winter, III-Spring, IV-Summer; 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Social-Cultural Diversity; Wrt-Writing Experience
291. Topics in Organizational Behavior (3)
Seminar—4 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Advanced topics in social psychology and sociology of organizations. Varies topics to cover more extensively issues discussed in courses 200A and 201A, or current business interest topics in fields of organization design, strategy, development, or workplace processes. May be repeated for credit.—I. (F.)

292. Topics in Finance (3)
Seminar—4 hours. Prerequisite: consent of instructor; completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Contemporary and emerging issues in finance. Application of modern techniques to business problems. Use of appropriate electronic database and research techniques. May be repeated for credit.—I. (F.)

293. Topics in Marketing (3)
Seminar—4 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Contemporary and emerging issues in financial management accounting. Application of modern techniques of evaluation and analysis of financial information. Use of appropriate electronic database and research techniques. May be repeated for credit.—I. (F.)

294. Topics in Accounting (3)
Seminar—4 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Contemporary and emerging issues in financial management accounting. Application of modern techniques of evaluation and analysis of financial information. Use of appropriate electronic database and research techniques. May be repeated for credit.—I. (F.)

295. Topics in Information Technology (3)
Seminar—4 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Applications of information technology to management and banking, finance, production, agriculture, food distribution, natural resources, the environment, resource allocation, and markets in developing and developed economies. Students specialize in one of three options: (1) Managerial Economics focuses on the economic aspects of managerial decision-making. (2) Environmental and Resource Economics focuses on issues related to the use of resources and environmental quality. (3) Agricultural Economics focuses on the economic and policy aspects of production and marketing of foods and fibers. Students in the Managerial Economics program develop valuable skills and strengths that lead to promising careers in business. Internships and Career Alternatives. Students in managerial economics have opportunities to gain additional career information and preparation through internships in a variety of private businesses and governmental agencies. Graduates qualify for supervisory and management training positions in banking, finance, commodity and stock price breaks in the private sector, farm and ranch production, food and agricultural processing, and governmental agencies. Students who desire additional training are well qualified to enter graduate programs in agricultural and resource economics, economics, business administration, or law. For more information, see the Readings and Research Techniques.

Major Entrance Requirements. Students may enter the Pre-Managerial Economics major while completing the major preparatory requirements. Acceptance into the major does not guarantee automatic admission into the major. Before declaring a major in Managerial Economics, a student must complete the following courses with a combined grade point average (GPA) of at least 2.800. All of these courses must be taken for a letter grade. In determining admission to major status, the Department of Agricultural and Resource Economics counts only the first repeat of any pre-major course. Economics 1A and 1B 8 units Statistics 13 4 units Mathematics 16A and 16B or 21A and 21B 8 units If a student has taken Agricultural Economics 100A and/or Economics 101, they should complete Economics 101 before applying for admission to our major. A student’s GPA will take the place of Economics 1A and 101 will take the place of Economics 1B for calculation of the student’s entrance GPA.

B.S. Major Requirements:

<table>
<thead>
<tr>
<th>UNITS</th>
<th>NAME</th>
<th>REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-12</td>
<td>English Composition Requirement</td>
<td>At least 8 units from the following list: English 3, University Writing Program 1, 18, 19, 101, 102A-G, 104A-F.</td>
</tr>
</tbody>
</table>

360 Managerial Economics

299. Directed Individual Study Management Practicum (3)
Project—3 hours. Prerequisite: consent of instructor; sponsorship of a Graduate School of Management Academic Senate faculty member, and approval of Graduate Advisor. Provides the opportunity for students to gain experience in applying business methodologies previously acquired in other Graduate School of Management courses. (S/U grading only.)—I, II, III, (II, III)

Managerial Economics

[College of Agricultural and Environmental Sciences]

The Major Program

The Managerial Economics major at UC Davis is a disciplinary program combining strong preparation in microeconomic and quantitative methods. It prepares students for the analysis of management and policy issues in business, finance, production, agriculture, food distribution, natural resources, the environment, resource allocation, and markets in developing and developed economies. Students specialize in one of three options: (1) Managerial Economics focuses on the economic aspects of managerial decision-making. (2) Environmental and Resource Economics focuses on issues related to the use of resources and environmental quality. (3) Agricultural Economics focuses on the economic and policy aspects of production and marketing of foods and fibers. Students in the Managerial Economics program develop valuable skills and strengths that lead to promising careers in business. Internships and Career Alternatives. Students in managerial economics have opportunities to gain additional career information and preparation through internships in a variety of private businesses and governmental agencies. Graduates qualify for supervisory and management training positions in banking, finance, commodity and stock price breaks in the private sector, farm and ranch production, food and agricultural processing, and governmental agencies. Students who desire additional training are well qualified to enter graduate programs in agricultural and resource economics, economics, business administration, or law. For more information, see the Readings and Research Techniques.

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<td>At least 8 units from the following list: English 3, University Writing Program 1, 18, 19, 101, 102A-G, 104A-F.</td>
</tr>
</tbody>
</table>

Remaining 4 units from above list or from Comparative Literature 1, 2, 3, 4, Native American Studies 5, Communication 1, Preparatory Subject Matter 72-74

Management 11A-11B 8 units Plant Sciences 21, Engineering Computer Science 10, 15 or 30 8-12 units Economics 1A-1B 8 units Mathematics 16A-16B 8 units 21A-21B 8 units Statistics 13 103 103 8 units

Major Breadth: 37

Social Science, Natural Science, and Agricultural Science

*See major breadth requirement checklist at http://www.agecon.ucdavis.edu for a complete list of courses.

Total Depth Subject Matter: 52

Core: 20

Agricultural and Resource Economics 100A, 100B, 106, 155 16 units Economics 101 4 units

Restricted Electives: 32

Choose at least one of the options below:

Managerial Economics option

Agricultural and Resource Economics 18 4 units


Environmental and Resource Economics option

Agricultural and Resource Economics 175, 176 8 units

Choose at least 18 units from Agricultural and Resource Economics 15, 120, 138, 145, 146, 150, 156, Economics 123, 125, 130, Environmental Science and Policy 168A, 168B 178. Select the remaining 6 units from the aforementioned courses or upper division courses in Agricultural and Resource Economics and/or Economics, Environmental Science and Policy 161, 163, 165, 166, 167, 171, 172, 173, Environmental Toxicology 138

Agricultural Economics option

Choose at least 15 units from Agricultural and Resource Economics 120, 138, 139, 140, 145, 150. Select the remaining 17 units from the aforementioned courses, Agricultural and Resource Economics 18, or upper division courses in Agricultural and Resource Economics and/or Economics.

*Students graduating with this major are required to attain at least a C average (2.000) in all upper division courses taken at the University in the depth subject matter.

Total Units for the Major: 128-137

Topical Breadth/General Education

See General Education requirement.

Note: Approved General Education courses may be used to simultaneously satisfy Social, Natural, and Agricultural Science breadth courses as defined in the Preparatory Subject Matter for the major and the campus General Education requirement.

Unrestricted Electives: 43-52

Total Units for the Degree: 180

Student Advising for the major is in 1176 Social Sciences and Humanities Building (530) 754-9536.

Major Adviser: Phillip L. Martin (Agricultural and Resource Economics), Richard D. Green (Agricultural and Resource Economics)
Minor Program Requirements:
Before declaring a minor in Managerial Economics, a student must complete the following courses with a combined grade point average (GPA) of at least 2.0. All of these courses must be taken for a letter grade. In determining admission to minor status, the Department of Agricultural and Resource Economics counts only the first 3 units of any pre-minor course.
Economics 1A and 1B ............................................. 8 units
Mathematics 16A-16B or 21A-21B .................................. 6-8 units
Statistics 13 ....................................................... 4 units
The Department of Agricultural and Resource Economics offers four minor emphases open to students majoring in other disciplines who wish to complement their study programs with a minor in Managerial Economics. Each emphasis requires Agricultural and Resource Economics 100A, which has prerequisites of Economics 1A-1B and Mathematics 16A-16B. For some courses, Statistics 13 and 103 may be required. Variable-unit courses and lower division courses are not accepted for any emphasis.

UNITs
Managerial Economics ........................................... 18

General emphasis
Agicultural and Resource Economics 100A or the equivalent ..................... 4
Additional upper division courses in Agricultural and Resource Economics .... 14

Agricultural Economics emphasis
Agicultural and Resource Economics 100A or the equivalent ..................... 4
Additional upper division courses in Agricultural and Resource Economics .... 14
Select 9 or more units from Agricultural and Resource Economics 175 and 176, and either 100B or 120.
Select additional upper division Agricultural and Resource Economics courses to complete the 18-unit total for the minor.

Environmental and Natural Resource Economics emphasis
Agicultural and Resource Economics 100A or the equivalent ..................... 4
Additional upper division courses in Agricultural and Resource Economics .... 14
Select 9 or more units from Agricultural and Resource Economics 175 and 176, and either 100B or 120.
Select additional upper division Agricultural and Resource Economics courses to complete the 18-unit total for the minor.

Managerial Economics emphasis
Agicultural and Resource Economics 100A or the equivalent ..................... 4
Additional upper division courses in Agricultural and Resource Economics .... 14
Select 9 or more units from Agricultural and Resource Economics 112, 118, 136, 157, 171A, 171B.
Select additional upper division Agricultural and Resource Economics courses to complete the 18-unit total for the minor.

Graduate Study. See Graduate Studies, on page 104.

Master of Education (M.Ed.)
(A Graduate Group)

The Master of Education (M.Ed.) program is no longer admitting students; admissions are suspended.

Maternal and Child Nutrition
(Department of Nutrition)

Charles E. Hess, Ph.D., Chairperson of the Department
Department Office: 3135 Meyer Hall
(530) 752-4630; http://extension.ucdavis.edu/unit/agriculture_and_food_science/master/materna_l_and_child_nutrition/

Faculty
Faculty members are listed on the Web site.

Graduate Study. The Nutrition Department offers the degree of M.A.S. in Maternal and Child Nutrition. This program consists of three required six-unit core courses (Nutrition During Pregnancy, lactation and Infant Nutrition, and Child and Adolescent Nutrition), six to eight units of special topics seminars, two units of electives, and a six-unit student project (produced in consultation with a three-member guidance committee) for a total of 36 units. Each of the core courses will comprise 10 weeks of in-class instruction twice per week for two-and-a-half hours per meeting. Classes will also include online discussion of related material and readings. Each student will be assigned a three-member guidance committee consisting of two members of the teaching faculty and an additional qualified faculty member to advise the student in choosing an elective and identifying a student project.

Preparation. Admission to the program requires a bachelor’s degree with prior course work that includes (or is comparable to): one year of general chemistry, two quarters of organic chemistry, a course in statistics, one course in general physiology, and two quarters of the biochemistry of nutrition.

Graduate Advisors. Kathryn G. Dewey, Ph.D., Professor; Matthew Eakin, Ph.D., Academic Administrator (Nutrition).

Courses in Maternal and Child Nutrition. See courses under Nutrition, on page 427.

Mathematical and Physical Sciences

(College of Letters and Science)

Louise H. Kellogg, Ph.D., Program Director
Program Office, 1201 Social Sciences and Humanities Building

Committee in Charge
Andreas J. Albrecht, Ph.D. (Physics)
R. David Britz, Ph.D. (Chemistry)
Shirley Chiang, Ph.D. (Physics)
Louise H. Kellogg, Ph.D. (Geology)
Mark J. Kurth, Ph.D. (Chemistry)
Isabel P. Montoya, Ph.D. (Geology)
Motovchik Mulashe, Ph.D. (Mathematics)
Bruno L. Nachtegaale, Ph.D. (Mathematics)
Wolfgang Polonik, Ph.D. (Statistics)
Francisco I. Samaniego, Ph.D. (Statistics)
Abigail Thompson, Ph.D. (Mathematics)

The Program of Study
The Division of Mathematical and Physical Sciences teaches students to use experimental studies and theoreti cal analyses to find solutions to real world problems. Students learn to address issues such as cleaning up the environment, preserving natural resources and creating innovative materials for the future. From the study of atoms to the examination of distant galaxies, from abstract number theory to the development of new chemical compounds, the division provides students with the skills to build the world of tomorrow.

The program in Mathematical and Physical Sciences provides an organizational structure within the College of Letters and Science for facilitating the development of innovative curricular initiatives across the mathematical and physical sciences, including offering broadly conceived, integrative undergraduate- and graduate-level courses. The program also may house resident faculty pursuing interdisciplinary research and teaching in this area of inquiry.

Courses in Mathematical and Physical Sciences (MPS)

Lower Division Courses
1. General Science: Science in the News (4)
   Lecture—3 hours; laboratory/discussion—1 hour.
   Prerequisite: lower division standing. Basic principles in science including numeracy, scale, energy, and time; the scientific method; good and bad science. Emphasis on science topics recently in the news. GE credit: SciEng. III.

11A-11B. Mathematical and Physical Sciences Seminar (2-2)
   Lecture—2 hours. Prerequisite: mentorship for undergraduate research participants in the physical and mathematical sciences. Research and writing in the mathematical and physical sciences. Presentations by various science faculty members. —III. (III.)

Mathematics

See Mathematics; and Applied Mathematics (A Graduate Group), on page 153.

Mathematics

(College of Letters and Science)

Bruno Nachtegaale, Ph.D., Chairperson
Department Office, 1130 Mathematical Sciences Bldg.
(530) 752-0827; studen servic es@math.ucdavis.edu
http://www.math.ucdavis.edu

Faculty
Eric Babson, Ph.D., Professor
Zhaoping Bai, Ph.D., Professor (Computer Science)
Craig Benham, Ph.D., Professor
Joseph Biello, Ph.D., Associate Professor
James Bremer, Ph.D., Assistant Professor
Angela Y. Cheer, Ph.D., Professor
Jesus De Laera, Ph.D., Professor
C. Albert Fannjiang, Ph.D., Professor
Roland Freund, Ph.D., Professor
Dmitry B. Fuchs, Ph.D., Professor
Janko Gravner, Ph.D., Professor
Robert Guy, Ph.D., Assistant Professor
Joel Hass, Ph.D., Professor
Michael Kapovich, Ph.D., Professor
Gregory J. Kuperberg, Ph.D., Professor
Timothy Lewis, Ph.D., Associate Professor
Fu Liu, Ph.D., Assistant Professor
E. O. Milton, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Alexander I. Magillen, Ph.D., Professor
Ben Morris, Ph.D., Associate Professor
Motovchik Mulashe, Ph.D., Professor
Bruno L Nachtegaale, Ph.D., Professor
Brian Osgood, Ph.D., Assistant Professor
E. Gerry Puckett, Ph.D., Professor
Naoki Saito, Ph.D., Professor
Anne Schilling, Ph.D., Professor
Jennifer Schulters, Ph.D., Professor
The Major Programs

A. Major Requirements:  

Preparatory Subject Matter .......................... 43-46
Mathematics 12 (or high school equivalent) ....... 0-3
Mathematics 21A, 21B, 21C, 21D, 22B .......... 19
Mathematics 25, 67 .................................. 8
Computer Science Engineering 30 or Engineering 6 .. 4
Additional non-Mathematics courses chosen from natural sciences .......... 12

Depth Subject Matter ................................ 34-38
A. Entry Level (Optional) .......................... 0-4
Mathematics 108, 114, 115A, 141, 145) ......... 16
B. Core .............................................. 7-10
Mathematics 125AB ................................ 4
Mathematics 135A .................................. 4
Mathematics 150A .................................. 4
C. Choose one Plan from the following two: 
   (up to 4 of these 18 units may be approved upper division courses outside of the Department of Mathematics with extensive use of mathematics) 18

Plan 1: General Mathematics
Additional upper division mathematics units selected in consultation with and subject to approval of an adviser .......... 18

Plan 2: Secondary Teaching
Mathematics 111 ................................ 4
Mathematics 115A ................................ 4
Mathematics 116 ................................ 4
Additional upper division mathematics units selected in consultation with and subject to approval of an adviser .......... 6

Note: Students who wish to satisfy the single subject matter waiver for the teaching credential should see an adviser as early as possible.

Total Units for the Major .................. 77-84

Applied Mathematics

B.S. Major Requirements: 

Preparatory Subject Matter .......................... 42-48
Mathematics 12 (or high school equivalent) ....... 0-3
Mathematics 21A, 21B, 21C, 21D, 22B .......... 19
Mathematics 25, 67 .................................. 8
Computer Science Engineering 30 or Engineering 6 .. 4

Depth Subject Matter ................................ 48-52
A. Entry Level (Optional) .......................... 0-4
(Mathematics 108, 114, 115A, 141, 145) ......... 16
B. Core .............................................. 7-10
Mathematics 125AB ................................ 4
Mathematics 135A .................................. 4
Mathematics 150A .................................. 4
Mathematics 150ABC ....................... 12
Physics 9A (Plans 1 and 2) or one course from Physics 7A, Statistics 13, 32, 100 or 102 (Plan 2) .......... 18

Total Units for the Major .................. 90-100

Mathematics

B.S. Major Requirements: 

Preparatory Subject Matter .......................... 35-38
Mathematics 12 (or high school equivalent) ....... 0-3
Mathematics 21ABC or Mathematics 17ABC, 21D, 22B .......... 19
Mathematics 25, 67 .................................. 8
Computer Science Engineering 30 or Engineering 6 .. 4

Depth Subject Matter ................................ 48-52
A. Entry Level (Optional) .......................... 0-4
(Mathematics 108, 114, 115A, 141, 145) ......... 16
B. Core .............................................. 7-10
Mathematics 125AB ................................ 4
Mathematics 135A .................................. 4
Mathematics 150A .................................. 4
Mathematics 150ABC ....................... 12
C. Enrichment ............................................. 12
1. Choice of two courses from Mathematics 118ABC, 119AB, 123, 167, 185A ..................................................... 8
2. Choice of one course from Mathematics 111, 114, 115A, 116, 135B, 141, 145, 146, 147, 148, 150B, 165 ........................................... 4
D. Choose One Emphasis from the following two. ............................................. 8

Computational and Mathematical Biology Emphasis
Mathematics 124 ............................................. 4
One approved upper division course
in Biology ............................................. 4
Computational and Mathematical Emphasis
Mathematics 168 ............................................. 4
One approved upper division course
involving computation or theory of computation ............................................. 4

Total Units for the Major ............................................. 83-90

Recommended Language Preparation. Bachelor of Science degree candidates are advised, but not required, to satisfy the same language requirement that faculty advisers recommend for all B.A. or B.S. degree candidates, and to fulfill it in French, German, or Russian.

Major Advisers. For a current list of faculty advisers, contact the Student Services office at studentservices@math.ucdavis.edu, or see our Web site.

Depth Subject Matter Requirements. Certain mathematically oriented courses given by other departments are admissible in partial satisfaction of the depth subject matter requirement with prior departmental approval. Up to three units of Math 194 may be counted toward the depth subject matter requirements. Additionally, up to three units of Math 189, Math 198, and Math 199 can be counted toward the depth subject matter requirement.

Statement of Objectives. As early as possible, but no later than the last quarter of the sophomore year or no later than the beginning of the first quarter of the junior year for transfer students, each prospective mathematics major, in consultation with a faculty adviser, should file a formal program of study in one of the majors offered in mathematics. Forms to be used for this are available on our Web site or from the Department of Mathematics. Failure to file a formal program could lead to a delay in graduation.

Information for Undergraduates. Assistance in planning an undergraduate major program in mathematics is available on our Web site, as well as by contacting a faculty adviser.

Mathematics Placement Requirement. Students who wish to enroll in Mathematics 12, 16A, 17A, 21A, 21AH, 36 and 67 must satisfy the mathematics placement requirement. See the Department of Mathematics Web page for details on the requirements in advance of enrolling. Students who do not satisfy the requirement will be administratively dropped from these courses. Dates and times for the Precalculus Diagnostic Exam, one of the ways to meet this requirement, are posted on the Learning Skills Center Web page. The Center also provides review materials, review workshops, and other recommended remedial math courses.

The Mathematics Placement Requirement is waived when one of the following conditions is met: (a) Advanced Placement Calculus AB exam score of 4 or 5; (b) Advanced Placement Calculus BC exam score of 3, 4, or 5; (c) a score of 700 or above on the Mathematics section of the SAT Reasoning Test; or (d) in either of the SAT Mathematics Subject tests (Level 1 or Level 2) a score of 700 and above.

Honors and Honors Program. Students who have completed 50 units with a minimum GPA of 3.500 in courses counted towards their major are automatically admitted to the Honors Program. Students who are eligible will be notified of their status by the department at the beginning of the Fall quarter of their senior year.

Students in the Honors Program who meet the minimum GPA requirement and who complete a senior project in consultation with their faculty adviser may also be recommended by the department for graduation with Honors High Honors. Recommendations will be based on evaluations of students' academic achievements in their major and the quality of their senior project. For complete details, see our Web site at http://www.math.ucdavis.edu.

Minor Program Requirements:
UNITS
Mathematics ............................................. 20
Upper division units in mathematics (exclusive of Mathematics 192, 197C, 198, 199) ............................................. 20
Teaching Credential Subject Representative. Ali Dad-del
Graduate Study. The Department offers programs of study and research leading to the M.A. and Ph.D. degrees in Mathematics. Information regarding graduate study may be obtained by consulting our Web site, and by sending an e-mail to studentservices@math.ucdavis.edu.

Courses in Mathematics (MAT)

Lower Division Courses
B. Elementary Algebra (no credit)
Lecture—3 hours. Basic concepts of algebra, including polynomials, factoring, equations, graphs, and inequalities. Offered only if sufficient number of students enroll. Not open to Concurrent student enrollment. (P/NP grading only) (There is a fee of $45.)—I. (I)
C. Trigonometry (no credit)
Lecture—2 hours. Basic concepts of trigonometry, including trigonometric functions, identities, inverse functions, and applications. Offered only if sufficient number of students enroll. Not open to Concurrent student enrollment. (P/NP grading only) (There is a fee of $30.)—I. (I)
D. Intermediate Algebra (no credit)
Lecture—3 hours. Basic concepts of algebra, designed to prepare the student for college work in mathematics, such as course 16A or 21A. Functions, graphs, logarithms, and systems of equations. Offered only if sufficient number of students enroll. Not open to Concurrent student enrollment. (P/NP grading only) (There is a fee of $15.)—I, II. (I, II)

12. Precalculus (3)
Lecture—3 hours. Prerequisite: two years of high school algebra, plane geometry, plane trigonometry; and obtaining required score on the Precalculus Diagnostic Examination. Topics selected for their use in calculus, including functions and their graphs, slope, zeros of polynomials, exponential, logarithmic and trigonometric functions, sketching surfaces and solids. Not open for credit to students who have completed any of courses 16A, 16B, 16C, 17A, 17B, 17C, 21A, 21B, or 21C with a C- or better.—I. (I, II, III)

16A. Short Calculus (3)
Lecture—3 hours. Prerequisite: two years of high school algebra, plane geometry, plane trigonometry, and satisfying the Mathematics Placement Requirement. Limits; differentiation of algebraic functions; analytic geometry; applications, in particular to maximization and minimization, open for credit to students who have received credit for Mathematics 17B, 17C, 21A, 21B, or 21C. Only 2 units of credit to students who have completed course 17A. GE credit: SciEng—II, III, I, II, III

16B. Short Calculus (3)
Lecture—3 hours. Prerequisite: course 16A, 17A, or 21A. Introduction to integral calculus and elementary differential equations via applications to biology and medicine. Fundamental theorem of calculus, techniques of integration including integral tables and numerical methods, improper integrals, elementary first order differential equations, applications in biology and medicine. Not open for credit to students who have completed course 16C, 21C, 21B, or 21C. Only 2 units of credit for students who have completed course 16A. GE credit: SciEng—II, III, I, II, III

17A. Calculus for Biology and Medicine (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: two years of high school algebra, plane geometry, plane trigonometry, and analytic geometry, and satisfying the Mathematics Placement Requirement. Introduction to differential calculus via applications in biology and medicine. Limits, derivatives of polynomials, trigonometric, and exponential functions, graphing, applications of the derivative to biology and medicine. Not open for credit to students who have completed course 16B, 16C, 21A, 21B, or 21C. Only 2 units of credit to students who have completed course 16A. GE credit: SciEng—II, III, I, II, III

17B. Calculus for Biology and Medicine (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 16A, 17A, or 21A. Introduction to integral calculus and elementary differential equations via applications to biology and medicine. Fundamental theorem of calculus, techniques of integration including integral tables and numerical methods, improper integrals, elementary first order differential equations, applications in biology and medicine. Not open for credit to students who have completed course 16C, 21C, 21B, or 21C. Only 2 units of credit for students who have completed course 16B. GE credit: SciEng—II, III, I, II, III

17C. Calculus for Biology and Medicine (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 16B, 17B, or 21B. Matrix algebra, functions of several variables, partial derivatives, systems of differential equations, and applications to biology and medicine. Not open for credit to students who have completed course 21C. Only 2 units of credit to students who have completed course 16C. GE credit: SciEng—II, III, I, II, III

21A. Calculus (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: two years of high school algebra, plane geometry, plane trigonometry, and satisfying the Mathematics Placement Requirement. Functions, limits, continuity. Slope and derivative. Differentiation of algebraic and transcendental functions. Applications to motion, natural growth, exponential, logarithmic functions, optimization, extrema of a function. Differentials, L'Hospital's rule. Not open for credit to students who have completed course 16B, 16C, 17B, or 17C. Only 2 units of credit to students who have completed course 16A or 17A. GE credit: SciEng—II, III, I, II, III

21AH. Honors Calculus (4)
Lecture/discussion—4 hours. Prerequisite: a Precalculus Diagnostic Exam score significantly higher than the minimum required. More intensive treatment of material covered in course 21A. Offered irregularly. GE credit: SciEng.
21AL. Emerging Scholars Program Calculus Workshop (2) Lecture—3 hours; discussion—1 hour. Prerequisite: concurrent enrollment in course 21A. Functions, limits, continuity. Slope and derivative. Same course content as course 21A. Enrollment for students in the Emerging Scholars Program by instructor’s invitation only. Offered irregularly. (P/NP grading only.)

21B. Calculus (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 21A or 21AH. Continuation of course 21A. Definitions of definite integral, fundamental theorem of calculus, techniques of integration. Application to area, volume, arc length, average of a function, improper integral, surface of revolution. Only 2 units of credit to students who have completed course 16B, 16C, 17B, or 17C. GE credit: SciEng.—I, II, III, (I, II, III.)

21BH. Honors Calculus (4) Lecture/discussion—4 hours. Prerequisite: a grade of B or better in course 21A or 21AH. More intensive treatment of material covered in course 21B. Students completing 21BH can continue with course 21CH or the regular 21C. Offered irregularly. GE credit: SciEng.

21B. Honors Calculus (4) Lecture/discussion—4 hours. Prerequisite: a grade of B or better in course 21A or 21AH. More intensive treatment of material covered in course 21B. Students completing 21BH can continue with course 21CH or the regular 21C. Offered irregularly. GE credit: SciEng.

21B. Calculus (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 21A or 21AH. Continuation of course 21A. Definitions of definite integral, fundamental theorem of calculus, techniques of integration. Application to area, volume, arc length, average of a function, improper integral, surface of revolution. Only 2 units of credit to students who have completed course 16B, 16C, 17B, or 17C. GE credit: SciEng.—I, II, III, (I, II, III.)

21BL. Emerging Scholars Program Calculus Workshop (2) Workshop—6 hours. Prerequisite: course 21A or 21AH; concurrent enrollment in 21B. Continuation of course 21A. Same course content as 21B. Enrollment for students in the Emerging Scholars Program by instructor’s invitation only. Offered irregularly. (P/NP grading only.)

21C. Calculus (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 16C, 17C, 21B, or 21BH. Continuation of course 21B. Sequences, series, tests for convergence, Taylor expansions. Vector algebra, vector calculus, scalar and vector fields. Partial derivatives, total differentials. Applications to maximum and minimum problems in two or more variables. Applications to physical systems. GE credit: SciEng.—I, II, III, (I, II, III.)

21CH. Honors Calculus (4) Lecture/discussion—4 hours. Prerequisite: a grade of B or better in course 21B or 21BH. More intensive treatment of material covered in course 21C. GE credit: SciEng. Offered infrequently.

21CL. Emerging Scholars Program Calculus Workshop (2) Workshop—6 hours. Prerequisite: course 21B or 21BH; concurrent enrollment in 21C. Continuation of course 21B. Same course content as 21C. Enrollment for students in the Emerging Scholars Program by instructor’s invitation only. (P/NP grading only.) Offered irregularly.

21D. Vector Analysis (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 21C or 21CH. Continuation of course 21C. Definite integrals over plane and solid regions in various coordinate systems. Line and surface integrals. Green’s theorem, Stokes’s theorem, divergence theorem. —I, II, III, (I, II, III.)

21M. Accelerated Calculus (5) Lecture/discussion—4 hours; discussion/labatory—1 hour. Prerequisite: grade of B or higher in both semesters of high school calculus or a score of 4 or higher on the Advanced Placement Calculus AB exam, and obtaining the required score on the Precalculus Diagnostic Examination and its trigonometric component. Accelerated treatment of material from courses 21A and 21B, with detailed presentation of theory, definitions, and proofs, and treatment of computational aspects of calculus at a condensed but sophisticated level. Not open for credit to students who have completed course 21A or 21B; only 3 units of credit will be allowed to students who have completed course 16A and only 2 units of credit will be allowed to students who have completed course 16B. Offered irregularly. GE credit: SciEng.
dynamic programming models. Computer simulation methods applied to biological systems. Applications to population growth, cell biology, physiology, evolutionary ecology and protein clustering. MATLAB programming required. Offered in alternate years. —III. (III.)

125A. Real Analysis (4)
Lecture/discussion—4 hours. Prerequisite: course 25. Functions, limits of functions, continuity and uniform continuity, sequences of functions, series of real numbers, series of functions, power series. Not open for credit to students who have completed former course 127B. —I, II, III. (III.)

125B. Real Analysis (4)
Lecture/discussion—4 hours. Prerequisite: course 67 and 125A. Theory of the derivative, Taylor’s series, integration, partial derivatives, Implicit Function Theorem. Not open for credit to students who have completed former course 127C. —II, III, (III.)

128A. Numerical Analysis (4)
Lecture—3 hours; project. Prerequisite: Computer Science Engineering 30 or equivalent; course 21C; Error analysis, approximation, interpn, numerical differentiation and integration. Programming in language such as Pascal, Fortran, or BASIC required. —II. (II.)

128B. Numerical Analysis in Solution of Equations (4)
Lecture—3 hours; project. Prerequisite: Computer Science Engineering 30 or equivalent; courses 21C or 22A or 67. Difference equations, operators, numerical solutions of ordinary and partial differential equations. Programming in language such as Pascal, Fortran, or BASIC required. —II. (II.)

129. Fourier Analysis (4)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 21D; 22A or 67; 225 or consent of instructor. Fourier series and integrals, orthogonal sets of functions. Topics selected from trigonometric approximation, orthogonal polynomials, applications to signal and image processing, numerical analysis, and differential equations. —III. (III.)

130A. Mathematical Finance (4)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 67; 135A. Analysis and evaluation of deterministic and random cash flow streams, yield and pricing of basic financial instruments, interest rate theory, mean-variance portfolio theory, capital asset pricing models, utility functions and general principles. MATLAB programming required. Offered in alternate years. —III. (III.)

135A. Probability (4)
Lecture/discussion—4 hours. Prerequisite: course 125A. Probability space; discrete probability, combinatorial analysis; independence, conditional probability; random variables, discrete and continuous distributions, probability mass function, joint and marginal density functions; expectation, moments, variance, Chebyshev inequality; sums of random variables, random walk, large number law, central limit theorem. Not open for credit to students who have completed former course 131. —I, II, III. (III.)

135B. Stochastic Processes (4)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 135A; 22A or 67. Generating functions, branching processes, characteristic function; Markov chains; convergence of random variables, law of iterated logarithm; random processes, Brownian motion, stationary processes, renewal processes, queueing theory, martingales. Not open for credit to students who have completed former course 132A. —III. (III.)

141. Euclidean Geometry (4)
Lecture/discussion—4 hours. Prerequisite: courses 21B; 22A or 67. An axiomatic and analytic examina- tion of Euclidean geometry from an advanced point of view. In particular, a discussion of its relation to other geometries. Designed to serve as prepa- ration for the more rigorous upper division courses. —II, III. (III.)

145. Combinatorics (4)
Lecture/discussion—4 hours. Prerequisite: course 21B. Combinatorial methods using basic graph theory, counting, characteristic functions, and recurrence relations. Designed to serve as prepara- tion for the more rigorous upper division courses. —II. (II.)

146. Algebraic Combinatorics (4)
Lecture/discussion—4 hours. Prerequisite: courses 25, 22A or 67. Enumeration, Polya theory, generating functions, current topics in algebraic combinatorics. Not open for credit to students who have completed former course 149B. —II. (II.)

147. Topology (4)
Lecture—3 hours; extensive problem solving. Prereq- uisite: courses 67, 125A. Basic notions of point-set and combinatorial topology. —II, III. (III.)

150A. Modern Algebra (4)
Lecture/discussion—4 hours. Prerequisite: course 67. Basic concepts of groups, symmetries of the plane. Emphasis on the techniques used in the proof of the ideas (Lemmas, Theorems, etc.) developing these concepts. Precise thinking, proof writing, and the ability to deal with abstraction. —I. (I.)

150B. Modern Algebra (4)
Lecture/discussion—4 hours. Prerequisite: course 150A. Bilinear forms, rings, factorization, modules. —II. (II.)

150C. Modern Algebra (4)
Lecture/discussion—4 hours. Prerequisite: course 150B. Groups, representations, fields, Galois theory. —II. (II.)

160. Mathematical Foundations of Database Theory, Design and Performance (4)
Lecture—3 hours; project. Prerequisite: course 22A or 67; one of the following courses: 25, 108, 114, 115A, 141, or 145. Relational model; relational algebra, relational calculus, normal forms, functional and multivalued dependencies, referential integrity. Benefit analysis of physical database design and reorganization. Performance via analytical modeling, simulation, and queueing theory. Block accesses; buffering; operating system contention; CPU intensive operations. Offered irregularly. —I, II, III, (III.)

165. Mathematics and Computers (4)
Lecture—3 hours; project. Prerequisite: Computer Science Engineering 30 or equivalent; course 22B and one of the following courses: 25, 67, 108, 114, 115A, 141 or 145. Introduction to computa- tional mathematics, symbolic computation, and computer generated/verified proofs in algebra, analysis and geometry. Introduction to the role of new mathe- matics developed in conjunction with modern com- putational questions and the role that computers play in mathematical conjecture and experimentation. —I. (I.)

167. Applied Linear Algebra (4)
Lecture—3 hours; extensive problem solving. Prereq- uisite: course 22A or 67. Linear algebra; linear equations; orthogonal projections, similarity transforma- tions, quadratic forms, eigenvalues and eigenvectors. Application to engineering, economics, biology and statistics. —I, II, III, (III.)

168. Optimization (4)

180. Special Topics (3)
Lecture—3 hours. Prerequisite: courses 25 and 67, or consent of instructor. Special topics from various fields of modern, pure, and applied mathematics. Some recent topics include Knot Theory, General Rela- tivity, and Fuzzy Sets. May be repeated for credit when topic differs. Not offered every year. —I, II, III, (III.)

185A. Complex Analysis (4)
Lecture—3 hours; extensive problem solving. Prereq- uisite: courses 67, 125A. Complex number system, analyticity and the Cauchy-Riemann equations, ele- mentary functions, complex integration, power and Laurent series expansions, residue theory. —II. (II.)

185B. Complex Analysis (4)
Lecture—3 hours; extensive problem solving. Prereq- uisite: course 185A. Analytical functions, elementary functions, power and Laurent series expansions, residue theory of integrals, the Cauchy integral theorem, conformal mapping and applications to heat flow and fluid mechanics. Offered in alternate years. —III.

189. Advanced Problem Solving (3)
Lecture—3 hours. Prerequisite: courses 21D; 22A or 67, 25. Solution and presentation of advanced problem solving techniques. Solve and present inter- esting and challenging problems of all areas of mathematics. Not offered every year. GE Credit: Writ. —II.

192. Internship in Applied Mathematics (1-3)
Internship. Final report. Prerequisite: upper division standing; project approved by faculty sponsor prior to enrollment. Supervised work experience in applied mathematics. May be repeated for credit for a total of 10 units. (P/NP grading only.) —I, II, III, (III.)

194. Undergraduate Thesis (3)
Prerequisite: consent of instructor. Independent research under supervision of a faculty member. Stu- dent will submit written report in thesis form. May be repeated with consent of Vice Chair. (P/NP grading only.) —I, II, III, (III.)

197TC. Tutoring Mathematics in the Community (1-5)
Seminar—1-2 hours; laboratory—2-6 hours. Prereq- uisite: upper division standing and consent of instruc- tor. Special projects in mathematics education developing techniques for mathematics instruction and tutoring on an individual or small group basis. May be repeated once for credit. (P/NP grading only.) —I, II, III, (III.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.) —I, II, III, (III.)

199. Special Study for Advanced Undergraduates (1-3)
(P/NP grading only.) —I, II, III, (III.)

Graduate Courses

201A-201B-201C. Analysis (4-4-4)

202. Functional Analysis (4)
Lecture—3 hours; term paper. Prerequisite: course 201A-201B-201C. The theory of Fredholm opera- tors. Examples of Fredholm operators (singular inte-
204. Applied Asymptotic Analysis (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: graduate standing or consent of instructor. Scaling and non-dimensionalization. Asymptotic expansions. Regular and singular perturbation methods. Approximations. Offered irregularly. Offered in alternate years. — I.

210A. Topics in Algebra (3)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 210B (concurrently); consent of instructor. Special topics related to course 210A which are of special interest to teachers and candidates for M.A.T. degree program. May be repeated for credit. Offered irregularly.

210B. Topics in Algebra (3)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: bachelor's degree in mathematics or consent of instructor. Topics in advanced algebra related to curriculum at all levels. Required for M.A.T. degree program for prospective teachers. May be repeated for credit with prior consent of instructor. Offered irregularly.

211. Partial Differential Equations (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 212A or equivalent, consent of instructor. Fundamental solutions for heat and Laplace operators and hyperbolic partial differential equations, existence, uniqueness and regularity for linear and non-linear equations; maximum principles; weak solutions, Holder and Sobolev spaces, energy methods; Euler-Lagrange equations. Offered in alternate years. — II.

218. Partial Differential Equations (4)
Lecture—3 hours; term paper or discussion. Prerequisite: courses 22A, 127C. Initial and boundary value problems for elliptic and parabolic partial differential equations; existence, uniqueness and regularity for linear and nonlinear equations; maximum principles; weak solutions, Holder and Sobolev spaces, energy methods; Euler-Lagrange equations. Offered in alternate years. — II.

219. Ordinary Differential Equations (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 22A or 67, 22B, 125B or consent of instructor. Theory of ordinary differential equations. Dynamical systems. Geometric theory. Normal forms. Bifurcation theory. Chaotic systems. Offered irregularly.

221A. Mathematical Fluid Dynamics (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 118B or consent of instructor. Kinematics and dynamics of fluids. The Euler and Navier-Stokes equations. Vorticity dynamics. Intrinsic flows and the Navier-Stokes equations. High Reynolds number flows and boundary layers. Compressible flows. Shock waves. Offered in alternate years. — I.

221B. Mathematical Fluid Dynamics (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 118B or consent of instructor. Kinematics and dynamics of fluids. The Euler and Navier-Stokes equations. Vorticity dynamics. Intrinsic flows and the Navier-Stokes equations. High Reynolds number flows and boundary layers. Compressible flows. Shock waves. Offered in alternate years. — II.

222. Introduction to Biological Dynamics (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: Population Biology 231/Ecology 231 and Neurobiology, Physiology and Behavior 245 or consent of instructor. The basic principles of fluid dynamics are introduced in the first half of the course by describing various phenomena studies from a biofluids perspective. The equations of fluid motion associated with these phenomena are derived and studied in the second half. Offered irregularly.

226A. Numerical Methods: Fundamentals (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 128A or equivalent, or consent of instructor; course 250AB highly recommended. Topics include: differentiable manifolds, vector fields, transversality. Sard's theorem, examples of differentiable maps, transversality, intersection theory, index of vector fields; differential forms, integration, Stokes' theorem, deRham cohomology; Morse functions, Morse lemma, index of critical points. — III.

226B. Numerical Methods: Large-Scale Matrix Computations (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 167 or equivalent, or consent of instructor; familiarity with some programming language. Numerical linear algebra and large-scale matrix computations, including direct and iterative methods for the solution of linear systems, the computation of eigenvalues and singular values, the solution of least squares problems, eigenvalue methods for the solution of linear programs. Offered in alternate years. — I.

226C. Numerical Methods: Ordinary Differential Equations (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 226 or equivalent, or consent of instructor; familiarity with some programming language. Numerical methods for the solution of ordinary differential equations, including methods for initial-value problems and two-point-boundary value problems, theory of and methods for differential algebraic equations, dimension reduction of large-scale dynamical systems. Offered in alternate years. — III.

227. Mathematical Biology (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: graduate standing or consent of instructor. Nonlinear ordinary and partial differential equations and stochastic processes in biology. Scaling, qualitative, and numerical analysis of mathematical models. Applications to nerve impulse, chemotaxis, muscle contraction, and morphogenesis. Offered in alternate years. — II.

228A-228B-228C. Numerical Solution of Differential Equations (4-4-4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 128C. Numerical solutions of initial-value, eigenvalue and boundary value problems for ordinary differential equations. Numerical solution of parabolic and hyperbolic partial differential equations. Offered in alternate years. — III.

235A-235B-235C. Probability Theory (4-4-4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: 235A—courses 125B and 135A or Statistics 131A or consent of instructor; 235B—course 235A/Statistics 235A or consent of instructor; 235C—course 235B/Statistics 235B or consent of instructor. Measure-theoretic foundations, abstract integration, independence, laws of large numbers, characteristic functions, central limit theorems. Weak convergence in metric spaces, Brownian motion, invariance principle. Conditional expectation. Topics selected from martingales, Markov chains, ergodic theory. (Same course as 235A235B235C.) Offered in alternate years. — III.

236A-236B. Stochastic Dynamics and Applications (4-4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 210C or course/Statistics 235B; course/Statistics 235A235B235C recommended. Stochastic processes, Brownian motion, stochastic integration, martingales, stochastic differential equations. Diffusions, connections with partial differential equations, mathematical finance. Offered in alternate years. — III.

240. Differential Geometry (4)

240A. Differential Geometry (4)

240B. Differential Geometry (4)
fields. Curves and surfaces. Positive and negative curvature; Morse Theory; homogeneous spaces; Hodge theory; applications. Offered irregularly. — (III.)

245. Enumerative Combinatorics (4) Lecture—3 hours; extensive problem solving. Prerequisite: course 145, 150 or the equivalent, or consent of instructor. Introduction to modern combinatorics and its applications. Emphasis on enumerative aspects of combinatorial theory. Offered in alternate years. — (I.)

246. Algebraic Combinatorics (4) Lecture—3 hours; extensive problem solving. Prerequisite: course 245 or consent of instructor. Algebraic and geometric aspects of combinatorics. The use of structures such as groups, polytopes, rings, and simplicial complexes to solve combinatorial problems. Offered in alternate years—II.

250A-250B-250C. Algebra (4-4-4) Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: graduate standing in mathematics or consent of instructor. Group and rings. Sylow theorems, abelian groups, Jordan-Holder theorem. Rings, unique factorization. Algebras, and modules. Fields and vector spaces over fields. Field extensions. Commutative rings. Representation theory and its applications. —I-II-III. (III-III)

258A. Numerical Optimization (4) Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: courses 25, 167. Numerical methods for solving systems. Theory of optimization problems. Newton and Quasi-Newton methods, linear and quadratic programming, barrier methods; large-scale optimization; theory of approximations; infinite and semi-infinite programming; applications to optimal control, stochastic optimization and distributed systems. Offered in alternate years. — (I.)

258B. Variational Analysis (4) Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: courses 25, 167, or consent of the instructor. Foundations of optimization theory. The design of solution procedures for optimization problems. Modeling issues, and stability analysis. Offered in alternate years. — (II.)


265. Mathematical Quantum Mechanics (4) Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 201 or consent of instructor. Mathematical foundations of quantum mechanics: the Hilbert space and Operator Algebra formulation; the Schrödinger and Heisenberg equations, symmetry in quantum mechanics, basis of spectral theory and perturbation theory. Applications to atoms and molecules. The Dirac equation. Offered in alternate years. — (II.)

266. Mathematical Statistical Mechanics and Quantum Field Theory (4) Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 265 or consent of instructor. Mathematical principles of statistical mechanics and quantum field theory. Topics include classical and quantum lattice systems, variational principles, spontaneous symmetry breaking and phase transitions, second quantization and Fock space, and fundamentals of quantum field theory. Offered in alternate years. — (II.)

271. Applied and Computational Harmonic Analysis (4) Lecture—3 hours; extensive problem solving. Prerequisite: courses 1258 or 201C, and 1288 or 167; and 1292 or equivalent, or consent of instructor. Introduction to mathematical basic building blocks (wavelets, local Fourier basis, and their relatives) useful for diverse fields (signal and image processing, numerical analysis, and statistics). Emphasis on the connection between the continuum and the discrete worlds. Offered in alternate years. — (II.)

280. Topics in Pure and Applied Mathematics (3) Lecture—3 hours. Prerequisite: graduate standing. Special topics in various fields of pure and applied mathematics. Topics selected based on the mutual interests of students and faculty. May be repeated for credit when topic differs. — (I., II, III, II., III.)

290. Seminar (1-6) Seminar—1-6 hours. Advanced study in various fields of mathematics, including analysis, applied mathematics, discrete mathematics, geometry, mathematical biology, mathematical physics, optimization, partial differential equations, probability, and topology. May be repeated for credit. (S/U grading only).—I, II, III, (I., II, III)

298. Group Study (1-5) 299. Individual Study (1-12) (S/U grading only).—I, II, III, (I., II, III)

299D. Dissertation Research (1-12) (S/U grading only).—I, II, III, (I., II, III)

Professional Courses

301A-301B-301C. Mathematics Teaching Practicum (3-3-3) Fieldwork—5 hours; discussion—1 hour. Prerequisite: course 302A-302B-302C and 303A-303B-303C concurrently or consent of instructor. Specialist training in mathematics teaching. Teaching, training, and coaching observing classes taught using large group Socratic techniques, small group guided inquiry experiments, and/or other approaches to teaching of various grade levels. Required for advanced degrees in mathematics education. May be repeated once for credit. Offered irregularly.

302A-302B-302C. Curriculum Development in Mathematics (1-1-1) Lecture/discussion—1 hour. Prerequisite: course 303A-303B-303C concurrently or consent of instructor. Mathematics curriculum development for all grade levels. Required for advanced degrees in mathematics education. May be repeated once for credit. Offered irregularly.

303A-303B-303C. Mathematics Pedagogy (1-1-1) Lecture/discussion—1 hour. Prerequisite: course 302A-302B-302C or 210L concurrently or consent of instructor. An investigation of the interplay of mathematical pedagogy and mathematical content, including a historical survey of past and present methods in view of some of the influences that shaped their development. May be repeated once for credit. Offered irregularly.

390. Methods of Teaching Mathematics (3) Lecture—1 hour; discussion—1 hour; laboratory—2 hours. Prerequisite: graduate standing. Practical experience in methods and problems of the teaching of mathematics at the university level. Includes discussion of lecturing techniques, analysis of tests and supporting material, preparation and grading of examinations, and related topics. Required of all departmental teaching assistants. May be repeated for credit. (S/U grading only).—I, II, III, (I., II, III)

399. Individual Study (2-4) Independent study—2-3 hours; discussion—1 hour. Individual study of some aspect of mathematics education or a focused work on a curriculum design project under supervision of a faculty member in mathematics. May be repeated once for credit. (S/U grading only).—I, II, III, (I., II, III)

Medical Informatics (A Graduate Group)

See Health Informatics (A Graduate Group), on page 314.

Medical Microbiology

See Medicine, School of, on page 367.

Medical Pharmacology and Toxicology

See Medicine, School of, on page 367; and Medicine and Epidemiology (VME), on page 506.

Medicine

See Medicine, School of, on page 367; and Medicine and Epidemiology (VME), on page 506.

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Edwin Bradbury, Ph.D., Professor Emeritus
George Cardinet, Ph.D., Professor Emeritus
Richard Carlsen, Ph.D., Professor Emeritus
James Carlson, M.D. Professor Emeritus
Marion Cawston, M.D., Professor Emeritus
James Castles, M.D., Professor Emeritus
William Castle, M.D., Professor Emeritus
Robert S. Chang, M.D., Professor Emeritus
Michael Chapman, M.D., Professor Emeritus
Anthony Cheung, Ph.D., Professor Emeritus
Ronald Chand, Ph.D., Professor Emeritus
Matthew Connors, M.D., Professor Emeritus
The curriculum for the M.D. degree at the UC Davis School of Medicine is a four-year program providing comprehensive preparation for graduate medical training (internships and residencies) and the practice of medicine. It offers a blend of basic science training and clinical experience with opportunities for research.

The first year curriculum begins in August and ends in May. It is organized into five blocks. The first block includes courses in Molecular Biology, Cell and Tissue Biology, Genetics, Gross Anatomy/Embryology/Radiology, and Human Physiology. The major organ systems are woven into the cases and didactics in clinical epidemiology, medical economics, and socio-behavioral medicine. The remainder of the second year is devoted to three major blocks composed of pathophysiology courses with tight integration of the systemic pathologies and pharmacology courses. The courses are organized according to organ system (cardiovascular, pulmonary, renal, musculoskeletal system, and hematological in Blocks 4 and 5; gastroenterology- oncology, and psychiatry in Block 6). The Doctoring 2 curriculum continues concurrently with its focus on advanced clinical skills, epidemiology, ethics, and shared problem-based learning and physical diagnosis skills are correlated with the ongoing pathophysiology courses. Like the first year, all of the second year courses utilize periodic quizzes and review sessions and a comprehensive final examination. The Doctoring 2 course includes an objective structured clinical examination (OSCE) using standardized patients at the end of the course series.

The second year curriculum ends in February and is followed by a six-week, unscheduled block for prearranged USMLE Step 1, remediation, electives, and vacation.

The third-year program begins in April and includes six required clerkship rotations in the clinical specialties: eight weeks each of surgery, medicine, obstetrics/gynecology, pediatrics, primary care (jointly administered by Family and Community Medicine and Internal Medicine) and psychiatry. Students may elect to defer one of the required clerkships to the fourth year. The third year Doctoring program consists of longitudinal small groups led by faculty members who remain with their groups throughout the year as the students rotate through their clerkships. Doctoring 3 themes include advanced interviewing techniques, clinical reasoning, clinical epidemiology, evidence-based medicine, and ethics/jurisprudence. Students take a comprehensive clinical skills examination at the end of the third year which features self-assessment and faculty feedback.

The fourth year curriculum features built-in flexibility to allow students to individualize their medical careers. The early start to the fourth year in May allows students to pursue electives for early exposure to clinical specialties or to complete clerkships which may have been deferred. All students are required to select 32 weeks of clinical learning activities in addition to a single 4 week special study module or scholarly project. The Special Study modules are designed to integrate basic sciences with clinical sciences, provide opportunities for students to process and refine fundamental skills in critical appraisal and analysis of emerging scientific developments, and to allow students to focus in-depth on a multidisciplinary topic of personal interest to the student. The Scholarly Project requires independent inquiry with faculty mentorship and leads to a publishable manuscript and student presentation of the project at a research forum held in the spring.

Individual student programs are designed under the guidance of college directors, mentors and faculty advisors, with the support of the Career Advising Office. Each student’s fourth year program must be approved by the Fourth Year Oversight Committee to ensure appropriate breadth, depth, and vigor. There are strict guidelines for the choices and time allowed away from the home institution. The fourth year curriculum also provides 18 weeks of unscheduled time for research, Acting Internships, residency interviews, national board study, vacation, or other elective experiences.

To satisfy the M.D. degree program, the student must successfully complete the required course work, clerkships, and fourth year requirements. Students must pass USMLE Step 1, USMLE Step 2 CS and CK, and complete the fourth year clinical performance examination. Students who enroll in the program with advanced training in one of the areas required for the program are permitted to substitute required courses with credits of equal credit. In addition to the fourth-year elective period available, there is the opportunity for students to select from a variety of electives during the first two years. Examples include electives in medical economics, history of ethics and medicine, medical Spanish, insights in clinical research. Most students also participate in one of several student-run, community clinics for elective credit during their first and second years.

The final assessment for the M.D. degree provides flexibility and encourages advanced degree programs (Ph.D., M.S., M.A., M.B.A., and M.P.H.). These offers a wide breadth of study areas and draw upon the consider- able expertise of the entire campus faculty. UC Davis Department of Public Health offers an M.P.H. program in conjunction with the M.D. program. This program is designed for students interested in disease prevention and control in health, health professionals and State Health Department employees.

Required Curriculum for the M.D. Degree

The following listing is the typical sequencing of all courses required for earning the M.D. degree. Course descriptions are given under the individual departmental course offerings.

First-Year Required Courses

Year 1, Block 1
- Molecular and Cell Biology, BCM 410A
- Gross/Radiologic-Developmental Anatomy, CHA 400
- Human Physiology, HPH 400
- Human Microscopic Anatomy, CHA 402
- Genetics, OBG 420
- Doctoring 1, MDS 411A

Year 1, Block 2
- Medical Immunology, MMI 480A
- Medical Microbiology, MMI 480B
- General and Endocrine Pathology, PMD 410A
- Pharmacology, PHA 400A
- Metabolism-Endocrine-Reproduction-Nutrition, "MERN," IMD 405
- Doctoring 1, MDS 411B

Second-Year Required Courses

Year 2, Block 3
- Neuroanatomy, CHA 403
- Systemic Pathology, PMD 410B
- Pharmacology, PHA 400B
- Integumentary System, DER 420
- Clinical Neurosciences, NEU 420
- Doctoring 2, MDS 421A

Quarter Offered: I:Fall, II:Winter, III:Spring, IV:Summer; 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum = Arts and Humanities; SciEng = Science and Engineering; SocSci = Social Sciences; Div = Social-Cultural Diversity; Wrt = Writing Experience
Year 2, Block 4
Cardiovascular System, IMD 420D
Pulmonary and Critical Care, IMD 420C
Nephrology, IMD 420E
Systemic Pathology, PMID 410C
Pharmacology, PHA 400C
Doctoring 2, MDS 421B

Year 2, Block 5
Hematology, IMD 420A
Musculoskeletal System, OSU 421
Systemic Pathology, PMID 410D
Pharmacology, PHA 400C
Doctoring 2, MDS 421B

Year 2, Block 6
Oncology, HON 420
Fundamentals of Clinical Psychiatry, PSY 403
GI System, IMD 420B
Systemic Pathology, PMID 410D
Pharmacology, PHA 400D
Doctoring 2, MDS 421C

Third- and Fourth-Year Required Courses

Third-Year Clerkships
Internal Medicine 430, Medicine Clerkship .......................... 8 weeks
Surgery 430, Surgery Clerkship ................................. 8 weeks
Pediatrics 430, Pediatrics Clerkship ............................ 8 weeks
Family and Community Medicine 430, Primary Care Clerkship 8 weeks
Obstetrics and Gynecology 430, Obstetrics
and Gynecology Clerkship .......................... 8 weeks
Psychiatry 430, Psychiatry Clerkship .......................... 8 weeks
Doctoring 3, MDS 430

Fourth-Year Requirements
32 weeks of learning experiences.
Single 4 week period special study module or scholarly project.
Clinical experiences are chosen by the student in consultation with, and with approval of, the Fourth Year Oversight Committee.
The fourth-year curriculum also allows for 12 weeks of undersigned time (electives, interviews, free time).

Medical Sciences (MDS)

Lower Division Course
99. Special Study in Medicine for Undergraduates (1-5)
Independent study—3–13 hours. Prerequisite: consent of instructor. Participate in research projects relating to the education, attitudinal and developmental work in the School of Medicine. (S/U grading only.—I, II, III, IV, [II, III, IV] Kumari

Upper Division Course
192. Medical Education Internship for Advanced Undergraduates (1-12)
Internship—3–66 hours. Prerequisite: competency with computers. Enrollment dependent on availability of intern positions. Participate in projects related to curriculum development in support of curriculum for M.D. degree. Gain work experience and appreciation for innovative approaches to learning in basic and clinical sciences of medical education. May be repeated for credit up to 12 units. (P/NP grading only.—I, II, III, IV, [II, III, IV] Kumari

Professional Courses

400. Application of Medical Principles (1)
Discussion—1.5 hours. Prerequisite: student in the School of Medicine. Application of multidisciplinary basic, social, and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (H/P/F grading only.—II, III, [I, III]

400B-400C. Application of Medical Principles (1-5)
Discussion—2-3 hours. Prerequisite: approval of the Committee on Student Progress. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. H/P/F grading only.—I, III, [I, III]

400D. Application of Medical Principles (1)
Discussion—1.5 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. P/F grading only)—I, IV. Stevenson

400F. Application of Medical Principles (1)
Discussion—1.5 hours. Prerequisite: second year medical student. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. P/F grading only)—I. Stevenson

400G. Application of Medical Principles (1)
Discussion—1.5 hours. Prerequisite: third year medical student. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. P/F grading only)—II. Stevenson

400H. Application of Medical Principles (1)
Discussion—1.5 hours. Prerequisite: third year medical student. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. P/F grading only)—III. Stevenson

400I. Application of Medical Principles (1)
Discussion—1.5, 3 hours; clinical activity—1.5, 1 hour; lecture/discussion—1.0, 1.8, 2.0 hours. Prerequisite: approval of committee on student progress; medical students only. Small, case-based learning groups with training in patient communication and interviewing techniques, clinical identification and problem solving, applications of social, psychological, cultural, biobehavioral, and basic science concepts to patient case scenarios, outpatient clinical experiences and didactic presentations. (Deferred grading only, pending completion of sequence. P/F grading only)—I, II, III, IV, [II, III, IV] Huntley

411A-411B-411C. Doctoring 1 (4-5-3)
Discussion—1, 1.5, 3 hours; clinical activity—1, 1.5, 1 hour; lecture/discussion—1.0, 1.8, 2.0 hours. Prerequisite: approval of committee on student progress; medical students only. Small, case-based learning groups with training in patient communication and interviewing techniques, clinical identification and problem solving, applications of social, psychological, cultural, biobehavioral, and basic science concepts to patient case scenarios, outpatient clinical experiences and didactic presentations. (Deferred grading only, pending completion of sequence. P/F grading only)—I, II, III, IV, [II, III, IV] Callahan, Edson-Ton, Jerant, Johl, Servis

413. Doctoring 1 (2-2)
Fieldwork—1.2 hours; independent study—1.2 hours; discussion—0.25 hours. Prerequisite: medical clearance for patient contact and consent of instructor. Clinically oriented experiential learning combined with didactic and self-directed research on a selected medical topic. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine as well as in-depth self-directed learning. (H/P/F grading only; deferred grading only pending completion of sequence.)—II, III, [II, III]

421A. Doctoring 2 (6)
Discussion—1 hour; lecture/discussion—1 hour; internship—5 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical students only. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small groups. History, physical examination with preceptors. Didactics in epidemiology, ethics, sexuality and clinical reasoning. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. P/F grading only)—I, IV. Stevenson

421B. Doctoring 2 (6)
Discussion—1 hour; lecture/discussion—1 hour; internship—5 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical students only. Application of multidisciplinary basic, social and clinical science concepts to cases in small groups. History, physical examination with preceptors. Didactics in epidemiology, ethics, sexuality, and clinical reasoning. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. P/F grading only)—I, II. Stevenson

421C. Doctoring 2 (6)
Discussion—1 hour; lecture/discussion—1 hour; internship—5 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical students only. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. P/F grading only)—III, IV. Stevenson

430. Applications of Medical Principles (1)
Discussion—2 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. P/F grading only)—I, II, III, IV. Stevenson

430A. Doctoring 3 (8)
Discussion—3 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical student only. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. H/P/F grading only)—I, IV. Wilkes

430B. Doctoring 3 (8)
Discussion—2 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical student only. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. H/P/F grading only)—I. Wilkes

430C. Doctoring 3 (8)
Discussion—2 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical student only. Application of multidisciplinary basic, social and clinical science concepts to clinical cases in small group discussions facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of clinical medicine. (Deferred grading only, pending completion of sequence. H/P/F grading only)—I, II, Wilkes

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer. 2009-2010 offering in parentheses

basic, social & clinical science concepts to clinical cases in small group discussions facilitated by medical faculty; med students only. Instruction on teaching methodology and pedagogy. Mentored teaching of junior medical students in seminar, lecture, and bedside. (Deferred grading only pending completion of sequence. H/P/F grading only.)(III.) Wilkes

440A-440B-440C. Doctoring 4 Teaching Fellowship (9) Discussion—0.5 hours; seminar—0.25 hours. Prerequisite: courses 430A, B, C, and D; consent of instructor. (H/P/F grading only.)—III. (III.)

III. (III.) Kumari

440D. Doctoring 4 Teaching Fellowship (3) Discussion—1.5 hours; seminar—0.5 hours. Prerequisite: courses 430A, B, C, and D; consent of instructor; medical students only. Instruction on teaching methodology and pedagogy. Mentored teaching of junior medical students in seminar, lecture, and bedside. (Deferred grading only pending completion of sequence. H/P/F grading only.)(III.) Wilkes

441. Combined Ophthalmology and Otolaryngology Clerkship (6) Clinical activity—4 weeks. Prerequisite: approval by Community Program for Promotion and Evaluation. Fundamental knowledge of ophthalmology and otolaryngology for the treatment of eye, ear, nose and throat problems at a level of training of general physicians, including when to refer patients to a specialist. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Brandt, Strong

450. Introduction to UC Davis Medical Center (1) Seminar—20 hours total. Prerequisite: second-year medical student. Designed to assist medical student in transition from classroom to hospital setting. (H/P/F grading only.)—III. (III.)

460. Introduction to Clinical Research (2) Lecture—2 hours; independent study—3 hours. Prerequisite: consent of instructor; completed one of the following degrees: M.D., D.D.S., M.D.M., O.D., N.D., D.O., Pharm.D., D.V.M., Ph.D., or D.N.S. in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program. Practical skills and training to accomplish CRGG mentored research project. (S/U grading only.)—IV. (IV.) Fredrick

461CR. Methods in Clinical Research (3) Lecture—3 hours; discussion—2 hours. Prerequisite: consent of instructor; completed M.D., D.D.S., M.D.M., O.D., Pharm.D., D.V.M., Ph.D., or D.N.S. in nursing; application and acceptance into Clinical Research Graduate Group, K30 program. Overview of major approaches to clinical research, including health services research techniques, informatics, the GCRC, and preclinical methodologies to enhance clinical projects. Overview of UC Davis clinical research curriculum. Methodologies applicable to clinical research and its multi-disciplinary perspective. (S/U grading only.)(IV.) Berglund, Lloyd, Kravitz


480. Insights into Clinical Specialties (1) Lecture/discussion—1 hour. Prerequisite: medical student in good standing. Seminars on research presented by Medical School faculty, overview of pertinent issues, including medical ethics, human subjects protocols, case control methods, etc. (P/F grading only.)—III. (III.) Kumari

481. Experiences, all occurring in other nations, students will research how health care systems address critical health issues. In 2007, Chronic Disease is the focal issue. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Kumari

497. Scholarly Project (6) Seminar—25 hours; independent study—50 hours. Prerequisite: consent of instructor; project proposal must be accepted by Adcom. Project Executive Committee (SPEC), fourth-year medical school students only. Student develops a research project on a focused topic area, implements the research, writes a publishable paper, and presents an oral summary of the project. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—I, II, IV. (I, II, IV.) Schreiber

499. Research in Medical Education and Curriculum Development (4-9) Independent study—10-36 hours. Prerequisite: medical student in good standing and competency with computers. Research and development of an independent project related to expanding computer assisted resources in support of the MD curriculum at UC Davis. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Kumari

Departmental Courses:

Anesthesiology and Pain Medicine (ANE)

Upper Division Course

462. Anesthesiology Clinical Clerkship (3-18) Full-time clinical activity (3 full days per week. Prerequisite: medical student. Indepth exposure to anesthesiology through informal lectures and mentoring by anesthesiologists. Emphasis on understanding and applying anesthesiologist in patients, serving as an assistant. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV.) Rivers

463. Anesthesiology (3) Clinical activity—full time. Prerequisite: medical student (gained toward second and third-year students). Exposure to anesthesiology through combination of informal lectures and mentoring by anesthesiologists. Anesthesiology programs, pharmacology, and basic anesthesiological principles. (P/F grading only.)—I, II, (I, II) Kantor
463. Multidisciplinary Pain Management (6)
Clinical Activity—30 hours; lecture/discussion—10 hours. Prerequisite: senior medical student in good standing. Senior clerkship to expose students to all facets of treating pain in all aspects of clinical care: outpatient and inpatient settings, acute and chronic pain, end of life issues, pediatrics, rehabilitation, etc. Daily clinics, rounds, and lectures. (H/P/F grading only)—I, II, III, IV (I, II, III, IV) Gallicia

481. Brief Introduction to Clinical Anesthesiology and Chronic Pain Management (3)
Clinical activity—25-30 hours (two weeks). Prerequisite: second-year medical student. Daily experience in clinical anesthesiology at the preoperative screening unit, operating room, post anesthesia care unit, chronic pain management clinic with daily clinical correlation case discussions, and one-on-one interaction with faculty anesthesiologists. (H/P/F grading only)—II. (III) Fishman

493A. Applied Physiology and Pharmacology (6)
Lecture—5 hours; lecture/laboratory—10 hours; laboratory—16 hours; clinical activity—4 hours. Prerequisite: consent of instructor; UC Davis School of Medicine students only. This course will review and demonstrate the application of basic physiology and pharmacology to patient care. There will be an in-depth analysis of the physiology and pharmacology of the cardiovascular, pulmonary, nervous, renal and endocrine systems. Limited enrollment. (H/P/F grading only)—II, III, IV (II) Fishman

493B. Intermediate Physiology in Pain Care (6)
Lecture—5 hours; lecture/laboratory—10 hours; laboratory—16 hours; clinical activity—4 hours. Prerequisite: consent of instructor; UC Davis School of Medicine students only. This course will integrate applied and practical neuroanatomy, physiology, pharmacology, psychology/psychiatry and social medicine in the care of patients who are receiving care for pain caused by acute or chronic medical disease or trauma. Limited enrollment. (H/P/F grading only)—III. (III) Fishman

498. Individual Group Study (1-5)
Discussion—1-5 hours; laboratory—2-10 hours. Prerequisite: interns and residents with consent of instructor. Directed reading and discussion and/or laboratory investigation on selected topics. (H/P/F grading only)—II, III, IV (II, III, IV) Antognini

499. Anesthesiology Research (4-8)
Laboratory—12-54 hours. Prerequisite: third- or fourth-year medical students, advanced standing undergraduate and veterinary medicine students; or consent of instructor. Problems in clinical and/or laboratory research. (H/F grading only for medical students.)—I, II, III, IV (I, II, III, IV) Antognini

Biological Chemistry (BCM)
Lower Division Course
192. Internship in Biological Chemistry (1-12)
Internship—3-36 hours; final report. Prerequisite: consent of instructor. Supervised work experience in biological chemistry and related fields. (P/NP grading only)

Upper Division Courses
192. Internship in Biological Chemistry (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project prior to internship by preceptor. Supervised work experience in Biological Chemistry and related fields. (P/NP grading only)

198. Group Study (1-5)
Prerequisite: consent of instructor. For undergraduate students desiring to explore particular topics in depth. Lectures and conferences may be involved. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

Graduate Courses
209. Prostaglandins/Leukotrienes and Related Lipids (2)
Lecture—2 hours. Prerequisite: Biochemistry 101A-101B or Physiological Sciences 101A-101B or Physiology 100A-100B. Oxidative deactivation/elongation of polyunsaturated fatty acids. Biosynthesis of prostaglandins/leukotrienes from polyunsaturated fatty acids. Chemistry, biochemistry, and metabolism. Nutritional, clinical, and pathophysiological implications; pharmacological and clinical relevance. Offered in alternate years.—(II) Ziboh

214. Molecular Medicine (1)
Discussion—1 hour. Prerequisite: course in molecular genetics, molecular and cellular biology, biochemistry or the equivalent. Series of lectures on current topics of molecular genetics related to medicine. Material stresses concepts derived from genetic research which have some potential clinical relevance. (Same course as course 414.) (S/U grading only)—II. (III) Seldin

217. Molecular Genetics of Fungi (3)
Lecture—3 hours. Prerequisite: graduate standing in a biological science; Biochemistry 101B; Genetics 100, 102A; Botany 119; Plant Pathology 130, 215X; Microbiology 215 recommended. Advanced treatment of molecular biology and genetics of filamentous fungi and yeasts, including gene structure, organization and regulation; secretion; control of reproduction; molecular evolution; transformation; and gene manipulation in eukaryotes. (Same course as course Pathology 217.)—II, III, Tyler

222. Mechanisms of Translational Control (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: Biochemistry 201C or consent of instructor. Molecular mechanisms of protein synthesis and translational control in eukaryotic cells, with emphasis on mammalian cells and their viruses. An advanced graduate-level treatment of topics of current interest, with readings and discussion of primary papers from the literature. Offered in alternate years.—II. Hershey

230. Practical NMR Spectroscopy and Imaging
Lecture—1 hour. Prerequisite: Chemistry 107A-107B, Physics 5A-5B or 9A-9B, or consent of instructor. Basic theory, experimental methods, and instrumentation of NMR. Emphasis on experiments to understand NMR spectroscopy and imaging experiments. (S/U grading only)—II. (II) Jue

231. Biological Nuclear Magnetic Resonance (3)
Lecture—2 hours. Prerequisite: Molecular and Cellular Biology 221A or the equivalent or consent of instructor. Principles and applications of magnetic resonance in biomedicine. Fundamental concepts and the biophysical basis for magnetic resonance applications in areas of tissue characterization/imaging, metabolic regulation, and cellular bioenergetics. (Same course as Biophysics 231.)—II, III, Jue

291. Seminar in Genetic Approaches to Pathogenesis of Human Disease (1)
Seminar—1 hour. Prerequisite: student in Genetics Graduate Group of consent of instructor. Current genetic approaches to understanding the pathogenesis of disease and mammalian development are presented and critically discussed by faculty, fellows and students. Topics include Mendelian and non-Mendelian diseases, imprinting, homologous recombination, statistical methods, genetic epidemiology and cell cycle dependent expression. (Same course as course 291B.) (H/P/F grading only)—I, II, III, IV (I, II, III, IV)

497T. Tutoring in Biological Chemistry (1-5)
Tutoring—3-15 hours. Prerequisite: advanced standing or consent of instructor. Assistant instructor by tutorial medical students in preparation for one of the departmental courses that is a component of the required curriculum of the School of Medicine. (H/P/F grading only)

498. Group Study (1-5)
Prerequisite: medical students with consent of instructor. (P/NP grading only)

499. Research (1-12)
Prerequisite: medical students with consent of instructor. (P/NP grading only)

405. Metabolism, Endocrinology, Reproduction and Nutrition (9.5)
Lecture—3.8 hours; discussion/laboratory—2.8 hours. Prerequisite: consent of instructor; medical students only. Basic and pathophysiologic processes involved in human metabolic and nutritional regulation and in reproductive and endocrine control systems across the lifespan. Integrate information across these systems and use clinical reasoning process to identify and understand relevant perturbations and diseases. (S/U grading only) 1, II, III, IV (I, II, III, IV) Kulkarni-Dote, Sweeney, Turner, Turgeon

410A. Biochemistry and Molecular Biology (3.5)
Lecture—3 hours. Prerequisite: approval of the Committee on Student Progress. Introduction to the transport of small molecules and ions across membranes followed by study of energy metabolism and biosynthetic processes in humans. Membrane receptors are considered as they regulate to basic metabolic processes. Correlations to human disease. (P/F grading only)—II. Jue, Tray

414. Molecular Medicine (1)
Discussion—1 hour. Prerequisite: course in molecular genetics, molecular and cellular biology, biochemistry or the equivalent. Series of lectures on current topics of molecular genetics related to medicine. Material stresses concepts derived from genetic research which have some potential clinical relevance. (Same course as course 214.) (H/P/F grading only)—II, III, IV, (I, II, IV) Hageman, Voss

410B. Cell Biology and Metabolism (3)
Lecture—3 hours. Prerequisite: approval of the Committee on Student Progress. Introduction to the transport of small molecules and ions across membranes followed by study of energy metabolism and biosynthetic processes in humans. Membrane receptors are considered as they regulate to basic metabolic processes. Correlations to human disease. (P/F grading only)—II. Jue, Tray

421. Biological Nuclear Magnetic Resonance (3)
Lecture—2 hours. Prerequisite: Molecular and Cellular Biology 221A or the equivalent or consent of instructor. Principles and applications of magnetic resonance in biomedicine. Fundamental concepts and the biophysical basis for magnetic resonance applications in areas of tissue characterization/imaging, metabolic regulation, and cellular bioenergetics. (Same course as Biophysics 231.)—III. Jue

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer, 2009-2010 offering in parentheses.

General Education (GE) credit: ArtHum—Arts and Humanities, ScLSci—Science and Engineering, SocSci—Social Sciences, Div—Social-Cultural Diversity, Wrt—Writing Experience
Courses in Cell Biology and Human Anatomy (CHA)

Upper Division Courses

101. Human Gross Anatomy (4)
Lecture—4 hours. Prerequisite: Biological Sciences 18; concurrent enrollment in course 101L strongly recommended. A detailed study of the gross anatomical structure of the human body, with emphasis on function and clinical relevance to students entering health care professions. GE credit: SciEng.—II. (Ill.) Gross

101L. Human Gross Anatomy (3)
Laboratory—6 hours; lecture/discussion—3 hours. Prerequisite: course 101 (may be taken concurrently); consent of instructor. A detailed study of dissected human cadavers in small group format with extensive hands-on experience. GE credit with concurrent enrollment in 101L.—Wrt.—II. (Ill.) Gross

192. Internship in Morphology (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; laboratory science experience including some chemistry; approval of project by preceptor prior to period of internship. Experience of supervised internship in research laboratories of members of the department. [P/NP grading only.]—I, II, III. (I, II, III.)

197T. Tutoring in Cell Biology and Human Anatomy (1-5)
Discussion—1 hour; laboratory—6-9 hours. Prerequisite: consent of instructor. Directed reading, discussion, and/or laboratory experience under the supervision of the instructor. [S/U grading only.]—I, II, III, IV. (I, II, III, IV.)

198. Directed Group Study (1-5)
Discussion—1-10 hours. Prerequisite: consent of instructor. Directed reading, discussion, and/or laboratory experience on selected topics. [P/NP grading only.]—I, II, III, IV. (I, II, III, IV.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. [P/NP grading only.]—I, II, III, IV. (I, II, III, IV.)

Graduate Courses

200. Graduate Human Gross Anatomy (6)
Lecture—4 hours; laboratory—6 hours. Prerequisite: consent of instructor. Lectures on human gross anatomy and cadaver dissection laboratory. Topics arranged by region; emphasis on osteology, neuroanatomy, cardiovascular anatomy, gastrointestinal anatomy and anatomy of reproductive systems. Only two units of credit for students who have completed course 101. Open only to full-time graduate students. —II. (Ill) Gross, Tucker

202. Human Microscopic Anatomy (5)
Lecture—3 hours; laboratory—6 hours. Examines the normal microscopic structure of the basic cells, tissues, and organs of the body. Lectures emphasize morphology and structure-function relationships. Accompanying laboratories involve analysis and identification of sectional material at the light microscopic and ultrastructural levels.—II. (Ill) Primakoff

203. Neurobiology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: two upper division or one graduate course in Neurobiology, consent of instructor. Physiology and anatomy of the normal human nervous system in an integrated format.—III. (Ill) Kumari

290. Seminar (1)
Seminar—1 hour. Prerequisite: consent of instructor. [S/U grading only.]—I, II, III, IV. (I, II, III, IV.)

290C. Research Group Conference (1)
Discussion—1 hour. Prerequisite: graduate student with research experience (may be taken concurrently); consent of instructor. Discussion of problems, progress, and literature relevant to current research undertaken by laboratory groups in Human Anatomy. [S/U grading only.]—I, II, III, IV. (I, II, III, IV.)

292. Fertilization and Gamete Literature Critique (1)
Discussion—1 hour. Prerequisite: consent of instructor. Critical evaluation of current journal articles dealing with cell biology and biochemistry of gametes and fertilization. Selected papers will be presented and discussed in the context of students and faculty. May be repeated for credit. [S/U grading only.]—I, III, (I, III.) Meizel

298. Advanced Group Study (1-5)
Prerequisite: consent of instructor. [S/U grading only.]—I, II, III, IV. (I, II, III, IV.)

Professional Courses

400. Developmental, Gross, and Radiologic Anatomy (7.5)
Lecture—3 hours; laboratory—5 hours. Prerequisite: consent of Committee on Educational Progress. Medical Students only. Gross and radiologic anatomy of the normal human nervous system in an integrated format.—III. (III.) Kumari

402. Cell and Tissue Biology (4.5)
Lecture—2 hours; laboratory—4 hours. Prerequisite: approval of the Committee on Educational Progress. Medical Students only. Microscopic structure of the basic cells, tissues and organs of the body with an emphasis on how structure explains function. Analysis and identification of sectioned material at the light microscopic and ultrastructural levels. (Deferred grading only, pending completion of sequence.) [P/F grading only.]—I, IV, (I, IV) Tucker

403. Medical Neuroanatomy (5)
Lecture—3 hours; laboratory—1 hour; discussion/ laboratory—1 hour. Prerequisite: successful completion of course 400, block 1; restricted to medical students only. Anatomy of the normal human nervous system, to include gross external and internal morphology of brain and spinal cord, and function neuroanatomy of motor, sensory and cognitive systems. Incorporates application of neuroanatomy to clinical problem solving. (Same course as Human Physiology 403.) [P/F grading only.]—IV. (IV) Kumari

493. Clinically-Oriented Anatomy (6)
Lecture—5 hours; laboratory—10 hours; laboratory—16 hours; clinical activity—4 hours. Prerequisite: consent of instructor; UC Davis School of Medicine students only. This course will review aspects of the anatomy of the head and neck, thoracic cavity, abdomen, pelvis, extremities, vascular system, peripheral and central nervous system. The focus will be the understanding of anatomy related to common surgical procedures. Limited enrollment. (Same course as Surgery 493) [H/P/F grading only.]—I, II, III, IV. (I, II, III, IV) Knowlton, Robbins, Stevenson

493B. Anatomy: Medical Education Special Study Module (6)
Seminar—10 hours; clinical activity—14 hours; autotutorial—6 hours; independent study—10 hours. Prerequisite: consent of instructor; UC Davis School of Medicine students only. Attend all of the lectures and laboratory sessions for courses 400 and 402 during the four-week session (approximately seven anatomy labs and two histology labs); tutor-first year students during the laboratory sessions; prepare and present a clinical correlate session. [H/P/F grading only.]—I, II, III, IV, (I, II, III, IV) Beck, Gross, Fitzgibbon, Tucker

497T. Tutoring in Human Anatomy (1-5)
Tutoring—3-15 hours. Prerequisite: advanced standing or consent of instructor. Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum for the School of Medicine. [H/P/F grading only.]—I, II, III, IV. (I, II, III, IV)

298. Advanced Group Study (1-12)
Prerequisite: medical students, interns, and residents with consent of instructor. Directed reading and group discussion and/or laboratory experience on selected topics. [H/P/F grading only.]

499. Research (1-12)
Prerequisite: consent of instructor. [H/P/F grading only.]

Clinical Psychology (CPS)

Graduate Course

299. Research (1-12)
Prerequisite: graduate student in Clinical Psychology or consent of instructor. Directed reading and group research on selected topics. [S/U grading only.]—Morrison

Clinical Research (CHL)

Graduate Courses

220. Basics of Stem and Progenitor Cells (1)
Lecture—1 hour. Prerequisite: Molecular, Cellular, and Integrative Physiology 200, 201; consent of instructor; graduate standing. This is a lecture course designed for graduate students who have experience in cell culture techniques. It is designed to give a broad overview of the field and current topics of interest to the greater research community. [S/U grading only.]—III. (III) Takahashi

222. Ethical Issues in Stem Cell Biology (1)
Lecture/discussion—1 hour. Prerequisite: consent of instructor; graduate standing. Critical presentation and analysis of recent articles in stem cell biology and small group discussions of the ethical issues surrounding this area of research. [S/U grading only.]—II. (II) Takahashi

230. Congestive Heart Failure, Mechanism of Disease (3)
Lecture/discussion—2 hours; project. Prerequisite: consent of instructor; graduate standing. Underlying mechanisms of cardiac remodeling and heart failure. Presentation of fundamental knowledge of and recent basic research on heart failure. Student team projects: investigation and presentation of a research topic and bench research project to advance research in the same area. [S/U grading only.]—II. (II) Knowlton

240. Predoctoral Clinical Research Training Program Research Integration (1)
Seminar—0.2 hours; discussion—0.5 hours. Prerequisite: consent of instructor and enrollment in the Pre-doctoral Clinical Research Training Program in the CTSC, School of Medicine. Alternating sessions: journal club, seminar/discussion, and research integration sessions. May be repeated three times for credit. [S/U grading only.]—I, II, III, IV. (I, II, III, IV) Berghold

250. Integrating Medicine Into Basic Science (6)
Lecture—3.75 hours; discussion—6 hours; seminar—2.5 hours; clinical—8 hours. Prerequisite: consent of instructor; graduate standing; acceptance into HHMI Integrating Medicine into Basic Science program. Four-week summer institute consisting of didactic lectures, reading assignments, group discussions, and clinical rotations to acculturate students to the human medical environment; integrate medical principles, physiology and pathophysiology into basic research; introduce high impact clinical studies related to medicine and health. [S/U grading only.]—IV. (IV) Knowlton, Robbins, Stevenson

290A. Hot Topics in Clinical Research (1)
Seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Seminars presented by guest lecturers on subjects of their own research activities. May be repeated for credit. [S/U grading only.]—I, II, III, IV. (I, II, III, IV)

290B. Hot Topics in Stem Cell Biology (1)
Seminar—1 hour. Prerequisite: graduate standing. Seminars presented by guest lecturers on subjects of their own research. [S/U grading only.]—I, II, III, IV. (I, II, III, IV)

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer; 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Social-Cultural Diversity; Wrt—Writing Experience
290C. Literature in Stem Cell Biology (1) Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Critical presentation and analysis of recent journal articles in stem cell biology by students. May be repeated for credit. (S/U grading only)—I, II, III, (I, II, III) Tarantal

299. Research in Cutaneous Biology (1-12) Laboratory—3-36 hours. Prerequisite: consent of instructor. Research, either laboratory or clinical, on ongoing projects at the department under supervision of faculty. (P/NP grading only)

301. Perspectives in Community Health (3) Lecture—3 hours. Prerequisite: undergraduate standing. Covers comprehensively the responsibilities, obligations, roles and professional activities of various health care disciplines in the community; provides students with perspectives on preventive medicine in society. (S/U grading only)

160. General Health Education and Prevention (1-5) Prerequisite: consent of instructor. Restricted to students in the internship program for the Health Education Program. Topics include prevention, substance abuse/prevention, nutrition, stress management, physical fitness, body image, reproductive anatomy & physiology, contraceptive options, safer sex, sexual health, healthy relations, and general wellness/health promotion topics. Practice in peer counseling and outreach presentations. Limited enrollment. (P/NP grading only)—I (I) Lake, Ferguson

161. Campus Alcohol/Drug Abuse Prevention Program Peer Educator Training (4) Lecture/discussion—3 hours; practice—1 hour. Prerequisite: course 160 (may be taken concurrently). Preparation for internship in campus and community substance abuse prevention and educational intervention. Additional topics include harm-reduction strategies for individuals and target populations. High risk behaviors. Practice in peer counseling skills and outreach presentations to small and large groups. (P/NP grading only)

162. Health Advocates Peer Educator Training (4) Lecture/discussion—3 hours; practice—1 hour. Prerequisite: course 160 (may be taken concurrently). Preparation for internship in campus and community health promotion and risk reduction. Nutrition, stress management, physical fitness, body image and disordered eating, skin cancer prevention, and other general wellness/health promotion topics. (P/NP grading only)—III (III) Belden, Gruhn

175W. Health Policy and Health Politics (4) Seminar—3 hours; extensive writing or discussion—1 hour. Following the model of a Congressional subcommittee, identifies issues in a salient health policy area; issues for study, research, and development of model policies to address them. (Same course as UC Davis Washington Center 175.) Ge credit: SocSci. (Wrt—III) Wintemute

190C. Research Conference in Community and International Health (1) Discussion—1 hour. Prerequisite: consent of instructor. Weekly conference on research problems, progress, and techniques in Community and International Health. Critical discussion of recent journal articles. May be repeated for credit. (P/NP grading only)—I, III, (I, II, III) Gold

222. Social and Behavioral Aspects of Public Health (3) Lecture/discussion—3 hours. Prerequisite: Statistics 102 and 106 or the equivalent, graduate standing, consent of instructor. Concepts and methods of the social and behavioral sciences relevant to the identification and solution of public health problems. Topics include nutrition, physical activity, smoking, socioeconomic status, gender, race/ethnicity, stress, social support, social marketing, media advocacy and behavioral theories of change—II Cassidy

244. Introduction to Medical Statistics (4) Lecture—6 hours, laboratory/discussion—3 hours. Introduction to statistical methods and software in clinical, laboratory and population medicine. Graphical and tabular presentation of data, probability, binomial, Poisson, normal, t, F, and Chi-square distributions, elementary hypothesis testing, simple linear regression and correlation, life tables. Only one unit of credit for students who have completed Statistics 100 or Preventive Veterinary Medicine 402, 403 (IV grading only)

245. Statistical Analysis of Laboratory Data (4) Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: course 244 or equivalent; consent of instructor. The analysis of data and design and interpretation of experiments for laboratory data with an emphasis on gene expression arrays and other high-throughput biological assay technologies. For students in the K30 training program in the School of Medicine. Additional class capacity will be available for students in other programs, but it is essential that the K30 students be accommodated first. (I) Rocke

246. Biostatistics for Clinical Research (4) Lecture—3 hours, laboratory/discussion—1 hour. Prerequisite: courses 244 and 245. Emphasizes critical biostatistics for clinical research and target biomedicine audience. Students will develop understanding for basic planning and analysis of clinical studies and learn to develop collaborations with biostatisticians—II (II) Oj

247. Biostatistics for Epidemiology (4) Lecture—3 hours, laboratory/discussion—1 hour. Prerequisite: course 244. Introduction to the principles and methods of statistical inference for categorical data and survival data in epidemiological studies. The major topics include contingency table methods, logistic regression, Kaplan-Meier and log rank methods, and Cox regression. (III) Kim

255. Human Reproductive Epidemiology (3) Lecture—3 hours. Prerequisite: Preventive Veterinary Medicine 405, 406, Physics 220, Physiology 222 or equivalents, or consent of instructor. Human reproductive effects and risk of reproductive disorders, examined from macro- and micro-environmental exposures in community and occupational settings. Topics may include dose-response relationships, epidemiologic study designs, exposure assessment, and statistical analysis. Offered in alternate years—(I) Hertz-Picciotto
262. Principles of Environmental Health Science (3)
Lecture—3 hours. Prerequisite: consent of instructor. Principles, approaches and issues related to environmental health. Recognizing, assessing, understanding and controlling the impact of people on their environment and the impact of the environment on the public. —I. (F) Bennett

273. Health Services Administration (3)
Lecture—3 hours. Prerequisite: consent of instructor. Structure and function of public and private medical care systems. Topics include categories and trends in national medical spending, predictors of patient use, causes of death, managed care, HMOs, Medicare, Medicaid, costs of technology, and medical care in other countries. —II, (II, IV) Leistikow, Kass, McCurdy, Schenker

290. Topics in Public Health (1)
Seminar—1.5 hours. Prerequisite: open to students in Master of Public Health program or consent of instructor. Seminar on key issues and current topics in public health. Course begins in August S81. Students must enroll in August, then Fall and Winter. The course is a series but grades and units are given at end of each quarter. May be repeated for credit. (S, U) —I, II, III, IV. (I, II, III, IV) Leistikow, Kass, McCurdy, Schenker

295. International Health (1)
Lecture/discussion—1 hour. Prerequisite: graduate standing. Forum for learning health issues and health care systems and the insurmountable. Topics include health care for refugees, the impact of political strife on health, the health care professional in international settings. Evening seminars begin in Fall quarter and continue through Spring quarter. (Deferred grading only, pending completion of sequence. S/U grading only.) —I. (I) Schenker

297. Public Health Practicum (1-16)
Fieldwork—3-32 hours. Open only to Master of Public Health students. Practical fieldwork experience in public health. Placement site will vary based on the interest and experience of each student. May be repeated four times up to 16 units of credit. (S/U grading only.) —I, II, III, IV. (I, II, III, IV) McCurdy

298. Study in Community and International Health (1-5)
Prerequisite: graduate student in good academic standing and consent of instructor. Study and experience for graduate students in any number of areas in community and international health. (S/U grading only.)

299. Research in Community and International Health (1-12)
Prerequisite: graduate standing; consent of instructor. Student will work with faculty member in areas of research interest, including but not limited to injury control, international health, health policy, occupational and environmental health, health promotion and wellness, women’s health, and health demographics. (S/U grading only for graduate students.)

Professional Courses

402. Introductory Medical Spanish (3)
Lecture—2 hours. Prerequisite: medical student or consent of instructor. The vocabulary needed to conduct a basic history and physical examination in Spanish. (H/P/F grading only.) —III. (III) Meizel

455. Multidisciplinary Clinical Preceptorship (4.5)
Clinical activity—full time (3 weeks). Prerequisite: second-year student in good academic standing. Students will be introduced to basic principals of geriatric health care and provided with opportunities for clinical observation and experience in a variety of facilities that serve older adults. Multidisciplinary nature of geriatrics will be emphasized. (H/P/F grading only.) —IV. (IV)

461. Clerkship in Community Health Group Practice (0-9)
Clinical activity—full time (2-6 weeks). Prerequisite: third or fourth-year medical student. Overview of local community health in group practice situations. Students participate in treatment at several clinic sites in Yolo County. Topics include primary care, environment, and child health, fall health, and preventive health care for the aged. (H/P/F grading only.) —I, II, III, IV. (I, II, III, IV)

465. Community Health Preceptorship (3-18)
Clinical activity—full time (2-12 weeks). Prerequisite: fourth-year medical student. Students participate at the California Department of Health Services in ongoing investigations into current public health problems, e.g., birth defects, cancer control, diabetes, hypertension, injury control, infectious diseases, aging, Alzheimer’s disease, and smoking and tobacco use control. (H/P/F grading only.) —I, II, III, IV. (I, II, III, IV)

466. Occupational and Environmental Medicine Elective (6-12)
Clinical and laboratory experience—full time (4 to 8 weeks). Prerequisite: fourth-year medical student and consent of instructor. Participate in activities of Occupational and Environmental Health Unit. Major activity is involvement in an epidemiologic research project of the University. Also participate in Ambulatory Occupational and Environmental Medicine Clinic at UC Davis Medical Center. (H/P/F grading only.) —I, II, III, IV. (I, II, III, IV) Schenker

470. Clinical Selective in Occupational and Environmental Medicine (1-9)
Clinical activity—9-18 hours. Prerequisite: fourth-year medical student in good academic standing, consent of instructor. Outpatient clinical experience in Occupational and Environmental Medicine at UCDCMC and in local industries. Participants will gain experience in evaluating occ/env medical conditions, use of medical literature resources, the worker’s compensation, occupational and toxicological principles. Students may take up to four weeks for six units. Limited enrollment. (H/P/F grading only.) —I, II, III, IV. (I, II, III, IV) McCurdy

471. Health Issues Confronting Asian Americans and Pacific Islanders (4)

481. Insights in Occupational and Environmental Medicine (1-3)
Clinical activity—3-9 hours. Prerequisite: first- or second-year medical student in good academic standing; consent of instructor. To participate in research and clinical activities in occupational and environmental medicine which include conferences, occupational and environmental medicine clinical activities, and seminars. Students develop and present small individual research projects. (Former course Occupational and Environmental Health 480.) (H/P/F grading only.) —I, II, III, IV. (I, II, III, IV) Schenker

495. International Health (1)
Lecture/discussion—1 hour. Prerequisite: medical student in good standing. Forum for learning health issues and health care systems in other countries. Topics include categories and trends in national medical spending, predictors of patient use, causes of death, managed care, HMOs, Medicare, Medicaid, costs of technology, and medical care in other countries. —II, (II, III, IV) McCurdy

496. Current Issues in Public Health (1)
Lecture/discussion—1 hour. Topics in public health issues. Speakers from the local public health community address issues such as disease control programs, access that are expanded up to three times for credit. (P/NP grading only.) —I, II, (II, III, IV) Schenker

498. Study in Community and International Health (1-6)
Prerequisite: medical student in good standing and consent of instructor. Study and experience for medical students in areas in community and international health. May be repeated for credit. (H/P/F grading only.)

499. Research in Community and International Health (1-9)
Prerequisite: medical student with consent of instructor. Students will work with faculty member in areas of research interest, including but not limited to injury control, international health, health policy, occupational and environmental health, health promotion and wellness, women’s health, and health demographics. (H/P/F grading only.)

Family and Community Medicine (FAP)

Lower Division Courses

92C. Primary Care Clinics (2)
Clinical activity—6-8 hours; seminar—2 hours; lecture—1-2 hours. Prerequisite: consent of instructor, enrollment at the UC Davis campus, for freshman and sophomore students. Students must apply and interview with the Board of Clinica Tepali or Imani Clinic. Field experience exposes lower division students to health care delivery, patient histories, physical examinations of episodic, acute and chronic illnesses, appropriate referral and follow-up. May be repeated for credit. (P/NP grading only.) —I, II, III, IV. (I, II, III, IV) Hitzeman, Smith

Upper Division Courses

92C. Primary Care Clinics (1-2)
Clinical activity—6-8 hours; seminar—2 hours; lecture—1-2 hours. Prerequisite: consent of instructor, enrollment at the UC Davis campus, upper-division standing. Students must apply and interview with the Board of Clinica Tepali or Imani Clinic. Field experience introduces students to health care delivery, patient histories and physical examinations, health promotions and disease prevention, diagnosis and treatment of episodic, acute and chronic illness, basic laboratory testing and appropriate referral and follow-up. May be repeated for credit. (P/NP grading only.) —I, II, III, IV. (I, II, III, IV) Hitzeman

195. Health Care to Underserved Populations (1)
Lecture—1 hour. Prerequisite: sociology, political science, or applied behavioral science background recommended, or registration in medical school. Discusses sociocultural perspectives of underserved populations in California impacting their health; roles of family/interpersonal relationships in making health care decisions; and clinician’s perspectives in treating people of cultures who are unfamiliar and/or uncomfortable with Western medicine. (P/NP grading only.) —II. (II) Nesbitt

Graduate Courses

The following courses are for students enrolled in the Family Nurse Practitioner/Physician Assistant (FNP/PA) program.

240A-240B-240C-240D-240E-240F. Clinical Preceptorship (1-13)
Clinical activity—9-36 hours. Prerequisite: enrollment in the Master’s Track of the FNP Certificate Program, and successful completion of each preceding 240A-F section. Diagnosis and treatment of patients of all ages in an ambulatory care setting, under the supervision of a preceptor. May be repeated twice for credit. (P/NP grading only.) —I, II, III, IV. (I, II, III, IV) Davermot

242A-242B. Clinical Role Seminar (1.5-1.5)
Seminar—1.5 hours. Prerequisite: course 240 concurrently and student in the Master’s Track of the FNP certificate program. Accompanies course 240 and provides a small group forum for students to explore role development and clinical management issues based on nursing theories and research. (Deferred grading only, pending completion of sequence.) —I, II, III, IV. (I, II, III, IV) Kourtes

252A. Professional Role Development (1.5)
Lecture/discussion—1.5 hours. Prerequisite: enrollment in the Master’s Track of the FNP Certificate Program. Provides opportunity to discover strategies for promoting role development and role satisfaction via
discussion of pertinent issues, theory, and research. [Deferred grading only, pending completion of sequence.]

252B. Nurse Practitioner as Leader (1.5)
Lecture/discussion—1.5 hours. Prerequisite: course 252A and concurrent enrollment in the Master’s Track of the FNP Certificate Program. Study of advanced practice of collaborative leadership. Overview of legal and regulatory issues, certification and malpractice liability issues. Includes critical analysis of theories, issues and research related to nurse practitioner role development and legal considerations through community involvement. [Deferred grading only, pending completion of sequence.]

264. Psychosocial Concepts and Issues in Primary Care (2)
Lecture/discussion—2 hours. Prerequisite: B.S. degree in nursing and enrollment in the Master’s Track of the FNP Certificate Program. Introduces the principles of effective communication in establishing the therapeutic provider-patient relationship. Provides an examination of relevant psychosocial concepts and issues related to primary care. Research and theory is emphasized. [I, II, III, IV] Hass

266A. Health Maintenance/Prevention (2)
Lecture—2 hours. Prerequisite: B.S. degree in nursing and enrollment in the Master’s Track of the FNP Certificate Program. Focuses on the health and wellness of the individual throughout the lifespan. Critical analyses of nursing interventions in health promotion and maintenance based on nursing and other theoretical frameworks and research data are emphasized. [I] DeAmicis

266B. Family Nursing Theory (1)
Lecture—1 hour. Prerequisite: enrolled in master’s track of the FNP Certificate Program or consent of instructor. Exploration of family theories as related to advanced primary care nursing practices. [I, II, III] Stewart

266C. Family Nursing Interventions (2)
Lecture—2 hours. Prerequisite: course 266B and enrollment in the Master’s Track of the FNP Certificate Program. Course integrates family theoretical and therapeutic concepts to focus on nursing assessment and intervention strategies for family problems in health and illness. [I, II, III] Stewart

266D. Community Assessment and Intervention (1)
Lecture—1 hour. Prerequisite: enrollment in the Master’s Track of the FNP Certificate Program. The relationship between advanced primary care nursing practice and community is explored. Community assessment and intervention strategies appropriate for the family nurse practitioner are discussed. May be repeated twice for credit. [II] Stewart

Professional Courses
The following courses are for students enrolled in the Family Nurse Practitioner/Physician Assistant (FNP/PA) Program.

300. Health Assessment for Advanced Practice (4.5)
Lecture/discussion—4.5 hours. Prerequisite: enrolled in the FNP/PA Certificate Program, or consent of instructor. Assessment of normal and abnormal health and physical assessment essential to the clinical decision making and caring process for the FNP/PA or advanced practice nurse. Emphasis on eliciting an accurate and thorough health history and performing the physical examination. [I, II, III, IV] Stewart

331A. Scientific Basis of Diseases—A (4)
Independent study—3 hours; lecture/discussion—1 hour. Prerequisite: registered student in the FNP/PA Certificate Program, or consent of instructor. Anatomy, physiology and concepts of pathophysiology. [I, II, III, IV] DeAmicis

331B. Scientific Basis of Diseases—B (1)
Independent study—0.5 hours; lecture/discussion—0.5 hours. Prerequisite: course 231A, registered student in the FNP/PA Certificate Program or consent of instructor. Neurological and renal diseases and abnormalities of adrenal function. Builds on concepts covered in prior coursework. Web-enhanced course. [I, II, III, IV] DeAmicis

340. Clinical Preceptorship for FNP/PA Students (19)
Clinical activity—13 hours. Prerequisite: student in the Family Nurse Practitioner/Physician Assistant Program. Hands-on experience including supervised patient care, development of clinical skills, assessment and management of patients in the medical ambulatory care setting. May be repeated twice for credit. [Deferred grading only, pending completion of sequence.]

341. Advanced Clinical Preceptorship for FNP/PA Students (26)
Clinical activity—26 hours. Prerequisite: registered students in the Family Nurse Practitioner/Physician Assistant Program, course 340. Development of skills learned in course 340 through an approved clinical preceptorship. May be repeated twice for credit. [Deferred grading only, pending completion of sequence.]

344. Inpatient Surgical Experience for FNP/PA Students (3)
Clinical activity—9 hours. Prerequisite: Registration in the FNP/PA program. Course 340, 240A, 240B, 240C, 354A, 354B, 354C, or consent of instructor. Student clerkships in the inpatient setting at UC Davis Medical Center and/or affiliated institutions. Designed to expose the students to inpatient management of surgical patients; acquisition of FNP/PA role in surgical settings. May be repeated twice for credit. [Deferred grading only, pending completion of sequence.]

346. Clinical Geriatrics (3)
Clinical activity—90 hours. Prerequisite: registered student in the FNP/PA program and successful completion of course 340A:340B-340C and 354A:354B-354C and 365A:365B-365C or consent of instructor. Application of principles of geriatric care in the outpatient, nursing home, acute hospitals and community settings that provide services for the elderly, including visits to patients’ homes. [Deferred grading only, Deferred grading only, pending completion of sequence.]

347. Inpatient Medical Experience for FNP/PA Students (4)
Clinical activity—80 hours. Prerequisite Registration in the FNP/PA program. Course 340, 240A, 240B, 240C, 354A, 354B, 354C, or consent of instructor. Student clerkships in the inpatient setting in Family Practice at UC Davis Medical Center and/or affiliated institutions. Designed to expose the students to inpatient management; acquisition of FNP/PA role in the inpatient setting. May be repeated twice for credit. [Deferred grading only, pending completion of sequence.]

350. Ethics and Trends in Health Care for FNP/PA Students (2)
Lecture/discussion—2 hours. Prerequisite: registered student in the FNP/PA program. Trends and ethical issues in health care, review of the process and policies for ethical decision making in patient care. These issues, trends, and processes will be related to the role of the Family Nurse Practitioner/Physician Assistant. [I, II, III, IV] DeAmicis

353. Geriatric Medicine for FNP/PA Students (1)
Lecture—1 hour. Prerequisite: registered student in the FNP/PA program. Introduction to advanced concepts in geriatric medicine. Comprehensive assessment, decision making, and management of selected medical problems encountered in primary care. Appropriate consultation and referral are discussed. [Deferred grading only, pending completion of sequence.]

354A. Fundamentals of Primary Health Care for FNP/PA Students (5)
Lecture/discussion—5 hours. Prerequisite: enrollment in the Family Nurse Practitioner/Physician Assistant Program. Anatomy and physiology, pathophysiology, diagnostic criteria, approaches to assessment and management medical problems in primary care. May be repeated twice for credit. [I, II, III, IV, I, II, III, IV] Slater, Stewart

354B-354C. Fundamentals of Primary Health Care for FNP/PA Students (6-4)
Lecture/discussion—4-6 hours. Prerequisite: registered student in FNP/PA Program. Study of anatomy and physiology, pathophysiology, diagnostic criteria, approaches to assess and manage common medical problems seen in primary care. May be repeated for credit. [I-III; III-IV; I, II, III, IV] Hass, Milton

355A. Advanced Principles of Family Health Care (5)
Lecture/discussion—5 hours. Prerequisite: enrollment in the Family Nurse Practitioner/Physician Assistant Program. Advanced concepts in the management of cardiac, respiratory, gastrointestinal, renal, and endocrine problems in primary health care. Emphasis on complex problems seen in primary care. May be repeated for credit. [I-III; III-IV; I, II, III, IV] DeAmicis

355B. Advanced Principles of Primary Health Care (5)
Lecture/discussion—5 hours. Prerequisite: registered student in the FNP/PA Program; successful completion of course 354A:354B-354C. Anatomy and physiology, pathophysiology, diagnostic criteria, approaches to assessment and management of patients with complex and/or multiple health care problems in primary care settings. [I, II, III, IV, I, II, III, IV] DeAmicis

355C. Advanced Principles of Health Care for FNP/PA Students (4)
Lecture/discussion—4 hours. Prerequisite: registered student in the FNP/PA Program; successful completion of course 354A:354B-354C. Study of anatomy and physiology, pathophysiology, diagnostic criteria and approaches to assess and manage patients with complex and/or multiple health care problems in primary care settings, and to learn the management of patients in inpatient settings. May be repeated for credit. [I, II, III, IV, I, II, III, IV] DeAmicis

355D. Advanced Principles of Health Care for FNP/PA Students (4)
Lecture/discussion—4 hours. Prerequisite: registered student in the FNP/PA Program; successful completion of course 354A:354B-354C. Study of anatomy and physiology, pathophysiology, diagnostic criteria and approaches to assess and manage patients with complex and/or multiple health care problems in primary care settings, and to learn the management of patients in inpatient settings. May be repeated for credit. [I, II, III, IV] DeAmicis

358. Pharmacology (6)
Lecture/discussion—6 hours. Prerequisite: registered student in the FNP/PA Program. Examines the pharmacokinetics and pharmacodynamics, and clinical therapeutics necessary to make rational and optimal therapeutic plans in ambulatory settings. (Deferred grading only, pending completion of sequence.) [I, II, III, IV, I, II, III, IV] DeAmicis

361. Family Therapy and Assessment (1)
Lecture—1 hour. Prerequisite: registered student in the FNP/PA Program. Examines a family system framework within the context of its internal dynamics, relationship to community and cultural variations. May be repeated twice for credit. [I, II, III, IV] DeAmicis

367A. Family Practice and Community Health for FNP/PA Students (2)
Lecture/discussion—2 hours. Prerequisite: registered student in the FNP/PA Program. Examines pediatric and adolescent concepts of growth and development.

Quarter Offered: I–Fall, II–Winter, III–Spring, IV–Summer; 2009–2010 offering in parenthesis

General Education (GE) credit: ArtHum—Arts and Humanities, ScLng—Science and Engineering, SoscSci—Social Sciences, Divw—Social-Cultural Diversity, Wr–Writing Experience
ment as related to primary health care. Primary health care issues and needs will be assessed in relation to the Family Nurse Practitioner (FNP) and Physician Assistant (PA) roles, history of the profession and impact of FNP and PA on health care systems; critical review of medical literature including introduction to evidence-based medicine and statistics; managed care. (Deferred grading only, pending completion of sequence.)—I, II, III, IV

372B. Professional Development for FNP/PA Students (1.5)
Lecture/discussion—1.5 hours. Prerequisite: registered student in the FNP/PA Program. Designed to increase critical thinking by utilizing the development and processing of the differential diagnoses of several cases as related to primary health care. Issues and needs of the adult are examined in relationship to family and community, health promotion, disease prevention and wellness concepts. May be repeated twice for credit.—I, II, III, IV

372C. Family Practice and Community Health for FNP/PA Students (1)
Lecture/discussion—1 hour. Prerequisite: registered student in the FNP/PA Program. Designed to increase critical thinking by utilizing the development and processing of the differential diagnoses of several cases as related to primary health care. Issues and needs of the adult are examined in relationship to family and community, health promotion, disease prevention and wellness concepts. May be repeated twice for credit.—I, II, III, IV, (I, II, III, IV) DeAmicis

372D. Behavioral Science for FNP/PA Students (1)
Lecture/discussion—1 hour. Prerequisite: registered student in the FNP/PA Program. Designed to increase critical thinking by utilizing the development and processing of the differential diagnoses of several cases as related to primary health care. Issues and needs of the adult are examined in relationship to family and community, health promotion, disease prevention and wellness concepts. May be repeated twice for credit.—I, II, III, IV, (I, II, III, IV) Milton

376A. Behavioral Science (1)
Lecture/discussion—1 hour. Prerequisite: completion of course 368A and registered student in the Family Nurse Practitioner/Physician Assistant Program. Exploration into a variety of addictive behaviors within diverse populations. Utilization of clinical case studies to develop skills in the identification, interview and management of these patients and recognition of how these behaviors impact the family system.—I, II, III, IV, (I, II, III, IV) Stewart

376B. Behavioral Science (1)
Lecture/discussion—1 hour. Prerequisite: registered student in the Family Nurse Practitioner/Physician Assistant Program. Multicultural perspectives of health. Traditional health, beliefs and healing practices of several California cultures.—I, II, III, IV, (I, II, III, IV, IV) Slater

376D. Behavioral Science for FNP/PA Students (1)
Lecture—1 hours. Prerequisite: registered student in the FNP/PA Program. Basic principles of assessment, counseling and treatment of individual patients, their families and support systems as they experience the effects of chronic illnesses, chronic pain, terminal diseases, death and grieving. Students are strongly encouraged to explore their coping styles. May be repeated twice for credit.—I, II, III, IV

370A-370B-370C-370D-370E-370F. Clinical Case Seminars for FNP/PA Students (1.5-1.5-1.5-1.5-1.5-1.5)
Seminar—1.5 hours. Prerequisite: registered student in the FNP/PA Program. Designed to increase critical thinking by utilizing the development and processing of the differential diagnoses of several cases based on the topics covered in the medicine course (course 354, 355, 356) in the same quarter. May be repeated twice for credit. (P/NP grading only)—I, II, III, IV, (I, II, III, IV) Millon, Stewart

372A. Professional Development for FNP/PA Students (1.5)
Lecture/discussion—1.5 hours. Prerequisite: registered student in the Family Nurse Practitioner/Physician Assistant Program. Understanding the Family Nurse Practitioner (FNP) and Physician Assistant (PA) roles, history of the profession and impact of FNP and PA on health care systems; critical review of medical literature including introduction to evidence-based medicine and statistics; managed care. (Deferred grading only, pending completion of sequence.)—I, II, III, IV

401. Introductory Preceptorship in Family Practice (3-9)
Clinical activity—20-40 hours. Prerequisite: completion of first year of medical training. Preceptorship in family practice offered as an introduction to clinical medicine. 20 hours or 40 hours per week in a family physician’s office, doing patient interviews, history-taking, and performing physical exams. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV) DeAmicis

407. Davis Community Clinic (3)
Clinical activity—8 hours. Prerequisite: second-year medical student in good academic standing. Students learn to diagnose and treat common medical problems as seen at a community clinic, under the direct supervision of a physician. (S/U grading only)—I, II, III, IV, (I, II, III, IV) Leron

411. Selected Studies of Systems for Chronic Illness Care (3)
Clinical activity—4 hours; discussion—4 hours. Prerequisite: course 400A, 400B, 400C, medical students with consent of instructor. Understanding of chronic illness, particularly diabetes, participation in patient care, alternative techniques. May be repeated once for credit. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV) von Bahr

430. Primary Care Clerkship (12)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Eight week primary care clerkship for third year medical students. Four week primary care experience with an additional four weeks in Internal Medicine clinic. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV) Leron

434. Primary Care Clinics (3-12)
Clinical activity—52-92 hours; laboratory—0.2 hours; lecture—1.2 hours. Prerequisite: open to medical students in all four years of medical school. Medical students will learn counseling, diagnosis and treatment of patients with chronic and acute disease under supervision of physician. Provides exposure to special health care needs of various ethnic and poverty-level populations. May be repeated for credit. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV) Leron

444. Advanced Preceptorship in Family Medicine (3-18)
Clinical activity—40 hours. Prerequisite: completion of third-year clerkship in primary care or consent of instructor. Preceptorships with primary care physicians in a variety of settings. Acquisition skills to evaluate and develop a treatment plan for patients with common medical problems seen by primary care physicians in an out patient setting. May be repeated up to 18 units of credit. (H/P/F grading only)—I, II, III, IV, Leron

460. Geriatrics in Community Health (3-6)
Fieldwork—24 hours; clinical activity—12 hours; lecture—4 hours. Prerequisite: course 430. Visits to community agencies including mental health teams, adult day health centers, a diagnostic and research center, and case management specialists. Observation and participation in MMSE’s, patient-family conferences, interdisciplinary team meetings, neuropsychiatric testing and home visit evaluations. (H/P/F grading only)—I, II, III, IV, Neyhart

468. International Preceptorship (3-12)
Clinical activity—40 hours. Prerequisite: medical student with consent of instructor. Preceptorship with a family practitioner in a foreign country (arranged by student contact or with assistance of the Family and Community Medicine Department.) Participate in clinical activities, analyze and report characteristics of the practice. May be repeated up to 12 units of credit. (H/P/F grading only)—I, II, III, IV

469. Clerkship in Family Practice Residency (3-12)
Clinical activity—40 hours. Prerequisite: completion of third year of medical school or consent of instructor. Comprehensive primary medical care of patients in a family practice hospital or residency. Usually includes inpatient and outpatient experience. May be repeated up to 12 units of credit. (H/P/F grading only)—I, II, III, IV

488. Selected Studies in Family Practice (1-9)
Clinical activity—40 hours. Prerequisite: medical student with consent of instructor. Assigned readings in family practice to increase understanding on selected topics relating to family medicine and primary care health delivery, visits to and written analysis of selected health care programs; and/or exposure to family practice with a community physician preceptor who is a member of the clinical faculty. May be repeated up to 9 units of credit.—I, II, III, IV

498. Directed Group Study (1-5)
Variable—3.15 hours. Explore in-depth various topics in primary care. Extensive contact with and oversight by instructor. May be repeated for credit. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV) Gracia, Leron

499. Research (1-12)
Prerequisite: medical students with consent of instructor. Research in various aspects of the health care delivery system. (H/P/F grading only)

Human Physiology (HPH)
Lower Division Course
99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

Upper Division Courses
192. Internship in Human Physiology (1-12)
Internship—3.36 hours; final report. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in physiology and related fields. (P/NP grading only)

198. Directed Group Study (1-5)
To be arranged. Prerequisite: consent of instructor. Directed reading, discussion and/or laboratory experience on selected topics. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
Laboratory—3.15 hours; undergraduate research project. Prerequisite: senior standing in biology, chemistry, physics, psychology, or engineering. (P/NP grading only)
Graduate Courses

200. Human Physiology (6)
Lecture—48 hours total; discussion—12 hours total. Prerequisite: graduate standing and consent of instructor. General cellular and organ system physiology, including neural, cardiovascular, respiratory, gastrointestinal and urinary systems in the human. Lectures concurrent with course 400; research/observation and laboratory/demonstration sessions, and examinations separate.—II. (II.) Carlsen, O’Donnell

210A. Advanced Physiology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Physiology Ph.D. program, or consent of instructor. Advanced course in general principles of physiology, surveying homeostasis, cellular and selected topics, and neurophysiology. [Same course as Physiology 210A—I. (I.) Cala, Payne]

285. Peripheral Circulation (3)
Lecture—1 hour; discussion—2 hours. Prerequisite: Physiology 111A, 113; or course 200 and consent of instructor. Lectures and critical analysis of papers on peripheral vascular function, including: structure/function and function/flow relationships, innervation, receptor pharmacology, endothelial and smooth muscle interactions, signal transduction, ion transport, permeability, paracrine mediators and disease mechanisms. Offered in alternate years.—(III.) Gray, O’Donnell

298. Group Study (1-5)
Prerequisite: consent of instructor. For graduate students desiring to explore particular topics in depth. Lecture and discussion may be involved.—(I.) (I-R.)

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional Courses

400. Human Physiology (6)
Lecture—3 hours; laboratory—2 hours. Prerequisite: consent of Committee on Student Progress. Medical student only. General and cellular physiology of neurons, muscle, and epithelial cells and systemic physiology of cardiovascular, respiratory, gastrointestinal, and renal systems. [Deferred grading only, pending completion of sequence]—(I-IV. P/F grading only)—I. IV. (I., IV.) O’Donnell, Payne

403. Neurobiology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: approval of Committee on Student Progress. Physiology and anatomical human nervous system. Gross and microscopic brain structure, functional neuroanatomy, and the physiology, biochemistry, and pharmacology of the nervous system. [Same course as Cell Biology and Human Anatomy 403 J; P/F grading only]—III. Kumari, Carlsen

405. Medical Neuroanatomy (5)
Lecture—3 hours; laboratory—1 hours; discussion/laboratory—1 hour. Prerequisite: Successful completion of course 400, block 1; restricted to medical students only. Anatomy of the normal human nervous system, to include gross external and internal morphology of brain and spinal cord, and function neuroanatomy of motor, sensory and cognitive systems. Incorporates application of neuroanatomy to clinical problem solving. [Same course as Cell Biology and Human Anatomy 403 J; P/F grading only]—IV. IV. Kumari

418. Mammalian Endocrinology and Homeostasis (3)
Lecture—3 hours; discussion—1 hour. Prerequisite: approval of Committee on Student Progress. Physiological and biochemical properties of the mammalian endocrine system both at the cellular and systemic level. Principles that regulate homeostasis, especially in organ-organ interrelationships, metabolic and mineral homeostasis. [Same course as Biological Chemistry 418]—(P/F grading only) III. Widdicomb

493. Physiological Principles in SICU (6)
Lecture—5 hours; lecture/laboratory—10 hours; laboratory—16 hours; clinical activity—4 hours. Prerequisite: consent of instructor; restricted to UC Davis School of Medicine students only. Special Study Module, a four week course on the topic: Care of the Critically Ill Surgical Patient: Use of Physiological Principles to Guide Treatment of Patients with Common Surgical Problems. [Same course as Surgery 493SC]—(I, II, III, IV, I. III, III, IV.) Cala, Holcroft

497T. Tutoring in Human Physiology (1-5)
Tutoring—3-15 hours. Prerequisite: advanced standing or consent of instructor. Assist instructor by tutoring medical students individually or in groups for one of the departmental courses that is a component of the required curriculum of the School of Medicine. (H/P/F grading only)—Cala

498. Directed Reading and Group Study (1-4)
Discussion—2.8 hours. Prerequisite: medical student. Directed reading and discussion on selected topics in human physiology. (H/P/F grading only)

499. Research (1-6)
Prerequisite: medical students with consent of instructor. Laboratory investigation on selected topics. (H/P/F grading only)

Internal Medicine (IM)

Lower Division Courses

92. Internship (1-4)
Internship—3-12 hours. Prerequisite: lower division standing and consent of instructor. Supervised internship in internal medicine and related fields. (P/NP grading only)—Last

98. Directed Group Study (1-2)
Seminar—1-2 hours. Prerequisite: lower division standing and consent of instructor. Directed group study in medicine and related fields. (P/NP grading only)—Last

99. Undergraduate Research in Medicine: Molecular and Cell Biology (1-3)
Prerequisite: consent of instructor. (P/NP grading only)—Last

Upper Division Courses

192. Internship in Internal Medicine (1-12)
Internship—3-36 hours; final recommendation only. Prerequisite: consent of instructor; restricted to UC Davis medical students only. Basic and pathophysiologic processes involved in human metabolic and nutritional regulation and in reproductive and endocrine control systems across the lifespan. Integrate information across these systems and use clinical reasoning process to identify and understand relevant perturbations and diseases. (Same course as Surgery 495SC)—(I. III. Kumaki-Date, Sweeney, Tower, Turgeon

199. Special Study in Advanced Undergraduate (1-5)
Prerequisite: upper division standing; consent of instructor. (P/NP grading only)

Graduate Courses

214. Topics in Medical Ethics (1)
Seminar—1 hour. The complex moral, legal, and ethical dilemmas that patients, families, and health care providers face in today’s clinics. May be repeated once for credit. (S/U grading only)—I. II. Laslett

220D. Cardiovascular System (2.5)
Lecture/discussion—5.5 hours. Prerequisite: Human Physiology 200, graduate student status and consent of instructor. Principles of etiology, mechanisms, diagnosis and management of the major diseases of the cardiovascular system. Included are ischemic, valvular, hypertensive, cardiomyopathic, pericardi- al, and electrical disorders.—II. (II.) Laslett

250. Medicine and the Law (3)
Lecture/discussion—2 hours; project—2 hours. Legal and bioethical principles and concepts in medicine. Topics include standards of care, informed consent, reproductive medicine, and end-of-life issues. (S/U grading only)—II. Rich

290C. Controversies in Clinical Research (1)
Seminar—3 hours. Clinical Research Study design and data analysis related to major medical research areas. Presentations assigned to and given by faculty/student teams. May be repeated for credit. (S/U grading only)—III. (III.) Lane, Meyers

Professional Courses

405. Metabolism, Endocrinology, Reproduction and Nutrition (9.5)
Lecture—3-5 hours; discussion/laboratory—2.8 hours. Prerequisite: consent of instructor; medical students only. Basic and pathophysiologic processes involved in human metabolic and nutritional regulation and in reproductive and endocrine control systems across the lifespan. Integrate information across these systems and use clinical reasoning process to identify and understand relevant perturbations and diseases. (Same course as Surgery 495SC)—(I. III. Kumaki-Date, Sweeney, Tower, Turgeon

419. Introduction to Clinical Nutrition (2.5)
Lecture—2 hours; lecture/discussion—2 hours. Prerequisite: approval of Committee on Student Progress. Basic and clinical concepts of human nutrition. Nutrient homeostasis and regulation and current perspectives on the role of nutrition in disease. (P/F grading only)—III. Halsted

420A. Hematology (2)
Lecture/discussion—3 hours; laboratory—2 hours. Prerequisite: consent of Committee on Student Progress. Normal hemotopoiesis and basic principles of blood cells, leukemia and lymphoma, transfusion therapy, immunoglobulin disorders, thrombosis and hemostasis. Normal and abnormal blood cells and the interpretation of common laboratory tests. (P/F grading only)—Widom

420B. Gastrointestinal System (2.5)
Lecture—2 hours; discussion—2 hours. Prerequisite: approval of Committee on Student Progress. Medical student only. Basic pathophysiological principles of digestive diseases on which clinical concepts and judgments can be developed. Emphasis on pathophysiological basis of gastrointestinal and hepatic disorders with discussion of major disorders and their diagnosis and management. (P/F grading only)—II. (II.) Terrado

420C. Pulmonary and Critical Care Medicine (2.5)
Lecture/discussion—5.5 hours. Prerequisite: approval of Committee on Student Progress. Clinical aspects of respiratory anatomy, physiology, and pathology. Diagnostic procedures and the evaluation of the major pulmonary diseases and disorders, and critical care medicine. (P/F grading only)—II. Louie

420D. Cardiovascular System (2.5)
Lecture/discussion—5.5 hours. Prerequisite: approval of the School of Medicine Committee on Student Progress. Principles of etiology, mechanisms, diagnosis and management of the major diseases of the cardiovascular system. Included are ischemic, valvular, hypertensive, cardiomyopathic, pericardial, and electrical disorders. (P/F grading only)—II. Laslett

420E. Nephrology (2)
Lecture—2 hours; discussion—2 hours; laboratory—2 hours. Prerequisite: approval of Committee on Student Progress. Fundamental aspects of disorders of body water, electrolytes and acid/base balance.
major categories and mechanisms of parenchymal renal diseases, urinary tract infections. (P/F grading only.)—II. Steven H. K I

420F. Pathophysiology of the Endocrine System (2.5) Lecture/discussion—5.5 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress. Clerkship is divided into two, four-week blocks, one at each at UCSD and at Kaiser Hospitals. Time is spent in direct patient care situations under the guidance of faculty assigned to acting intern rounds, conferences are required. (H/P/F grading only.)—II, III, IV. Prescott

430. Medicine Clerkship (12) Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Clerkship is divided into two, four-week blocks, one at each at UCSD and at Kaiser Hospitals. Time is spent in direct patient care situations under the guidance of faculty assigned to acting intern rounds, conferences are required. (H/P/F grading only.)—II, III, IV. Prescott

450. Medicine and the Law (1-3) Legal and bioethical principles and concepts in medicine. Topics include the role of the law in medicine, informed consent, reproductive medicine, and end-of-life issues. Not offered every year. (H/P/F grading only.)—I, II, III, IV. Rich

450P. Oncology: Research and Treatment of Cancer (2) Lecture/discussion—2 hours. Prerequisite: second-, third-, or fourth-year medical student and/or consent of instructor. Comprehensive review of current treatment options and state-of-the-art research impacting treatment and prevention of cancer. Emphasis on epidemiology, molecular biology, and pharmacology. (H/P/F grading only.)—II. DeCarolis

460. Correctional Health Care Clerkship (1-4) Clinical activity—full time. Prerequisite: fourth-year medical student in good academic standing. Covers Correctional Health delivery and the effects of detention and incarceration on health status. Special emphasis on problems unique to health care delivery in a prison setting. Student will spend time in clinical settings at three prison facilities. (H/P/F grading only.)—I, II, III, IV. Silva

462. Externship in Medicine (1-21) Clinical Activity—40 hours. Prerequisite: Medical Sciences 431; demonstrated a capacity for critical thinking and the ability to make clinical decisions. (P/F grading only.)—II, III, IV. (II, III, IV) Meyers

463. Acting Internship in Medicine Intensive Care Unit (MICU) (9) Clinical activity—full time. Prerequisite: completion of third year in medical school; consent of Director of MICU. At UCSDMC, student functions as acting intern in a medical ICU under direction of medical resident and staff. Responsibility for patients admitted to acting intern rounds. (H/P/F grading only.)—I, II, III, IV. (II, III, IV) Henderson

465. Medics-Global Health Sciences (9) Lecture—5 hours; clinical activity—25 hours; feedback—5 hours; project—5 hours. Prerequisite: consent of instructor; medical students only. Travel to foreign country for four weeks to collaborate with faculty from local universities and work in urban and rural environments, including hands-on experience with clinic patients. Cultural exchange and awareness of global health. (P/F grading only.)—IV. (IV) Wilkie

470. Landmark Clinical Trials and Evidence-Based Medicine (3) Lecture/discussion—10 hours; clinical activity—8 hours. Prerequisite: fourth-year medical student. Ten landmark clinical trials from a historical, clinical, and epidemiologic/research perspective. Principles of evidence-based medicine. (H/P/F grading only.)—III. Krawitz, Amsterdam

480. Person Centered Assessment (1) Lecture—1 hour. Prerequisite: open to all medical students. Person-centered assessment modalities and diagnostic approaches with regards to Internal Medicine and its subspecialties. (P/F grading only.)—I. Fitzgerald

494. Practicum in Community Health Clinics (1-3) Clinical activity—15-40 hours. Prerequisite: medical student with consent of instructor. Students are assigned to clinical settings that demonstrate ethnic, urban/rural, or other related aspects of clinical community health. Through active participation in health care delivery, students are able to relate conceptual with practical aspects of primary health care. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. Kumagai

497. Medicine, Bioethics and the Holocaust (3) Lecture/discussion—10 hours. Prerequisite: medical students only, consent of instructor. The concept of “evil” and the role of collaborators, bystanders and participants exemplified by the Holocaust and compared to present-day issues. Demonstration that evil becomes incrementally utilized taken for granted. (P/F grading only.)—Not offered every year.—I, II, III.

498. Group Study in Internal Medicine (1-18) Prerequisite: consent of instructor. Special study for medical students which may involve laboratory or library research, ambulatory or inpatient care responsibility on campus, at UCSDMC or off campus by specific arrangement. (H/P/F grading only.)—I, II, III, IV (I, II, III, IV)

499. General Medicine Research (1-18) Independent study—20 hours. (H/P/F grading only.)—I, II, III, IV. (II, III, IV) Meyers

501. Clinic in Cardiology (S) Seminar—2 hours (for 2-4 weeks); clinical activity—full time (2-4 weeks). Prerequisite: completion of third year of medical school. Clinical experience, weekly seminar and reading on primary and secondary prevention of cardiovascular disease. Will be carried out in Lipid and Hypertension Clinics, Exercise Laboratory, Cardiovascular Unit, Cardiac Catheterization, and Cardiac Surgery services. (H/P/F grading only.)—II, III, IV. (II, III, IV) Amsterdam

502. Internal Medicine—Cardiology (CAR) Upper Division Courses 192. Internship in Cardiology (1-12) Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experience in cardiology. May be repeated for credit up to 12 units. (P/N/F grading only.)

199. Cardiology Research (1-5) Prerequisite: consent of instructor. Special study by individual arrangement in cardiovascular medicine. Work will include directed readings, laboratory and discussions. (P/N/F grading only.)

Graduate Courses 220. Basic Science in Cardiology (1) Lecture—1 hour. Prerequisite: graduate or medical student standing. Fundamentals underlying cardiovascular medicine. Including hemodynamics, neural control of the circulation, biochemistry and some experimental design and statistics. Experts in each of these fields will provide current information in their areas. Offered in alternate years. (S/U grading only.)—III. Kaufman

299. Cardiology Research (2-3.5) Prerequisite: consent of instructor. Research or special studies. (S/U grading only.)—Bonham, Langhurst

Professional Courses 401. Clinical Cardiology Clerkship: Kaiser (3-18) Clinical activity (4 weeks)—8-12 hours (hospital), 1-3 hours (clinics). Prerequisite: third and fourth-year medical students with advance approval by Division of Cardiology. Emphasis placed on history-taking and physical examination of pediatric and adult patients with congenital and acquired cardiovascular disease. Limited enrollment. (P/N/F grading only.)—I, II, III, IV. (II, III, IV)

460. Cardiology Clinical Clerkship (3-18) Clinical activity—full time (2-12 weeks). Prerequisite: Internal Medicine 430, third- and fourth-year medical students in good academic standing with consent of instructor. Participation with members of subspecialty consultation service in initial clinical evaluation, work-up, management, and follow-up of patients with cardiologic disorders. Two outpatient clinics per week. May be repeated for credit. Limited enrollment. (H/P/F grading only.)—I, II, III, IV

461. Management of Coronary Artery Disease (6) Clinical activity (inpatient service)—full time (4 weeks). Prerequisite: completion of second year of medical school and advance approval by Division of Cardiology. Research in laboratory and exercise testing to be determined by instructor. Current methods of clinical research involving certain aspects of diagnosis and treatment. Includes acute coronary care, hemodynamic monitoring, stress testing, cardiovascular anesthesia, statistics, and biostatistics. Readings on evaluation and treatment of patients with cardiovascular disease. (H/P/F grading only.)—I, II, III, IV

464. Preventive Cardiology (3-6) Seminar—2 hours (for 2-4 weeks); clinical activity—full time (2-4 weeks). Prerequisite: completion of third year of medical school. Clinical experience, weekly seminar and reading on primary and secondary prevention of cardiovascular disease. Will be carried out in Lipid and Hypertension Clinics, Exercise Laboratory, Cardiovascular Unit, Cardiac Catheterization, and Cardiac Surgery services. (H/P/F grading only.)—II, III, IV. (II, III, IV) Amsterdam

480. Insights in Cardiology (1-3) Clinical activity—3-9 hours. Prerequisite: medical student in good academic standing and approval by Division of Cardiology. Students will attend one or more cardiovascular medicine clinics: general, hypertension, arrhythmia. Introduction to the diagnosis/treatment of common cardiovascular problems. (H/P/F grading only.)—I, II, III, IV. (II, III, IV)

493. Gender Specific Medicine SSM (6) Lecture—5 hours; lecture/laboratory—10 hours; laboratory—16 hours; clinical activity—4 hours. Prerequisite: consent of instructor; restricted to UC Davis School of Medicine students only. Special Studies Module, a four week course on the topic: Basic Science Principles Relating to Gender Specific Medicine. (Same course as Obstetrics & Gynecology 493.) (H/P/F grading only.)—I, II, III, IV. (II, III, IV) Sweet, Villablanca

498. Special Group Study: EKG Unit (1-12) Special study—2 week sessions. Prerequisite: medical students with advance approval by monthly attending faculty. Special group study in cardiology for medical students in EKG Unit. May include lectures, directed reading, and/or discussion groups. May be repeated for credit. Limited enrollment. (H/P/F grading only.)

499. Research (1-12) Prerequisite: approval by Division of Cardiology. (H/P/F grading only.)
Internal Medicine—Clinical Nutrition and Metabolism (NCM)

Upper Division Course
192. Internship in Clinical Nutrition (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor or director. Supervised work experience in nutrition. May be repeated for credit up to 12 units. [P/NP grading only.]

Graduate Course
290C. Clinical Nutrition Research Conference (1)
Seminar—1 hour. Weekly seminar presented by a graduate student, taking the form of research completed in progress, topic review or journal review from current journal. [S/U grading only]—I, II, III, IV. [I, II, III, IV] Davis

Professional Courses
461. Nutrition Clinical Clerkship (3-18)
Lecture—2 hours; clinical activity—full time (2 to 12 weeks). In-depth experience in assessment and monitoring of nutritional support of adult patients at UC Davis Medical Center whose illnesses are complicated by malnutrition, and of patients attending the Nutrition Clinic with problems in undernutrition due to various illnesses.—I, II, III, IV. [I, II, III, IV.]

480. Insights in Clinical Nutrition (1-3)
Clinical activity—3-9 hours. Prerequisite: student in good standing; consent of instructor. Will attend weekly clinical nutrition consult rounds (four evening and/or Nutrition Clinic, one day). Introduction to diagnosis and treatment of common nutritional problems. [S/U grading only]—I, II, III, IV. [I, II, III, IV.]

499. Research in Nutrition (9-18)
Prerequisite: medical student in good standing; consent of instructor. Participation in ongoing clinical or basic nutrition research. Student may devise own project depending upon time commitments. —Halded, Davis

Internal Medicine—Emergency Medicine (EMR)

Lower Division Course
92. Emergency Medicine Clinical Research Internship (1-4)
Prerequisite: Undergraduate student in good academic standing at UC Davis, consent of instructor. This course is intended to give the undergraduate student an opportunity to conduct “hands-on” clinical research in the Emergency Department. Through the lecture/discussion, students will learn the basics of conducting and developing clinical research studies, using examples from ongoing studies. May be repeated for credit up to four units. Units awarded will depend on hours worked.—I, II, III, IV. [I, II, III, IV] Panacek

Upper Division Course
192. Emergency Medicine Clinical Research Internship (1-4)
Prerequisite: Undergraduate student in good academic standing at UC Davis, consent of instructor. This course is intended to give the upper division undergraduate student an opportunity to conduct “hands-on” clinical research in the Emergency Department. Through the lecture/discussion, students learn the basics of conducting and developing clinical research studies. May be repeated for credit up to four units. Units awarded will depend on hours worked.—I, II, III, IV. [I, II, III, IV] Panacek

Panacek 1994. Special Study for Advanced Undergraduates (4-12)
Prerequisite: open to experienced RA’s who have successfully performed in the EMR/F program for a minimum of three quarters, consent of instructor. This course is intended to be an organized effort in working on specific EMR projects in a more extensive way. Must complete at least 4 hours per week for two quarters. Must have database skills. Deferred grading only, pending completion of sequence.—I, II, III, IV. [I, II, III, IV] Panacek

Professional Courses
401. Preceptorship in Emergency Medicine (1-4)
Clinical activity—6 hours; tutorial—2 hours. Prerequisite: consent of instructor and completion of first year of medical school. Exposure to the specialty of Emergency Medicine and observation of a wide array of patients in the Emergency Department. A literature review of an Emergency Medicine topic of interest to the student must be performed and discussed. (H/P/F grading only)—I, II, III, IV. [I, II, III, IV.]

430. Introduction to Medical Toxicology (3)
Independent study—24 hours; lecture/discussion—4 hours; fieldwork—12 hours. Prerequisite: fourth-year medical student with consent of instructor. Student will become familiar with the resources available to manage exposure and poison cases. Hands-on training in the use of Poisindex® computer database. Additional readings from medical literature required. (H/P/F grading only)—I, II, III, IV. [I, II, III, IV.]

440. Emergency Medicine Required Clerkship (6)
Clinical activity—46 hours; lecture/discussion—8 hours. Prerequisite: satisfactory completion of Medicine, Surgery, and Pediatric Clerkship. Student will see patients primarily in the Emergency Department under the supervision of an Emergency Medicine Attending. Emphasis will be on the recognition and management of acute life threats, as well as the treatment of common medical and surgical conditions. (H/P/F grading only)—I, II, III, IV. [I, II, III, IV.]

445. Emergency Medicine Ultrasound for 4th Year Medical Student (3)
Lecture—5 hours; clinical activity—30 hours; discussion—5 hours; performance instruction—5 hours. Prerequisite: fourth-year Medical Student in good standing; interest in Emergency Medicine or Critical Care is recommended; course 440 or equivalent is recommended prior to the rotation. The Emergency Medicine ultrasound elective is intended for students interested in learning both the technical and cognitive skills of bedside ultrasound. Emphasis will be on the use of ultrasound in emergency medicine as a diagnostic tool and in procedural guidance. Limited enrollment.—IV. [IV] Cusick

450. Ambulatory Care Clerkship (6)
Clinical activity—full time (4 weeks). Prerequisite: Medicine, Surgery and Emergency Medicine Clerkship. Ambulatory care experience in the “last track” area of the Emergency Department. Exposure to patients with minor illnesses and injuries. Emphasis on wound management and treatment of orthopaedic injuries. [Former course Internal Medicine 440.] (H/P/F grading only)—I, II, III, IV. [I, II, III, IV.]

465. Acting Internship in Emergency Medicine (6)
Clinical activity—36 hours; lecture/discussion—4 hours. Prerequisite: satisfactory completion of Medicine, Surgery, Pediatric and Emergency Medicine Clerkship. The student will function as an Acting Intern and treat a wide variety of patients and problems under the supervision of the Emergency Medicine Attending. (H/P/F grading only)—I, II, III, IV. [I, II, III, IV.]

493. Cardiac Arrest, Resuscitation and Repetition of SSM (6)
Lecture—5 hours; lecture/laboratory—10 hours; laboratory—16 hours; clinical activity—4 hours. Prerequisite: consent of instructor. UC Davis School of Medicine students only. Special Studies Module, a four week course specific to the topics of cardiac arrest, resuscitation and repertition. Limited enrollment. (H/P/F grading only)—I, II, III, IV. [I, II, III, IV.]

499. Research (1-12)
Prerequisite: consent of instructor. Endocrinology research. [S/U grading only.]

Professional Courses
460. Endocrinology Clinical Clerkship (3-18)
Clinical activity (inpatient-outpatient service)—full time (3 days per week). Prerequisite: Internal Medicine 430 and/or consent of instructor. Participation with members of subspecialty service in the initial evaluation, work-up, management and follow-up of patients with endocrinologic disorders. Limited enrollment. (H/P/F grading only)—I, II, III, IV. [I, II, III, IV.]

480. Insights in Endocrinology (1-3)
Clinical activity—3-9 hours, oral presentation. Prerequisite: student in good academic standing and consent of instructor. First or second-year students observe in morning Endocrine and Diabetes clinics and attend bi-weekly noon and afternoon endocrine conferences. They also give brief endocrine physiologic oral presentation to the endocrine group. (H/P/F grading only)—I, II, III, IV. [I, II, III, IV.]

499. Research (1-12)
Prerequisite: consent of instructor. (H/P/F grading only.)

Internal Medicine—Gastroenterology (GAS)

Upper Division Course
192. Internship in Gastroenterology (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experience in gastroenterology. May be repeated for credit up to 12 units. [P/NP grading only.]

Graduate Course
299. Research (1-12)
Research in gastroenterology. [S/U grading only]—Bowlus

Professional Courses
460. Clinical Clerkship (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: completion of third year of medical school. Work-up, manage, and follow-up new patients on active inpatient consulting service. Gastroenterology/Hepatology patients. Daily rounds with attending physician. (H/P/F grading only)—I, II, III, IV. [I, II, III, IV.]

480. Insights in Gastroenterology (1-3)
Clinical activity—3-9 hours. Prerequisite: student in good academic standing and consent of instructor. To gain insight in clinical activities of Gastroenterology Division through attendance at any of the following: endoscopic procedures, ward rounds, outpatient clinic, and G.I. grand rounds. (H/P/F grading only)—I, II, III, IV. [I, II, III, IV.]

Leung, Hsu
499. Research (1-12)
Clinical activity—varied. Prerequisite: medical student status; consent of instructor. Part time participation in active clinical and basic research projects. Some will involve both patient care and relevant laboratory procedures. Basic research includes liver metabolism, cancer, porphyrias, diet and cancer, folate metabolism. May be repeated for credit. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV)

493A. Teaching and Designing Curriculum 55M (6)
Lecture—5 hours; lecture/laboratory—10 hours, lab—16 hours, clinical activity—4 hours. Prerequisite: consent of instructor; concurrent registration in Medical Sciences 440. Special Studies Module, A four week course on the topic: Teaching and Designing the Preclinical/Basic Science Curriculum. Open to UC Davis School of Medicine students only. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV) Gaudron-Edwards, Mudryj, Stevenson, Turgeon

499. General Medicine Research (1-18)
Discussion—3 hours; laboratory—5 hours; clinical activity—4 hours. Prerequisite: consent of instructor. Students will be involved in a clinical research problem within the areas, interest, and expertise of members of Division of General Internal Medicine. Alternatively, the research effort will be directed toward investigation of a clinical problem of general medical interest. May be repeated for credit. (H/P/F grading only)

Internal Medicine—Hematology-Oncology (HON)
Upper Division Course

199. Research in Hematology-Oncology (1-5)
Laboratory—hours variable. Prerequisite: upper division standing and consent of instructor. Experience in laboratory research. (P/NP grading only)—I, II, III, IV, (I, II, III, IV)

Graduate Courses

298. Topics in Hematology (1-4)
Prerequisite: one year of graduate work and/or consent of instructor. Basic concepts of the physiology of the hematopoietic organ, the pathophysiology of hematopoietic disease, and concepts of therapeutics will be offered for study. The specific topics to be dictated by the interest and background of the students.

299. Research (1-12)
Prerequisite: consent of instructor. Laboratory investigation contributing to the dissertation for a graduate degree. (S/U grading only)

Professional Courses

420. Oncology (1)
Lecture—2 hours; discussion—3 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; medical student only. Cancer epide- miology, cancer genetics, and cancer pharmacology; the pathophysiological principles of oncology as they relate to specific common cancers while using both lectures and case discussions. (P/NP grading only)—I, II, Welborn

460. Hematology–Oncology Acting Internship (6-18)
Clinical activity—full time (4-12 weeks). Prerequisite: fourth-year medical student in good academic standing. Acting intern on inpatient hematology/oncology ward service. May be repeated for credit. Limited enrollment. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV)

461. Hematology–Oncology Consult Clerkship (6-18)
Clinical activity—full time (4-8 weeks). Prerequisite: fourth-year medical student in good academic standing. An integral student member of the inpatient hematology and oncology consult service, the bone marrow service, and will attend all conferences sponsored by the Division. May be repeated for credit. Limited enrollment. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV)

462. Hematology–Oncology Ambulatory Clerkship (6-18)
Clinical activity [inpatient/outpatient service]—full time (4 weeks). Prerequisite: fourth-year medical student in good academic standing. Outpatient rotations in related disciplines with members of the subspecialty service in the clinical evaluation, work-up, management and follow-up of the patient with hematologic or oncologic disorders. May be repeated for credit. Limited enrollment. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV)

490. Practicum in Care for the Terminally Ill (3-6)
Clinical activity—full time (2-4 weeks); three 4-hour seminars included. Prerequisite: fourth-year medical student and an interview with Program Medical Director. Work with hospice interdisciplinary team. Direct experience in the care of patients with illnesses where no cure is possible. Emphasis on symp- tom relief, end of life issues, physician-assisted suicide. Fullfills the Ambulatory Care requirement. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV)

493. Ethical, Legal and Social Issues in Clinical Genetics (6)
Seminar—10 hours; clinical activity—14 hours; autotutorial—6 hours; independent study—10 hours. Prerequisite: consent on instructor; UC Davis School of Medicine students only. This module will cover cancer as a process, including risks of prevention, preneoplasia, microinvasion, treatment options, metastasises and systemic therapy, pain medicine and palliative care, and cancer communication. The format includes traditional lectures, student- led case discussions, and problem-based learning. (H/P/F grading only)—III. (III) Meyer, von Friederichs Fitzwater.

499. Research (1-12)
Prerequisite: consent of instructor. (H/P/F grading only)

Internal Medicine—Infectious Diseases (IDI)
Upper Division Courses

141. Infectious Diseases of Humans (1)
Lecture—1 hour. Prerequisite: introductory knowledge in biology and chemistry recommended. Course integrates information on biological and molecular nature of the causative organism, microorganisms, treatment and prevention strategies, and the role of infectious diseases in contemporary society and throughout human history. (P/NP grading only)—I. (I) Danecker

192. Research Internship in Internal Medicine (1-12)
Internship—3-36 hours; final report. Supervised work experience in the division of Infectious Diseases. Undergraduates will have an opportunity to acquire research experience in the laboratory setting. May be repeated for credit up to 12 units. (P/NP grading only)

199. Infectious Diseases Research (1-5)
Prerequisite: chemistry through organic chemistry (in addition to physical, and biological sciences and calculus), biol- ogy through basic bacteriology (in addition, microbiol- ogy and immunology preferred); and consent of instructor. Discrete problem requiring reading and actual manual effort in solution will be assigned to each student. Progress and results will be reviewed at intervals with instructor and via seminar presenta- tion. (S/U grading only)

Graduate Courses

211. Epidemiology and Prevention of Infectious Diseases (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Epidemiology 205B, 207 or Internal Medicine 421. Infectious disease epidemiology and prevention, with emphasis on human and veterinary diseases. Major categories of infectious diseases by mode of transmission. —III. DeFerrari, Sanderock

299. Research in Infectious Diseases (1-12)
Prerequisite: consent of instructor. Laboratory investi- gation contributing to the dissertation for a graduate degree. (S/U grading only)

Professional Courses

440. Introduction to AIDS and Related Disorders (1.5-6)
Clinical activity—30 hours; discussion—10 hours. Prerequisite: first and second year medical students must in good academic standing and have con-
Internal Medicine—Pulmonary Medicine (PUL)
Upper Division Course
192. Internship in Pulmonary Medicine (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experience in pulmonary medicine. May be repeated for credit up to 12 units. (P/NP grading only.)

Graduate Course
299. Pulmonary Disease Research (1-12)
Laboratory. Prerequisite: by arrangement only. Pulmonary disease research activity with focus in inhalation toxicology, human or animal. (H/P/F grading only.)

Cross Professional Courses
460. Pulmonary and Critical Care Medicine Clinical Clerkship (6-18)
Clinical activity—full time (4-12 weeks). Prerequisite: Medical Sciences 431. At UC Davis Medical Center participating and rounding with Pulmonary/Critical Care Medicine fellows and consultation staff. Also includes pulmonary function test interpretation, outpatient assignments in outpatient clinic, and preparation and presentation of material at weekly conferences. (H/P/F grading only.)

462. Pulmonary Clinical Clerkship (3-12)
Clinical activity—full time (2-8 weeks). Prerequisite: completion of second year of medical school and/or consent of instructor. Participation at the Sacramento VA clinic with members of the subspecialty service in initial clinical evaluation, workup, management, and follow-up of patients with pulmonary disorders. Includes experience in Pulmonary Function Laboratory, and pulmonary diagnostic processes. Limited enrollment. (H/P/F grading only.)

480. Pulmonary-Critical Care Medicine Insights (1-3)
Clinical activity—3-9 hours. Prerequisite: student in good academic standing and consent of instructor. Student will attend respiratory outpatient clinics and in-patient pulmonary consultation rounds and medical intensive care rounds. Introduction to diagnosis and treatment of common pulmonary problems. (H/P/F grading only.)

499. Research (1-12)
Prerequisite: consent of instructor. (H/P/F grading only.)

Internal Medicine—Rheumatology—Allergy (RAL)
Lower Division Course
99. Directed Research in Immunology (1-5)
Lab. Prerequisite: consent of instructor. Independent research will be encouraged in basic immunology, including the role of the cellular immune system in oncogenesis. (P/NP grading only.)

Upper Division Course
192. Internship in Rheumatology-Allergy (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experience in rheumatology-allergy. May be repeated for credit up to 12 units. (P/NP grading only.)

199. Directed Research in Immunology (1-5)
Laboratory. Prerequisite: consent of instructor. Independent research will be encouraged in basic immunology, including the role of the cellular immune system in oncogenesis. (P/NP grading only.)

Graduate Courses
209. Current Topics in Immunology: From Presentations to Grants (3)
Lecture—1 hour; term paper or discussion—1 hour; project presentation—1 hour. Prerequisite: immunology 201. Current developments in various aspects of immunology and their interrelationships. Focus on areas of immunology not currently covered in the basic and advanced immunology courses. Oral presentation, written review and grant preparation.——II. (III) Van de Water

298. Topics in Rheumatology and Clinical Immunology (1-5)
Laboratory. Prerequisite: consent of instructor. Library and/or laboratory work as required. (S/U grading only.)

Professional Courses
460. Rheumatology Clinical Clerkship (1-18)
Clinical activity (inpatient-outpatient service) full time. Prerequisite: Medical Sciences 431 and consent of instructor. Participants with members of the subspecialty service in the diagnosis and therapeutic management of patients with rheumatologic diseases. (H/P/F grading only.)

461. Allergy Clinical Clerkship (3-18)
Clinical activity (inpatient-outpatient service) full time (2 to 12 weeks). Prerequisite: completion of second year of medical school and consent of instructor. Students will work with practicing allergist in daily work with patients and participate in weekly allergy clinic and teaching conferences. Study of the literature. Will see patients with problems in clinical immunology, immunodeficiency, asthma, allergic rhinitis. (H/P/F grading only.)

480. Insights in Rheumatology (1-3)
Clinical activity—3-9 hours. Prerequisite: student in good academic standing and consent of instructor. Participation in rheumatology consultation rounds, rheumatic disease clinics and conferences with supervised readings in rheumatology. (H/P/F grading only.)

499. Research (1-12)
Prerequisite: medical student with consent of instructor. Part-time participation in active clinical and basic research projects which can involve both patient care and relevant laboratory procedures. Students can gain experience in clinical medicine and clinical investigation. (H/P/F grading only.)

Medical Microbiology (MMI)
Lower Division Courses
10. Parasitic Disease in Humans (2)
Lecture—2 hours. Introduction to parasitic diseases in humans, including relationships between humans and parasites, symptoms, diagnosis, drug distribution, treatment and prevention of parasitic disease. Not offered every year.——III. Thes

Upper Division Courses
115. Ecological Parasitology (3)
Lecture—3 hours. Parasitism as a life style is explored from the ecological point of view, illustrating the way parasites utilize biotic habitats and the influence climate, geography, behavior, cultural change and alteration of habitat can have on the distribution and prevalence of parasites.—II. (III) Thes
116. Parasitology for Wildlife Biologists (3) Lecture—3 hours. Prerequisite: upper division standing or consent of instructor. Emphasis on the role infectious diseases play in wildlife dynamics. Lectures and demonstrations on techniques and methods for examining wild animals for evidence of infectious diseases, methods used in preserving and identifying parasites of wildlife, as well as what is known about their pathogenesis. — III. (III) Theis

130. Medical Mycology (2) Lecture—2 hours. Prerequisite: a course in pathogenic microbiology and consent of instructor. Various aspects of pathogenic fungi, particularly affecting humans, will be discussed including epidemiology, pathogenesis and pathology, diagnosis and therapy. Offered in alternate years. (Same course as 415.)—I. Thesis

188. Human Immunology (3) Lecture—3 hours. Prerequisite: undergraduate level introductory biology course. Human immune system and 200A or consent of instructor. Study of mechanisms involved in microorganisms and function of immune system. Molecular basis of immune response; basic cellular and molecular mechanisms. Interactions between cells of immune system producing immune responses; regulating molecules. —II. (II) Pappagianis

192. Internship in Medical Microbiology (1-12) Internship—3-36 hours; final report. Prerequisite: upper division standing. Approval of project prior to period of internship. Supervised work experience in medical microbiology and related fields. (P/NP grading only.)—II, III, IV, (II, III, IV)

194H. Senior Honors Project in Medical Microbiology and Immunology (5) Independent study—15 hours. Prerequisite: course 199 and consent of instructor. Project in research related to immunology of medically important viruses. Designing and implementing a hypothesis-driven project, performance of experimental protocols and preparation of graphical representation of original data. Requires oral and written presentation of research results. May be repeated three times for credit with consent of instructor. (P/NP grading only.)—II, III, (I, II, III, IV) Torres

198. Group Study in Medical Microbiology (1-5) Prerequisite: upper division standing and consent of instructor. Directed reading and discussion and/or laboratory investigation on selected topics. (P/NP grading only.)

199. Research in Medical Microbiology (1-5) Prerequisite: upper division standing and consent of instructor. Individual research. (P/NP grading only.)

Graduate Courses

200D. Mechanisms for Microbial Interactions with Hosts (3) Lecture/discussion—3 hours. Prerequisite: Microbiology and consent of instructor. Study of mechanisms involved in microbial interactions within a host environment. The following principles are basic to understanding these interactions: host recognition, invasion, competition, and growth, and host defense. — II. (II) Beamler, Beaman

208. Seminars in Microbiology and Immunology (1) Seminar—1 hour. Research seminars on current topics in microbiology and immunology. May be repeated for credit if topic differs. (S/U grading only.)—II, III, (II, III, IV) Torres

210. Animal Models of Infectious Disease Training Grant (1) Lecture/discussion—1 hour. Prerequisite: students funded by the Animal Models of Infectious Diseases Training Grant; others by consent of instructor. Research articles in current literature. Topics/articles to include a broad range of frontier in animal models of human infectious diseases. Limited enrollment. May be repeated for credit. (S/U grading only.)—II. (II) Solnick

215. Medical Parasitology (5) Lecture—3 hours; laboratory—6 hours. Prerequisite: graduate student with consent of instructor. Epidemiology, pathogenesis, diagnostic methods and laboratory studies of protozoa, helminths and arthropods of medical importance. Offered in alternate years. (Same course as 415.)—I. Thesis

220. Current Concepts in Bacterial Ultrastructure (2) Discussion—2 hours; student presentations; term paper. Prerequisite: Microbiology 105 or consent of instructor. Critical evaluation of current literature dealing with all aspects of bacterial ultrastructure. Discussion of selected and assigned reading and formal student presentations of assigned topics.—III. (III) Beamman

280. Molecular Pathobiology for Diagnosis and Therapy of Human and Animal Diseases (3) Lecture—3 hours. Prerequisite: graduate standing. Molecular mechanisms for infections caused by human hereditary viruses and diseases. Emphasis on molecular diagnostics at cellular/tissue level, and therapy including vaccines and gene transfer using recombinant DNA technology. Not open for credit to students who have completed Internal Medicine: Infectious Diseases 280.—III. (III) Tools

291. Seminar in Microbiology and Immunology (1) Seminar—1 hour. Restricted to students with upper division or graduate standing. Research seminars on current topics in microbiology and immunology. May be repeated for credit if topic differs. (S/U grading only.)—I, II, III, (I, II, III) Danielek, Torres

298. Group Study in Medical Microbiology and Immunology (1-5) Prerequisite: consent of instructor; open to graduate students. Directed reading and discussion and/or laboratory investigation on selected topics. (Sections 1, 2, 4, 5: S/U grading only.)

299. Research (1-12) Prerequisite: consent of instructor; open to graduate students. Laboratory investigation contributing to the dissertation for a graduate degree. (S/U grading only.)

Professional Courses

410. Physician Scientist Molecular Medicine Journal Club (1) Lecture—1 hour. Weekly seminars by students on research articles in current literature. Topics/articles to be selected to include a broad range of frontier in biomedical literature. May be repeated for credit. (H/P/F grading only.)—I. (I) Bevis

415. Medical Parasitology (5) Lecture—3 hours; laboratory—6 hours. Prerequisite: medical student with consent of instructor. Approved for graduate degree credit. Epidemiological, pathogenesis, diagnostic methods and laboratory studies of protozoa, helminths and arthropods of medical importance. Offered in alternate years. (Same course as 215.) (H/P/F grading only.)—I. Thesis

420. Current Concepts in Bacterial Ultrastructure (2) Discussion—2 hours; formal presentation or term paper. Prerequisite: medical students with consent of instructor. Evaluation of current status of bacterial ultrastructure with an emphasis on host-parasite interactions through discussions of assigned readings. (H/P/F grading only.)—II, III (II, III) Beamman

430. Medical Mycology (2) Lecture—2 hours. Prerequisite: a course in pathogenic mycology and consent of instructor. Various aspects of pathogenic fungi, particularly affecting humans, will be discussed including epidemiology, pathogenesis and pathology, diagnosis and therapy. Offered in alternate years. (Same course as 130.) (H/P/F grading only.)—II. Pappagianis

480A. Medical Immunology (2.5) Lecture—2 hours; laboratory/discussion—5 hours. Prerequisite: approval of Committee on Student Progress; medical students only. This course helps students understand the immune system, the nomenclature and functional significance of the tissues, cells, proteins and genes of the immune system, as well as the normal regulatory mechanisms and pathologic outcomes related to the immune response. (Deferred grading only, pending completion of sequence. P/F grading only.)—I, II, III, (I, II, III) Shacklett, Torres

480B. Pathogenic Microbiology (5.5) Lecture—2.75 hours; laboratory/discussion—1 hour. Prerequisite: approval of the School of Medicine Committee on Student Progress; medical students only. Discussion of the diseases caused by infectious agents includes their pathogenesis, clinical manifestations, diagnosis, treatment epidemiology and prevention. The course will cover the general properties of and diagnostic techniques for bacteria, fungi and viruses. (Deferred grading only, pending completion of sequence. P/F grading only.)—II, III, (II, III) Luckhart, Mudry, Tools

497T. Tutoring in Medical Microbiology (1-5) Tutoring—3-15 hours. Prerequisite: appropriate preparation in subject matter and consent of instructor. Assist instructor by helping medical students in one of the departmental courses that is a component of the required curriculum of the School of Medicine. (H/P/F grading only.)

498. Group Study in Medical Microbiology and Immunology (1-5) Prerequisite: medical students with consent of instructor. Directed reading and discussion and/or laboratory investigation on selected topics. (H/P/F grading only.)

499. Research (1-12) Prerequisite: medical students with consent of instructor. (H/P/F grading only.)

Master of Public Health (MPH) Graduate Course

210. Public Health Informatics (1) Lecture—2 hours. Collection, verification, and utilization of data related to populations; infrastructure, functions, and tools used to generate public health knowledge supporting public health practices and policy development/designation. (S/U grading only.)—Hogarth, Dobbett

266. Applied Analytic Epidemiology (3) Lecture—2 hours; laboratory—2 hours. Prerequisite: Preventive Veterinary Medicine 404 or consent of instructor. Principles and applications in analysis of epidemiologic data. Methods of analyzing stratified and matched data, logistic regression for cohort and case-control studies, Poisson regression, survival-time methods. (Same course as Public Health and Reproduction 266.)—III. (III) Kass

Medical Pharmacology and Toxicology (PH4)

Lower Division Courses

92. Internship in Pharmacology (1-12) Internship—3-36 hours; final report. Prerequisite: lower division student with good academic standing; approval of project prior to period of internship. Supervised work experience in pharmacology and related fields. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) Prerequisite: lower division standing. (P/NP grading only.)

Upper Division Courses

192. Internship in Pharmacology (1-12) Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project prior to period of internship. Supervised work experience in pharmacology and related fields. (P/NP grading only.)
198. Directed Group Study (1-5)  
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)  
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200. Advanced General Pharmacology (3)  
Lecture—3 hours. Prerequisite: upper division courses in biochemistry (101A-101B) and mammalian physiology (111A-111B and 112-113) or the equivalent (may be taken concurrently). Core course in human pharmacology designed for graduate and medical students. Students in pharmacology, including pharmacokinetics and drug metabolism and the actions, uses and toxicity of the major classes of drugs. —I (I.)

208. Advanced General Pharmacology (4)  
Lecture—4 hours. Prerequisite: upper division courses in biochemistry (101A-101B) and mammalian physiology (111A-111B and 112-113) or the equivalent (may be taken concurrently). Core course in human pharmacology designed for graduate and medical students. The actions, use and toxicity of the major classes of drugs. —II (II.)

250. Functional Genomics: From Bench to Bedside (2)  
Lecture/discussion—2 hours. Prerequisite: consent of instructor. Functional genomics (gene regulation, microarrays, proteomics), with an emphasis on clinical relevance. Topics include cancer therapeutics, gene therapy, and biomarker discovery. —III (III.) Farnham

291. Pharmacology Research Seminar Series (1)  
Seminar—1 hour; discussion—1 hour. Prerequisite: consent of instructor; upper division or graduate standing. Research seminars on current topics in Pharmacology. May be repeated for credit when topic differs. (S/U grading only) —I, II, III, IV (I, II, III, IV.) Wulff

298. Group Study (1-5)  
Prerequisite: consent of instructor.

299. Research (1-12)  
Prerequisite: consent of instructor. (S/U grading only.)

Professional Courses

400A. Pharmacology (2)  
Lecture—1 hour; discussion/lab—3 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical students only. Principles in pharmacology, including pharmacokinetics, drug metabolism and the actions, uses and toxicities of the major classes of drugs. (Deferred grading only, pending completion of sequence. P/F grading only)—I, II, III, IV (I, II, III, IV.) Gelli, Wulff

400B. Pharmacology (1.5)  
Lecture—1 hour; discussion—25 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical students only. Principles in pharmacology, including autonomic pharmacology, general anesthetics, neuropsychopharmacology and stress hormones. (Deferred grading only, pending completion of sequence. P/F grading only)—IV (IV.) Albertson, Segal

400C. Pharmacology (1.5)  
Lecture—1 hour; discussion—25 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical student only. Topics taught include the treatment of respiratory and cardiovascular disease. Specific topics include: asthma, chronic obstructive pulmonary disease, hypertension, congestive heart failure, and the treatment of arrhythmias. (Deferred grading only, pending completion of sequence. P/F grading only)—I (I.)

400D. Pharmacology (2)  
Lecture—2 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical student only. Pharmacology topics covered include central nervous system drugs, GI drugs, toxicology/poisoning and cancer chemotherapy. Specific topics are: anesthesia, local anesthetics, pain management, the treatment of depression and psychosis, acid reflux disease, irritable bowel syndrome, and geriatric toxicology. (P/F grading only) —II (II.) Albertson, Diaz

445. Introduction to Integrative Medicine (1)  
Lecture/discussion—1 hour. Prerequisite: medical student in good standing. Basic principles of alternative medical systems (e.g., traditional Chinese, Ayurvedic, Tibetan), alternative practices (e.g., chiropractic, osteopathy, naturopathy, homeopathy, herbalism, guided imagery/meditation, massage therapy), and mind/body connection are presented as an introduction to integrating alternative treatments into traditional medical practice. (H/P/F grading only) —II (II.) Diaz

490. Seminar in Pharmacology for Medical Students (1)  
Seminar—1 hour. Prerequisite: consent of instructor. Seminar in pharmacology for medical students. (H/P/F grading only) —I, II, III, IV (I, II, III, IV.)

497T. Tutoring in Pharmacology (1-5)  
Tutoring—3-15 hours. Prerequisite: advanced standing or consent of instructor. Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum at the School of Medicine. (H/P/F grading only)

498. Special Study for Medical Students (1-5)  
Lecture, directed reading, and/or discussion groups—3-15 hours. Prerequisite: consent of instructor. Special study in pharmacology for medical students. (H/P/F grading only)

499. Directed Research for Medical Students (1-12)  
Laboratory—3-36 hours. Prerequisite: consent of instructor. Directed research in pharmacology for medical students. (H/P/F grading only)

Neurology (NEU)

Upper Division Course

199. Individual Special Study and Research (1-4)  
Prerequisite: consent of instructor. Individual special study in neuropsychopharmacology and biomedical engineering is offered to capable students. Studies on psychophysics, single-unit electrophysiology and instrumentation are offered in Davis. (P/NP grading only)

Graduate Courses

201. Human Behavioral Neurobiology (2)  
Lecture/discussion—2 hours. Prerequisite: Cell Biology and Human Anatomy 202, Psychology 108 or 110. Neurobiology of normal and abnormal behavior of humans, based on single neuron anatomy, neurophysiological, and cognitive parameters. Evaluation of these parameters will be, for example, by application of clinical neuropsychology, neuropsychophysics, and neuroimaging tests. —I (I.)

202. Visuomotor Neurobiology (2)  
Seminar—2 hours. Prerequisite: course 201, Cell Biology and Human Anatomy 203. An overview of neural mechanisms of directed behavior in humans will examine the integration of visual attention and eye movements. Performance of normal humans and neurologic patients in reflexive orienting, visual search, reading and reaching will be considered. Offered in alternate years. —III (III.)

290. Seminar in Selected Topics (1)  
Seminar—1 hour. Prerequisite: consent of instructor. Selected topics in Neuroscience will be offered. (S/U grading only) —Goorin

298. Group Study (1-5)  
Prerequisite: consent of instructor. For graduate students desiring to explore particular topics in depth. Lectures and conferences may be involved. (S/U grading only)

299. Individual Special Study and Research (1-12)  
Laboratory—3-36 hours. Prerequisite: consent of instructor. Individual special study and research in Neuropsychopharmacology and Biomedical Engineering is offered at both Davis and Sacramento Medical Centers. (S/U grading only.)

Professional Courses

420. Clinical Neurosciences (2)  
Lecture/discussion—1 hour; lecture—1.5 hours. Prerequisite: medical students only. Pathophysiology underlying neurological disorders, including disorders of development, muscle, nerve, cerebral circulation, metabolism, myelin, cortical function, movement, cerebrospinal fluid, autonomic function and special senses. Anatomical basis of clinical testing, nervous system infection, neoplasia and trauma. (P/F grading only) —IV (IV.) Wheelock

450. Clinical Neurology Clerkship (6)  
Clinical activity—24 hours; conference—12 hours; seminar—4 hours; independent study—10 hours. Prerequisite: fourth-year medical student or third-year medical student with consent of instructor. Critical elements of neurological clinical skills (history & exam) and basic and clinical neurological concepts expected for general residency preparation. Active, didactic, experiential and independent learning to encourage maturation of general professional competencies. (H/P/F grading only) —I, II, III, IV; I, II, III, IV; I, II, III, IV; Wheelock

451. Clinical Neurology Clerkship (3-6)  
Clinical activity—full time (24 weeks at Highland General Hospital, Oakland). Prerequisite: fourth-year medical student. Essentials of detailed neurological examination and principles of differential neurological diagnosis. Emphasis on common neurological disorders encountered in practice. (H/P/F grading only) —I, II, III, IV; I, II, III, IV; I, II, III, IV; Wheelock

452. Advanced Clinical Neurology (6)  
Clinical activity—full time (4 weeks). Prerequisite: completion of four-week Neurology selective and consent of instructor. Extension of basic Neurology clerkship. Designed for students with special interest in medical disorders of the nervous system. By arrangement with department, student may serve as an acting intern. Principles of neurological differential diagnosis and therapeutics emphasized. (H/P/F grading only) —II, III, IV; I, II, III, IV

453. Advanced Clinical Neurology (6)  
Clinical activity—full time (4 weeks at Highland General Hospital, Oakland). Prerequisite: completion of four-week Neurology selective and consent of instructor. Extension of basic Neurology clerkship. Designed for students with special interest in medical disorders of the nervous system. By arrangement with department, student may serve as an acting intern. Principles of neurological differential diagnosis and therapeutics emphasized. (H/P/F grading only) —II, III, IV; I, II, III, IV

454. Electroencephalography and Evoked Potentials (3-18)  
Clinical activity—full time (2-12 weeks) technique and interpretation. Prerequisite: four-week Neurology clerkship and consent of instructor. Principles of electroencephalographic diagnosis including technical basis of electroencephalography and evoked potentials. Emphasis placed on how these studies are applied to neurological diagnoses. (H/P/F grading only) —I, II, III, IV; I, II, III, IV; Batchen, Selay

455. Child Neurology (6)  
Clinical activity—full time (4 weeks). Prerequisite: satisfactory completion of Internal Medicine 430, Obstetrics and Gynecology 430, Pediatrics 430 and consent of instructor. Student exposed to children with disorders of the nervous system, both in an outpatient and inpatient services. Cases presented to a member of full-time faculty who will discuss clinical findings, differential diagnosis, management and therapy. This course satisfies the fourth-year neuroscience requirement. (H/P/F grading only) —I, II, III, IV; I, II, III, IV
456. Cortical Neurology (3-18)
Clinical neurological research—full time (12 weeks at Highland General Hospital, Oakland). Prerequisite: course 451 or the equivalent; consent of instructor. Student will pursue a small project in clinical neurological research on higher cortical functions. The focus is on the scientific analysis of behavior in disease states. Study may be arranged for from two weeks to twelve weeks, with units corresponding to length of course. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Remler

457. Special Topics in Neurology (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: course 450, 451 or consent of instructor. Students study areas of special interest in tutorial manner under supervision of member of faculty with expertise and interest in elected field. Students may elect tutorial clinical experience with member of staff. (H/P/F grading only.)—I, II, III, IV, (I, III, IV)

458. Introduction to Cognitive and Communication Disorders (3)
Lecture—3 hours; observations, individual projects. Prerequisite: consent of instructor. Introduction to cognitive and communication disorders. Includes a survey of disorders subsequent to brain damage, management by neurology, neuropsychology, and speech pathology; and current research on appraisal, diagnosis, and treatment. (H/P/F grading only.)—I

459. Independent Study in Neurogenic Communication Disorders (1-3)
Conference, observation and data collection—3-9 hours. Prerequisite: consent of instructor. Independent study of neurogenic communication disorders—aphasia, dementia, apraxia of speech, dysarthria. Designed for individual interest and includes discussions, directed reading, research design, data collection, and preparation of results. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Drunkers

460. Special Clinical Elective in Neurology (6-18)
Clinical activity—full time (minimum of one-half quarter). Prerequisite: fourth-year medical student or third-year medical student with completion of a medical clerkship; consent of Chairperson. Clerkship in neurology to be arranged at another institution with accredited residency programs in neurology under proper supervision. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Wheelock

462. Special Clinical Elective in Neurology (6-18)
Clinical activity—full time (4 to 12 weeks). Prerequisite: fourth-year medical student or third-year medical student with completion of a medical clerkship; consent of Chairperson. Clerkship in neurology to be arranged at another institution with accredited residency programs in neurology under proper supervision. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV)

464. Clinical Neurology (3-18)
Clinical activity—full time (minimum of one-half quarter). Prerequisite: fourth-year medical student or third-year medical student with completion of a medical clerkship; consent of Chairperson. Clerkship in neurology to be arranged at another institution with accredited residency programs in neurology under proper supervision. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Wheelock

466. Special Clinical Elective in Neurology (6-18)
Clinical activity—full time (4 to 12 weeks). Prerequisite: fourth-year medical student or third-year medical student with completion of a medical clerkship; consent of Chairperson. Clerkship in neurology to be arranged at another institution with accredited residency programs in neurology under proper supervision. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV)

470. Advanced Clinical Neurosurgery (6-18)
Clinical activity—full time (4-12 weeks). Prerequisite: second-year medical student in good academic standing; consent of instructor. Observation of the surgical care of patients. (H/P grading only.)—I, II, III, IV, (I, II, III, IV)

480. Insights in Neurology (1-3)
Discussion—3 hours; clinical activity—3 to 9 hours. Prerequisite: student in good academic standing; consent of instructor. Attendance at neurology grand rounds and regular rounds following. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV)

498NE. Group Study in Neurology (1-6)
Prerequisite: medical students with consent of instructor. Active participation in discussions with a comprehensive written examination at the end of course. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV)

499. Research (1-12)
Laboratory—2-24 hours. Prerequisite: consent of instructor. Preparation for graduate degree credit. Laboratory investigation on selected topics. (H/P/F grading only for graduate and medical students.)

Neurosurgery (NSU)
Upper Division Course
190. Special Study in Neurosurgery for Advanced Undergraduates (1-5)
Prerequisite: advanced undergraduate standing with consent of instructor. Students may participate in ongoing neurological projects or pursue and design independent projects. (P/NP grading only)

Graduate Course
299. Neurosurgery Research (3-12)
Prerequisite: graduate student with consent of instructor. Student may participate in ongoing neurosurgical projects or pursue and design independent projects. (S/U grading only)

Professional Courses
451. Neurosurgical Critical Care Clerkship (3)
Clinical activity—full time (2 weeks). Prerequisite: third- or fourth-year medical student having completed a neurological clerkship or consent of instructor. Students participate in the care of neurosurgical patients in the NSICU and in the admission and surgical management of patients admitted through the Emergency Room. (H/P/F grading only.)—I, II, III, IV

455. Clinical Pediatric Neurosurgery (6)
Clinical activity—full time (4 weeks). Prerequisite: third- or fourth-year medical students who have satisfactorily completed course 450; consent of instructor. Admission and follow-up of pediatric patients. Neurological history, examination, and diagnostic procedures are emphasized. Students will participate in surgical procedures required to attend all pediatric neurosurgical conferences. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Pang

460. Clinical Neurosurgery (6-18)
Clinical activity—full time (3 days per week; 4 weeks minimum). Prerequisite: third- or fourth-year medical students; consent of instructor. Approved for graduate degree credit. Admission and follow-up of patients. Neurological history, examination and further diagnostic procedures are emphasized. Students participate in meaningful aspects of surgical procedures and attend listed conferences, rounds, and seminars. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV)

464. Externship (6-18)
Clinical activity—full time (4-12 weeks). Prerequisite: fourth-year medical student having completed a neurosurgical clerkship or consent of instructor. Clerkship in neurosurgery to be arranged at another institution with accredited residency program in neurosurgery under proper supervision. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV)

470. Advanced Clinical Neurosurgery (6-18)
Clinical activity—full time (4-12 weeks). Prerequisite: second-year medical student in good academic standing; consent of instructor. Observation of the surgical care of patients. (H/P grading only.)—I, II, III, IV, (I, II, III, IV)

480. Insights in Neurosurgery (1-3)
Clinical activity—3 to 9 hours. Prerequisite: student in good academic standing; consent of instructor. Attendance at neurology grand rounds and regular rounds following. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV)

498NE. Group Study in Neurosurgery (1-6)
Prerequisite: medical students with consent of instructor. Active participation in discussions with a comprehensive written examination at the end of course. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV)

500. Research (1-12)
Laboratory—2-24 hours. Prerequisite: consent of instructor. Preparation for graduate degree credit. Laboratory investigation on selected topics. (H/P/F grading only for graduate and medical students.)

Obstetrics and Gynecology (OBG)
Upper Division Courses
190. Seminar in Early Mammalian Development (1)
Seminar—1 hour. Each student will be asked to present a paper from the recent scientific literature on various research topics in early mammalian development. Short paper will be required at the end of course. (I, II, III, IV, (I, II, III, IV) Kulkarni-Dale, Sweeney, Towner, Turgeon

210. Seminar in Early Mammalian Development (1)
Seminar—1 hour. Each student will be asked to present a paper from the recent scientific literature on various research topics in early mammalian development. Short paper will be required at the end of course. (I, II, III, IV, (I, II, III, IV) Kulkarni-Dale, Sweeney, Towner, Turgeon

299. Research (1-12)
Prerequisite: graduate standing; consent of instructor. (S/U grading only)

Professional Courses
405. Metabolism, Endocrinology, Reproduction and Nutrition (9.5)
Lecture—3 hours; discussion/ laboratory—2.8 hours. Prerequisite: consent of instructor; medical students only. Basic and pathophysiological processes involved in human metabolic and nutritional regulation and in reproductive and endocrine control systems across the lifespan. Integrate information across these systems and use clinical reasoning process to identify and understand relevant perturbations and diseases. (Same course as Biological Chemistry 405, Internal Medicine 405, Human Physiology 405) (Deferred grading only, pending completion of sequence. P/F grading only.)—I, II, III, IV, (I, II, III, IV) Kulkarni-Dale, Sweeney, Towner, Turgeon

420. Genetics and Reproduction (2)
Lecture—3 hours; conference—2.8 hours. Prerequisite: approval of Committee on Student Progress; medical students only. Introduction to medical genetics and the clinical consequences of genetic abnormalities. Aspects of reproduction, gamogenesis, development of the conceptus, maternal adaptation to pregnancy, labor and delivery and menopause. (P/F grading only.)—I, II, (I, II) Lorch

430. Obstetrics and Gynecology Clerkship (12)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Obstetrics, gynecology and gynecological oncology experience in the delivery room, operating room, clinics and wards at UCSDMC and affiliated sites. Rounds, conferences, interactive student presentations and seminars ongoing. (H/P/F grading only.)—I, II, III, IV, Darylmy

465. Elective Clerkship (4-18)
Clinical activity—full time (3 days per unit). Prerequisite: third- and fourth-year medical student; course 430 or the equivalent; consent of instructor. Active
Graduate Course

299. Basic Research in Visual Science (1-12)
Prerequisite: consent of instructor. (S/U grading only)

Professional Courses

440. Ophthalmology Required Clerkship (3)
Clinical activity—full-time (2 weeks). Prerequisite: consent by Committee on Student Evaluation and Promotion. Fundamental knowledge of ophthalmic diagnosis and principles, basic ophthalmic instruments; understanding of treatments and eye problems manageable by a primary care physician; knowledge of what patients should be referred for ophthalmic care. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV) J. Brandt

442. Ophthalmology Clerkship (3)
Clinical activity—40 hours. Prerequisite: fourth-year medical student or third-year medical student with completed clerkships in medicine and surgery and consent of instructor and adviser. Ocular disease diagnosis and management relevant to the clinical practice of future primary care physicians and specialists. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV)

461. Basic Clinical Ophthalmology (4.5)
Clinical activity—time varies for credit. Prerequisite: medical students who have completed either Medical Sciences 430 or course 440 (in third or fourth year); consent of instructor. Provides an acquaintance with the fundamentals of routine clinical ophthalmology. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV) J. Brandt

465. Advanced Subspecialty Ophthalmology (6-9)
Clinical activity—be arranged (4 weeks off campus or 6 weeks at UC Davis Medical Center). Prerequisite: medical students who have completed Internal Medicine 430 (in third or fourth year); consent of instructor. Participation in disciplines of neuro-ophthalmology/pediatric ophthalmology, diseases of the cornea and external eye, glaucoma and retina. Rotations at UC Davis Medical Center may be arranged in 6-week units of one service alone, or in combination, as arranged with instructors. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV) Mannis, Karlin, J. Brandt

480. Insights in Orthopaedic Surgery (1-3)
Clinical activity—3–9 hours. Prerequisite: first- and second-year medical students in good academic standing; consent of instructor. Exposure to aims, methods and procedures in orthopaedic surgery via attendance at grand rounds, patient care conferences, and group discussions. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV) Yoo

498. Research in Ophthalmology (1-12)
To be arranged—3–36 hours. Prerequisite: medical students with consent of instructor. Individual research on selected topics in optics and visual physiology, cornea and external disease. (H/P/F grading only)

Orthopaedic Surgery (OSU)

Lower Division Course

99. Special Studies for Undergraduates (1-4)
Prerequisite: lower division standing and consent of instructor. (P/NP grading only)

Upper Division Course

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

Professional Course

421. The Musculoskeletal System (2.5)
Lecture/discussion—6 hours. Prerequisite: consent of Committee on Student Progress. Basic and clinical science of orthopaedic surgery and rheumatology. (P/F grading only)—I. Fujiwara

428. Ambulatory and Emergency Room Orthopaedics (3-6)
Clinical activity—full-time (2-4 weeks). Prerequisite: fourth-year medical student in good academic standing and consent of instructor. Introduction to general orthopaedic problems and trauma and their management in an outpatient environment, including the emergency room. Student will conduct orthopaedic examinations, present patients to staff rotating through trauma, hand, pediatrics, adult and foot clinics. Orthopaedic physical examination and interpretation of x-rays. Limited enrollment. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV) Yoo

462. Community Preceptorship (3-6)
Clinical activity—full time (2 weeks). Prerequisite: fourth-year medical student in good academic standing with consent of instructor. Acquaints student with private practice of orthopaedics in the community setting. Opportunity to observe and assist private practitioners in office, emergency room, operating room, and inpatient environment. Student must provide own transportation. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV) Bovill, Yoo

464. Acting Internship (6)
Clinical activity—full time (4 weeks). Prerequisite: first- and second-year medical students in good academic standing and consent of instructor. Rotation designed to increase basic knowledge of musculoskeletal abnormalities at clinical level. Attention focused on select case material. For those students who demonstrate proficiency, responsibility will be similar to that of intern. Limited enrollment. May be repeated for credit. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV) Yoo

480. Insights in Orthopaedic Surgery (1-3)
Clinical activity—3–9 hours. Prerequisite: first- and second-year medical students in good academic standing; consent of instructor. Exposure to aims, methods and procedures in orthopaedic surgery via attendance at grand rounds, patient care conferences, and group discussions. (H/P/F grading only)—I, II, III, IV, (I, II, III, IV) Szabó

498. History of Medicine for Medical Students (1.5)
Lecture/discussion—2.5 hours (for six weeks). Prerequisite: third- or fourth-year students in the School of Medicine or second-year students with consent of instructor. Overview of the history of medicine throughout the world to introduce medical students to landmark accomplishments and key figures in the development of health care and to provide an expanded philosophical perspective on the ever-changing field of modern medicine. (H/P/F grading only)—I, (I) Benson

499. Orthopaedics Research (1-12)
Clinical activity—3 hours to full time (to be arranged with individual faculty). Prerequisite: third- or fourth-year medical student in good academic standing; consent of instructor. Laboratory or clinical investigations on selected topics. May be repeated for credit. (H/P/F grading only)

Otolaryngology (OTO)

Lower Division Courses

192. Internship in Otolaryngology (1-12)
Internship—3 to 36 hours. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in otolaryngology and related fields. Final project report. (P/NP grading only)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)
199. Special Study in Otolaryngology for Advanced Undergraduates (1-5)
Prerequisite: advanced undergraduate with consent of instructor. (P/NP grading only) — I, II, III, IV. Vasquez

Graduate Courses

290C. Research Conference in Otolaryngology (1)
Lecture/discussion — 1 hour. Prerequisite: graduate students, medical students, advanced undergraduates with consent of instructor. Presentation and discussion of faculty and student research in otolaryngology. (S/U grading only) — I, II, (I, II.)

291. Principles of Speech, Hearing and Equilibrium (3)
Lecture/discussion — 3 hours. Prerequisite: graduate students, medical students, advanced undergraduates with consent of instructor. Presentations by faculty and guest lecturers on anatomy, physiology, and behaviors involved in speech production, hearing, and equilibrium. Each student will be expected to make one class presentation. — I, II, III, IV. Leonard

298. Group Study (1-5)
(S/U grading only)

299. Individual Study in Otolaryngology for Advanced Graduate Students (1-12)
Prerequisite: advanced graduate student with consent of instructor. (S/U grading only)

Professional Courses

403. Basic Principles of Reconstructive Surgery (1)
Lecture — four 2-hour sessions; laboratory — one 2-hour session (4 weeks). Prerequisite: third- or fourth-year medical student with consent of instructor. Formal presentations covering basic principles of reconstructive surgery, including wound healing, treatment of lacerations, skin and bone grafts, flaps, Z-plasties and revision of scars. Laboratory session utilizing animal tissues. — II. (II) Donald

440. Otolaryngology Required Clerkship (3)
Clinical activity — full time (2 weeks). Prerequisite: consent by Committee on Student Evaluation and Promotion. To provide fundamental knowledge of otolaryngologic diagnosis and principles, develop facility with basic ENT instruments, provide an understanding of treatment for ear, nose and throat problems and provide knowledge of what patients should be referred for otolaryngologic care. — I, II, III, IV. Diaz

450. Fourth Year Otolaryngology Elective (6)
Clinical activity — 35 hours; lecture — 2 hours; film-viewing — 0.25 hours; discussion — 1 hour. Prerequisite: third or fourth-year medical student; consent of instructor. Participation in Otolaryngology Clinic and operating room. Evaluation and management of common otolaryngologic diseases. (P/F grading only) — I, II, III, IV. Diaz

460. Clinical Otolaryngology Elective (3-18)
Clinical activity — full time. Prerequisite: third- and fourth-year medical students with consent of instructor; open to graduate students. Approved for graduate credit. (Deferred grading only) — I, II, III, IV. Diaz

490. Journal Seminar (1)
Lecture/discussion — 10 hours total (course given three times per quarter). Prerequisite: fourth-year medical students with consent of instructor; open to graduate students. Approved for graduate degree credit. Monthly review of current otolaryngologic and related literature and recent advances. (P/F grading only) — I, II, III, IV. (I, II, III, IV) Diaz

498. Individual or Group Study (1-5)
Lecture/discussion — 1-2 hours; laboratory — 1-4 hours. Prerequisite: consent of instructor. Introduction to basic research in Otolaryngology. Lectures, discussion and laboratory study of sensory and motor systems. (H/P/F grading only) Diaz

499. Research (1-12)
Prerequisite: medical students with consent of instructor; open to graduate students. Approved for graduate degree credit. Participation in ongoing projects. (H/P/F grading only) Brodie

Pathology (PMD)

Upper Division Courses

192. Internship in Human Pathology (1-12)
Internship — 3-36 hours; final project report. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in pathology and related fields. (P/NP grading only)

199. Special Study in Pathology for Advanced Undergraduates (1-5)
Prerequisite: advanced undergraduates and consent of instructor. (P/NP grading only)

Graduate Courses

298. Advanced Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only)

Professional Courses

405. Brain Cutting Conference (1-4)
Seminar — 1-4 hours. Prerequisite: third- and fourth-year medical students or consent of instructor. Current specimens are sectioned, discussed, and clinical correlations presented. — I, II, III, IV. (I, II, III, IV) Ellis

407. Advanced Neuropathology (1-12)
Discussion and laboratory. Prerequisite: consent of instructor. Study of pathologic reaction in human central and peripheral nervous systems and skeletal muscle by microscopic, light and electron microscopic examination of current and archival material. Discussions of clinical correlations and current medical literature. Individualized experience in neuropathologic techniques. (H/P/F grading only) — I, II, III, IV. (I, II, III, IV) Ellis

410A. General Pathology (2.5)
Lecture — 4 hours; laboratory/discussion — 4.5 hours. Prerequisite: approval of Committee on Student Progress; medical students only. Pathologic mechanisms of human disease. Emphasis on integration of clinical practice with gross and histologic images. (P/F grading only) — I, (I) Gandour-Edwards, Jensen

410B. Systemic Pathology (1)
Lecture — 1 hour; laboratory/discussion — 5 hours. Prerequisite: Approval by SOM Committee on Student Progress; medical student only. Concepts of general pathologic processes, i.e., cell death, inflammation and neoplasia in the context of specific organ systems and human diseases in a clinical context. (Deferred grading only, pending completion of sequence. P/F grading only) — IV. (IV) Gandour-Edwards, Jensen

410C. Systemic Pathology (2)
Lecture — 1 hour; discussion — 2 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress. Anatomic and clinical pathology of organ system human disease with an emphasis on integration with clinical medicine. Topics include hematopathology, gynecologic pathology, endocrine pathology, and musculoskeletal pathology. (Deferred grading only, pending completion of sequence. P/F grading only) — I. (I) Gandour-Edwards, Jensen

410D. Systemic Pathology (2.5)
Lecture — 1 hour; discussion — 2 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical students only. Anatomic and clinical pathology of organ system human disease with an emphasis on integration with clinical medicine. Course content will closely parallel current clinical courses with integration of lectures and discussions sections. Topics include gastrointestinal pathology, hepatopathology, nutritional pathologies. (Deferred grading only, pending completion of sequence. P/F grading only) — II. (II) Gandour-Edwards, Jensen

464. Anatomic Pathology (3-6)
Clinical activity — 40 hours. Prerequisite: third- or fourth-year medical student or consent of instructor; medical students only. Anatomic pathology with an emphasis in surgical pathology and correlation to clinical practice. Specimen grossing, frozen sections, microscopic sign-out and conferences. Exposure to autopsy, cytology, hemopathology, and clinical pathology. (H/P/F grading only) — I, II, III, IV. (I, II, III, IV) Gandour-Edwards

465. Applied Clinical Laboratory Medicine (6-9)
Prerequisite: consent of instructor. Emphasis upon laboratory techniques, procedures, and interpretation of laboratory results. Students will be expected to participate fully in and all laboratory operations including bench techniques, laboratory management, and quality control. (P/F grading only) — I, II, III, IV. (I, II, III, IV) Kost

497T. Tutoring in Pathology (1-5)
Tutoring — 3-15 hours. Prerequisite: advanced standing or consent of instructor. Assist instructor by tutoring medical students in preparation for one of the departmental courses that is a component of the required curriculum of the School of Medicine. (H/P/F grading only)

499. Advanced Group Study (1-5)
Prerequisite: medical student and consent of instructor. Group study in variety of advanced topics in general, special, experimental, or comparative pathology. (H/P/F grading only)

499. Research (1-18)
Prerequisite: medical student with consent of instructor. Research in experimental, molecular, comparative, and applied pathology. Limited enrollment. (H/P/F grading only)

PEDIATRICS (PED)

Upper Division Course

199. Special Study in Pediatric Research (1-5)
Prerequisite: undergraduate student with consent of instructor based upon adequate preparation as determined by instructor. (P/NP grading only)

Graduate Course

299. Pediatric Research (1-12)
Prerequisite: graduate students who are candidates for a degree in some area of biology or behavioral sciences; consent of instructor. (S/U grading only)

Professional Courses

401. Preceptorship in Pediatrics (2)
Preceptorship — half time. Prerequisite: second-year medical student or first-year medical student with consent of instructor. Opportunity to observe and participate in primary medical care in a practicing pediatrician’s office. Participation in history-taking and physical examination will be at discretion of preceptor and dependent on student’s experience. Evaluation by student. (H/P/F grading only) — I, II, III, IV. (I, II, III, IV)

402. Clinical Experience in Private Practice (1-18)
Clinical activity — full time (2 to 12 weeks). Prerequisite: third- or fourth-year medical student; course 430; consent of preceptor and Chairperson. Opportunity to participate in practice of preceptor, performing such tasks as history taking, physical examination and patient management. (H/P/F grading only) — I, II, III, IV. (I, II, III, IV)

430. Pediatric Clerkship (12)
Clinical activity — 45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Eight week clinical clerkship providing students with the opportunity to learn fundamentals of caring for the pediatric patient by participating in nursery, ambulatory and inpatient services at UCSDMC and
460A. Acting Internship: General Inpatient Pediatric Clerkship (6-18)
Clinical activity—full time (4 to 12 weeks). Prerequisite: completion of course 430 with grade of B or better; letter of recommendation from Pediatrics faculty member. The Ward Acting Intern functions in a manner similar to that of a pediatric intern. The Acting Intern takes admissions in the regular sequence and is expected to take night call. The Acting Intern can expect to manage between six and ten patients at a time. Limited enrollment. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV) Connors

460B. Acting Internship: Outpatient Pediatrics (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: completion of course 430 with grade of B or better; letter of recommendation from Pediatrics faculty member. Supervised experience in pediatric care on outpatient service at UC DMC. Student functions as “Acting Intern” with appropriate supervision by residents and attending faculty. Limited enrollment. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV) Connors

461. Elective in Hematology/Oncology (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430; consent of instructor. Inpatient and outpatient experience in diagnosis and management of hematologic disorders in children. Laboratory experience and participation in clinical investigation may be arranged. Limited enrollment. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV) Wold

462. Elective in Pediatric Endocrinology (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: completion of second-year study or the equivalent; consent of instructor. Inpatient and outpatient experience in diagnosis and management of endocrine disorders in children. Laboratory experience and participation in clinical investigation may be arranged. Limited enrollment. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV)

464. Acting Internship in Neonatology (6-18)
Clinical activity—full time (4 to 12 weeks). Prerequisite: completion of course 430 with grade of B or better; letter of recommendation from Pediatrics faculty member. Diagnostic and therapeutic aspects of the medical and surgical neonate. Student expected to take night call. Limited enrollment. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV) Neru

465. Pediatric Specialty Clinic Elective (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430; consent of instructor. Supervised experience in a variety of pediatric subspecialty clinics. Limited enrollment. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV) Oberholtzer

466. Elective in Pediatric Cardiology (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430. Inpatient and outpatient experience in diagnosis and management of cardiovascular diseases in children. Laboratory experience and participation in clinical investigation may be arranged. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV) Parashar

467. Elective in Pulmonary Medicine (3-18)
Clinical activity—full time (2 to 12 weeks); daily rounds, two weekly half-day clinics. Prerequisite: pediatric clerkship. Inpatient and outpatient management of pediatric patients with pulmonary diseases. These will include but will not be limited to cystic fibrosis, asthma, and other forms of chronic pulmonary diseases as well as congenital abnormalities. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV) McDonald, Jared

468. Elective in Pediatric Nephrology (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430; consent of instructor. Inpatient and outpatient experience in diagnosis and management of renal disorders in children. Laboratory experience and participation in clinical investigation may be arranged. Limited enrollment. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV) Makker

469. Elective in Pediatric Infectious Disease (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430; consent of instructor. Inpatient and outpatient experience in diagnosis and treatment of infectious disease of infants and children. Laboratory and clinical investigation may be arranged. Limited enrollment. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV) Wenman

470. Elective in Pediatric Neurology (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430, Internal Medicine 430, Obstetrics and Gynecology 430, and Pediatrics 430 and consent of instructor. Inpatient and outpatient experience in diagnosis and management of neurological disorders in children. Laboratory experience and participation in clinical investigation may be arranged. Limited enrollment. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV) Gosp

471. Elective in Pediatric Gastroenterology (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430; consent of instructor. Inpatient and outpatient experience in diagnosis and management of gastroenterology disorders in children. Laboratory experience and participation in clinical investigation may be arranged. Limited enrollment. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV)

472. Clinical Rotation in Adolescent Medicine (3-18)
Clinical activity—39 hours; lecture—1 hour. Prerequisite: consent of instructor; fourth-year medical student. Under supervision, students will see patients in the UC Davis clinic and at a number of community-based sites. Emphasis on the socially-mediated problems that face adolescents, including substance abuse, STD’s, pregnancy, depression and suicide. One hour of lecture each week. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV) Wilkes

476. Acting Internship in Pediatric Intensive Care (6-18)
Clinical activity—full time (4 to 12 weeks). Prerequisite: completion of course 430 with grade of A or consent of instructor. Clinical experience in management of critically ill children. Students will work closely with the UC Davis Pediatric Intensive Care Unit. Emphasis is on supervision and care of the mechanically ventilated patient. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV) Davis

498. Directed Group Study (1-5)
Variable—3-15 hours. Explore in-depth various topics in Pediatrics. Extensive contact with and oversight by faculty mentor. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV) Li

499. Research Topics in Pediatrics (1-18)
Prerequisite: student in Medical School with consent of instructor. Individual research project in pediatric subspecialty or laboratory. Emphasis on evaluation of pediatric diseases associated with neuromuscular diseases. Intent is to encourage interest in professions that serve the disabled community and increase awareness of rehabilitation goals. Limited enrollment. (H/P/F grading only)—I, II, III, IV. (I, II, III, IV) Shin

498. Advanced Group Study (1-5)
Prerequisite: consent of instructor. Study and experience for medical students in any of a number of areas in physical medicine and rehabilitation. (H/P/F grading only)

499. Research for Medical Students (1-12)
Prerequisite: consent of instructor. Research on any of a variety of topics in physical medicine and rehabilitation. (H/P/F grading only)

501. Plastic Surgery (PSU) Professional Courses
460. Clinical Plastic Surgery Elective (1-18)
Clinical activity—full time (approximately 40 hours per week). Prerequisite: third- or fourth-year medical students; Surgery 430; consent of instructor. Total immersion in patient care focusing surgical preperation, treatment, operative care, and follow-up. Developing and understanding reconstruction and
461. Dentistry for Future Physicians and Surgeons (6-8)
Discussion/seminar—3 hours; laboratory—2 hours; clinical activity—full time (4-6 weeks). Prerequisite: third-year medical students. General practitioners must recognize dental-related problems, have the ability to alleviate potential pain, and be able to refer these problems for further definitive evaluation and treatment. Students will have basic knowledge of dentistry; recognize potential dental problems; provide emergency care; have knowledge of where to refer these problems. (H/P/F grading only)—I, II, III, IV, II, III, IV) Stevenson

461. Child Psychiatry Clerkship (6-12)
Clinical activity—full time (4 to 8 weeks). Prerequisite: course 430 (Psychiatry Core Clerkship) and/or consent of instructor. Didactic and clinical inpatient, outpatient, and consultation-liaison experiences with children, adolescents and families. Clinical observations, diagnostic assessments, and treatment will be undertaken with close supervision. Literature review and case conferences presented on a regular basis. (H/P/F grading only)—I, II, III, IV, II, III, IV, II, III, IV, IV) Ton

411. Jail Psychiatry Clerkship (6-12)
Clinical activity—full time (4 to 8 weeks). Prerequisite: course 430 (Psychiatry Core Clerkship) and/or consent of course coordinator. Students gain experience, under close faculty supervision, assessing and evaluating potentially indigent patients as well both inpatient and clinic settings. (H/P/F grading only)—I, II, III, IV, II, III, IV, IV) Ton

419. Group Psychotherapy (6 or 12)
Clinical activity—full time (4 or 8 weeks). Prerequisite: first- or second-year medical students; consent of instructor. Clinical or research elective in off-campus medical school or mental health setting. To be arranged with advance approval of instructor and individual in charge of off-campus setting. (H/P/F grading only)—I, II, III, IV, II, III, IV, IV) Ton

420. Acting Internship in Psychiatry (6-12)
Clinical activity—full time (4 to 8 weeks). Prerequisite: psychiatry clerkship or consent of instructor of record; medical students only. Senior medical students will rotate through a community mental health clinic with an extensive group psychotherapy program. Students will have the opportunity to see patients individually, but the main emphasis will be to participate in cutting edge group therapies. May be repeated twice for credit. (H/P/F grading only)—I, II, III, IV, II, III, IV, IV) Ton

421. Combined Medicine-Psychiatry Clerkship (3-6)
Clinical activity—32 hours; discussion—8 hours. Prerequisite: psychiatry clerkship or consent of instructor; medical students only. Students will rotate through the county Primary Care Clinic under the supervision of dual-boarded Psychiatry and Internal Medicine/Family Practice Faculty to provide medical care to indigent patients as well as primary care for psychiatric patients. May be repeated for credit two times. (H/P/F grading only)—I, II, III, IV, II, III, IV, IV) Ton

422. Readings in Psychiatry (1-3)
Readings/discussion—3-9 hours. Independent reading of a selected topic in psychiatry. Supervision and discussion with a psychiatry faculty member. (H/P/F grading only)—I, II, III, IV, II, III, IV, IV) McCarron, Onate, Ton

430. Psychiatry Clinical Clerkship (12)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Assigned to clinical settings, students build upon the skills gained in previous years; emphasis on diagnostic, therapeutic and interpersonal skills. Areas of focus include patient management, interviewing skills, mental status exam, differential diagnosis, basic psychopharmacology, II, IV, crisis assessment, intervention and case referrals. (H/P/F grading only)—I, II, III, IV, Cox

480. Insights in Psychiatry (1-3)
Clinical activity—3-9 hours. Prerequisite: first or second-year medical students; consent of instructor. Opportunity for gaining an understanding of patients with serious mental illness. Students will have basic knowledge of psychiatry; recognize potential mental health problems; provide emergency care; have knowledge of where to refer these problems. (H/P/F grading only)—I, II, III, IV, II, III, IV, IV) Cox
400. Introductory Medical Spanish (2)
 Lecture—2 hours. Prerequisite: medical student or consent of instructor. The vocabulary needed to conduct a basic history and physical examination in Spanish. (H/P/F grading only.)—III. (III.)

455. Multidisciplinary Clinical Preceptorship (4.5)
Clinical activity—full time (3 weeks). Prerequisite: second-year student in good academic standing. Students will be introduced to basic principals of geriatric health care and provided with opportunities for clinical observation and experience in a variety of facilities that serve older adults. Multidisciplinary nature of geriatrics will be emphasized. (S/U grading only.)—IV. (IV.)

461. Clerkship in Community Health Group Practice (3-9)
Clinical activity—full time (2-6 weeks). Prerequisite: third- or fourth-year medical student. Overview of local community health in group practice situations. Students participate in treatment at several clinic sites in Yolo County. Topics include primary care, environmental health, maternal and child health, jail health, and preventive health care for the aged. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.)

465. Community Health Preceptorship (3-18)
Clinical activity—full time (2-12 weeks). Prerequisite: fourth-year medical student; consent of instructor. Students participate at the California Department of Health Services in conducting investigations into current public health problems, e.g., birth defects, cancer control, diabetes, hypertension, injury control, infectious diseases, aging, Alzheimer’s disease, and smoking and tobacco use control. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.)

466. Occupational and Environmental Medicine Elective (6-12)
Clinical activity; laboratory—full time (4 to 8 weeks). Prerequisite: fourth-year medical student and consent of instructor. Participate in activities of Occupational and Environmental Health Unit. Major activity is involvement in an epidemiologic research project of the University. Also introduced to Ambulatory Occupational and Environmental Medicine Clinic at UC Davis Medical Center. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.)

470. Clinical Selective in Occupational and Environmental Medicine (3-6)
Clinical activity—full time. Prerequisite: fourth-year medical student in good academic standing; consent of instructor. Outpatient clinical experience in Occupational and Environmental Medicine at UC Davis and in local industry. Students will gain experience in evaluating occupational and environmental health, health promotion and wellness, women’s health, and health demographics. (S/U grading only.)

471. Health Issues Confronting Asian Americans and Pacific Islanders (4)

480. Insights in Occupational and Environmental Medicine (1-3)
Clinical activity—3-9 hours. Prerequisite: first- or second-year medical student in good academic standing; consent of instructor. Students will observe and participate in research and clinical activities in occupational and environmental medicine which include conferences, occupational and environmental medicine clinical activities, and field visits. Students will develop and present small individual research projects. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.)

491. International Health (1)
Lecture/discussion—1 hour. Prerequisite: medical student in good standing. Forum for learning health issues and health care systems in other countries. Topics include health care for refugees, the impact of political strife on health, the health care profession in international settings. (H/P/F grading only.)—III. (III.)

492. Current Issues in Public Health (1)
Lecture/discussion—1 hour. Topical issues in public health. Speakers from the local public health community address issues such as disease control programs, access to care. May be repeated up to three times for credit. (P/F grading only.)—III. (III.)

498. Study in Community and International Health (1-6)
Prerequisite: medical student in good standing and consent of instructor. Study and experience for medical students in community and international health. May be repeated for credit. (H/P/F grading only.)

499. Research in Community and International Health (1-9)
Prerequisite: medical student with consent of instructor. Students will work with faculty member in areas of research interest, including but not limited to injury control, international health, health policy, occupational and environmental health, health promotion and wellness, women’s health, and health demographics. (S/U grading only.)

Radiation Oncology (RON)

Upper Division Course

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Course

299. Independent Study and Research (1-12)
Clinical activity—full time (2-8 weeks). Prerequisite: enrollment with Biomedical Engineering Group for Ph.D. candidacy and consent of Group Advisor and Sponsor. Research under supervision of Radiation Oncology faculty. Work must be appropriate to fulfill the requirements for the Ph.D. degree. (S/U grading only.)—I, II, III, IV. (I, II, III, IV.)

462. Diagnostic Imaging of Acquired and Congenital Heart Disease (2)
Lecture/discussion—5 hours (for 3 weeks). Prerequisite: fourth-year medical student in good academic standing and course 461 (may be taken concurrently). Main emphasis on radiology of acquired and congenital heart disease, but also on magnetic resonance, nuclear medicine, and echocardiography of heart diseases. (H/P/F grading only.)—III. (III.)

498. Group Study in Diagnostic Radiology (1-12)
Prerequisite: consent of instructor. (H/P/F grading only.)
499. Research in Diagnostic Radiology (1-12)
Prerequisite: consent of instructor. Approved for graduate degree credit. (H/P/F grading only for medical students.)

Radiology—Nuclear Medicine (RNU)
Upper Division Courses

198. Directed Group Study (1-5)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

Graduate Course

299. Research (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Courses

401. Biomedical Radiochemistry (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: open to graduate and medical students; consent of instructor. Approved for graduate degree credit. Course is designed to combine basic nuclear physics, chemistry, and biology into a comprehensive and vigorous lecture/laboratory experience in biomedical nuclear chemistry. Subjects include choice and purification of appropriate gamma and beta radioisotopes, compelling biological pharmaco-dynamics and radioimmunoassay. (H/P/F grading only.)—I, II, III, IV.

411. Radiological Physics I (Physics of Nuclear Medicine) (5)
Lecture—43 hours total; laboratory—12 hours total. Prerequisite: consent of instructor. Physics of diagnostic and therapeutic nuclear medicine, nuclear physics, radioactive decay; interaction of ionizing radiation; dosimeters; attenuation; internal and external dosimetry; health physics; radiation detection and imaging, scintillation cameras, computerized planar and tomographic imaging. Offered at UC Davis Medical Center. Offered in alternate years. (H/P/F grading only.)—(J.) Bushberg, Vera

462. Clinical Clerkship in Nuclear Medicine (3-6)
Clinical Activity—full time (2-6 weeks). Prerequisite: satisfactory completion of second-year medical school; Radiology—Diagnostic 461 recommended; consent of instructor. Clerkship correlates radionuclide methods with clinical, pathophysiological, and other diagnostic aspects of the patient's care. Each patient reviewed by student with faculty member. Reading assignments, informal projects, and research techniques available. Limited enrollment. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Shalon.

498. Group Study in Nuclear Medicine (1-12)
Prerequisite: consent of instructor. Approved for graduate degree credit. (H/P/F grading only for medical students.)

499. Research in Nuclear Medicine (1-12)
Prerequisite: consent of instructor. Approved for graduate degree credit. (H/P/F grading only for medical students.)

Surgery (SUR)
Upper Division Courses

192. Internship in General Surgery (1-12)
Internship—3-36 hours. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in general surgery and related fields. (P/NP grading only.)

199. Special Study in General Surgery for Advanced Undergraduates (1-5)
Prerequisite: advanced undergraduate student with consent of instructor. (P/NP grading only.)

Graduate Course

299. Research (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Courses

430. Surgery Clerkship (12)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Progress. Eight-week general surgery clerkship includes GI, Burn, Oncology, Plastic, vascular Cardiothoracic, consult, transplant and trauma. Clerkship assignments are at UC Davis, UC Davis Medical Center, Sutter Hospital, and selected hospitals. Limited enrollment. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Owen.

460A. Clinical Surgical Elective (6-18)
Clinical activity—full time. Prerequisite: fourth-year medical student or third-year medical student with completion of course 430. Rotation through Surgery Specialty Clinics: Vascular, GI, GU, Thoracic, Plastic, Radiotherapy. Student works up one new and two return visits, presents to one faculty. Weekly review with preceptor and course director. Reading assignments to add perspective for in-depth discussions. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Van Hecke.

461. Surgery Burn Unit Clerkship (6 or 9)
Clinical activity—full time (4 or 6 weeks). Prerequisite: fourth-year medical student, or third-year medical student with completion of course 430. Rotation through Shriners Hospital for Children. Prerequisites of critical care, fluid and electrolyte resuscitation and management of surgical wounds in both adults and children. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Vahl.

462. Surgery Trauma Service Clerkship (6 or 9)
Clinical activity—full time (4 or 6 weeks). Prerequisite: fourth-year medical student, or third-year medical student with completion of course 430. Student works as an extern on one of the two general surgery teams, participating in resuscitation and management of critically injured patients. Team hours consist of 24 hours on and 24 hours off. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Organ.

463. Surgery Intensive Care Unit (6 or 9)
Clinical activity—full time (4 or 6 weeks). Prerequisite: fourth-year medical student, or third-year medical student with completion of course 430. Extensive experience in the Intensive Care Unit and the 80 bed Shriners Hospital for Children. Principles of critical care, fluid and electrolyte resuscitation and management of surgical wounds in both adults and children. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Vahl.

464. General Surgery Clerkship: Kaiser Hospital (6 or 9)
Clinical activity—full time (4 or 6 weeks). Prerequisite: fourth-year medical student, or third-year medical student with completion of course 430. Student participates with University residents on the teaching services at Kaiser Hospital, Sacramento. Opportunity to see large number of practical, general surgical problems and participate in their care. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Vahl.

467. Surgery Oncology (3-9)
Clinical activity—full time (2 to 6 weeks). Prerequisite: fourth-year medical student or third-year medical student with completion of course 430. Students actively participate in management of patients requiring surgery for cancer, endocrine disease and selected genitourinary problems. Cases include malignant melanoma, sarcomas, gastrointestinal cancer, head and neck pathology, and metastatic malignancies. Attending rounds daily. Four teaching conferences weekly. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) coworking.

468. Cardiothoracic Surgery Clerkship (6-9)
Clinical activity—full time (4 to 6 weeks). Prerequisite: fourth-year medical student or third-year medical student with completion of course 430. Student works as an extern on the Cardiothoracic Surgical Service, participating in perioperative management and operations on the heart, lung, mediastinum, and other thoracic structures. Regularly scheduled teaching conferences are conducted. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Benfield.

469. Trauma Service: East Bay (6-9)
Clinical activity—full time. Prerequisite: fourth-year medical student, or third-year medical student with completion of course 430 and Internal Medicine 430. Student works as an extern on the Trauma Service at Highland General Hospital (Oakland) participating in resuscitation and management of critically injured patients. Total hours consist of 24 hours on and 24 hours off. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Vahl.

470. General Surgery: East Bay (6-9)
Clinical activity—full time. Prerequisite: fourth-year medical student or third-year medical student with completion of course 430. Student will work on an extern on one of the two general surgery services and participate in the pre-operative evaluation, intra-operative management, and post-operative care of surgical patients. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Organ.

471. Gastrointestinal Surgery (3-9)
Clinical activity—full time. Prerequisite: fourth-year medical student or third-year medical student with completion of course 430, Internal Medicine 430 and Pediatrics 430. Student participates on the GI Surgery Service, working under the immediate supervision of the faculty and surgical housestaff, involving the full spectrum of gastrointestinal diseases performed by the medical student. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Wolfe.

472. Vascular Surgery (3-9)
Clinical activity—full time. Prerequisite: fourth-year medical student or third-year medical student with completion of course 430. Internal Medicine 430 and Pediatrics 430. Student participates on the vascular surgery service and in the management and operations of arterial and venous system, exclusive of diseases that require cardiopulmonary bypass for treatment. Includes patient care responsibilities with appropriate supervision. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Holcroft.

473. Surgical Intensive Care Unit-East Bay (6-9)
Clinical activity—full time. Prerequisite: fourth-year medical student or third-year medical student with completion of course 430 and Internal Medicine 430. Extensive experience on the ICU team, caring for patients with critically ill patients in the ICU, ICUs, in the appropriate supervision. An eight lecture didactic series. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Organ.

474. Breast Disease (6)
Clinical activity—full time (4 weeks). Prerequisite: third-year surgery clerkship, Medical Sciences 430. Students focus on aspects of benign and malignant breast disease working in the surgical oncology clinics, observing needle localization procedures, following patients to the O.R., working with radiologists in mammography, working in hematology-oncology clinics, and with pathologists reviewing histology. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Goodnight.

475. Pediatric Surgery (6-9)
Clinical activity—full time (4-6 weeks). Prerequisite: fourth-year medical student or third-year medical student with completion of course 430. Care of patients with neonatal congenital surgical problems. Fluid and electrolyte management in infants. General experience with acquired surgical diseases in children. (H/P/F grading only.)—I, II, III, IV, (I, II, III, IV) Marr, Clifford.

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer. 2009-2010 offering in parentheses.
School of Medicine students only. Special Study Module, a four-week course on the topic: Care of the Critically Ill Surgical Patient: Use of Physiological Principles to Guide Treatment of Patients with Common Surgical Problems. (Same course as Human Physiology 492C; course credit for H/P grading only.)—II, III, IV. (I, II, III, IV) Holcroft

494H. Fourth-Year Surgical Honors Program (18) Prerequisite: completion of third year of medical school with superior performance on course 430; consent of instructor. To provide intensive and comprehensive training in surgery to students interested in a postgraduate surgical career, that would enable them to succeed during the internship and residency training. (H/P/F grading only.)—II, III, IV. (I, II, III, IV) Holcroft

498. Group Study (1-5) Prerequisite: medical student, consent of instructor. Directed reading and discussion and/or laboratory investigation on selected topics. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV) Holcroft

499. Research in Urology (1-12) Research—3-36 hours. Prerequisite: fourth-year medical students with consent of instructor. Under supervision, student acting as intern will assume full independent responsibility including admission history, physical examination, management of hospitalization, and participate in surgical procedures, outpatient clinic and learning diagnostic and therapeutic procedures. May be repeated for credit. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV) Low

499. Research in Urology (1-12) Research—3-36 hours. Prerequisite: medical or veterinary medical students with consent of instructor. Research in oncology, male infertility, urodynamic, neurogenic bladder. Unique opportunity to apply recent technologies [nuclear medicine resonance, flow cytometry, microwave (FAM)] in investigation, diagnosis and treatment of GU cancer, infectious disease, male infertility and development of genitourinary bioprosthesis. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV) Low

499. Research in Urology (1-12) Research—3-36 hours. Prerequisite: medical or veterinary medical students with consent of instructor. Research in oncology, male infertility, urodynamic, neurogenic bladder. Unique opportunity to apply recent technologies [nuclear medicine resonance, flow cytometry, microwave (FAM)] in investigation, diagnosis and treatment of GU cancer, infectious disease, male infertility and development of genitourinary bioprosthesis. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV) Low

499. Research in Urology (1-12) Research—3-36 hours. Prerequisite: medical or veterinary medical students with consent of instructor. Research in oncology, male infertility, urodynamic, neurogenic bladder. Unique opportunity to apply recent technologies [nuclear medicine resonance, flow cytometry, microwave (FAM)] in investigation, diagnosis and treatment of GU cancer, infectious disease, male infertility and development of genitourinary bioprosthesis. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV) Low

499. Research in Urology (1-12) Research—3-36 hours. Prerequisite: medical or veterinary medical students with consent of instructor. Research in oncology, male infertility, urodynamic, neurogenic bladder. Unique opportunity to apply recent technologies [nuclear medicine resonance, flow cytometry, microwave (FAM)] in investigation, diagnosis and treatment of GU cancer, infectious disease, male infertility and development of genitourinary bioprosthesis. (H/P/F grading only.)—I, II, III, IV. (I, II, III, IV) Low...
Depth Subject Matter ........................................ 44
In consultation with the undergraduate adviser, students may design a total of ten or more courses from the following disciplines with at least four courses from each of the medieval and early modern periods.

Art History, 178A, 178B, 178C, 179A, 179B, 190A


French 115, 116, 117A, 118B, 141*


History and Philosophy of Science 130A


Medieval Studies 120A, 120B, 120D, 120E, 130A, 130B, 190

Music 121*, 122A, 124B

Political Philosophy 105, 132, 145, 190*

Political Science 115, 116, 118A

Religious Studies 102, 115, 130*, 142

Spanish 130, 132N, 132N, 134N, 142*

Dramatic Art 156A

Total Units for the Major ........................................ 68

* Prior approval by Undergraduate Adviser necessary.

Major Adviser. K. Roddy

Minor Program Requirements:

UNITs

Medieval and Early Modern Studies ........ 24

The minor in Medieval and Early Modern Studies is a coherent program of interdisciplinary study. Medieval Studies units may be taken in one or more of the following fields of concentration, including art, history, literature, music, language, philosophy, political theory, and religious studies. Courses must be approved in consultation with at least two courses chosen from the medieval and early modern periods. Students may also select a minor with a thematic emphasis.

Although the minor is intended for those considering a minor in history or a modern European language, the minor does not necessarily meet the requirements for a major in history.

The minor is designed in consultation with the Undergraduate Adviser.

Minor Adviser. K. Roddy

Courses in Medieval Studies (MST)

Lower Division Courses

20A. Early Medieval Culture (4)

Lecture—3 hours; discussion—1 hour. Readings (in translation) in early medieval culture, such as the Codes of Justinian, the Confessions of Saint Augustine, The Consolation of Philosophy of Boethius, Beowulf, The Nibelungenlied, and The Song of Roland. GE credit: ArtHum. Wrt.—I. (I.) Roddy

20B. The Culture of the High Middle Ages (4)

Lecture—3 hours; discussion—1 hour. Readings (in translation) in the culture of the High Middle Ages, such as The Chronicles of Froissart, The Canterbury Tales of Chaucer, and The Divine Comedy of Dante. GE credit: ArtHum. Wrt.—II. (II.) Roddy

20C. The Late Medieval and Early Modern Period (4)

Lecture—3 hours; discussion—1 hour. The great transformations that created the modern world: Constitutional Government, the Hundred Years’ War, the Black Death, and the Peasants’ Revolts, the Renaissance, Reformation and Counter-Reformation, and the Baroque. GE credit: ArtHum. Wrt.—II. (II.) Roddy

98. Directed Group Study (1-5)

(P/NP grading only)

99. Special Study for Undergraduates (1-5)

(P/NP grading only)

Upper Division Courses

120A-E. The Medieval World (4)

Lecture—3 hours; discussion—1 hour; term paper. Course deals with selected themes from the Middle Ages: the Fall of Rome to the beginning of the Renaissance. Subjects will vary from year to year and cover such topics as (A) The Monastic Orders; (B) Origins of Universities; (C) Family and Society; (E) Chivalry. GE credit for 120A or 120B or 120C: ArtHum, Wrt.

121. Jewish/Christian/Islamic Relations 700-1400 (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing; one course from the 20 series recommended. Examination of the relationships among Islam, Judaism, and Christianity between 700-1400. Topics include religion, philosophy, science, and ethics. GE credit: ArtHum, Div, Wrt.

130A. Special Themes in Medieval Cultures (4)

Lecture—3 hours; discussion—1 hour. Each offering concentrates on an interdisciplinary aspect of medieval culture, in the Middle East and Europe: the idea of the hero, mysticism, urban development. GE credit: ArtHum, Div, Wrt.

130B. Special Themes in Renaissance Culture (4)

Lecture—3 hours; discussion—1 hour. Each theme illuminates an interdisciplinary aspect of Renaissance culture in the eastern and western hemispheres: exploration, medical practice, daily life, baroque culture. GE credit: ArtHum, Div, Wrt.

190. Senior Thesis (4)

Seminar—4 hours. Prerequisite: senior standing and major in Medieval Studies. Preparation of a research paper dealing with a selected aspect of medieval culture, under supervision of three members of the Committee in Charge. Wrt.—I, II, III. (I, II, III.)

197T. Tutoring in Medieval Studies (1-4)

Seminar—2 hours: prerequisite: courses 20A and 20B; upper division standing; consent of instructor. GE credit: ArtHum, Div, Wrt.

198. Directed Group Study (1-5)

(P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only)

Mexican-American (Chicano) Studies

See Chicana/Chicano Studies, on page 179.
B.S. program is especially well suited for students who want a professional career in microbiology, or who wish to pursue graduate education in a biological science discipline. The choice of a major program and its suitability for particular career options should be discussed with a major adviser.

Career Alternatives. A bachelor’s degree in microbiology is excellent preparation for a career in biotechnology, pharmacology, agriculture, and the food industry. It also provides a strong background for students wishing to continue on to professional studies in medicine and the other health sciences.

A.B. Major Requirements:

Preparatory Subject Matter............ 42-56
- Biological Sciences 2A-2B-2C........ 14
- Chemistry 2A-2B....................... 10
- Chemistry 8A-8B or 118A-118B-118C....................... 6-12
- Mathematics 16A-16B, 17A-17B or 21A-21B....................... 6-8
- Physics 1A-1B or 7A-7B-7C....................... 6-12

Depth Subject Matter...................... 37-45
- Biological Sciences 101, 102, 103....................... 10
- Biology 105, 105L, 105S, 140....................... 16
- Microbiology 162 or Pathology, Microbiology, and Immunology 128....................... 3-4
- Three additional courses from Food Science and Technology 104; Medical Microbiology 115, 116, 130; Microbiology 100, 120, 150, 155L, 160, 170; Molecular and Cellular Biology 120, Pathology, Microbiology, and Immunology 127; Plant Pathology 120, 130, 148, 150; Soil Science 111; Statistics 100, 102....................... 8-15

Total Units for the Major................... 79-101

B.S. Major Requirements:

Preparatory Subject Matter............. 59-69
- Biological Sciences 2A-2B-2C........ 14
- Chemistry 2A-2B-2C....................... 15
- Chemistry 8A-8B or 118A-118B-118C....................... 6-12
- Mathematics 16A-16B-16C or 17A-17B-17C....................... 9-12
- Physics 7A-7B-7C....................... 12
- Statistics 13, 32, 100 or 102....................... 3-4

Depth Subject Matter..................... 47-51
- Biological Sciences 101, 102, 103, 104....................... 13
- Molecular and Cellular Biology 120L....................... 6
- Microbiology 102, 105L, 105S....................... 13
- Two courses from Microbiology 140, 150, or 170....................... 6
- Microbiology 162 or Pathology, Microbiology, and Immunology 128....................... 3-4
- Two courses from Food Science and Technology 104; Medical Microbiology 120, 140, 150, 155L, 170, Pathology, Microbiology, and Immunology 127; Soil Science 111....................... 6-9

Total Units for the Major................. 106-120


Graduate Study. The Graduate Group in Microbiology offers programs of study and research leading to the M.S. and Ph.D. degrees. Strong preference is given to doctoral applicants. The group offers general microbiology, microbiology, microbial physiology, microbial genetics, molecular mechanisms of microbial regulation, molecular mechanisms of microbial pathogenesis, immunology, virology, and recombinant DNA technology. For information on the graduate study and undergraduate preparation for the program contact a graduate adviser or the Chairperson of the Group.

Related Courses. The offerings of the Department of Microbiology are augmented by courses and faculty of the Evolution and Food Science and Technology; Land, Air, and Water Resources; Medical Microbiology; Medicine and Epidemiology; Molecular and Cellular Biology; Pathology, Microbiology, and Immunology; Plant Biology; Plant Pathology; Viticulture and Enology. Faculty of the Department of Microbiology also teach or participate in the following courses: Biological Sciences 2A, 101 and 104.

Courses in Microbiology (MIC)

Lower Division Courses

10. Natural History of Infectious Diseases (3)
- Lecture—3 hours. Topics in the natural history of infectious diseases and the effects on human. Introduction to infectious microbial agents, ecology, epidemiology, and induction of disease. Focus on diseases of a contemporary nature. For students not majoring in the biological sciences. Not open for credit to students who have completed course 102. GE credit: SciEng—I. (I.) Manning

91. Introduction to Research (1)
- Seminar—1 hour. Prerequisite: Biological Sciences 1A or 2A and 105. One-week introduction of faculty research focusing on the biochemistry, genetics, and cell biology of microorganisms, along with ways undergraduates can participate in research projects of faculty members. This project may be repeated three times for credit. (P/NP grading only)—III. (III.)

98. Directed Group Study (1-5)
- Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only)

99. Special Study for Undergraduates (1-5)
- (P/NP grading only)

Upper Division Courses

100. Chemical and Biological Weapons (3)
- Lecture/discussion—3 hours. Prerequisite: upper division standing in biology and modern history of chemical and biological weapons; mechanism of action; tactical and strategic uses; riot-control agents; international legal constraints; disarmament and nonproliferation; genetics and the future. GE credit: SciEng or SocSci—Wheels

101. Introductory Microbiology (5)
- Lecture—4 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A or 2A or Chemistry 2B (Chemistry 2B may be concurrent). Survey of microorganisms emphasizing their interactions with humans and diseases. Topics include microscopy, survey of various microbes, the immune system, food microbiology, and genomics. Focus on key mechanisms of disease transmission. Designed for students requiring microbiology for professional schools. Not open for credit to students who have completed course 102 or 102L—II. III. (I. II. III.) Singer

102. General Microbiology (4)
- Lecture—4 hours. Prerequisite: Biological Sciences 1A or 2A, and Chemistry 8B or 118B (may be taken concurrently). Survey of the biology of microorganisms. Topics include microbial structure, physiology, genetics, and evolution; virology; environmental microbiology; the immune system; and microbial pathogens and disease transmission. In combination with course 102L, the microbiology requirement for professional schools. Not open for credit to students who have completed course 101—II, III. (I. II. III.)

102L. General Microbiology Laboratory (3)
- Lecture/laboratory—7 hours. Prerequisite: course 102 may be taken concurrently; consent of instructor.

Restrictions on Enrollment: Introduction to princi- ples and laboratory methods in microbiology. Designed for students continuing in microbiology or using microorganisms as tools for the study of genetics and biochemistry. In combination with course 102, fulfills the microbiology requirement for professional schools. Due to the high demand for this class, students must fill out a petition in order to be considered for enrollment. The petition will be avail- able on the Section of Microbiology Web site. Only two units of credit allowed to students who have completed course 101—II, III. (I. II. III.)

105. Microbial Diversity (3)
- Lecture—3 hours. Prerequisite: course 102, Biological Sciences 102; Biological Sciences 103 recommended. Survey of the major groups of microorganisms emphasizing diversity of energy metabolism, morphology, evolution, and natural history. Survey of the major groups of microorganisms emphasizing diversity of energy metabolism, morphology, and natural history. Particular emphasis will be given to the microbial strains from various habitats. Includes methods for determination of evolutionary relationships among groups. Due to the heavy demand for this class, students must fill out the petition in order to be considered for enrollment. The petition will be available in the following courses: Biological Sciences 2A, 101 and 104.

105L. Microbial Diversity Laboratory (3)
- Laboratory—9 hours (8 hours scheduled lab peri- ods; 1 hour during open laboratory). Prerequisite: courses 102, 102L, 105 (may be taken concurrently), Biological Sciences 102; Biological Sciences 103 recommended. Isolation and characterization of microbial strains from various habitats. Includes methods for determination of evolutionary relationships among groups. Due to the heavy demand for this class, students must fill out the petition in order to be considered for enrollment. The petition will be available in the following courses: Biological Sciences 2A, 101 and 104.

115. Recombinant DNA Cloning and Analysis (3)
- Lecture—3 hours. Prerequisite: Biological Sciences 101 or equivalent. Cloning of recombinant DNA using phage vectors. Topics include basic concepts of the E. coli cell. Engineering chimeric proteins. Not offered every year.

120. Microbial Ecology (3)
- Lecture—3 hours. Prerequisite: course 105, Biological Sciences 102 or 105. Interactions between non- pathogenic microorganisms and their environment, emphasizing physiological and metabolic characteristics of various groups and their adaptation to and modification of specific habitats. —III. (III.) Nelson

140. Bacterial Physiological (3)
- Lecture—3 hours. Prerequisite: Biological Sciences 101, 102, 103 (may be taken concurrently), or Biological Sciences 101, 105, Microbiology 102 recommended. Fundamentals of bacterial growth and bacterial responses to environmental stimuli. Topics will include carbon and nitrogen regulation, growth rate control, post-exponential growth, and motility and chemotaxis. Not open for credit to students who have completed course 130A—II. (I. II.) Meeks, Singer

150. Bacterial Genetics (3)
- Lecture—3 hours. Prerequisite: Biological Sciences 101, 102 or 105; Microbiology 102 recommended. Molecular genetics of enterobacteria and their viruses. Isolation of mutants; genetic exchange and mapping; complementation; suppression; trans- posons; gene expression and regulation; and genetic systems. Examples will be used to demonstrate molecular cloning of recombinant DNA, and the study of bacterial pathogenesis. —II. (II.) Stewart

153L. Bacterial Physiology Lab (4)
- Lecture/discussion—1 hour; laboratory—4.5 hours. Prerequisite: course 140 or 150, 1525, consent of instructor. Physiology and genetics of bacteria. Isola- tion and characterization of mutant strains. Mapping of mutations by conjugation and transduction studies of control of enzymes, replication, transcription, and catabolite repression. —III. (III.) Singer

162. General Virology (4)
- Lecture—4 hours. Prerequisite: Biological Sciences 102 or 105. Integrated presentation of the nature of animal, bacterial, and plant viruses, including their
structure, replication and genetics. Only three units to students who have completed Pathology, Microbiology, and Immunology 128.—II, III, IV. Falk, Manning

170. Yeast Molecular Genetics (3) Lecture—3 hours. Prerequisite: Biological Sciences 101; 102 or 105; Microbiology 102 or 140 strongly recommended. Survey of the genetics, cell biology and technologies in yeasts and related lower eukaryotes. Topics include diversity of yeasts; cell structure; metabolism; cell cycle; genetic approaches and genomics; gene expression; yeasts as models to study higher eukaryotes; and contemporary techniques.—II, III. Shiozaki

170. Yeast Molecular Genetics (3) Lecture—3 hours. Prerequisite: Biological Sciences 101 and 102; course 102 or 140 (may be taken concurrently) strongly recommended. Survey of the genetics, cell biology and technologies in yeasts and related lower eukaryotes. Topics include diversity of yeasts; cell structure; metabolism; cell cycle; genetic approaches and genomics; gene expression; yeasts as models to study higher eukaryotes; and contemporary techniques.—II, III. Shiozaki

190C. Undergraduate Research Conference (1) Discussion—1 hour. Prerequisite: upper division standing and consent of instructor, course 199 concurrently. Presentation and critical discussion of staff research activities; designed for advanced undergraduate students. May be repeated for credit. (P/NP grading only.)—I, II, III (I, II, III)

191. Introduction to Research for Advanced Undergraduates (1) Seminar—1 hour. Prerequisite: Biological Sciences 1A or 2A or consent of instructor. Discussion of faculty research focusing on the biochemistry, genetics, and cell biology of microorganisms, along with ways undergraduates can participate in research projects of faculty members. May be repeated three times for credit. (P/NP grading only.)—III. (III)

192. Internship (1-12) Internship—3-36 hours. Technical and/or professional experience on or off campus. Supervised by a member of the Microbiology Section faculty. (P/NP grading only.)

194H. Microbiology Honors Research (2) Independent study—6 hours. Prerequisite: senior standing, eligibility for college honors; completion of six units of 199 in microbiology; consent of section. Continuation of an individual microbiological research project culminating in writing of a senior thesis under a faculty director. (P/NP grading only.)

197T. Tutoring in Microbiology (1-12) Tutoring—1-12 hours. Prerequisite: upper division standing and consent of instructor. Assisting the instructor in one of the section's regular courses by tutoring individual or small groups of students in a laboratory, in voluntary discussion groups, or other voluntary course activities. May be repeated for credit. (P/NP grading only.)—I, II, III (I, II, III)

198. Directed Group Study (1-5) Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200A. Biology of Prokaryotes (3) Lecture—3 hours. Prerequisite: course 102 or the equivalent. Intended for first year graduate students in microbiology and closely related fields. Overview of prokaryotic biology, with emphasis on phylogeny, physiology, and diversity of bacteria.—I, II

200B. Advanced Bacteriology (3) Lecture—3 hours. Prerequisite: course 200A. Intended for first year graduate students in microbiology and closely related fields. Advanced topics in phylogeny, physiology, and diversity of bacteria. Not offered every year.—II (II)

201L. Advanced Microbiology Laboratory Rotations (5) Laboratory—1.5 hours. Prerequisite: course 200A (may be taken concurrently). Two five-week assignments in microbiology research laboratories. Individual research problems with emphasis on methodology and procedural experience and experimental design. May be repeated twice for credit.—I, II, III

210. Molecular Mechanisms in Microbial Pathogenesis (3) Lecture—2 hours. Prerequisite: course 105 or Veterinary Microbiology 127 and course 162 or Veterinary Microbiology 128 or the equivalent. Study of the molecular mechanisms involved in cytopathogenesis of higher eukaryotic organisms. Emphasis on the alteration or inhibition of cellular metabolism and function by bacteria and animal viruses. Not offered every year.

215. Recombinant DNA (3) Lecture—3 hours. Prerequisite: Biological Sciences 101, 102, 103 or the equivalent. Application of recombinant DNA technology to modern problems in biology, biochemistry, and genetics, emphasizing molecular cloning strategies, choice of vectors, preparation of insert DNA, and selection procedures. (I) Privalsky

250. Biology of Yeasts (5) Lecture—3 hours; discussion—2 hours. Prerequisite: Biological Sciences 102, 103; course 102, 102L; course 215 recommended. Survey of the genetics, physiology, metabolism, regulatory mechanisms, structure, cell biology, ecology and diversity of yeasts and related organisms. Not offered every year.

260. Bacterial Genetic Regulatory Mechanisms (3) Lecture/discussion—3 hours. Prerequisite: general knowledge of nucleic acid biochemistry and bacterial genetics. Analysis of the molecular level of genetic regulation in selected bacterial systems. Specific systems discussed will include the following types of regulation: control of transcription initiation and termination; translational controls; RNA modification effects; autoregulation; control circuits in bacterial viruses; supercontrols. Not offered every year.

262. Advanced General and Molecular Virology (5) Lecture—3 hours. Prerequisite: graduate standing. Advanced integrated presentation of animal, bacterial, and plant viruses, including their structure, modes of regulation, replication and replication, and effects on host cells and organisms.—II Bruning

263. Principles of Protein–Nucleic Acid Interactions (3) Lecture—3 hours. Prerequisite: advanced graduate standing and completion of one year of basic graduate course work in biochemistry, biophysics, chemistry, genetics, microbiology, or molecular biology. Physical basis of protein–nucleic acid interactions. Topics include nucleic acid recognition by proteins, thermodynamics of protein–nucleic acid stability, and kinetics of binding processes for both non-specific and sequence-specific nucleic acid binding proteins. Emphasis on systems that represent paradigms in protein–nucleic acid interactions. Not offered every year.

274. Seminar in Genetic Recombination (1) Seminar—1 hour. Prerequisite: graduate standing, consent of instructor. Biochemical and genetic aspects of genetic recombination in prokaryotes and eukaryotes. Mechanisms of recombination and biochemical and genetic characteristics of recombination proteins. Proteins include DNA strand exchange, DNA helicases, and Holliday junction resolving proteins. May be repeated for credit. Not offered every year. (S/U grading only.)

275. Seminar in DNA Repair and Recombination (1) Seminar—1 hour. Prerequisite: consent of instructor; graduate standing in Microbiology or closely related field. Review and discussion of current research and literature in DNA repair and recombination with presentations by individual students and invited speakers. May be repeated for credit. (S/U grading only.)—I, II, III (I, II, III) Heyer

276. Advanced Concepts in DNA Metabolism (3) Lecture—3 hours. Prerequisite: Molecular and Cellular Biology 221C or Genetics 201C or equivalent course recommended. DNA damage checkpoints, homologous recombination, and meiotic recombination. An advanced treatment of the clinical and current literature to discuss emerging principles and current models in these research areas. Offered in alternate years. —II Heyer

290C. Advanced Research Conference (1) Discussion/conference—1 hour. Prerequisite: graduate standing and/or consent of instructor. Presentation and critical discussion of staff research activities. Offered in alternate years for graduate advanced students. May be repeated for credit. (S/U grading only.)—I, II, III (I, II, III)

291. Selected Topics in Microbiology (1) Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Current progress in microbiology and cellular and molecular biology. May be repeated for credit. (S/U grading only.)—I, II, III (I, II, III)

292. Seminar in Bacterial Physiology and Genetics (1) Seminar—1 hour. Prerequisite: consent of instructor, graduate standing in microbiology or closely related field. Review and discussion of current research and literature in bacterial physiology and genetics, with presentations by individual students. (S/U grading only.)—I, II, III (I, II, III)

296. Seminar in Animal Virology (1) Seminar—1 hour. Prerequisite: graduate-level standing or consent of instructor. A discussion of the current topics in animal virology. (Same course as Pathology, Microbiology, and Immunology 296A.) May be repeated for credit. (S/U grading only.)—I, II, III (I, II, III)

298. Group Study (1-5) Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12) (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4) Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III (I, II, III)

Microbiology

Jay V. Solnick, Ph.D., Chairperson of the Group
Group Office, 3143 Tupper Hall (Medical Microbiology and Immunology) (530) 752-0262

Faculty

Enoch P. Baldwin, Ph.D., Assistant Professor [Molecular and Cellular Biology]

Peter A. Barry, Ph.D., Assistant Professor [Comparative Medicine]

Steven W. Barthold, Ph.D., Professor [Pathology, Microbiology, and Immunology]

Nicole Baumgarth, Ph.D., Associate Professor [Center for Comparative Medicine]

Andrew Baumer, Ph.D., Professor [Medical Microbiology and Immunology]

Blaine L. Beamman, Ph.D., Professor [Medical Microbiology and Immunology]

Charles L. Bevins, Ph.D., Professor [Viticulture and Enology]
Middle East/South Asia Studies

[College of Letters and Science]
Suad Joseph, Ph. D., Program Director
Program Office. 156 Everson Hall
(530) 754-4926, http://mesa.ucdavis.edu

Committee in Charge
Omnia El Shkarky, Ph. D. (History)
Kevin Johnson, J.D. (School of Law)
Suad Joseph, Ph. D. (Anthropology, Women and Gender Studies)
Zeew Maoz, Ph. D. (Political Science)
Parama Roy, Ph. D. (English)
Sudipta Sen, Ph. D. (History)
Smriti Sinivas, Ph. D. (Anthropology)

The Major Program
The major in Middle East/South Asia Studies offers a comparative understanding of the Middle East and South Asia, regions that have been intricately linked for centuries by trade, migration, exchange of scientific, mathematical, political and philosophical ideas, religion, literature, and art. These regions are connected in the modern period through similar and shared experiences of colonial rule, decolonization and nationalist struggle. Knowledge of the major languages of the region, such as Arabic, Hindi-Urdu, Bengali, Persian, Punjabi, and Turkish, have heavily influenced each other. Religion is a significant force in the region binding people to sacred geographical spaces, scripts, and genealogies. As opposed to presentist approaches which reproduce traditional area studies defined for strategic geopolitical interests, the Middle East/South Asia Studies major rethinks area studies through critical, comparative, historical, and sociological analyses of global interconnections of people, products, ideas, and processes. The major in Middle East/South Asia Studies offers students a unique opportunity to study exchanges, complementarities, and correspondences between these regions in religion, family structures, gender relations, media, literature and film, history, anthropology, law, political economy, international relations, development, urbanism, science and technology, diaspora studies, and other themes.

Programs, Internships, and Career Alternatives. Many internship opportunities are available for the Middle East/South Asia Studies major and minor, consult with your advisor.

Middle East/South Asia Studies Abroad Program. University of California Education Abroad Program. More information can be found at http://eap.ucop.edu/ and http://summer-abroad.ucdavis.edu/

A.B. Major Program Requirements:

Preparatory Subject Matter ..................... 8-38

| History | 6 | 8 | 8 | 8 |

| Arabic | 1 | 2 | 3 | 21 | 22 | 23 | Hebrew | 1 | 2 | 3 | 21 | 22 | 23 |

| Hindi/Urdu | 1 | 2 | 3 | 21 | 22 | 23 |

| Arabic | 1 | 2 | 3 | 21 | 22 | 23 | Hebrew | 1 | 2 | 3 | 21 | 22 | 23 |

| Hindi/Urdu | 1 | 2 | 3 | 21 | 22 | 23 |

| History | 6 | 8 | 8 | 8 |

| Arabic | 1 | 2 | 3 | 21 | 22 | 23 | Hebrew | 1 | 2 | 3 | 21 | 22 | 23 |

| Hindi/Urdu | 1 | 2 | 3 | 21 | 22 | 23 |

| Arabic | 1 | 2 | 3 | 21 | 22 | 23 | Hebrew | 1 | 2 | 3 | 21 | 22 | 23 |

| Hindi/Urdu | 1 | 2 | 3 | 21 | 22 | 23 |

| History | 6 | 8 | 8 | 8 |

| Arabic | 1 | 2 | 3 | 21 | 22 | 23 | Hebrew | 1 | 2 | 3 | 21 | 22 | 23 |

| Hindi/Urdu | 1 | 2 | 3 | 21 | 22 | 23 |

| Arabic | 1 | 2 | 3 | 21 | 22 | 23 | Hebrew | 1 | 2 | 3 | 21 | 22 | 23 |

| Hindi/Urdu | 1 | 2 | 3 | 21 | 22 | 23 |

Courses in Microbiology (MBI)

Graduate Courses

Graduate Advisers.

P. Barry (Center for Comparative Medicine, L.F. Bisson (Virology and Immunology), K.L. Rakde (Animal Science), R.E. Parales (Microbiology), K. Shiozaki (Microbiology), E.E. Sparger (Vet Med: Medicine)

Courses in Microbiology (MBI) Graduate Courses

290C. Advanced Research Conference (1)

Discussion/conference—1 hour. Prerequisite: graduate standing and/or consent of instructor. Presentation and critical discussion of staff research activities. Designed for advanced graduate students. May be repeated for credit. (S/U grading only)—1, II, III, (I, II, III)

299. Research (1–12)

Research under the guidance of dissertation committee. (S/U grading only)

Quarter Offered: I=Fall, II=Winter, III=Spring, IV=Summer; 2009-2010 offering in parenthesis

General Education (GE) credit: ArtHum=Arts and Humanities, SciEng=Science and Engineering, SocSci=Social Sciences, Div=Interdisciplinary Diversity, Wrt=Writing Experience
### Core Course List:

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
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</table>

**Note:** Without prior consultation with an advisor, students can petition the Program Committee in advance to accept other elective courses toward the major program, including language courses. **Note:** While some courses are identified as fulfilling more than one requirement, a given course can only fulfill one such requirement.

**Restriction:** No more than six units of MSA 92, 98, 99, 192, 198, 199 may be offered in satisfaction of the major requirements.

**Major advisor:** Consult the Middle East/South Asia Studies Program, 515 Eversen Hall (503) 754-4926 or the Middle East/South Asia Studies Web site at http://mesa.ucdavis.edu.

### Minor Program Requirements:

<table>
<thead>
<tr>
<th>COURSES IN ARABIC (ARB)</th>
<th>UNITS</th>
</tr>
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<tbody>
<tr>
<td>1. Elementary Arabic 1 (5)</td>
<td>Lecture/discussion — 5 hours. Introduction to basic Arabic. Interactive and integrated presentation of listening, speaking, reading, and writing skills, including the alphabet and basic syntax. Focus on standard Arabic with basic skills in spoken Egyptian and/or one other colloquial dialect. —Sharlet</td>
</tr>
<tr>
<td>2. Elementary Arabic 2 (5)</td>
<td>Lecture/discussion — 5 hours. Prerequisite: course 1 or with instructor’s consent after taking all components of the course 1 final exam. Continues introduction to basic Arabic from course 1. Interactive and integrated presentation of listening, speaking, reading, and writing skills, including syntax. Focus on standard Arabic and limited use of spoken Egyptian and/or one other colloquial dialect. —II. (II.) Sharlet</td>
</tr>
<tr>
<td>3. Elementary Arabic 3 (5)</td>
<td>Lecture/discussion — 5 hours. Prerequisite: course 1 and 2 or with consent of instructor after taking all parts of course 3 final exam. Builds on courses 1, 2, and 3. Interactive and integrated presentation of listening, speaking, reading, and writing skills, including idiomatic expression. Focus on standard Arabic with limited use of Egyptian and/or one other colloquial dialect. —II. (II.) Sharlet</td>
</tr>
<tr>
<td>4. Elementary Arabic 4 (5)</td>
<td>Lecture/discussion — 5 hours. Prerequisite: courses 1, 2, 3 or with consent of instructor after taking all parts of course final 21 exam. Continues from course 21. Interactive and integrated presentation of listening, speaking, reading, and writing skills, including idiomatic expression. Focus on standard Arabic with limited use of Egyptian and/or one other colloquial dialect. —II. (II.) Sharlet</td>
</tr>
<tr>
<td>5. Elementary Arabic 5 (5)</td>
<td>Lecture/discussion — 5 hours. Prerequisite: course 22 or with consent of instructor after completing all parts of the final exams for courses 21 and 22. Continues from courses 21 and 22. Interactive and integrated presentation of listening, speaking, reading, and writing skills, including idiomatic expression. Focus on standard Arabic with limited use of Egyptian and/or one other colloquial dialect. —II. (II.) Sharlet</td>
</tr>
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### Courses in Hindi (HIN)

<table>
<thead>
<tr>
<th>COURSES IN HINDI</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Elementary Hindi/Urdu I (5)</td>
<td>Lecture/discussion — 5 hours. An introduction to Hindi and Urdu in which students will learn vocabulary and grammar in both Devanagari and Urdu scripts, and will practice skills in reading, writing, speaking and listening. —II. (II.) Sharlet</td>
</tr>
<tr>
<td>2. Elementary Hindi/Urdu II (5)</td>
<td>Lecture/discussion — 5 hours. Prerequisite: course 1. An introduction to Hindi and Urdu in which students will learn vocabulary and grammar in both Devanagari and Urdu scripts, and will practice skills in reading, writing, speaking and listening. —II. (II.) Sharlet</td>
</tr>
<tr>
<td>3. Elementary Hindi/Urdu III (5)</td>
<td>Lecture/discussion — 5 hours. Prerequisite: course 2. An introduction to Hindi and Urdu in which students will learn vocabulary and grammar in both Devanagari and Urdu scripts, and will practice skills in reading, writing, speaking and listening. —II. (II.) Sharlet</td>
</tr>
</tbody>
</table>

**Quarter Offered:** I—Fall, II—Winter, III—Spring, IV—Summer, 2009-2010 offering in parentheses. **General Education (GE) credit:** ArtHum=Arts and Humanities, SciEng=Science and Engineering, SocSci=Social Sciences, Div=Social/Cultural Diversity, Wrt=Writing Experience.
Military Science

[College of Letters and Science]

Reserve Officers' Training Corps (ROTC), Army

Mark W. Connelly, Lt. Col., Chairperson of the Department; Professor of Military Science

Department Office. 125 Hickey Gymnasium (530) 752-5252

Faculty

Major Daniel Williamson, Associate Professor
Major Jason D. Hiico, Assistant Professor
Major Stephen F. Heringer, Assistant Professor

Program of Study

The Military Science Department offers hands-on training in management and leadership. The pro-
gram stresses the following Army Values: loyalty, duty, respect, selfless-service, honor, integrity, and
personal courage. The program also stresses leader-
ship dimensions as taught in the classes. Also
stressed are current events, national and interna-
tional politics, military affairs, ethics training, and
human relations with emphasis on eliminating racial
and gender discrimination. Management and leader-
ship are taught using the U.S. Army as a model.
Military skills (such as drill and ceremonies, map
reading, and squad tactics) are taught to the extent
necessary to create an environment where students
can enter leadership positions and apply theories
taught in the classroom. Students learn by doing.
The program provides experience in all academic fields
to prepare for positions of leadership in military or
civilian careers.

The department offers two program tracks: (1) a
purely academic track, (2) a pre-commissioning
track for those desiring commission in the U.S.
Army. The academic track entails no obligation to
the military and is open to all students. Students
pursuing the academic track do not wear a uniform or
otherwise participate in extracurricular activities
designed as part of the pre-commissioning process.
Activities for all students include the Ranger Club (a
club designed for adventure activities such as rappel-
ing, white-water rafting, orienteering and patrol-
ing) and intramural sports teams.

Students who desire a commission in the U.S. Army
participate in both the academic portion of the pro-
gram and in the leadership laboratories and extra-
curricular activities designed to enhance their leader-
ship and technical skills. They wear uniforms to lead-
ership laboratories and selected classes and become
ROTC cadets. Students may be cadets in the lower
division courses without incurring a military obliga-
tion. Students participating in the upper division
pre-commissioning program incur a military obliga-
tion. See below for details. Extracurricular activities for
cadets include an intercollegiate sports team
(Ranger Challenge), the university color guard, a mil-
tary honor society, and opportunities to participate in
field training exercises.

Department Programs

Students are enrolled in Military Science under one
of two programs.

Four-Year Program

There is no military obligation associated with attend-
dance in lower division courses. Students are enrolled in
the basic course (lower division) for the first two years on
a voluntary basis. Admission to the advanced course (upper division) is by application from second-year lower division students who meet the academic, physical, and military aptitude
requirements. Qualified veterans can enter the ad-
vanced course immediately because of their military
service experience, upon approval by the Department Chairperson.

Seniors receive $450 subsistence per month, and
Juniors $500 per month, after executing a contract
agreeing to complete the courses. During the course,
all Military Science text books, uniforms and equip-
ment are provided without cost. Students are given
leadership development at Leader Develop-
ment and Assessment Course (Operation Warrior
Forge) between their third and fourth years of the
course. Emphasis is placed on leadership, lead-
ership development and the capability to function
effectively in positions of significant responsibility.

Two-Year Program

The two-year program is for students, including grad-
uate students, who have not attended lower division
Military Science classes. In lieu of lower division courses, an applicant attends a six-week summer pro-
gram, Leaders Training Course (LTC) which is volun-
tary and carries no military obligation. Applicants are
paid and transportation costs covered. Applica-
tions are accepted at anytime prior to the student’s
junior year; graduate students are also accepted. All
other provisions explained above for the upper divi-
sion course apply to the two-year program.

Scholarship Program

The U.S. Army offers four-, three-, and two-year
Active Duty scholarships, two-year Reserve Forces
Duty, and two-year Dedicated National Guard scholar-
ships to students planning to attend or attending
UC Davis. The U.S. Army ROTC scholarship pack-
ages pay tuition and educational fees. Also included
in all scholarships is a flat rate of $900 per year for text-
books.

The Army Reserve Officers’ Training Corps four-year
Active Duty merit scholarships are awarded to quali-
fied high school seniors in a national competition
each year. There are three cycles available for sub-
mission of the four-year scholarship application. As
high school seniors, students compete for the Regular
Cycle scholarship by submitting their complete appli-
cation. Interested applicants should apply at http://www.
monroe.army.mil or contact UC Davis, Depart-
ment of Military Science at (530) 752-7682. The three-year Active Duty and two-year Reserve
Forces Duty scholarships are awarded to college stu-
dents who are already attending UC Davis or trans-
ferring from a junior college to UC Davis. Students
apply for and are awarded these Army scholarships
through the Military Science Department.

Leadership Laboratory

During the course of the school year, two hours per
week are spent conducting practical exercises.
Classes emphasize adventure activities including
offense, defense and patrolling techniques, weapons
familiarization, rappelling, rope bridging, obstacle
courses, leadership reaction course, and land navi-
gation. All cadet leadership laboratories, including
laboratories for practical leadership experience and
to prepare for attendance at Warrior Forge, held at
Fort Lewis, Washington.

Academic Credit

College of Agricultural and Environmental
Sciences. The Bachelor of Science degree in agri-
culture requires the completion of 180 units. Military
Science courses are counted in the unit allowance
for electives.

College of Engineering. Military Science units are
acceptable toward the requirements for the
Bachelor of Science degree to the extent of the unre-
stricted elective units available in the curriculum
being followed.

College of Letters and Science. The Bachelor of
Arts degree requires the completion of 180 units.
Military Science courses are counted in the allow-
ance for electives.

School of Veterinary Medicine. The number of
Military Science units acceptable toward the Bache-
or of Science degree in Veterinary Medicine is on
an individual program basis approved by the Dean of
the School. Graduates with the D.V.M. degree may
apply for direct commission in the United States
Army Veterinary Corps.

Courses in Military Science (MSC)

Lower Division Courses

11. Roles and Organization of the U.S. Army

Lecture—1 hour. Prerequisite: lower division stand-
ing. Constitutional and legal basis of the Army, or-
ganization and strategic roles in times of war, peace,
and “total Army” concept. Impact of civil-mil-
itary relations and Soviet military power on role of
Army studied in context of current problems. —I. (I.)

12. Introduction to Military Leadership

Lecture—2 hours. Prerequisite: lower division stand-
ing, and consent of instructor. Introduction to leader-
ship theories used in military organizations. Course
surveys the duties and responsibilities of junior Army
officers, the general environment in which they work,
and leadership roles performed. Introduces military
map reading skills. —I. (I.)

13. Introduction to Basic Military Operations

Lecture—1 hour. Prerequisite: lower division stand-
ing. Basic military tactical theories and their applica-
tion at the individual and squad level. Course
introduces military tactical operations, and covers
military first aid. Principles of weapon systems intro-
don in course 11 are applied to offensive and defensive
tactics. —III. (III.)

14A. Introduction to Military Leadership Skills

Laboratory—2 hours. Prerequisite: lower division stand-
ing and consent of instructor; completion of all
previous laboratories. Personal and organizational
leadership skills introduced in leadership laboratory.
Excessive supervised leadership is conducted in a
military environment. Basic military skills necessary
to function in a leadership role are also covered. (P/NP grading only).—I. (I.)

14B. Introduction to Military Leadership Skills

Laboratory—2 hours. Prerequisite: lower division stand-
ing and consent of instructor; completion of all
previous laboratories. Development of leadership
and military skills introduced in course 14A is contin-
ued with emphasis on the individual’s role in the
squad, the basic organizational element of the
Army. As students gain capabilities, supervisory con-
trols are reduced. (P/NP grading only).—II. (II.)

14C. Introduction to Military Leadership Skills

Laboratory—2 hours. Prerequisite: lower division stand-
ing and consent of instructor; completion of all
previous laboratories. Leadership and military skills introduced in course 14A is contin-
ued with emphasis on the individual’s role in the
squad, the basic organizational element of the
Army. As students gain capabilities, supervisory con-
trols are reduced. (P/NP grading only).—III. (III.)

21. Military History

Lecture—2 hours. Prerequisite: lower division stand-
ing; course 11 or consent of instructor. Survey of mil-
itary history from 1900 to present, focusing on World
War I, World War II, the Korean War, and the
Vietnam War. —III. (III.)

22A. Intermediate Military Leadership and
Operations I (2)

Lecture—2 hours. Prerequisite: lower division stand-
ing; course 12 or consent of instructor. Develops and
exercises personal military leadership skills in exten-
sive supervised leadership laboratories. Intermediate
level military skills necessary for leadership roles as
junior non-commissioned officers are developed. Stu-
dents perform in role of junior non-commissioned
officers. —I. (I.)

22B. Intermediate Military Leadership and
Operations II (2)

Lecture—2 hours. Prerequisite: lower division stand-
ing; course 22A or consent of instructor. Continua-
tion of course 22A. Leadership skills developed in
22A are applied in leadership of a squad platoon
organization. —II. (II.)
24A. Individual Military Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: lower division standing; courses 14A, 14B, 14C and 21, or consent of instructor. Develops and exercises personal military leadership skills in extensive supervised leadership laboratories. Intermediate level military leadership skills necessary for leadership roles as junior non-commissioned officers are available. Students perform in role of junior non-commissioned officers. (P/NP grading only.)—II. (II.)

24B. Individual Military Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: lower division standing; courses 14A, 14B, 14C and 21, or consent of instructor. Students are rotated through squad- and team-level supervisory positions, given responsibility commensurate with positions. (P/NP grading only.)—II. (II.)

24C. Individual Military Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: lower division standing; courses 14A, 14B, 14C and 21, or consent of instructor. Students are prepared for transition from junior leader to non-commissioned officer. Chain of command and hierarchical responsibilities and reporting requirements are demonstrated in a laboratory setting. (P/NP grading only.)—III. (III.)

Upper Division Courses

131A. Advanced Military Leadership and Management (2)
Lecture—2 hours. Prerequisite: upper division standing; course 22A or consent of instructor. Course addresses power of authority and influence, and introduces basic management skills. Instruction provided on the various branches in which a commissioned officer may serve. (P/NP grading only.)—II. (II.)

132A. Advanced Military Operations (2)
Lecture—2 hours. Prerequisite: upper division standing; course 22B or consent of instructor. First phase of advanced military tactical operations. Advanced weapons, topographical maps, navigation, and orienteering techniques. Instruction also provides on resource planning techniques and military intelligence. (P/NP grading only.)—II. (II.)

132B. Advanced Military Operations (2)
Lecture—2 hours. Prerequisite: upper division standing; course 323A or consent of instructor. Continuation of course 132A. Military tactical theories and their application in offense and defense are presented at the platoon and company level. Course covers in-depth analysis of the principles of war related to offensive and defensive operations. (P/NP grading only.)—II. (II.)

134A. Military Organizational Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: upper division standing; courses 24A-24B-24C or consent of instructor. Students develop interpersonal and management skills by practical application of leadership of military organizations in a supervised leadership laboratory. Advanced-level military skills presented. Students fulfill the roles of senior non-commissioned officers. (P/NP grading only.)—I. (I.)

134B. Military Organizational Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: upper division standing; courses 24A-24B-24C or consent of instructor. As more complex material is presented in classroom, the laboratory environment becomes more challenging. Students serve as senior non-commissioned officers in squad, platoon and company levels, given authority and responsibility. (P/NP grading only.)—II. (II.)

134C. Military Organizational Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: upper division standing; courses 24A-24B-24C or consent of instructor. Students prepared for advanced summer training experience by extensive requirements to plan, organize and conduct military operations inheld environments. Individual leadership potential is closely assessed in the laboratory environment. (P/NP grading only.)—III. (III.)

141. U.S. Army Management Systems (2)
Lecture—2 hours. Prerequisite: upper division standing and course 21. Analysis of the American Military System, the Uniform Code of Military Justice, the Hague and Geneva Conventions, and customary law of war. Includes detailed study of selected procedures of military justice system. (P/NP grading only.)—II. (II.)

142. Military Law (2)
Lecture—2 hours. Prerequisite: upper division standing and course 141. Analysis of the American Military Justice System, the Uniform Code of Military Justice, the Hague and Geneva Conventions, and customary law of war. Includes detailed study of selected procedures of military justice system. (P/NP grading only.)—II. (II.)

143. Military Ethics and Professionalism (2)
Lecture—2 hours. Prerequisite: upper division standing and course 142. Profession of arms, its characteristics, roles, and responsibilities. Discussion topics include the professional soldier’s responsibilities to the Army and the Nation, and the need for ethical conduct. Case studies are used to develop ethical decision making skills. (P/NP grading only.)—II. (II.)

144A. Military Training Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: upper division standing; courses 134A, 134B, 134C, and 141. Develops and exercises the leadership skills necessary to plan, coordinate and conduct a training program through the use of both on and off campus. Emphasis on analytical techniques, instructor planning, media utilization and evaluation of learning. Students perform as cadet officers. (P/NP grading only.)—II. (II.)

144B. Military Training Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: upper division standing; courses 134A, 134B, 134C, and 141. Requirements in training of all other levels of the cadet corps are given to students for conduct in laboratory environment (under supervision). Students placed in realistic role of junior officer with appropriate level of responsibility. Students perform as cadet staff officers. (P/NP grading only.)—II. (II.)

144C. Military Training Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: upper division standing; courses 134A, 134B, 134C, and 141. Final laboratory in military science sequence; students are prepared for final testing and certification prior to commissioning as officers. Students will demonstrate all leadership skills commissioned officers. Students perform leadership tasks at platoon, company, and battalion levels. (P/NP grading only.)—II. (II.)

141. Special Studies in Military Science (2)
Independent study—6 hours. Prerequisite: consent of department chair, and courses 131, 132A, 132B, 141, 142, 143. Intensive examination of one or more special problems in military science. Possibility of study of special dimensions, principles of war, airland battle imperatives, military strategy, the operational art and professional ethics. May be repeated twice for credit when topic differs. (P/NP grading only.)

Aerospace Studies (Air Force)
The Air Force Reserve Officer’s Training Corps (AFROTC) is a cadet program providing training in leadership, management, communications and military proficiency on college and university campuses. It also offers an opportunity to obtain a commission as a second lieutenant in the Air Force and enter the active duty forces after you complete a bachelor’s or a graduate degree. The skills you acquire will become valuable assets for any subsequent career you choose.

The program is normally four years long, but a flexible design allows students to complete the curriculum in as little as two years. There are no costs for AFROTC uniforms, books, or classes. UC Davis students have the option of taking the Air Force program on the UC Berkeley or CSU Sacramento campus.

Qualifications
Freshmen/Sophomore applicants must:
- Be full-time college students in good academic standing
- Have good moral character
- Be in strong physical condition
- Be at least 14 years old

Additionally, Juniors/Seniors/Scholarship recipients must:
- Be United States citizens or in the process of applying for citizenship
- Be 18 years old (or 17 years old with consent of parent or guardian)
- Pass the Air Force Officer Qualifying Test
- Pass a medical examination
- Be under the age of 30 at time of graduation (may be waived)

Scholarships
Opportunities for four-year and three-year undergraduate scholarships are better than ever. Scholarships cover the full cost of tuition, books and required fees at the University of California and are available for eligible high school seniors. It also includes $150 monthly stipends during the school year. If you are a junior or senior in high school and plan on attending a college or university in Northern California, you can write, call or visit the local AFROTC detachments for a scholarship application. Applications are also available from local Air Force recruiters or your high school guidance counselors.

All scholarships are merit-based and consider a variety of factors: cumulative GPA, class standing, SAT/ACT scores, academic awards/achievements, leadership ability, athletic involvement, extracurricular activities, community service and letters of recommendation. All scholarship recipients must graduate and be commissioned before their 27th birthday (may be waived for prior military personnel). A personal interview with an Air Force officer is also part of the application process. Prior to activating a scholarship, students must meet AFROTC medical and physical fitness standards. All scholarships must be used at an accredited college or university that offers AFROTC on campus or through cross-registration. The program is available at more than 700 universities and colleges nationwide.

If you are already in college, contact our office directly and apply for enrollment into AFROTC as a cadet. Three- and two-year full tuition scholarships are available for all academic majors, especially scientific and technical majors such as engineering, atmospheric science, math, computer science, and physics. GPA Scholarship requirements for non-technical majors are slightly higher. Applicants are primarily evaluated on their leadership ability and academic performance. Scholarship boards meet throughout the year for scientific and technical majors and in July for all academic majors. Scholarships also include a $150 monthly stipend throughout the school year, required books and fees. Other loans and grants may be used towards room and board costs.

Challenging Careers
All commissioned officers enter the Air Force as second lieutenants for a 4-year active duty service commitment. Pilots and navigators serve longer commitments, based on training requirements. Once on active duty, you’ll be given instant responsibility...
Molecular Biosciences

See Veterinary Medicine, School of, on page 302.

Molecular and Cellular Biology

[College of Biological Sciences]
Michael E. Dahmus, Ph.D., Chairperson of the Department

Department Office, 149 Briggs Hall
(530) 752-3611; http://www.mcb.ucdavis.edu

Faculty

Primary Members
Peter B. Armstrong, Ph.D., Professor
Enoch Baldwin, Ph.D., Associate Professor
Sean M. Burgess, Ph.D., Associate Professor
Kenneth C. Burtis, Ph.D., Professor
Judy Callis, Ph.D., Professor
Frederic L. Chedin, Ph.D., Assistant Professor
R. Holland Cheng, Ph.D., Professor
Michael E. Dahnus, Ph.D., Professor
Roy H. Doi, Ph.D., Distinguished Professor

Bruce W. Draper, Ph.D., Assistant Professor
Jo-Anne Engebret, Ph.D., Associate Professor
Carol A. Erickson, Ph.D., Professor
Marllynn E. Etzler, Ph.D., Professor
Oliver Fiehn, Ph.D., Associate Professor
Andrew Fisher, Ph.D., Professor
[Chemistry]
Charles S. Gasser, Ph.D., Professor
Kenneth B. Kaplan, Ph.D., Associate Professor
John A. Kiger, Ph.D., Professor
Ian Korf, Ph.D., Assistant Professor
J. Clark Lagarias, Ph.D., Professor
Julie A. Leary, Ph.D., Professor
Frankis J. McNally, Ph.D., Associate Professor
Richard W. Michelman, Ph.D., Professor
[Vegetable Crops, Medical Microbiology and Immunology]
Diana G. Myles, Ph.D., Professor
Jeanette E. Natalie, Ph.D., Associate Professor
Jodi Nunnari, Ph.D., Professor
Edmund R. Powers, Ph.D., Professor
Raymond L. Rodriguez, Ph.D., Professor
Leslie S. Rose, Ph.D., Associate Professor
Jonathan M. Scholey, Ph.D., Professor
Irwin H. Segel, Ph.D., Distinguished Professor
Henning Stahlberg, Ph.D., Associate Professor
Daniel A. Starr, Ph.D., Assistant Professor
Michael D. Toney, Ph.D., Professor
[Chemistry]
David K. Wilson, Ph.D., Professor

Secondary Section Members
John J. Harada, Ph.D., Professor
Wolf-Dietrich Heyer, Ph.D., Professor
Stephen C. Kowalczykowski, Ph.D., Distinguished Professor
William J. Lucas, Ph.D., Professor
Brian Mulloney, Ph.D., Professor Emeritus
Sharmar O’Neill, Ph.D., Professor
Pamela A. Pappone, Ph.D., Professor
Martin L. Privalsky, Ph.D., Professor
Steven M. Press, Ph.D., Professor
Larry N. Vanderhoef, Ph.D., Professor
Martin Wilson, Ph.D., Professor

Emeriti Faculty
Ronald J. Baskin, Ph.D., Professor Emeritus
Don M. Carlson, Ph.D., Professor Emeritus
Sterling Chaykin, Ph.D., Professor Emeritus
James S. Clegg, Ph.D., Professor Emeritus
Eric E. Conn, Ph.D., Professor Emeritus
Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching and Scholarly Achievement
Richard S. Criddle, Ph.D., Professor Emeritus
John H. Crowe, Ph.D., Professor Emeritus
David W. Deamer, Ph.D., Professor Emeritus
Gordon J. Edlin, Ph.D., Professor Emeritus
Richard H. Falk, Ph.D., Professor Emeritus
Leslie D. Gottlieb, Ph.D., Professor Emeritus
Melvin M. Green, Ph.D., Professor Emeritus
Robert D. Grey, Ph.D., Professor Emeritus
Academic Senate Distinguished Teaching Award
Jerri L. Hedrick, Ph.D., Professor Emeritus
Distingushed Graduate Mentoring Award
Mark G. McNamara, Ph.D., Professor Emeritus
Carl W. Schmid, Ph.D., Professor Emeritus
Che-Kun J. Shen, Ph.D., Professor Emeritus
Larry R. Sprechman, Ph.D., Senior Lecturer Emeritus
Paul K. Stumpf, Ph.D., Professor Emeritus

Affiliated Faculty
Benjamin F. Edwards, Ph.D., Lecturer
Kenneth L. Hilt, Ph.D., Professor
Deborah A. Kimbrell, Ph.D., Lecturer
Judith A. Kjelstrom, Ph.D., Academic Coordinator/Lecturer
Leand L. Lindsay, Ph.D., Lecturer
Larry Z. Morand, Ph.D., Lecturer
Alan B. Rose, Ph.D., Lecturer
Carol M. Rubin, Ph.D., Lecturer
Mark F. Sanders, Ph.D., Lecturer
Leigh D. Segel, Ph.D., Lecturer

Molecular and Cellular Biology offers three major programs: Biochemistry and Molecular Biology, Cell Biology, and Genetics.
The Biochemistry and Molecular Biology Major Program

The Biochemistry and Molecular Biology major introduces students to the chemistry of living organisms and the molecular techniques that are used to probe the structures and functions of biologically important molecules. Students who enjoy both chemistry and biology and who are comfortable with quantitative approaches to problem-solving will find this major a rewarding field of study.

The Program. The biochemistry and molecular biology program begins with the four-course, upper division common curriculum that provides an introduction to the principles of biochemistry, genetics, and cell biology. Majors then take a comprehensive and rigorous laboratory course to familiarize them with the most important aspects of biochemical research. Additional upper division courses in biochemistry and molecular biology examine detailed aspects of these subjects. Students are also required to take courses in other biological sciences and a full year of physical chemistry.

Career Alternatives. The biochemistry and molecular biology program provides a solid scientific background for students seeking a research, teaching, or service career in the life sciences. Positions in medicine and biotechnology consist in biomedical, biotechnological, pharmaceutical, agricultural research and chemical industries. Also, university-affiliated research laboratories, hospital laboratories, and government-sponsored research facilities provide employment opportunities. The major provides excellent preparation for advanced study in graduate or professional schools.

B.S. Major Requirements:  UNITS

Preparatory Subject Matter..........................60-69

Biology 2A-2B-2C ..................................14
Chemistry 2A-2B-2C ................................15
Mathematics 16A-16B-16C or 17A-17B-17C or 21A-21B-21C .................9-12
Physics 2A-2B-2C ..................................12
Statistics 13 or 100 (recommended) or 12 ............................................6-12

Depth Subject Matter .................................42-43

Biological Sciences 101, 102, 103, 104 .............................................13
Molecular and Cellular Biology 140 .................................................6-12
Two courses from Molecular and Cellular Biology 143, 144, or 145 .............................................6
Molecular and Cellular Biology 121 or 161 .............................................3
Molecular and Cellular Biology 150 and 150L or 164 and 164 ..................5-6

Select at least 6 additional units from the following: Chemistry 107A, 170B, Evolution and Ecology 100, 150; Microbiology 102, 150, 170; Molecular and Cellular Biology 120, 123, 124, 126, 138, 143, 144, 145, 148, 150/150L, 158, 160L, 162, 163, 164, 178, 182, 191; Neurobiology, Physiology, and Behavior 100, 101, 103, 112, 131, 160, 161; Pathology, Microbiology, and Immunology 126, 126L; Plant Biology 111, 111D, 113D, 113D, 152.

No more than 4 units of research (193, 194H, 195) may be used for credit in this category ..................................................10

Total Units for the Major .........................106-114

Master Adviser, D.G. Myles
Advising Center for the major is located in 156 Briggs (530) 752-0202
Graduate Study, See Biochemistry and Molecular Biology (A Graduate Group), on page 165.

The Cell Biology Major Program

The Cell Biology major program provides students with a comprehensive understanding of the cell, the basic structural and functional unit of all living organisms.

The Program. To understand living organisms, the biologist must understand the cell. Hence, cell biology lies at the core of the biological sciences. Students taking this major gain a solid foundation in biological principles and major focuses on the cellular organization and function that contribute to the development, maintenance, and reproduction of adult organisms. The major illustrates the ways in which principles derived from the physical sciences, genetics, biochemistry, molecular biology and physiology are integrated in the study of living organisms and emphasizes the experimental nature of the study of cell biology.

Career Alternatives. The major provides an excellent background for students wishing to enter graduate and professional programs in biophysical, biological sciences, or veterinary sciences; for students pursuing careers involving teaching or research in the biological sciences; for students interested in careers in the pharmaceutical or other biotechnological industries; or for students interested in careers related to the administrative, legal or commercial aspects of biomedical science.

B.S. Major Requirements:  UNITS

Preparatory Subject Matter.................56-65

Biology 2A-2B-2C ..................................14
Chemistry 2A-2B-2C ................................15
Mathematics 16A-16B-16C or 17A-17B-17C or 21A-21B-21C .................9-12
Physics 2A-2B-2C ..................................12
Statistics 13 or 100 (recommended) or 12 ............................................6-12

Depth Subject Matter .................................48-49

Biology 101, 102, 103, 104 .............................................13
Molecular and Cellular Biology 160L, 164 .............................................7
Evolution and Ecology 100 .............................................4
One course from Molecular and Cellular Biology 161 (recommended) or 121D .............................................3
Two courses from Molecular and Cellular Biology 162, 163, 182 or Evolution and Ecology 102 .............................................6-7
Statistics 100 .............................................4
Restricted Electives ..................................11

Upper division courses in genetics or other fields relevant to the student's interest may be chosen in consultation with the advisor. No more than 4 units of 192, 193, 198, or 199 may be used for credit in this category.

Total Units for the Major ........................104-114

Master Adviser, J.E. Natzle
Advising Center for the major is located at 156 Briggs (530) 752-0202
Graduate Study, See Genetics (A Graduate Group), on page 302.

Courses in Molecular and Cellular Biology (MCB)  }

Lower Division Courses

10. Introduction to Human Heredity (4) Lecture—3 hours, discussion—1 hour. Topics in human heredity and human gene structure and function, including the genetic basis of human development, causes of birth defects, mental retardation, genetic diseases, sexual determination, development, and behavior. GE credit: SciEng. III. (I, III)
Sanders
99. Special Study (1-5) Independent study—3-15 hours. Prerequisite: consent of instructor. (P/NP grading only)

Upper Division Courses

120L. Biochemistry Laboratory (6) Lecture—3 hours; discussion—2 hours; laboratory—1 hour. Prerequisite: Biological Sciences 103 (may be taken concurrently). Introduction to laboratory methods and procedures employed in studying biochemical processes. Designed for students who need experience in the use of biochemical techniques as laboratory tools.—I, II, III. (I, II, III)
Fairclough, Hilt, Lagarias, Lindsay, Liu, L. Morand, Russia
121. Molecular Biology of Eukaryotic Cells (3) Lecture—3 hours. Prerequisite: Biological Sciences 101 and 103. Structure, expression, and regulation of eukaryotic genes. Chromosome structure and replication; gene structure, transcription, and RNA processing; protein synthesis and translation control; development, immune system, and oncogenes. Not open for credit to students who have completed Molecular and Cellular Biology 161. —I, II, III. (I, III)
Burgess, Dahmus, Gasser, Hamer
123. Behavior and Analysis of Enzyme and Receptor Systems (3)
Lecture—3 hours. Prerequisite: Biological Sciences 103. Introduction to the principles of enzyme kinetics and receptor-ligand interactions with emphasis on metabolic regulation and data analysis. Topics include: enzyme kinetics, chemical and steady-state kinetics, allosteric enzymes, multireac-
tant systems, enzyme assays, membrane transport and computer-assisted simulations and analyses.—I, III, III. J. Seigel, Williams.

124. Macromolecular Structure and Function (4)
Lecture—4 hours. Prerequisite: Biological Sciences 103, Chemistry 107B, 118C. An in-depth investiga-
tion into the molecular basis of important plant processes and metabolic pathways. Discussion of methods used to understand plant processes, includ-
ing use of transgenic plants. (Same course as Plant Biology 126A.)—I, III. A. Abat, Callis.

138. Undergraduate Seminar in Biochemistry (1)
Seminar—1 hour. Prerequisite: Biological Sciences 103. Discussion of the historical developments of modern biochemistry or current major research prob-
lems. May be repeated twice for credit when topic differs. (P/NP grading only.)—I, II, III. I, III, III.

140L. Cell Biology Laboratory (5)
Lecture—2 hours, laboratory—6 hours; discussion—1 hour. Prerequisite: Biological Sciences 104 (may be taken concurrently). Exercises illustrating the prin-
ciples of cell biology with emphasis on light micros-
copy.—II. (II.) Kaplan, Nunnari.

142. Advanced Cell Biology: Contractile and Motile Systems (4)
Lecture—3 hours; term paper. Prerequisite: Biological Sciences 102, 104 (may be taken concurrently); Mathematics 168. Advanced cell biology with emphasis on molecular, biophysical and cellular properties of contractile and motile systems.

143. Cell Biophysics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101, 102, 103, 104. Physical principles underlying observations of dynamic mechanisms of cell motility. Orga-
nization of biomolecules into higher order subcell-
ular structures that function as macromolecular machines. Examples include cytoskeletal filaments, polymerizations, motors, axonemes and mitotic spindles.—I. (I.) Schaley.

144. Mechanisms of Cell Division (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101, 102, 104. The molecules and mechanisms that allow eukaryotic cells to coordinate cell growth, DNA replication, segregation of chromosomes and cell division.—II. (II.) McNally.

145. Assembly and Function of Cell Signaling Machinery (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101, 102, 104. Molecular basis of cell signaling, including positioning of cellular machinery, compo-
nents of various signaling pathways, and down-
stream effects on cells and on cellular adhesion, cell differentiation, and programmed cell death.—III. (III.) Erickson.

148. Undergraduate Seminar in Cell Biology (2)
Seminar—2 hours. Prerequisite: upper division standing in the biological sciences or a related disci-
pline. Student reports on current topics in cell biol-
ogy with emphasis on integration of concepts, synthesis, research approaches. Reviews of literature and reports of undergraduate research may be included. May be repeated for credit. (P/NP grading only.)

150. Developmental Biology (4)
Lecture—4 hours. Prerequisite: Biological Sciences 101 and current enrollment in course 150L. Analysis of the mechanistic basis for animal develop-
ment with a focus on experimental evidence and the relevant fundamental experimental strategies. Fertil-
ization, early cleavage, morphogenesis and patterning, cell differentiation, regulation of cell pro-
fission and tissue growth.—I. (I.) Armstrong, Edwards

150L. Laboratory in Developmental Biology (1)
Laboratory—3 hours. Prerequisite: concurrent enroll-
ment in course 150. Experiments using live embryos and histological slide preparations of developing embryos will be performed to illustrate the basic mechanisms of animal development. (P/NP grading only.)—I. (I.) Edwards

158. Undergraduate Seminar in Developmental Biology (2)
Seminar—2 hours. Prerequisite: upper division standing in the biological sciences or a related disci-
pline. Student reports on current topics in cell biol-
ogy with emphasis on integration of concepts, synthesis, research approaches. Reviews of literature and reports of undergraduate research may be included. May be repeated for credit. (P/NP grading only.)—I, II, III. I, III, III.

191. Introduction to Research (1)
Seminar—1 hour. Prerequisite: Biological Sciences 102 (may be taken concurrently) or consent of instructor. Various topics in molecular and cellular biology including biochemistry, genetics, and cell biology will be discussed, along with ways undergrad-
uates can participate in research projects of fac-
ulty members. May be repeated for credit. (P/NP grading only.)—I, II, III. I, III, III.

192. Internship (1-12)
Internship—3.36 hours. Prerequisite: completion of 84 units and consent of instructor. Technical and/or practical experience on and off campus, supervised by a member of the faculty of Molecular and Cellular Biology faculty. (P/NP grading only.)

193. Advanced Research (3)
Laboratory—6 hours; discussion—1 hour. Prerequi-
site: upper division standing, completion of an upper division Molecular and Cellular Biology laboratory course and consent of instructor. Research project carried out under the supervision of a faculty spon-
sor. Discussion and analysis of results and proposed experiments on a weekly basis with faculty sponsor. May include presentation of a seminar to a research group. May be repeated for credit. (P/NP grading only.)—I, II, III. I, III, III.

194H. Research Honors (3)
Honors independent study course. Prerequisite: 6 units of course 193 and/or 199 with faculty director; senior standing; GPA of at least 3.25; consent of Section. Honors project. Continuation of an individual, indivi-
dual laboratory research project in biochemistry, genetics, or cell biology culminating with the presen-
tation of the work in a written thesis and in a semi-
nar. (P/NP grading only.)

197T. Tutoring in Molecular and Cellular Biology (1-5)
Tutorial—2-6 hours. Prerequisite: upper division standing, completion of course to be tutored, and consent of instructor. Assisting the instructor in one of the section’s regular courses by tutoring individual or small groups of students in a laboratory, in voluntary discussion groups, or other voluntary course activi-
ties. May be repeated for credit. (P/NP grading only.)—I, II, III. I, II, III.

198. Directed Group Study (1-5)
Variable—1-5 hours. Prerequisite: consent of instruc-
tor. [P/NP grading only]

199. Special Study for Advanced Undergraduates (1-5)
Independent study—3-15 hours. Prerequisite: consent of instructor. [P/NP grading only]

Graduate Courses

200A. Current Techniques in Cell Biology (2)
Lecture—2 hours. Prerequisite: upper division standing. Biological Sciences 104 and course 141 or the equivalent courses. Current techniques used in cell biology research including microscopy, spectros-
copy, electrophysiology, immunocytochemistry, histology, organellar isolation, calorimetry, tissue culture and gel electrophoresis. Lectures are presented by experts on each technique, with an emphasis on pitfalls to avoid when using the technique. (Same course as Cell and Developmental Biology 200.) (S/U grading only.)—I. (I.) Beck.

200B. Current Techniques in Biochemistry (2)
Lecture—2 hours. Prerequisite: Biological Sciences 103 and course 120L or the equivalent. Current techniques used in biochemical research including protein and carbohydrate analyses, immunochem-
240C. Current Techniques in Biophysics (2) Lecture—2 hours. Prerequisite: graduate standing; Biological Sciences 102 or 104 or the equivalent. Current techniques in biophysics research including diffraction, microscopy, spectroscopy, calorimetry, optical spectroscopy, and electrophysiology. (Same course as Biophysics Graduate Group 200.) S/U grading only.—II. (B.)

220A. Advanced Biochemistry Laboratory Rotations (5) Laboratory—1.5 hours. Prerequisite: course 221A (may be taken concurrently) and 120L or the equivalent. Two five-week assignments in biochemistry research laboratory. Individual research problems with emphasis on methodological/procedural experience and experimental design. May be repeated twice for credit.—I, II, III. (I, II, III) Chedin, Trimmer

221A. Physical Biochemistry (4) Lecture—4 hours. Prerequisite: Biological Sciences 103, Chemistry 107B, 108, and 128C, 129C, or 118C or the equivalent or consent of instructor. Chemical and physical properties of biomacromolecules emphasizing the interaction of molecular interactions and thermodynamic properties as determinants of higher order structure. The use of NMR and crystallography in determining macromolecular structure.—I. (I) Baldwin, Stahlberg, D. Wilson

221B. Mechanistic Enzymology (3) Lecture—3 hours. Prerequisite: undergraduate level organic and biological chemistry, one course in physical chemistry recommended. Analysis of organic enzymes: mechanisms and the exploitation of enzyme catalyzed reactions.—I. (I) Baldwin, Fihey, Toney

221C. Molecular Biochemistry (4) Lecture—4 hours. Prerequisite: course 221A or the equivalent. Pass 1 restricted to graduate students in biochemistry and molecular biology, microbiology, or genetics. Structure and organization of DNA and chromatin; DNA replication, repair and recombination; transcription and RNA processing; protein biosynthesis and turnover; transcriptional and post-transcriptional control mechanisms; examples from eukaryotic and eubacterial cells, and viruses. (Same course as Genetics 201C.)—I, II, III. (I, II, III) Baldwin, H. Chen, Heyer, Korf, Stewart

221D. Cellular Biochemistry (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 102, course 221A or the equivalent, consent of instructor. Molecular structure and biological properties of cellular membranes; organelle biogenesis and trafficking; signal transduction, metabolism and metabolic regulation, cytoplasmic organization, functions of the cytoskeleton and force-generating mechanisms, mechanism of intracellular transport and mitosis; cell reproduction and the cell cycle.—II. (II) McNally, Nunnari, Powers, Schrader

241. Membrane Biology (3) Lecture—3 hours. Prerequisite: Biological Sciences 102, 103, 104 or consent of instructor. Advanced topics on membrane biochemistry and biophysics. Relationship of the functional properties of biomembranes to their role in cell biology and physiology. (Same course as Biophysics 241.)—I, II, III. (I, II, III) Longo, Hsu

248. Seminar in Cell Biology (2) Seminar—2 hours. Prerequisite: consent of instructor. Discussion of recent literature on the physical and chemical aspects of organization and function of living systems, topics of current interest in ultrastructure and molecular biology, and major genetic and functional properties of the molecular and cellular levels of biological systems. May be repeated for credit.—I. (I) Myles

251. Molecular Mechanisms in Early Development (3) Lecture—3 hours. Prerequisite: graduate standing or consent of instructor; introductory background in developmental biology and/or cell biology recommended. Analysis of the early events of development including: germ cells and other stem cells, gamete genesis, mitosis, meiosis, fertilization, genetically-engineered organisms, egg activation and establishment of embryonic polarity with focus on cellular events including cell signalling. Offered in alternate years.—I. (I) Myles

252. Cellular Basis of Morphogenesis (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 150D. Development of form and structure; morphogenetic movement, mechanisms of cellular motility, cell adhesion, intercellular invasion, interaction of cells and tissues in development. Offered in alternate years.—II. (II) Armstrong, Tucker

253. Molecular Mechanisms in Pattern Formation (3) Lecture—3 hours. Prerequisite: graduate standing or consent of instructor; introductory background in developmental biology and/or genetics recommended. Genetic and molecular analysis of mechanisms that control development after fertilization. Establishment of embryonic axes, cell fate and embryonic pattern; induction, apoptosis, tissue patterning. Critical reading of current literature in C. elegans, Drosophila, and mouse genetic model systems. Offered in alternate years.—III. Natzel, Rosse

256. Cell and Molecular Biology of Cancer (2) Lecture—1 hour; term paper. Prerequisite: course in cell or developmental biology (e.g., course 150, 141, 163, or Biological Sciences 104). Analysis at the cellular and molecular levels of the regulation of normal and neoplastic tissue growth; tumor dissemination; identification and characterization of oncogenic agents; characterization of oncoproteins and tumor-suppressor genes.—II. (II) Armstrong

257. Cell Proliferation and Cancer Genes (3) Lecture—1.5 hours; seminar—1.5 hours. Prerequisite: course 221C and 221D or the equivalent. Genetic and molecular alterations underlying the conversion of normal cells to cancers, emphasizing regulatory mechanisms and pathways. Critical reading of the current literature and development of experimental approaches.—II. (II) Carraway, Radke

258. Seminar in Development (2) Seminar—2 hours. Prerequisite: consent of instructor. Reports and discussion on embryology, morphogenesis, and developmental mechanisms. May be repeated for credit.—II. (II) Armstrong, Erickson

259. Literature in Developmental Biology (1) Seminar—1 hour. Prerequisite: consent of instructor. Critical presentation and analysis of recent journal articles in developmental biology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III) McDonald, Rodriguez

263. Biotechnology Fundamentals and Application (2) Lecture—2 hours. Prerequisite: Biological Sciences 101, 102, Microbiology 102, graduate student in good standing. To train graduate students interested in a biotechnology career track, to learn recombinant DNA, rate processes of biological systems, optimization of fermentation processes, practical issues in biotechnology, and some case studies of the development of biotechnology products and processes. Offered in alternate years.—II. (II) McDonald, Privalky, Rodriguez, Vachhyounst

282. Biotechnology Internship (7-12) Internship—21-36 hours. Prerequisite: graduate standing and consent of instructor. Research at a biotechnology company or interdisciplinatory cross-collegial experience lasting from 3 months as part of the Designated Emphasis in Biotechnology Program. (S/U grading only.)—I, II, III. (I, II, III) Dandekar

290C. Research Conference (1) Discussion—1 hour. Prerequisite: graduate standing and consent of instructor; introductory background in biotechnology and critical discussions of faculty and graduate student research in molecular and cellular biology including biochemistry, genetics, and cell biology. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III) Draper

294. Current Progress in Biotechology (1) Seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Seminars presented by guest lecturers on subjects of their own research activities. May be repeated for credit. (Same course as Biophysical Engineering 294.) (S/U grading only.)—I, II, III. (I, II, III)

299. Research (1-12) Independent study—3-36 hours. (S/U grading only.)

300. Methods of Teaching (1) Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Practical experience in the methods and problems of teaching biochemistry/genetics/cell biology. Includes analysis of texts and supporting material, discussion of teaching techniques, preparing for and conducting discussion and laboratory sections, formulating examinations under supervision of instructor. Participating in the teaching program required for Ph.D. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III)

Molecular, Cellular, and Integrative Physiology (A Graduate Group)

Catherine VandeVoort, Ph.D., Chairperson of the Group

Group Office, 313 Life Sciences (530) 752-3902
http://biochem.ucdavis.edu/gg/mcip/

Faculty
Thomas Sean H. Adams, Ph.D., Research Physiologist (USDA WHRSC)
Thomas E. Adams, Ph.D., Professor (Animal Science)
Steven E. Anderson, Ph.D., Associate Researcher (Physiology and Membrane Biology)
Joseph F. Antonini, M.D., Professor (Anesthesiology and Pain Medicine)
Trish J. Berger, Ph.D., Professor (Animal Science)
Bers, Donald M., Ph.D., Professor (Medical Pharmacology)
Sue Bodine, Ph.D., Professor (Exercise Science)
Ann C. Bonham, Ph.D., Professor (Medical Pharmacology and Toxicology)
Laura Borodinsky, Ph.D., Assistant Professor (Physiology & Membrane Biology)
Robert Bronson, Ph.D., Assistant Professor (VM: Surgical & Radiological Sciences)
Peter M. Caffa, Ph.D., Professor (Physiology and Membrane Biology)
Christopher C. Calvert, Ph.D., Professor (Animal Science)
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(Animal Science)

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**291B. Seminar in Cellular Mechanisms of Adaptation (1)**
Discussion—0.5 hour; seminar—0.5 hour. Prerequisite: Neurobiology, Physiology, and Behavior 100B; Biological Sciences 103, consent of instructor. Review and evaluation of current literature and research in cellular adaptations to the environment. May be repeated for credit when topic differs. (S/U grading only.)

**291D. Research Approaches in Physiology (2)**
Seminar—2 hours. Prerequisite: graduate standing in Graduate Group in Physiology or consent of instructor. Current research in physiology. Overall design of experiments and particular research areas. (S/U grading only.)—II. Eiserich, Royballd

**293. Current Progress in Physiology (1)**
Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Seminars presented by guest lecturers describing their current research activities. May be repeated for credit. (S/U grading only.)

**298. Group Study (1-5)**

**299. Research (1-12)**
(S/U grading only.)

**Professional Courses**

**300A-300B. Pedagogical Aspects of Physiology in Higher Education (3-3)**
Lecture, discussion, or laboratory, or combination. Prerequisites: methodology for teaching assistant in physiology. Participation as a teaching assistant for onequarter in a designated physiology course. Instruction in methods of leading discussion groups, leading discussions, writing and grading quizzes, operation and use of laboratory equipment, and reading and grading laboratory reports. Course meets teaching requirements for Ph.D. program in Physiology. (S/U grading only.)—II, III, I, II, III.

**390. The Teaching of Physiology (1)**
Discussion—1 hour. Prerequisite: Teaching Assistant assignment to a physiology lecture course and consent of instructor. Practical experience in methods and problems of teaching physiology lecture courses. May include analyses of texts and supporting material, discussion of teaching techniques, preparing for and conducting discussion sessions, and formulation of topics and questions for examinations under supervision of instructor. May be repeated for credit. (S/U grading only.)—II, III, I, II, III.

**Music**

(College of Letters and Science)
Anna Maria Busse Berger, Ph.D., Chairperson of the Department

Department Office. 112 Music Building (530) 752-5537; Fax (530) 752-0983; http://music.ucdavis.edu

**Faculty**
Rass Bauer, Ph.D., Professor
Anna Anna Maria Busse Berger, Ph.D., Professor
Sandra Graham, Ph.D., Assistant Professor
D. Kern Holoman, Ph.D., Professor, Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching and Scholarly Achievement
Beth Levy, Ph.D., Assistant Professor
David A. Nutter, Ph.D., Professor
Paula O. Oshiro, Ph.D., Professor
Christopher A. Reynolds, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Kurt Rohde, M.M., Assistant Professor
Laurie San Martin, Ph.D., Assistant Professor
Henry Spiller, Ph.D., Assistant Professor
Jeffrey Thomas, Professor

**Emeriti Faculty**
Robert S. Bloch, M.A., Professor Emeritus
Sydney R. Charles, Ph.D., Professor Emeritus

Andrew D. Frank, M.A., Professor Emeritus
Albert J. McNeill, M.S., Professor Emeritus
Jerome W. Rosenblatt, M.A., Professor Emeritus
Wayne Lawson, Ph.D., Professor Emeritus

**Affiliated Faculty**
Phoebe Craig, M.M., Lecturer
Sam Nichols, Ph.D., Lecturer
Donald Roth, Ph.D., Lecturer
Robert Sabino, Lecturer
Thomas Slabaugh, M.M., Lecturer
Amelia Triest, B.A., Lecturer

**Faculty Affiliates in Applied Music**
Keith Bohm, D.M.A., Lecturer (saxophone)
Lois Brandwynne, M.A., Lecturer (piano)
Ted Broady, B.A., Lecturer (flute)
Delbert Bump, M.A., Lecturer (jazz)
Scott Choate, Lecturer (tuba)
Bruce Chrisp, M.M., Lecturer (trombone)
Susan Lamb Cook, M.A., Lecturer (cello)
Phoebe Craig, M.M., Lecturer (percussion)
Michael Goldberg, M.A., Lecturer (guitar)
David Granger, M.M., Lecturer (bassoon)
Ann Lavin, D.M.A., Lecturer (clarinet)
Agnes Lee, M.M., Lecturer (soprano)
Calvin Lymos, B.A., Lecturer (gospel choir)
Scott Macomber, M.M., Lecturer (trumpet)
Justin Montigue, D.M.A., Lecturer (voice)
Zaiza Muzik, M.L., Lecturer (piano)
Peter Nowlen, B.M., Lecturer (French horn)
Laura Reynolds, M.M., Lecturer (oboe)
Ellen Ruth Rose, M.M., Lecturer (viola)
Rita Sahai, M.A., Lecturer (Grecian vocal music)
Michael Sand, M.M., Lecturer (violin)
Bharati Soman, M.M., Lecturer (voice)

**The Major Program**

The Bachelor of Arts degree in music provides both a broad liberal arts education and the skills necessary to explore music through its history, composition, theory, and performance. Students majoring in music may choose from three tracks in the major: composition and theory, music history, or performance. After a common core of courses, students following the track in composition and theory take advanced theory courses and/or seminars in composition; students following the track in music history may take specialized seminars in music history; and students following the track in performance take an increased number of lessons and performance ensemble courses as well as conducting.

All majors are expected to complete a substantial project [composition, research presentation, recital] in the senior year (Music 195). Music majors who intend to pursue graduate studies in music are encouraged to satisfy the requirements of one of the honors programs in music.

**Study Abroad and the Music Major**
The department encourages students to pursue a portion of their studies abroad. In close collaboration with their undergraduate advisers, students plan a course of study abroad that complements their coursework at Davis. UC Davis Music majors have completed upper division coursework at EAP partner institutions in Argentina, Austria, Brazil, Germany, and Italy; Music faculty members lead summer programs in Argentina and Slovenia.

**The Program.** A fundamental grounding in music theory, music history, and performance during the first two years of study leads to more specialized study of composition, history, or performance during the last two years of undergraduate work.

**Career Alternatives.** Students who graduate with a B.A. in music from UC Davis have gone on to careers as composers and performers, in academia, and in the concert, media, and computing industries. Others have continued in medicine, law and business.
A.B. Major Requirements:

<table>
<thead>
<tr>
<th>Preparatory Subject Matter</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music 6A, 6B, 6C</td>
<td>9</td>
</tr>
<tr>
<td>plus Music 2A, 2B, 2C and Music 16A, 16B, 16C</td>
<td>0-6*</td>
</tr>
<tr>
<td>Music 7A, 7B, 7C</td>
<td>6</td>
</tr>
<tr>
<td>plus Music 17A, 17B, 17C</td>
<td>0-6*</td>
</tr>
<tr>
<td>Music 24A, 24B, 24C</td>
<td>0</td>
</tr>
</tbody>
</table>

* May be excused by diagnostic examination at the beginning of each quarter.

Depth Subject Matter 36-37

<table>
<thead>
<tr>
<th>Track 1: Theory/Composition</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music 124A, 124B</td>
<td>6</td>
</tr>
<tr>
<td>Music 195</td>
<td>2</td>
</tr>
<tr>
<td>At least 9 units selected from Music 130, 131, 140, 141, 142, 143, 144, 145, 146, 147, 154</td>
<td>9</td>
</tr>
<tr>
<td>Music 101A, 101B</td>
<td>8</td>
</tr>
<tr>
<td>Music 103 or 199 (for composers) or Music 122 (for theorists)</td>
<td>4-8*</td>
</tr>
</tbody>
</table>

**Note:** Music 103 and 199 may be taken only once for credit toward the major.

<table>
<thead>
<tr>
<th>Track 2: Music History</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music 124A, 124B</td>
<td>6</td>
</tr>
<tr>
<td>Music 195</td>
<td>2</td>
</tr>
<tr>
<td>At least 9 units selected from Music 130, 131, 140, 141, 142, 143, 144, 145, 146, 147, 154</td>
<td>9</td>
</tr>
</tbody>
</table>

Two quarters of Music 121 (on different subjects) | 8 |

<table>
<thead>
<tr>
<th>Track 3: Music Performance</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Music 124A, 124B</td>
<td>6</td>
</tr>
<tr>
<td>Music 195</td>
<td>2</td>
</tr>
<tr>
<td>At least 19 units selected from Music 130, 131, 140, 141, 142, 143, 144, 145, 146, 147, 154</td>
<td>19</td>
</tr>
</tbody>
</table>

| Total Units for the Major | 63-82 |

Honors Programs. Students who wish to pursue particularly intensive studies in music should elect one of the following honors programs in addition to one of the tracks above: Theory/Composition Honors 45-49 Music 124A, 124B 6 At least 11 units selected from Music 130, 131, 140, 141, 142, 143, 144, 145, 146, 147, 154 11 Music 101A, 101B 8 Two quarters of Music 194H for a total of at least 6 units resulting in a Senior composition or theory thesis 6 Select 14-18 units from Music 102, 107A, 107B, 107C, 108A, 108B, 112, 113, 114, 122 14-18 Music History Honors 41-45 Music 124A, 124B 6 At least 11 units selected from Music 130, 131, 140, 141, 142, 143, 144, 145, 146, 147, 154 11 Music 101A, 101B 8 Two quarters of Music 194H for a total of at least 6 units resulting in a Senior thesis 6 Select 10-14 units from Music 108A, 121, 122 10-14

Major Advisers. H.J. Spiller (AF), D.A. Nutter (GM), D.K. Holoman (INZ)

Minor Program Requirements:

<table>
<thead>
<tr>
<th>Music</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A minimum of 16 units of upper division Music courses</td>
<td>16</td>
</tr>
<tr>
<td>Courses chosen from Music 105, 106, 107, 110, 126, 129 10-14</td>
<td></td>
</tr>
<tr>
<td>A minimum of 6 units in upper division music performance courses</td>
<td>16</td>
</tr>
<tr>
<td>Courses chosen from Music 140, 141, 142, 143, 144, 145, 146, 147, 154 10-14</td>
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Foreign Language Requirement. Students contemplating graduate study in music are advised to consider pursuing a foreign language study beyond the elementary level.

Diagnostic Exams are given before admission into Music 6A-6B-6C. As an alternative Music 3A-3B may be recommended. Diagnostic exams are also given for Music 102, 107, 110, 126, 129 and 170 at the beginning of each year. Transfer students should take the Music 6 diagnostic exam given during the first class meetings.

Beginning and transfer students are required to take Music 2A-2B-2C (Keyboard Competence) unless they can pass one or more of the classes by demonstrating proficiency through a diagnostic exam given at the beginning of each quarter. Students learn: (1) four-part keyboard harmony in all major and minor keys; (2) moderate fluency with figured bass at the keyboard; (3) major and minor scales with proper fingering; (4) ability to sight read simple piano music and Bach chorales.

Student Performing Activities. The Department of Music presents over 100 concerts each year, offering performance opportunities for both majors and non-majors in the UCD Symphony Orchestra, University Chorus and Chamber Singers, Concert Band and Wind Ensemble, Early Music Ensemble, Baroque Chamber Orchestra, Jazz Band, Gospel Choir, world music ensembles (Gamelan, Samba, School, Hindustani Vocal Ensemble) and numerous chamber ensembles. There is a close relationship with the Robert and Margrit Mondavi Center for the Performing Arts, where several of the ensembles are resident. Chamber ensembles perform frequently in the popular weekly Thursday Noon Concerts. Performance groups have collaborated with the Department of Theatre and Dance in productions of musical theater and opera. Study of instruments and voice with professional performers and teachers is required of all majors. Similar opportunities exist for qualified non-majors.

Faculty and Facilities. The faculty is noted for its achievements in a variety of areas. The music scholars are active in research, writing, and performance; the music of the composers is performed and recorded nationally and internationally. The journal, 19th-Century Music, is housed in the department. The regular faculty is joined throughout the year by visiting Artists-in-Residence, distinguished performers who give public concerts and lectures and who work with students.

The Empyrean Ensemble, a professional new music ensemble, is in residence at UC Davis, where it performs student-composed music. The American Bach Soloists, an ensemble of professional singers and instrumentalists specializing in music of the late 18th and early 19th centuries, is affiliated with the Department of Music.

The department’s facilities include a large collection of Renaissance, Baroque, and modern instruments, along with non-western instruments including a full Indonesian gamelan. The arts quadrangle houses the Computer and Electronic Music Studio, practice and rehearsal rooms, and an excellent music library with some 10,000 CDs, several hundred videos and a collection of music reference materials. Scores and music monographs are housed in the Peter J. Shields Library, adjacent to the Music Building. A partnership of campus libraries offers online access to more than 100,000 tracks of classical and world music by streaming audio.

Graduate Study. The Department of Music offers programs of study and research leading to the M.A. degree in composition/theory, musicology, ethnomusicology, and conducting, and the Ph.D. degree in composition/theory, musicology, and ethnomusicology. Detailed information regarding graduate study may be obtained from the Graduate Adviser.

Graduate Advisers. R. Bauer

Courses in Music (MUS)

Lower Division Courses

2A. Keyboard Competence, Part 1 (2) Performance—2 hours. Prerequisite: course 6A and 16A concurrently. Training to meet the minimum piano requirements for the major in music. All music majors will be expected to play at least one piano and in simple harmonic progressions in twelve keys, both major and minor. (P/NP grading only)—I. Triest

2B. Keyboard Competence, Part 2 (2) Performance—2 hours. Prerequisite: course 68 and 168 concurrently, course 28 or demonstration of required keyboard proficiency on diagnostic exam. Training to meet the minimum piano requirements for the major in music. The study of scales with both hands, harmonic progressions, and sight reading at the piano. (P/NP grading only)—II. Triest

2C. Keyboard Competence, Part 3 (2) Performance—2 hours. Prerequisite: course 6C and 16C concurrently, course 2B or demonstration of required keyboard proficiency on diagnostic exam. Training to meet the minimum piano requirements for the major in music. The study of chord progressions, figured bass, sight reading, and piano repertoire. (P/NP grading only)—III. Triest

3A. Introduction to Music Theory (4) Lecture—1 hour; recitation—3 hours. Fundamentals of music theory, ear-training, harmony, counterpoint, and analysis directed toward the development of listening and writing technique necessary for the general student—I. Triest

3B. Introduction to Music Theory (4) Lecture—3 hours; laboratory—1 hour. Prerequisite: course 3A. Continuation of course 3A. Intended for the general student—II. Triest

6A. Elementary Theory, Part 1 (3) Lecture—3 hours. Prerequisite: Admission by examination given during first class meeting; concurrent enrollment in course 16A and 2A or demonstration of required proficiency level on diagnostic exam. Development of music writing and listening skills through the study of music fundamentals, species counterpoint, harmony, analysis of repertory. Intended primarily for music majors—III. Triest

6B. Elementary Theory, Part 2 (3) Lecture—3 hours. Prerequisite: course 6A; concurrent enrollment in course 16B and 2B or demonstration of required proficiency level on diagnostic exam. Continuation of courses 6A-B—III. Triest

6C. Elementary Theory, Part 3 (3) Lecture—3 hours. Prerequisite: course 6B; concurrent enrollment in course 16C and 2C or demonstration of required proficiency level on diagnostic exam. Continuation of courses 6A-B—III. Triest

7A. Intermediate Theory, Part 1 (3) Lecture—3 hours. Prerequisite: course 6C; course 17B concurrently. Homophonic music of the Classical era with a focus on analysis of music by Haydn, Mozart, and Beethoven. Composition of pieces in the homophonic forms such as Minuet and Trio.

7C. Intermediate Theory, Part 3 (3) Lecture—3 hours. Prerequisite: course 7B; course 17C concurrently. The history of the first thirty years of the twentieth century and various analytical tools pertaining to it. Works of Debussy, Stravinsky, Schoenberg, Berg, and others. Composition of small pieces for solo instruments, voice and piano. Intended for music majors. —III. (III.) Nichols


16A. Elementary Musicianship, Part 1 (2) Lecture/laboratory—2 hours. Prerequisite: concurrent enrollment in course 6A is required; students must pass a short diagnostic exam, at the beginning of the quarter, in order to be admitted into the course. The melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis.—I. (I.) Triest

16B. Elementary Musicianship, Part 2 (2) Lecture/laboratory—2 hours. Prerequisite: concurrent enrollment in course 6B is required; course 16A or demonstration of required proficiency level on diagnostic exam. The melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis.—II. (II.) Triest

16C. Elementary Musicianship, Part 3 (2) Lecture/laboratory—2 hours. Prerequisite: concurrent enrollment in course 6C is required; course 16B or demonstration of required proficiency level on diagnostic exam. The melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis.—III. (III.) Triest

17A. Intermediate Musicianship, Part 1 (2) Lecture/laboratory—2 hours. Prerequisite: course 7A concurrently; successful completion of course 16C or demonstrate required proficiency level on diagnostic exam. The melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis.—I. (I.) Craig

17B. Intermediate Musicianship, Part 2 (2) Lecture/laboratory—2 hours. Prerequisite: course 7B concurrently; successful completion of course 17A or demonstrate required proficiency level on diagnostic exam. The melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis.—II. (II.) Craig

17C. Intermediate Musicianship, Part 3 (2) Lecture/laboratory—2 hours. Prerequisite: course 7C concurrently; successful completion of course 17B or demonstrate required proficiency level on diagnostic exam. The melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis.—III. (III.) Craig

24A. Introduction to the History of Music I (3) Lecture—3 hours. Prerequisite: course 6A (may be taken concurrently). History of music from the late Baroque to Beethoven. Intended primarily for majors in music. GE credit: Writ.—II. Busse Berger

24B. Introduction to the History of Music II (3) Lecture—3 hours. Prerequisite: course 24A, course 6B (may be taken concurrently). The history of music from the Romantic Period to the nineteenth century. Intended primarily for majors in music. GE credit: Writ.—III. Busse Berger

24C. Introduction to the History of Music III (3) Lecture—3 hours. Prerequisite: course 24B, course 6C (may be taken concurrently). The history of music of the 20th century. Intended primarily for majors in music. GE credit: Writ.—II. Reynolds

28. Introduction to African American Music (4) Lecture/discussion—3 hours; discussion—1 hour; listening; project. Survey of African American music, such as spirituals, blues, ragtime, jazz, theater, gospel, R&B, rap, and hip-hop techniques. Lectures, rehearsal, study, and performance of Gospel music. May be repeated for credit. [Same course as African American and African Studies 54] (P/NP grading only)—I, II, III. (III.) Graham

54. University Give Choir (2) Rehearsal—4 hours. Prerequisite: consent of instructor; open to any student in the university. Rehearsal, study, and performance of Gospel music. May be repeated for credit. [Same course as African American and African Studies 54] (P/NP grading only)—I, II, III. (III.) Laursen

98. Directed Group Study (1-5) Prerequisite: consent of instructor. (P/NP grading only)

99. Special Study for Undergraduates (1-5) (P/NP grading only)

Upper Division Courses

101A. Advanced Theory, Part 1 (4) Lecture—3 hours; lecture/laboratory—1 hour. Prerequisite: course 7C. Twentieth-century music from 1930 through 1950 and the various analytical tools pertaining to it. Works of Copland, Sessions, Schaeffer, Bartók, and Stravinsky. Composition of small pieces for percussion and other contemporary media.—II. (II.) Martin

101B. Advanced Theory, Part 2 (4) Lecture—3 hours; lecture/laboratory—1 hour. Prerequisite: course 101A. Music from 1950 to the present and the analytical tools pertaining to it. Works of Babbitt, Carter, Dallapiccola, Ligeti, Messiaen, Reich and others. Composition of small pieces for ensemble.—II. (II.) San Martin

102. Tonal Counterpoint (4) Lecture—3 hours; practice—1 hour. Prerequisite: course 7C. Imitative tonal counterpoint with an analytical focus on the Two-Part Inventions and fugues from the The Well-Tempered Clavier by J. S. Bach. Composition of exercises and short pieces using contrapuntal techniques. Intended for music majors.—I. (I.) Bauer

103. Workshop in Composition (3) Workshop—3 hours. Prerequisite: course 4C. Workshop in musical composition for undergraduates who are interested in writing for voice and instrumental groups. Course will allow students to explore the techniques and materials of musical composition. May be repeated for credit. (P/NP grading only)—I, II, III. (III.) Bauer, Rohde, San Martin

105. History and Analysis of Jazz (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 3A or 10 or the equivalent. Jazz will be studied in its historical and cultural contexts; the evolution of jazz styles will be analyzed. Lectures, discussion, and selected readings. Designed for non-majors. GE credit: ArtHum, Writ.—I. Bauer

106. History of Rock Music (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 3A-3B or 10 or consent of instructor. Rock studied in its musical, historical, and cultural contexts; analysis of the evolution of rock styles. Includes guided listening sections and selected readings. Designed for non-majors. GE credit: ArtHum, Writ.—II. Sabino

107A. Computer and Electronic Music I (3) Lecture—3 hours; laboratory—1 hour. Prerequisite: consent of instructor. Studies in electronic and computer music composition: Principles and procedures of composition in various electronic media are explored through compositional exercises. Limited enrollment.—I. (I.) Nichols

107B. Computer and Electronic Music II (3) Lecture—3 hours; laboratory—1 hour. Prerequisite: course 107A and consent of instructor. Continuation of course 107A. Limited enrollment.—(II.) Nichols

107C. Computer and Electronic Music III (3) Lecture—3 hours; laboratory—1 hour. Prerequisite: course 107B and consent of instructor. Continuation of course 107B. Limited enrollment.—(III.)

108A-108B. Orchestration (2-2) Lecture—2 hours. Prerequisite: course 5C. Techniques of orchestration from study of basic instrumental techniques to analysis of orchestral scores and scoring for various instrumental combinations.—II, III. Ortitz, Nichols

110A. The Music of a Major Composer: Beethoven (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or 3A-3B. The work of Beethoven will be studied in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors. GE credit: ArtHum, Writ.—II. Reynolds

110B. The Music of a Major Composer: Stravinsky (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or 3A-3B. The work of Stravinsky will be studied in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors. GE credit: ArtHum, Writ.—II. Bauer

110C. The Music of a Major Composer: Bach (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or 3A-3B. The work of Bach will be studied in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors. GE credit: ArtHum, Writ.—II. San Martin

110D. The Music of a Major Composer: Mozart (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or 3A-3B. The work of Mozart will be studied in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors. GE credit: ArtHum, Writ.—I. Bauer

110E. The Music of a Major Composer: Haydn (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or 3A-3B. The work of Haydn in the context of his time and his contemporaries. Lectures, discussion/guided listening sections, and selected readings. For non-majors. GE credit: ArtHum, Writ.—II. Bauer

110F. American Music (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or 3A-3B. An overview of American concert music by master composers from Charles Ives to the present. Lectures, discussion/guided listening sections, and selected readings. For non-majors. GE credit: ArtHum, Writ.—II. Levy

113. Introduction to Conducting (2) Lecture—1 hour; performance—1 hour. Prerequisite: consent of instructor; course 10 or consent of instructor. Principles and techniques of conducting; as they apply to both vocal and instrumental ensembles. Not offered every year.—I, II. Derthick, Slabaugh
114. Intermediate Conducting (2)

Lecture—1 hour; performance—1 hour. Prerequisite: course 101 and 1A-3B or style selected by the instructor and announced in advance. May be repeated for credit. GE credit: Wrt.—II, III, Nutter, Reynolds

121. Topics in Music History and Criticism (4)

Seminar—4 hours (includes selected listening). Prerequisite: courses 4A-4B, 24A-24B, 24C, and consent of instructor. Sources and problems of a historical period or musical style selected by the instructor and announced in advance. May be repeated for credit. GE credit: Wrt.—II, III, Nutter, Reynolds

122. Topics in Analysis and Theory (4)

Seminar—4 hours (includes selected listening). Prerequisite: courses 5C and 25C. Analysis of works of a composer or musical style selected by the instructor and announced in advance. Consideration of theoretical issues. May be repeated for credit. GE credit: Wrt.

124A. History of Western Music: Middle Ages to 1600 (3)

Lecture—3 hours. Prerequisite: course 6C and 24C. Historical survey of composers and musical styles from the Middle Ages to the beginning of the 17th century. GE credit: Wrt.—II, III, Nutter

124B. History of Western Music: 1600-1750 (3)

Lecture—3 hours. Prerequisite: course 124A. Historical survey of composers and musical styles from the late 1500s to the mid-18th century. GE credit: Wrt.—II, III, Nutter

126. American Music (4)

Lecture—3 hours; listening—1 hour. Prerequisite: course 10 or 1A-3B or consent of instructor. Introductory survey of American music, including Native American music, Hispanic polyphony, New England psalmody, and selected 20th-century composers and styles. Offered in alternate years. GE credit: Div. Wrt.—II, Lev

127. Music from Latin America (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor. Examination of music from Latin America. Characteristic music (i.e. tango, bossa nova, salsa, musica moteca, musica andina) as well as its implications in other musical genres. Taught in Spanish. Not open to students who have taken Spanish 171 or 171S. Same course as Spanish 171.

Offered in alternate years.—II, Ortiz

129A. Musics of the Americas (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 3A or 3B recommended. Survey of music cultures from North, Central, and South America, including the Caribbean, with emphasis on the role of music in society and on the elements of music [instruments, theory, genres and form, etc.]. Introduction to ethnomusicological theory, methods, approaches. Not offered every year. GE credit: ArtHum, Div. Wrt.—II, Spiller

129B. Musics of Africa, Middle East, Indian Subcontinent (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 3A or 3B recommended. Survey of music cultures with special emphasis on the role of music in society and on the elements of music [instruments, theory, genres and form, etc.]. Introduction to ethnomusicological theory, methods, approaches. Not offered every year. GE credit: ArtHum, Div. Wrt.—II, Graham

129C. Musics of East and Southeast Asia (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 3A or 3B recommended. Survey of music cultures from Japan, China, Korea, Vietnam, and Indonesia, with special emphasis on the role of music in society and on the elements of music [instruments, theory, genres and form, etc.]. Introduction to ethnomusicological theory, methods, approaches. Not offered every year. GE credit: ArtHum, Div. Wrt.—II, Graham

129D. Folk Musics of Europe (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 3A or 3B recommended. Survey of folk musics from all of Europe, with emphasis on the role of music in society and on the elements of music [instruments, genres, form, etc.]. Introduction to ethnomusicological theory, methods, approaches. Not offered every year. GE credit: ArtHum, Div. Wrt.


Performance instruction—1 hour. Prerequisite: open to Music majors only; admission by audition and consent of instructor. Individual instruction in (A) Voice (prerequisite of course 1 or the equivalent); (B) Piano; (C) Harpsichord; (D) Organ; (E) Violin; (F) Viola; (G) Cello; (H) Double Bass; (I) Flute; (J) Oboe; (K) Clarinet; (L) Bassoon; (M) French Horn; (N) Trumpet; (O) Trombone; (P) Tuba; (Q) Percussion; (R) Classical Guitar; (U) Recorder. May be repeated for credit.

Offered as demand indicates.—I, II, III, (I, II, III)


Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: open to Music majors only; admission by audition and consent of instructor. Individual instruction in (A) Voice (prerequisite of course 1 or the equivalent); (B) Piano; (C) Harpsichord; (D) Organ; (E) Violin; (F) Viola; (G) Cello; (H) Double Bass; (I) Flute; (J) Oboe; (K) Clarinet; (L) Bassoon; (M) French Horn; (N) Trumpet; (O) Trombone; (P) Tuba; (Q) Percussion; (R) Classical Guitar. May be repeated for credit.—I, II, III, (I, II, III)

132. Singing for Actors (1)

Performance—1 hour. Prerequisite: consent of instructor. The elements of basic singing techniques, through selected exercises, vocalises, and songs. May be repeated for credit. (P/NP grading only.)

140. University Jazz Band (2)

Rehearsal—4 hours. Prerequisite: consent of instructor. Open to students in any major. Rehearsal, study, and performance of jazz band music and full variety of jazz band styles, including swing, be-bop, and contemporary jazz styles. May be repeated for credit. (P/NP grading only.)—I, II, III, (I, II, III)

141. University Symphony (2)

Rehearsal—4 hours. Prerequisite: admission subject to audition before first class meeting. Open to any student in the University whose proficiency meets the requirements of concert performance. Sight-reading, rehearsal and performance of music from the orchestral literature. May be repeated for credit. (P/NP grading only.)—I, II, III, (I, II, III)

142. University Chamber Singers (2)

Rehearsal—3 hours. Prerequisite: admission subject to audition before first class meeting. May be repeated for credit. (P/NP grading only.)—I, II, III, (I, II, III)

143. University Concert Band (2)

Rehearsal—4 hours. Prerequisite: admission subject to audition before first class meeting. Open to any student in the University whose proficiency meets the requirements of concert performance. Rehearsal and performance of music for band. May be repeated for credit. (P/NP grading only.)—I, II, III, (I, II, III)

144. University Chorus (2)

Rehearsal—4 hours. Prerequisite: admission subject to audition before first class meeting. Open to any student in the University. Rehearsal and performance of choral music. May be repeated for credit. (P/NP grading only.)—I, II, III, (I, II, III)

145. Early Music Ensemble (2)

Rehearsal—4 hours. Prerequisite: admission subject to audition before first class meeting. Rehearsal and performance of Medieval, Renaissance, and Baroque music for vocal ensemble and historical instruments. May be repeated for credit. (P/NP grading only.)—I, II, III, (I, II, III)

146. Chamber Music Ensemble (1)

Rehearsal—2 hours; student practice—1 hour. Prerequisite: admission subject to audition before first class meeting. Open to any student in the University whose proficiency meets the requirements of concert performance. Study, rehearsal, and performance of ensemble music for strings, winds, voice, harpsichord, and organ. May be repeated for credit. (P/NP grading only.)—I, II, III, (I, II, III)

147. University Wind Ensemble (2)

Rehearsal—4 hours. Prerequisite: consent of instructor. Open to students in any major. Rehearsal, study, and performance of a full variety of wind ensemble music; and to have students share their work in public performances. May be repeated for credit. (P/NP grading only.)—I, II, III, (I, II, III)

148. Hindustani Vocal Ensemble (2)

Rehearsal—2 hours. Basics of Hindustani music through theory and practice. Fundamentals of raga (mode) and talá (rhythms) with special emphasis on improvisation, a central feature of khyála (singing style). Five ragas each quarter. May be repeated up to six times for credit. (P/NP grading only.)—I, II, III, (I, II, III)

154. University Gospel Choir (2)

Rehearsal—4 hours. Prerequisite: consent of instructor; open to any student in the university. Rehearsal, study, and performance of Gospel music. May be repeated for credit. (Same grading only.)—I, II, III, (I, II, III)

194HA-194HB. Special Study for Honors Students (2-4)

Independent study.—6-12 hours. Prerequisite: course 7C, 12A8. Open only to students who qualify for the honors program and admission to Music Senior Honors Program. Preparation and presentation of a culminating project, under the supervision of an instructor, in one of the creative or scholarly areas of music. [Deferred grading only, pending completion of sequence.]-I, II, III, (I, II, III)

195. Senior Project (2)

Project.—6 hours. Prerequisite: Consent of instructor and academic advisor. Organization of a senior project in music composition (public presentation of a new work), in music performance (a public recital), or in music history and theory (public presentation of research work) for music majors with senior standing.—I, II, III, (I, II, III)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

Graduate Courses

202. Notation (4)

Seminar—3 hours; term paper. Study of musical notation; investigation of techniques for editing Medieval and Renaissance music.—I. Busse Berger

203. Music Composition (4)

Seminar—3 hours; term paper. Technical projects that explore compositional problems, the skill and techniques with which to solve them, and free composition. May be repeated for credit.—I, II, III, (I, II, III)

204. Advanced Conducting (3)

Tutorial—2 hours; practicum—2 hours. Prerequisite: courses 111, 112, or the equivalent; keyboard skills appropriate to graduate standing. Technical aspects of conducting and the broader issues in music his-
Native American Studies

(College of Letters and Science)
Steven J. Crum, Ph.D., Chairperson of the Department

Department Office, 2401 Hart Hall
(530) 752-3237
http://nas.ucdavis.edu

Plan II—Mexico-Central America

Emphasis .................. 28

Native American Studies 133, 166, 168, 173, 174

Three courses from History 161A, 166A, Anthropology 134, 145, 146, 174
Chicana/o Studies 130, Native American Studies 122

Two courses from Spanish 155, 172, Art History 151, Native American Studies 101, 156, 181A, 181B, 181C, or, if student's work is specifically focused upon a Meso-American language or topic, from Native American Studies 188, 191

Plan III—South American Emphasis ........... 28

Native American Studies 107, 120

Two courses from History 161A, 161B, 162, 163A, 163B, 181C, 181D, 181E

Three courses from Anthropology 134, 144, 174, 175, Native American Studies 101, 122, 156, 181A, 181B, 181C, or, if student's work is specifically focused upon a South American language or topic, from Native American Studies 188, 191

Total Units for the Major .................. 64

Major Adviser, S. Crum

Minor Program Requirements:
The Native American Studies minor provides an introduction to the Native experience in the Americas by means of exposure to course work dealing with some of the major aspects of Indian life, including history, values, politics, literature, and art.

UNITS

Native American Studies ................. 24

Native American Studies 1 or 10 ............ 4

Five upper division courses, at least one of which is chosen from each of the following groups

Ethno-History: Native American Studies 130A, 130B, 130C, or 133

Philosophy and values: Native American Studies 156, 157, or 180

Politics and current affairs: Native American Studies 115, 116, 117, 118, 120, 122

Art and literature: Native American Studies 101, 181A, 181B, or 181C

One other upper division course selected in consultation with adviser.

Study Off Campus.

 Majors have the option of spending one to three quarters elsewhere in the Americas or on an arner as part of the fulfillment of the Area of Specialization. Each student's plan must be approved by the student's adviser and by the chairperson and may fulfill from 12 to 20 of the 28 units required for the emphasis. The courses or field internship taken elsewhere must be focused upon indigenous peoples or indigenous languages and the institution of study shall be located in an area with substantial indigenous population. Students must have upper division standing and, for Plan I, course 107 or the equivalent should have been completed, for Plan II, courses 107 and 133 should have been completed; and for Plan III, courses 107 and 120 should have been completed prior to departure. Semester programs cannot be used for receiving academic credit, including course 195. The department strongly encourages students to participate in the UC Education Abroad Program, Short-Term Programs Abroad.

Graduate Study. The Department offers a program of study leading to the M.A. and Ph.D. in Native American Studies, as well as a a designated emphasis in Native American Studies for graduate students in applied programs. Further information regarding graduate study may be obtained at the Department office and at Graduate Studies.

Graduate Advisers. I. Hernandez-Avila, E. Valandro
Courses in Native American Studies (NAS)

Lower Division Courses

1. Introduction to Native American Studies (4)
   Lecture—3 hours; discussion—1 hour. Introduction to Native American Studies with emphasis on basic concepts relating to Native American historical and political development. GE credit: SocSci, Div.—I, II, III, (I, II, III) Crum, Coates, Montejo, Valandra

5. Introduction to Native American Literature (4)
   Lecture/discussion—4 hours. Prerequisite: completion of Subject A requirement. Study of selected Native American texts. Intensive focus on analysis of these texts, with frequent writing assignments to develop critical thinking and composition skills. GE credit: ArtHum, Div, Wrt [cannot be used to satisfy a college or university composition requirement and GE writing experience simultaneously].—I, II, III, (I, II, III)

10. Native American Experience (4)
   Lecture—3 hours; discussion—1 hour. Introduction to the diverse cultures of Native American peoples from North, Central, and South America. Emphasis on Native American voices in the expression of cultural views and in the experience of conflicting values. GE credit: ArtHum or SocSci, Div, Wrt.—I, II, III, (I, II, III) Henríndez-Avila, Mendoza, Macri, Tishinahninnie, Varese

32. Native American Music and Dance (4)
   Lecture/discussion—4 hours. Introduction to the music and dance of the Native peoples of the Americas. Students will learn Native music and dance from a cross-section of regions and tribes. GE credit: Div.—(I) Mendoza

33. Native American Art in the U.S. (4)
   Lecture—4 hours. Comprehensive survey of Indian art forms with emphasis on design, media, and function. Intended to familiarize the student with a wide range of styles and techniques. GE credit: ArtHum, Div

34. Native American Art Workshop (4)
   Lecture—4 hours; laboratory—6 hours, 3 hours to be arranged. Prerequisite: consent of instructor; course 33 recommended. Studio projects in Native American art, design, and crafts. [P/NP grading only].—I, Tishinahninnie

46. Orientation to Research in Native American Studies (4)
   Lecture/discussion—3 hours; term paper. Prerequisite: Native American Studies major or minor, or consent of instructor. Introduces students to basic research resources pertinent to Native American subjects available in the region, including libraries, archives, museums, etc. Emphasis is upon learning to use documentary resources or other collections of data. Students will carry out individual projects. Limited enrollment. GE credit: SocSci, Div, Wrt.

55. Americanisms: Native American Contributions to World Civilization (4)
   Lecture/discussion—4 hours. Prerequisite: course 1 or 10 recommended. American indigenous people's contributions to the contemporary world, with attention to forced participation of Indian societies in the development of Western dominance and resulting appropriation of their cultures. Responses and initiatives of indigenous peoples will be analyzed. GE credit: SocSci, Div, Wrt.

98. Directed Group Study (1-5)
   Prerequisite: consent of instructor. [P/NP grading only]

99. Special Study for Undergraduates (1-5)
   Prerequisite: consent of instructor. [P/NP grading only]

Upper Division Courses

101. Contemporary Indian Art (4)
   Lecture—4 hours. Prerequisite: course 33. Historical review of contemporary Indian art from 1900 to the present by looking at the two art centers of Oklahoma and Santa Fe. Social pressures that have influenced the imagery that exists today will be examined. GE credit: ArtHum, Div—III, Tishinahninnie

107. Special Topics in Native American Languages (4)
   Lecture/discussion—4 hours. Prerequisite: consent of instructor. Investigation of various subjects in contemporary and historical Native American language studies. May be repeated for credit when a different topic is studied. GE credit: Div.—II, (II) Macri, Mendoza

108. Indigenous Languages of California (4)
   Lecture/discussion—4 hours. Survey of the indigenous languages of the California region. Linguistic phylogeny, languages at first European contact, subsequent language loss, current efforts at language and cultural revitalization, indigenous languages of recent immigrants to California. GE credit: Div, Wrt.—II, (II) Macri

115. Native Americans in the Contemporary World (4)
   Lecture/discussion—4 hours. Prerequisite: course 1, 10, or 55. The sociocultural development of American Indian peoples will be examined. GE credit: ArtHum, Div

117. Native American Governmental Decision Making (4)
   Lecture—4 hours. Prerequisite: course 116, Political Science 2, Anthropology 123 recommended. Native American government and community decision making with emphasis on federal and state programs, tribal sovereignty, current political trends and funding for tribal services. Offered in alternate years. GE credit: SocSci, Div

118. Native American Politics (4)
   Lecture—4 hours. Prerequisite: course 117. Examination of the various interest groups and movements found among Native people and how they relate to the determination of Indian affairs. Study of political action available to Native groups, and local communities, along with relevant theory relating to underdevelopment. Offered in alternate years. GE credit: SocSci, Div—II, Valandra

120. Ethnopolitics of South American Indians (4)
   Lecture/discussion—4 hours. Prerequisite: course 1, 10 or 55. Social, political, cultural movements of indigenous South Americans in response to establishment, expansion of European colonialism, post-colonial nation-states. Ethnopolitical processes developed through interactions between Indians, Euro-Americans. Analysis of main indigenous areas and the development of national societies. GE credit: SocSci, Div, Wrt.—(I) Varese

122. Native American Community Development (4)
   Lecture—4 hours. Prerequisite: course 1, Community and Regional Development 151. Application of community development theory and techniques to the development problems of Native American communities. Offered in alternate years. [Former course 161.] GE credit: SocSci, Div, Wrt.—II, Varese

125. Performance and Culture Among Native Americans (4)
   Lecture—3 hours; listening—3 hours. Prerequisite: upper division standing in division of humanities or social sciences or consent of instructor. Interdisciplinary study of public expressive forms among Native Americans. Comparative analysis of music, dances, rituals, and dramas from throughout the Americas in their social and cultural contexts. Offered in alternate years. Not open for credit to students who have completed Music 125.—(III) Mendoza

130A. Native American Ethno-Historical Development (4)
   Lecture—4 hours. Prerequisite: course 1 or 10; History 17A recommended. Study of Native American ethno-history in North America before 1770s. GE credit: SocSci, Div, Wrt.—I, (I) Crum

130B. Native American Ethno-Historical Development (4)
   Lecture—4 hours. Prerequisite: course 1; History 17A-178 recommended. Study of Native American ethnohistory in North America after 1770s. GE credit: SocSci, Div, Wrt.—II, (II) Crum

132. Native American Ethno-Historical Development (4)
   Lecture—4 hours. Prerequisite: course 1; History 17A-178 recommended. Study of Native American ethnology in North America after 1890. GE credit: SocSci, Div, Wrt.—III, (III) Mendoza

133. Ethnohistory of Native People of Mexico and Central America (4)
   Lecture/discussion—4 hours. Prerequisite: course 1, or 10 or 55. Ethnohistorical development of pre-colonial, post-colonial, and modern times of Central American indigenous people; the impact of economic and political factors on the process of cultural adaptation. Attention is given to the questions of nation-building, forced assimilation, indigenous resistance, organized political responses. GE credit: SocSci, Div—(III) Varese

134. Race and Sex: Race Mixture and Mixed Peoples (4)
   Lecture—4 hours. Prerequisite: one course chosen from Anthropology 1 or 2, Native American Studies 10, Chicana/o Studies 110, African American and African Studies 100 or Asian American Studies 110. The phenomenon of racial, ethnic and interreligious intermixture and marriage, and of multi-ethnic peoples. Emphasizes on the Americas and upon the sociocultural effects of intermixture and on the lives of bicultural and multi-ethnic persons. (Same course as Anthropology 134.) GE credit: SocSci, Div, Wrt.—II, Coates

156. Native American Ethics and Value Systems (4)
   Lecture—4 hours. Prerequisite: upper division standing; course 1. Analysis of Native American systems of values and how these values translate into actual behavior; attention to the problem of implementing traditional values in the twentieth century and the possible impact of native values in modern societies. Offered in alternate years. GE credit: ArtHum, Div, Wrt.

157. Native American Religion and Philosophy (4)
   Lecture—4 hours. Prerequisite: upper division standing; course 1 or Anthropology 2. Religious and philosophical thinking of Native American people with emphasis upon North America. Offered in alternate years. GE credit: Div.—(II) Henríndez-Avila

180. Native American Women (4)
   Lecture/discussion—4 hours. Prerequisite: course 1 or 10 or Women's Studies 50. Social and cultural foundations of the Native American woman's experience, including the development of the Indian girl and the life phases of mature womanhood. Autobiographical and biographical texts are utilized. GE credit: SocSci, Div, Wrt.—II, Coates

181A-181B-181C. Native American Literature (4-4-4)
   Lecture—4 hours. Prerequisite: English 3, Comparative Literature 1, 2, 3, or any course from the General Education Literature Preparation List. Analysis of works by or about Native Americans including novels and autobiographies, analysis of Native American poetry, oral literature, songs, and tales. [A], the novel and fiction; [B], nonfiction works by native authors; [C], traditional literature and poetry. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—I, II, (III) Henríndez-Avila, Montejo
184. Contemporary Indigenous Literature of Mexico (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 10; course 181A or 181B recommended. Reading knowledge of Spanish required. Contemporary indigenous literature of Mexico, with a focus on the genres of poetry, fiction, drama, essay; analysis of cultural, historical, and spiritual themes, imagery, styles and performances; biographies of and influences on the Native writers themselves. Offered in alternate years. [III.] Hernández-Avila.

188. Special Topics in Native American Literary Studies (4)
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing and consent of instructor. Topics drawn from Native American literature. May be repeated for credit when a different topic is studied. GE credit: Div. Wrt.—III. [II.] Hernández-Avila, Montejó.

190. Seminar in Native American Studies (2)
Discussion—2 hours. Prerequisite: senior standing. Seminar of critical issues faced by Native American people. (P/N/P grading only.)

191. Topics in Native American Studies (4)
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing and consent of instructor. Selected topics in Native American ethno-history, development, culture, and thought. May be repeated for credit when a different topic is studied. GE credit: ArtHum, Div.—III. [I.]

192. Internship (1-12)
Internship. Prerequisite: consent of instructor; upper division standing; dependent on availability of internship position in Native American Studies or the CN Garman Museum; priority to Native American Studies minors/major. Supervised internship in the CN Garman Museum, community, and institutional settings related to Native American concerns. May be repeated three times for a maximum of 12 units including 192 and other internships taken in other departments and institutions. (P/N/P grading only)—I, II, III, IV, I, II, III, IV, Tashinahjimé, 194HA-194HB. Special Studies for Honors Students (4-4)
Independent study—12 hours. Prerequisite: senior qualifying for honors. Directed reading, research and writing culminating in the completion of a senior honors thesis or project under direction of faculty adviser. (Deferred grading only, pending completion of sequence.)

195. Field Experience in Native American Studies (1-12)
Field work—36 hours. Prerequisite: senior standing and major in Native American Studies, completion of lower division major requirements, and course 101. Field work with governmental and community groups, under supervision of faculty adviser and sponsor. Knowledge acquired in other courses to be applied in field work. (P/N/P grading only)—I, II, III, I, II, III.

196. Senior Project in Native American Studies (4)
Discussion—1 hour; independent study—3 hours. Prerequisite: senior standing and major in Native American Studies; course 195 (may be taken concurrently), and consent of instructor. Guided research project that enables student to apply the theory and research principles from major coursework. Final product is to be a major senior project or thesis. (P/N/P grading only)—I, II, III, I, II, III.

197C. Community Tutoring in Native American Studies (1-5)
Tutorial—3-15 hours. Prerequisite: consent of major community upholding standing with major in Native American Studies. Supervise tutoring in community. (P/N/P grading only.)

198. Directed Group Study (1-5)
Prerequisite: upper division standing; consent of instructor. (P/N/P grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/N/P grading only.)

Graduate Courses

200. Basic Concepts in Native American Studies (4)
Seminar—4 hours. Prerequisite: graduate standing and consent of instructor. Analysis of the characteristics of the discipline of Native American Studies. Concentration is on both traditional and contemporary native scholarship and thought as well as the theoretical and methodological consequences derived from application of these ideas. Offered in alternate years. [I.] Montejó.

202. Advanced Topics in Native American Studies (4)
Seminar—4 hours. Prerequisite: graduate standing. Advanced study of selected topics relevant to the field of Native American studies. Topics will be announced at the time of offering. May be repeated for credit when topic differs. —II, III, I, II, III.

212. Community Development for Sovereignty and Autonomy (4)
Seminar—4 hours. Prerequisite: graduate standing and consent of instructor. Examines a sample of contemporary indigenous movements from south, central and north America with the goal of understanding and evaluating the strategies adopted by Native American communities to develop and implement forms of sovereignty or autonomous self-management. Offered in alternate years. —III. Varese.

213. Public Law 83-280: Colonial Termination (4)
Seminar—4 hours. Prerequisite: graduate standing, including school of law students. Examination of the signature law of the Termination Era, Public Law 83-280. Discussions to include termination, societal conformity, political consent, jurisdiction, self-determination & decolonization, and colonial relationship between Native Peoples and the United States. —III. Valandra.

217. Public Law 83-280: Colonial Termination (4)

220. Colonialism/Racism and Self-Determination (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Study of imperial/colonial systems and their psychosocial impacts upon indigenous peoples and oppressed, as racism as the outgrowth of colonialism, and of nationalism, ethnic conflict and self-determination. Focus on indigenous peoples, but other groups will also be considered. Offered in alternate years. —II. Varese.

224. Performance in the Americas (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Ethnomusicological and anthropological approaches to study of public performance in the Americas. New ways of looking at music, dance, ritual and other forms of public expressive forms normally called “folklore” or “popular culture.” Offered in alternate years. Open not for credit to students who have completed Music 224. (Former course Music 224.) —II. Mendosa.

250. Indigenous Critique of Classic Maya Ethnographies (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Construction of the Maya world through ethnographic writing during the present century. Deconstruction of ethnographies about the Maya's considering the modern theories and social/anthropological critiques of modern ethnography. Offered in alternate years. [III.] Montejó.

280. Ethnohistorical Theory and Method (4)
Seminar—3 hours; term paper. Discussion of the ethnohistorical method; the utilization of diverse types of data, especially documentary sources, to reconstruct socio-cultural history. Particular attention to the applied area of ethnohistory in the solution of contemporary social problems. Offered in alternate years. —I. Crum.

298. Group Study for Graduate Students (1-5)
Prerequisite: graduate standing, consent of instructor. (S/U grading only.)

299. Special Study for Graduate Students (1-12)
Prerequisite: graduate standing, consent of instructor. (S/U grading only.)

Professional Courses

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing, may be repeated for credit. (S/U grading only)—I, II, III, I, II, III.

Natural Sciences

(Quarters are offered in odd years only except where noted.)

Advising Center. 1023 Sciences Laboratory Building (530) 754-9621; http://naturalsciences.ucdavis.edu/

Committee in Charge


The Major Program

Natural Sciences is an interdisciplinary major that provides significant breadth in biology, chemistry, earth sciences, physics and mathematics while offering additional depth in two of the natural sciences. It is especially designed to meet the needs of prospective science teachers, but will also serve students who wish to acquire training in more than one science. The major is sponsored by the Department of Geology. The Program. The Natural Sciences curriculum offers an unusually broad training in science and mathematics. All students must complete a one year sequence in calculus, one course in statistics and one year sequence in chemistry, earth science, life science and physics. Each student will complete depth courses in two of these sciences. Prospective teachers may use these depth courses as preparation for primary and supplementary teaching credentials in science. Students who might wish to prepare for a teaching credential program should consult an advisor at their first opportunity to combine the prerequisites with General Education requirements. Career Alternatives. Students whose goals include business, journalism, law, or medicine may acquire a broad background in science through this curriculum. The study of natural sciences also prepares a student to meet the subject matter requirements for primary and supplementary science teaching credentials in California. Students who might wish to become a teacher should consult an advisor in the Mathematics and Science Teaching Program (MAST, http://mast.ucdavis.edu) at their first opportunity. MAST advisors can help students combine the prerequisite requirements with General Education requirements. The program also offers seminars that give participants experi-
ence in elementary, middle school, and high school classrooms.

**B.S. Major Requirements:**

**Preparatory Subject Matter** ............................................................... 68

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>Chemistry 2A, 2B, 2C</td>
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<td>Organic and Related Science courses may be substituted with the prior approval of the major adviser.</td>
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**Depth Subject Matter** ................................................................. 42

**Units for the Major** ...................................................................... 110

**Fields of Concentration:**

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<th>Field</th>
<th>Units</th>
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<td>Organic and Related Science courses may be substituted with the prior approval of the major adviser.</td>
<td></td>
</tr>
<tr>
<td>Biology 101</td>
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<tr>
<td>Other Geology or related science courses may be substituted with the prior approval of the major adviser.</td>
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</tr>
<tr>
<td>Geology 101</td>
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**Supplementary Fields:**

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<tbody>
<tr>
<td>Physics</td>
<td>15</td>
</tr>
<tr>
<td>Other Geology or related science courses may be substituted with the prior approval of the major adviser.</td>
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</tr>
</tbody>
</table>

**Nature and Culture**

[College of Letters and Science]

**Program Office**

176 Voorhies Hall

(530) 752-2257

http://www.nuc.ucdavis.edu

**Committee in Charge**

Michael Barbour, Ph.D. (Environmental Horticulture)

Laurie Glover, Ph.D. (English)

W. Jack Hicks, Ph.D. (English)

James S. McClain, Ph.D. (Geology)

Scott McLean, Ph.D. (Comparative Literature)

Timothy Morton, Ph.D. (English)

Peter Mayle, Ph.D. (Wildlife, Fish, and Conservation Biology)

David A. Osleger, Ph.D. (Geology)

Michael Ziser, Ph.D. (English)

**The Major Program**

The Nature and Culture major is a coherent interdisciplinary set of studies that explores the power of nature and culture to express, shape, and interpret the world. The Program is the first of its kind in the country, providing a rigorous curriculum that interweaves courses in the natural sciences, the humanities, and the social sciences, supplemented by elective courses work in these and other fields of study. There are at present three required core courses in Nature and Culture itself, a principal function of which is to tie together knowledge and experience gained in these disciplines. Offered in alternate years. GE credit: ArtHum and SciEng.

**Major Advisers:**

Consult the Program office.

**Minor Program Requirements:**

**Lower Division Courses**

1. **Intersections of Nature and Culture (4)**

   Lecture/discussion—3 hours; term paper. Prerequisite: satisfactory completion of prerequisite courses 1 or 2. May substituted with the prior approval of the major adviser. GE credit: ArtHum and SciEng.

2. **Directed Group Study (1-5)**

   Prerequisite: consent of instructor. P/NP grading only.

3. **Individual Study (1-5)**

   Prerequisite: consent of instructor. P/NP grading only.

**Upper Division Courses**

100. **The Culture of Nature: Theoretical Frameworks and Case Studies (4)**

   Lecture/discussion—3 hours; term paper. Prerequisite: course 1. Problems in nature and culture, with particular attention to integrative theoretical frameworks available for the investigation of specific issues. GE credit: ArtHum or SciEng, Writing intensive.

120. **Environmental Ethics (4)**

   Lecture/discussion—3 hours; term paper. Prerequisite: course 1. Ethical issues underlying environmental and ecological controversies, including anthropocentrism vs. ecocentrism, wilderness and species preservation, human population growth, animal rights, deep ecology, and ecofeminism. GE credit: ArtHum or SciEng, Writing intensive.
The Nature and Culture Honors Program makes students familiar with the methodologies and tools used to analyze the effectiveness of their enterprise. Offered in alternate years. II. Williamson

Ecology of Parasitic Nematodes (2)

Lecture—1 hour; discussion—1 hour. Prerequisite: course 100 or 110 or Entomology 150; Evolution and Ecology 101 or Plant Biology 117. Major concepts in population and community ecology of animal- and plant-parasitic nematodes. Current advances in techniques, theory, and basic information about nematode-host dynamics, and application to management of nematode diseases. Offered in alternate years. III. Caswell-Chen

Management of Plant-Parasitic Nematodes (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 100 or 110, Entomology 100 or 110. The biology of insect-parasitic nematodes, their effect on the host, and their potential as biological control agents of insect and other invertebrate pests. Application of ecological theory in classical and augmentative biological control. Offered in alternate years. III. Westerdahl

Nematode Systematics and Evolution (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 100 or 110, Entomology 100 or 110. The biology of insect-parasitic nematodes, their effect on the host, and their potential as biological control agents of insect and other invertebrate pests. Application of ecological theory in classical and augmentative biological control. Offered in alternate years. II. Kaya, Lewis

Molecular Phylogenetic Analysis (3)

Lecture—2 hours; laboratory—3 hours. Theory and practice of inferring phylogenetic trees using molecular sequence data. Practical techniques for obtaining sequence data, advantages and disadvantages of common approaches for inferring trees, statistical methods for comparing alternative hypotheses. (Some course as Evolution and Ecology 210.) Offered in alternate years. II. Nadler

Field Nematology (1)

Fieldwork—6 days. Prerequisite: course 100. Six-day demonstration and field study in applied nematology including diagnosis and prediction of nematode field problems and strategies for controlling field plant diseases, and establishment in association with diverse California crops. (S/U grading only.) II. Caswell-Chen, Nadler

Seminar—1 hour. (S/U grading only.) II, III, III. Caswell-Chen, Nadler

Advanced Research Conference (1)

Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Planning and results of research programs, proposals, and experiments. Discussion and critical evaluation of research being conducted by the group. Discussion led by individual research instructors for research groups. (S/U grading only.)

Group Study (1-5)

(S/U grading only.)

Research (1-12)

(S/U grading only.)
Neurobiology, Physiology, and Behavior

[College of Biological Sciences]
Leo M. Chatlupa, Ph.D., Chairperson of the Department
Department Office, 196 Briggs Hall
(530) 752-0203; http://www.npb.ucdavis.edu

Faculty
Primary Department Members
Joseph F. Antognini, Ph.D., M.D. Professor
(Anesthesiology and Pain Medicine)
Sue C. Badine, Ph.D., Professor
(Physiology & Membrane Biology)
Kenneth H. Britten, Ph.D., Professor
(Department Office)
Thomas P. Coombs-Hahn, Ph.D., Associate Professor
(Physiology & Membrane Biology)
William DeBello, Ph.D., Assistant Professor
(Physiology & Membrane Biology)
John D. Furlow, Ph.D., Assistant Professor
(Physiology & Membrane Biology)
Jack M. Goldberg, Ph.D., Senior Lecturer
(Physiology & Membrane Biology)
Mark S. Goldman, Ph.D., Assistant Professor
(Physiology & Membrane Biology)
Aldrin V. Gomes, Ph.D., Assistant Professor
(Physiology & Membrane Biology)
Samantha Harris, Ph.D., Assistant Professor
(Physiology & Membrane Biology)
David A. Hawkins, Ph.D., Professor
(Physiology & Membrane Biology)
Barbara A. Horwitz, Ph.D., Distinguished Professor
(Physiology & Membrane Biology)
Academic Senate Distinguished Teaching Award, UIC Davis Prize for Teaching and Scholarly Achievement
Andrew T. Ishida, Ph.D., Professor
(Opthalmology)
Kim McAllister, Ph.D., Associate Professor
(Physiology & Membrane Biology)
Lee Miller, Ph.D., Assistant Professor
(Microbiology and Molecular Genetics, Immunology, and Pathology)
Brian C. Mullaney, Ph.D., Professor
(Physiology & Membrane Biology)
Gabielle K. Nevitt, Ph.D., Associate Professor
(Physiology & Membrane Biology)
Charles A. Fuller, D. Phil., Professor
(Physiology & Membrane Biology)
Mitchell L. Sutter, Ph.D., Associate Professor
(Physiology & Membrane Biology)
Grace L. Rosenquist, Ph.D., Assistant Adjunct Professor
(Physiology & Membrane Biology)
Dorothy E. Woolley, Ph.D., Professor Emerita
(Physiology & Membrane Biology)
Erwin A. Bautista, Ph.D., Lecturer
(Genetics & Developmental Biology)
Gretchen Casassa, Ph.D., Assistant Adjunct Professor
(Sports Medicine Program)
Amy V. Hedrick, Ph.D., Associate Professor
(Physiology & Membrane Biology)
Lauryn Corbin, Ph.D., Lecturer
(Physiology & Membrane Biology)
Jack M. Goldberg, Ph.D., Senior Lecturer
(Physiology & Membrane Biology)
William DeBello, Ph.D., Assistant Professor
(Physiology & Membrane Biology)
James D. Shaffrath, M.D., Lecturer
(Physiology & Membrane Biology)
Erwin A. Bautista, Ph.D., Lecturer
(Physiology & Membrane Biology)
A.B. Major Requirements:

<table>
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<th>Subject</th>
<th>Units</th>
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<tr>
<td>Biological Sciences 2A-2B-2C</td>
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<tr>
<td>Chemistry 2A-2B-2C</td>
<td>15</td>
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<tr>
<td>Physics A-98-99</td>
<td>12</td>
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<tr>
<td>Mathematics 16A-16B-16C or 17A-17B-17C</td>
<td>6-12</td>
</tr>
<tr>
<td>Physics 7A-7B-7C or 9A-9B-9C-9D</td>
<td>12-20</td>
</tr>
<tr>
<td>Statistics 31, 32, 100, or 102</td>
<td>3-4</td>
</tr>
</tbody>
</table>

Advising and Career Alternatives. Meet with an Exercise Biology staff advisor or review the information available in the advising office to learn more about the best course sequences to take to prepare you for careers in basic exercise physiology, applied exercise physiology, or biomechanics; for graduate study in exercise physiology or biomechanics; or for professional programs in medicine, or physical therapy, athletic training or occupational therapy. Students with further academic or professional interests in medicine and other health sciences, community service, business, sales, communications, education or coaching might find the Bachelor of Arts program attractive. The Bachelor of Science could lead to further graduate study in any field related to human biology as well as exercise science and other health sciences (e.g., physical therapy), biomechanics and biomedical engineering and medical equipment and pharmaceutical development and sales.

A.B. Major Requirements:

Preparatory Subject Matter: 37-40

- Biological Sciences 2A-2B-2C
- Chemistry 2A, 2B
- Physics 1A-1B or 7A-7B
- Psychology 1
- Statistics 31, 32, 100, or 102
- Psychology 41 recommended

Depict Subject Matter: 40-45

- Biological Sciences 101
- Neurobiology, Physiology, and Behavior
- Cell Biology and Human Anatomy 101 and 102
- Exercise Biology 101, 102, 103, 104L
- One additional upper division course in Exercise Biology

Minor Program Requirements:

At least 18 upper division units in exercise biology from one of three options: 

- Biomechanics
- Exercise Physiology
- Exercise Science

<table>
<thead>
<tr>
<th>Exercise Biology</th>
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<td>Exercise Biology 103</td>
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<tr>
<td>Exercise Biology 113, 115, 126</td>
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Total Units for the Major: 128

Minor Program Requirements:

At least 18 upper division units in exercise biology from one of three options: 

- Biomechanics
- Exercise Physiology
- Exercise Science

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</tr>
<tr>
<td>Exercise Biology 113, 115, 126</td>
<td>3-6</td>
</tr>
</tbody>
</table>

No variable unit courses or Exercise Biology 148, 148L may be used to fulfill these requirements. Consult your adviser regularly.

Total Units for the Major: 128
Master Adviser: Jack Goldberg in 191 Briggs Hall, for the Neurobiology, Physiology, & Behavior Major, the Human Physiology and Neuroscience Minor.

Advising Center: 188 Briggs Hall (530) 752-9696
Graduate Study. Information on graduate study in neuroscience behavior may be obtained by writing the Graduate Adviser, Graduate Group Complex. See also the graduate course offerings listed under Animal Behavior (A Graduate Group) on page 325.

Courses in Exercise Biology (EXB) Lower Division Courses


90C. Research Conference (1) Discussion—1 hour. Prerequisite: lower division standing in Exercise Biology or related biological science and consent of instructor; concurrent enrollment in course 99. Research findings and methods in exercise biology. Presentation and discussion of research by faculty and students. May be repeated for credit. (P/NP grading only)—I, II, III (I, III, III) Saltinsky, Shaffrey.

90X. Lower Division Seminar (1-2) Lecture—1-2 hours. Prerequisite: lower division standing and consent of instructor. Gives freshmen or sophomore level students the opportunity to study a special topic in the general area of Exercise Biology in a small class setting.

92. Exercise Biology Internship (1-5) Internship—3-5 hours. Prerequisite: consent of instructor, dependent on availability of intern positions. Work experience in the application of physical activity programs to teaching, recreational, clinical or research situations under department faculty supervision. May be repeated once for credit. (P/NP grading only)

97T. Tutoring in Exercise Biology (1-5) Tutorial—3-5 hours. Prerequisite: lower division standing and consent of instructor. Assisting the professor by tutoring students in exercise biology course-related projects. May be repeated for credit for 10 units including course 97TC, 97TE, and 97TC. No tutorial units will be counted towards the Exercise Biology major. (P/NP grading only)—I, II, III, (II, III, III)

97TC. Tutoring Exercise Biology in the Community (1-5) Tutorial—3-5 hours. Prerequisite: consent of instructor and chairperson. Tutoring in the community in exercise biology related projects under the guidance of the faculty. May be repeated once for credit. (P/NP grading only)

98. Directed Group Study Prerequisite: consent of instructor and chairperson. (P/NP grading only)

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only)

Upper Division Courses

101. Exercise Physiology (4) Lecture—4 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101. Physiological responses to acute exercise, and physiological adaptations to both chronic exercise (training) and selected environmental stresses. Emphasis on the muscular, metabolic, cardiovascular, respiratory and renal responses and adaptations to exercise. Only 1 unit of credit allowed to students who have completed Exercise Science 101. Only 2 units of credit allowed to students who have completed Exercise Science 102. Not open for credit to students who have completed Exercise Science 101 and 102 (Former Exercise Science 101 and 102). (I, II, III) Boudet, Shaffrey.

102. Introduction to Motor Learning and the Psychology of Sport and Exercise (4) Lecture—4 hours. Prerequisite: Psychology 1 recommended. Theoretical and practical issues in motor learning, sport psychology, and exercise psychol-
ogy. Emphasis on how motor skills are acquired and retained, and on the application of social psychology and biomechanics to sports and exercise. GE credit: SocSci. III. (I, II) Saltzky

103. Analysis and Control of Human Movement (4)
Lecture—4 hours. Prerequisite: Cell Biology and Human Anatomy 101 and 101L, Physics 7A and 7B. Neurobiology, Physiology, and Behavior 101 recommended. Introduction to functional anatomy, neurophysiological basis of motor control, and biomechanics of human movement. Human movement understood in the context of body structures, basic principles of physics, and functional characteristics of nerve and muscle. Only 1 unit of credit allowed to students who have completed Exercise Science 103. Only 2 units of credit allowed to students who have completed Exercise Science 104. Not open for credit to students who have completed Exercise Science 104 and 105. (Former Exercise Science 104 and 105.) GE credit: SocSci. III. (I, II) Saltzky

104L. Exercise Biology Laboratory (3)
Lecture—3 hours; laboratory—1 hour; discussion—1 hour. Prerequisite: course 101, 102, 103 (the last course may be taken concurrently). Principles and analytical techniques for assessing fundamental physiological, biomechanical, motor learning and motor control factors which underlie human movement and performance. Only 1 unit of credit allowed to students who have completed Exercise Science 101L. Only 1 unit of credit allowed to students who have completed Exercise Science 103. Not open for credit to students who have completed Exercise Science 101 and 103. GE credit: Wri.—I., II, III (I, II, III) Shaffrath

110. Exercise Metabolism (3)
Lecture—3 hours. Prerequisite: course 101 or Neurobiology, Physiology, and Behavior 101. Exercise metabolism with emphasis on skeletal muscle metabolism during activity and inactivity. Basics of bioenergetics, substrate utilization, and cell signaling; mechanisms that regulate these properties. —III. (III) Gomes

111. Environmental Effects on Physical Performance (3)
Lecture—2 hours; discussion/laboratory—3 hours. Prerequisite: courses 101 or consent of instructor. The effects of environmental and gravitational conditions on physiological function and physical performance of humans. Acute and chronic effects, emphasizing physiological adaptations and limitations, will be explored. —II. Shaffrath

112. Clinical Exercise Physiology (4)
Lecture—3 hours; lecture/discussion—3 hours. Prerequisite: courses 101 or consent of instructor. Physical activity as a therapeutic modality is examined in normal and diseased populations (cardiovascular, pulmonary, diabetic). Assessment (graded exercise testing), exercise prescription and the effects of exercise conditioning are examined in detail. —II. (II) Harris, Shaffrath

113. Growth and Development in Human Performance (3)
Lecture—3 hours. Prerequisite: Cell Biology and Human Anatomy 101, and Neurobiology, Physiology, and Behavior 101. The role of nutrition to fund human performance potential from conception to old age, including influence of exercise, athletic participation, and preventive medicine. Alterations in motor skill patterns, morphology, and body composition, and physiological responses to aging. GE credit: SciEng.—III. (III) Saltzky, Shaffrath

115. Biomechanical Bases of Movement (3)
Lecture—2 hours; laboratory—3 hours to alternate weekly with discussion—1 hour. Prerequisite: course 102 or consent of instructor. Biomechanical bases of human movement investigated; topics include musculo-skeletal mechanics, tissue mechanics, electro-myography, and measurement and analysis techniques. Application made to sport, clinical, and work environments, including extensive analysis of locomotion. GE credit: SciEng.—I. (I) Williams

116. Nutrition for Physically Active Persons (3)
Lecture—3 hours. Prerequisite: course 101, Neurobiology, Physiology, and Behavior 101. The role of nutrition and exercise in modifying metabolism, body composition, performance and health of humans.

117. Exercise and Aging in Health and Disease (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 101 or 113 (concurrently). Endocrinology of aging. (Also valid for students in the Health Promotion Program.) GE credit: SciEng.—III. (III) Shaffrath

120. Sports in American Society (4)
Lecture—3 hours; discussion—1 hour. Sociological approaches to the study of sport and contemporary American culture, including sport’s interaction with politics, economics, religion, gender, media, and ethics. Socialization factors involving youth, scholastic, collegiate, and Olympic sport. (Same course as Physical Education 120.) GE credit: SocSci. Div.—II. (II) Saltzky

121. Sport Psychology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 102. Consideration of major theories, research findings and methods of data collection in sport psychology through a critical examination of relevant experimental, clinical, and field data. —II. (II) Saltzky

122. Psychological Effects of Physical Activity (3)
Lecture—2 hours. Prerequisite: Psychology 1; upper division standing. Physical activity is evaluated in terms of its ability to enhance the quality of life. Topics studied include: individual factors (self concept, type A); special populations (elderly, cardiovacular); and mental health changes (depression, anxiety). —III. (III) Saltzky

125. Neuromuscular and Behavioral Aspects of Motor Control (3)
Lecture—2 hours; lecture/discussion—2 hours. Prerequisite: course 101. Factors which affect control of movement from neuropsychological, physiological, behavioral, and mechanical viewpoints. Topics include central and peripheral control mechanisms, open and closed loop theories, motor programming, cognitive learning strategies, and the effects of bio-chemical and biomechanical influences. —Bodine

126. Tissue (3)
Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: course 103 or Engineering 45 or consent of instructor. Structural and mechanical properties of biological tissues including bone, cartilage, ligaments, tendons, nerves, and skeletal muscle. (Same course as Biomedical Engineering 126.) GE credit: SciEng.—III. (II) Hawkins

148. Theory and Practice of Exercise Testing (1)
Lecture/discussion—1 hour. Prerequisite: course 112 (may be taken concurrently). Theory and practice of exercise testing applied to older adult populations. Physiological responses to and limitations of exercise testing. Application of exercise testing and training to healthy and diseased populations. (P/NP grading only)—I, II, III (I, II, III) Casanova

148L. Adult Fitness Testing Laboratory (1)
Laboratory—3 hours. Prerequisite: courses 148 (concurrently). Testing of asymptomatic older adults for functional aerobic capacity, body composition, blood lipids, pulmonary function, and cardiovascular disease risk. Counseling adults in appropriate exercise plans and lifestyle modifications. Two quarters minimum; third quarter permit-
ed. May be repeated twice for credit. (Former course Physical Education 148L) (P/NP grading only)—I, II, III (I, II, III) Casanova

179. Frontiers in Exercise Biology (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: courses 101, 102 and 103 (may be taken concurrently). 104L recommended. Lectures by leading authorities and discussion of the latest research in newly emerging areas in exercise biology. Offered every fourth year.—III.

190C. Research Conference (1)
Discussion—1 hour. Prerequisite: upper division standing in Exercise Biology or related biological science and consent of instructor; concurrent enrollment in course 199. Research findings and methods in exercise biology. Presentation and discussion of research completed by faculty and students. May be repeated for credit. (P/NP grading only)—I, II, III (I, II, III)

192. Exercise Biology Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor, dependent on availability of intern positions. Work experience in the application of physical activity programs to teaching, recreational, clinical or research situations under program faculty supervision. Written report required. May be repeated up to 15 units of credit, including course 92. (P/NP grading only)

194H. Research Honors (2)
Independent study—6 hours. Prerequisite: senior standing, minimum of 6 units of course 199, 3.500 GPA or greater in major courses, consent of honors thesis adviser. Completion of individual honors research project in Exercise Biology, under the guidance of an Exercise Biology faculty adviser, culminating in written honors thesis. (P/NP grading only)—I, II, III, (II, III)

197T. Tutoring in Exercise Biology (1-5)
Tutorial—3-15 hours. Prerequisite: upper division standing and consent of instructor. Assisting the instructor by tutoring students in coursework, course-related projects. May be repeated up to 10 units of credit including courses 97T, 97TC, and 97TCl. No tutorial units will be counted towards the Exercise Biology major. (P/NP grading only)—I, II, III (I, II, III)

197TC. Tutoring Exercise Biology in the Community (1-5)
Tutorial—3-15 hours. Prerequisite: consent of instructor and chairperson. Tutoring in the community in exercise biology related projects under the guidance of the faculty. May be repeated up to 10 units of credit including courses 97T, 97TC, 97TCl. (P/NP grading only)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor and chairperson. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of chairperson. (P/NP grading only)

Courses in Neurobiology, Physiology, and Behavior (NPB)

Lower Division Courses

12. The Human Brain and Disease (3)
Lecture—3 hours. Normal function and diseases of the human brain and nervous system. Diseases discussed include Parkinson’s, Alzheimer’s, leprosy, amnesia and schizophrenia. Intended for non-science majors. Not open for credit to students who have completed courses 100, 101, 112, or Psychology 121. GE credit: SciEng.—I. (I) Pappone

14. Illusions: Fooling the Brain (3)
Lecture—3 hours. Introduction to perceptual processing in the human nervous system: Illusions. GE credit: SciEng.—II. (II) Dittemer

15. The Physiology of Human Aging (4)
Lecture—3 hours; discussion—1 hour. A broad examination of age-associated changes in body functions. Includes basic cellular and structural changes of major organ systems and the age-induced alterations
in system function. Some age associated diseases will also be examined. Intended for non-science majors. Not open for credit to students who have completed Biological Sciences 15. GE Credit: Sci-Eng.—I. (I.) Bautista

68. Biology of Drug Addiction and Abuse (3)
Lecture—3 hours. Broad examination of addictive substances and their use/abuse. Topics include historical perspective, physiological effects, etiology, neurobiology of addiction and the impact of drugs on learning and memory. Intended for non-science majors. Not open for credit to students having completed course 168. GE Credit: Sci-Eng.—III. (III.) Bautista

90A. Lower Division Seminar: Issues in Body Weight Regulation (2)
Seminar—2 hours. Prerequisite: lower division standing, consent of instructor. Critical examination of issues in body weight regulation through shared readings, discussions, written assignments, debates and oral presentations. Limited enrollment.—II. (II.) C. Warden, N. Warden

90B. Human Color Perception (2)
Seminar—2 hours, term paper. Prerequisite: lower division standing. The neural determinants of color appearance, and why we see the world in the way we do. Discussions center around demonstrations of color phenomena and what they tell us about the human brain. Enrollment.—II. (II.) Werner

90C. Current Issues in Animal Behavior (2)
Seminar—2 hours. Prerequisite: lower division standing. The mechanisms and outcomes of sexual selection [mate choice and mate competition]. Theory, current issues, and evidence that supports or refutes the models. Limited enrollment.—III. (III.) Hedrick

90D. Lower Division Seminar: Current Issues in Reproductive Endocrinology (2)
Seminar—2 hours. Prerequisite: lower division standing. The biologic roles of reproductive hormones in mammalian reproduction and health. Current theory and models regarding hormone function and use in reproductive health and contraception, and evidence that supports or refutes the models.

90E. Biology of Aging (2)

90F. Visual Impairment and Blindness: A World Wide Problem (2)
Seminar—2 hours. Prerequisite: lower division standing. Examination of various abnormalities of the eye and the important geographic and cultural factors that influence the epidemiology of these abnormalities. —I. (I.) Choi

91C. Research Conference (1)
Discussion—1 hour. Prerequisite: Lower division standing in Neurobiology, Physiology, and Behavior or related biological science and consent of instructor; concurrent enrollment in course 99. Research findings and methods in neurobiology, physiology, and/or behavior. Presentation and discussion of research by faculty and students. (P/NP grading only)—I, II, III, (I, II, III)

92. Internship (1-12)
Internship—1-3.6 months. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in all subject areas offered in the section of Neurobiology, Physiology, and Behavior. Internships supervised by a member of the faculty. (P/NP grading only)

98. Directed Group Study (1-5)
Prerequisite: lower division standing and consent of instructor. (P/NP grading only)

99. Special Study for Undergraduates (1-5)
Prerequisite: lower division standing and consent of instructor. (P/NP grading only)

Upper Division Courses
100. Neurobiology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1A, 1B, or 2A, 2B, 2C and Chemistry 2B, 2C, or 2B recommended. Brains and nervous systems, neurons and neural circuits. Vision, hearing, and feature extraction by the central nervous system. Development of nervous systems. Coordinating and maintaining the cell biology of learning and memory. Perception, cognition, and disorders of the brain. Not open for credit to students who have completed course 112, 160, 161 or 162, or Neurobiology 5C or 7C. (I, II, III, (I, II, III) Chapman, Cheng, Mulloney, Sutter

100G. Quantitative Foundations of Neurobiology (1)
Autotutorial—1.5 hours; extensive problem solving—1.5 hours. Prerequisite: course 100 (may be taken concurrently). Computational methods and mathematical models used to study phenomena in neurobiology. —III. (III.) Chapman, Cheng, Mulloney, Sutter

101. Systemic Physiology (5)
Lecture—5 hours. Prerequisite: Biological Sciences 1A, 1B or 2A and Chemistry 2B; Physics 1B or 7C strongly recommended. Systemic physiology with emphasis on anatomy and physiology. Functions of major organ systems, with the structure of those systems described as a basis for understanding the functions. Only three units of credit awarded for students having taken Biomedical Engineering 116.—I, II, III, (I, II, III) Bautista, DeBello, Fuller, Furlow, Ishida, Goldberg, Usrey, Weidner, Wingfield

101L. Systemic Physiology Laboratory (3)
Laboratory—3 hours; discussion—2 hours; term paper. Prerequisite: course 101. Selected experiments to illustrate functional characteristics of organ systems discussed in course 101.—I, II, III, (I, II, III) Bautista, Goldberg, Liets

102. Animal Behavior (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C. Basic principles of behavioral organization in vertebrate and invertebrate animals. Underlying physiological and ethological mechanisms of behavior, with special emphasis on behavior under natural conditions. Not open for credit to students who have completed course 155. (Former course 155)—II, III, (I, II, III) Hahn, Nevin

103. Cellular Physiology/Neurobiology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 103 or 105, and Physics 7C recommended. Cellular physiology with emphasis on membrane transport processes and neuronal physiology. Fundamental principles of chemical and biophysical mechanisms of membrane transport will be considered in relation to cytoplasmic homeostasis, communication between cells, and the cellular mechanisms of senility and motor transduction. Not open for credit to students who have completed course 100B (Former course 100B).—II, (II) Posspne

104L. Cellular Physiology/Neurobiology Laboratory (4)
Lecture—1 hour; laboratory—3 hours; discussion—1 hour; term paper or discussion. Prerequisite: courses 101 and 101L, Biological Sciences 103 or 105. Experiments in classical and experimental processes of cells and tissues. GE Credit: Wrt. —II, (II) Liets

105. Introduction to Computer Models (4)
Lecture—3 hours; lecture/laboratory—1 hour. Prerequisite: Mathematics 16C or the equivalent, Physics 7C, Chemistry 2C, and course 100 or 101. Introduction to the ideas, mathematical techniques and computer tools required for developing models of cellular processes in physiology and neurobiology. Applications include neural transport, ionic channels, action potentials, Ca2+ oscillations, respiration, and muscle contraction.

106. Experiments in Neurobiology, Physiology, and Behavior: Design and Execution (3)
Laboratory—7.5 hours; discussion—0.5 hours. Prerequisite: course 100 or 101 or 102, and 199 and consent of instructor. Design and execution of experiments in neurobiology, physiology, and/or behavior. Students choose and design a project in consultation with the sponsoring faculty member. May be repeated once for credit to complete the project, with consent of instructor. Design of additional repeat is permitted for a different project under the guidance of another faculty member. (P/NP grading only)—I, II, III, (I, II, III) Rosequist

111C. Advanced Systemic Physiology Laboratory (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: courses 101, 101L, Statistics 13; course 112, 113, or 114 recommended. Interfacing physiological recording equipment with microcomputers; data acquisition and analysis using the microcomputer; data interpretation within the framework of physiological concepts.—Sutter

111L. Advanced Systemic Physiology Laboratory (4)
Lecture—1 hour; discussion—1 hour; laboratory—3 hours; term paper. Prerequisite: courses 101 and 101L. Selected comprehensive experiments in the autonomic nervous system, cardiovascular, respiratory, and neuromuscular systems. Emphasis on conceptual and methodological approaches in demonstrating the physiology of organ systems. GE Credit: Wrt.—II, (II) Giehlberg

112. Neuroscience (3)
Lecture—3 hours. Prerequisite: course 100 or 101. Presentation of concepts in neuroscience including sensory systems, motor systems, and higher neuron integration. Emphasis on mammalian nervous systems.—I. (I) Carsens

113. Cardiovascular, Respiratory, and Renal Physiology (4)
Lecture—4 hours. Prerequisite: course 101, Chemistry 88, Physics 7B and 7C recommended. An intense and advanced presentation of concepts in cardiovascular, respiratory, and renal physiology including discussion of acid-base balance.—II. (II) Goldberg

114. Gastrointestinal Physiology (3)
Lecture—3 hours. Prerequisite: course 101; Biological Sciences 105 or 103 recommended, 105 preferred. Gastrointestinal anatomy and physiology. Digestion, secretion, absorption, motility, comparative physiology and pathology. Strong emphasis on neural and hormonal regulation and on cellular mechanisms of secretion and absorption.—I. (I) Bautista

117. Avian Physiology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1B, or 2A and 2B and Chemistry 2B; course 101 strongly recommended. Physiology of the various systems of birds with emphasis on digestion, respiration, excretion, and endocrine systems.—III. (III) Millam

121. Physiology of Reproduction (4)
Lecture—4 hours. Prerequisite: course 101. Physiological mechanisms related to reproduction; breeding efficiency and fertility, with special reference to domestic animals.—II. (II) Berget

121L. Physiology of Reproduction Laboratory (1)
Laboratory—3 hours. Prerequisite: course 121 recommended (may be taken concurrently). Experiments on the reproductive systems of domestic animals including male and female gametes. (P/NP grading only)—II. (II) Berget

122. Developmental Endocrinology (3)
Lecture—3 hours. Prerequisite: course 101. Hormonal control of development, maturation and senescence from the cellular to organizational level, with emphasis on the hypothalamic control of both prenatal and newborn life, childhood and adolescence, adulthood and pregnancy, as well as the endocrinology of aging.
mittee. Honors thesis to be submitted upon comple-
tion of the project. (P/NP grading only)—I, II, III. (I, II, III)
197T. Tutoring in Neurobiology, Physiology, and Behavior (1-5)
Discussion—2-6 hours. Prerequisite: upper division standing and consent of instructor. Assisting the
instructor by tutoring students in one of the Section’s
regular courses. May be repeated for credit.
(P/NP grading only)—I, II, III. (I, II, III)
198. Directed Group Study (1-5)
(P/NP grading only)
199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)
Graduate Courses
211. Advanced Topics in Neuroimaging (2)
Seminar—2 hours. Prerequisite: Psychology 210 or
consent of instructor. Critical presentation and dis-
cussion of the most influential advanced issues in
neuroimaging, emphasizing fMRI design/analysis and
the integration of fMRI with EEG/MEG. Limited
enrollment. (Same course as Neuroscience 211 and
Psychology 211.) S/U grading only.—II. (II) Miller
217. Advanced Avian Physiology (1)
Prerequisite: course 117 concurrently and
graduate standing. Study in depth of a topic in avian physiology through development of a
lecture with associated instructional materials such as
lecture plans, exam questions, presentation, and evalu-
ation aids. (S/U grading only.)—III. (III) Millam
222. Systems Neuroscience (5)
Lecture—4 hours; discussion—1 hour. Prerequisite:
graduate standing or consent of instructor. Integrative
level ideas and processing at a systems level.
Topics include sensory systems, motor function,
sensorimotor integration, the limbic system, and
the neurobiology of learning and memory. 
Same course as Neuroscience 222.—II. (II) Usrey
245. Computational Models of Cellular Signaling (3)
Lecture—3 hours. Prerequisite: consent of instructor.
Computational and analytical techniques in mod-
eling of regulatory and signaling phenomena in
neurobiology and cell physiology, focusing on linear
and nonlinear ordinary differential equation models.
Applications include neuronal signal propagation,
activity, signal transduction, calcium oscillations,
and simple neural circuits. —II. (II)
247. Topics in Functional Neurogenomics (2)
Lecture—1 hour; discussion—1 hour. Prerequisite:
graduate standing or consent of instructor. The
ory, methods and principles of functional neuro-
genomics with emphasis on the relationship to
molecular mechanisms involved in development and
disease of the nervous system. (Same course as Neu-
roscience 247.)
261A. Topics in Vision: Eyes and Retinal Mechanisms (2)
Lecture/discussion—2 hours. Prerequisite: graduate
standing, course 100 or 112 or the equivalent.
Structure and function of the visual system, with
emphasis on the eye and retina, including optics,
anatomy, transduction, retinal synapses, adaptation,
and parallel processing. (Same course as Neurosci-
ence 261A and Molecular, Cellular, and Integrative
Physiology 261A.) S/U grading only.—I I Ishida
261B. Topics in Vision: Systems, 
Psychophysics, Computational Models (2)
Lecture/discussion—2 hours. Prerequisite: consent of
instructor, course 261A recommended. Functions of
the central visual pathways and their underlying
mechanisms. Recent research on aspects of annoy-
amy, biochemistry, electrophysiology, psychophys-
ics, development, and genetics of the visual system.
(Same course as Neurobiology, Physiology, and
Behavior 261B and Molecular, Cellular, and Integrative
Physiology 261B.) S/U grading only.) Offered in alternate years.—II. Britten
261C. Topics in Vision: Clinical Vision Science (2)
Lecture/discussion—2 hours. Prerequisite: courses
261A and 26B or consent of instructor. Causes and
mechanistic bases of major blinding diseases. Recent
research on aspects of anatomy, biochemistry,
electrophysiology, psychophysics, development, and
genetics of the visual system related to disease.
(Same course as Neuroscience 261C and Mole-
cular, Cellular, and Integrative Physiology 261C.)
Not offered every year. (S/U grading only)—III. Wer-
ner
263. Modeling in Systems Neuroscience (4)
Lecture—3 hours; lecture/laboratory—1 hour. Prere-
quisite: consent of instructor. Modeling as a tool in
systems neuroscience. Mathematical techniques will
be introduced and used to explore advanced topics
in echolocation, sound localization, electrorecep-
tion, communications, and motor systems. Other top-
ics include transforms, modeling assumptions, scales
and linearity. Offered in alternate years.
270. How to Write a Fundable Grant Proposal (3)
Lecture/discussion—3 hours. Prerequisite: graduate
standing in a life science and consent of instructor.
Familiarization with the skills required to craft a suc-
cessful grant proposal submitted to extramural a-
genies such as NIH and NSF. (S/U grading only.)—I, II, III. (I, II, III) Chalu-
pa
285. Literature in Visual Neuroscience (2)
Seminar—2 hours. Critical presentation and dis-
cussion of current literature in visual neuroscience.
(Same course as Neuroscience 285.) May be
repeated for credit if topic differs. (S/U grading
only.)—I, II, III. (I, II, III) Usrey, Britten, Ditterich
291. Auditory Neuroscience (1)
Seminar—0.5 hours; discussion—0.5 hours. Prere-
quisite: course 100 or 112 or Neuroscience 222 or
the equivalent. Exploration of various impor-
tant aspects of auditory physiology, behavior and psy-
chophysics through review of original literature.
New topic each quarter. May be repeated for credit
with consent of instructor. (S/U grading only)—I, II,
III. (I, II, III) Recanzone, Sutter

Neuroscience
See Neurobiology, Physiology, and Behavior, on page 420; and
Neuroscience (A Graduate Group), below.

Neuroscience
(A Graduate Group)

Robert Berman, Ph.D., Chairperson of the Group
Group Office, 148 Center for Neuroscience
(530) 757-8845; http://neuroscience.ucdavis.edu/grad

Faculty
David Amaral, Ph.D., Professor (Psychiatry)
Kathleen Baynes, Ph.D., Associate Professor (Neurology)
Robert Berman, Ph.D., Professor (Neurological Surgery)
Ann Banham, Ph.D., Associate Professor (Internal Medicine, Pharmacology)
Kenneth H. Britten, Ph.D., Professor (Neurobiology, Physiology, and Behavior)
Marie Burns, Ph.D., Associate Professor (Opthalmology and Vision Science)
Earl E. Carstens, Ph.D., Professor (Neurobiology, Physiology, and Behavior)
Cameron Carter, Ph.D., Professor (Psychology and Behavioral Science)
Leo M. Chalupa, Ph.D., Professor (Neurobiology, Physiology, and Behavior)
Barbara Chapman, Ph.D., Professor (Neurobiology, Physiology, and Behavior)
Tsung-Yu Chen, Ph.D., Associate Professor (Neurology)
Hwai-Jong Cheng, MD, Ph.D., Assistant Professor (Neurobiology, Physiology, and Behavior)
Blythe Corbett, Ph.D., Assistant Professor (Psychology)
Gino Cortiappi, Ph.D., Professor (Molecular Biosciences)
William DeBello, Ph.D., Assistant Professor (Neurobiology, Physiology, and Behavior)
Michael Ferns, Ph.D., Associate Professor (Anesthesiology and Pain Medicine)
Qizhi Gong, Ph.D., Assistant Professor (Medicine: Cell Biology and Human Anatomy)
Fredric Garin, M.D., Ph.D., Professor (Neurology)
Paul Hagerman, MD, Ph.D., Professor (Biochemistry and Molecular Medicine)
Randi Hagerman, MD, Professor (Pediatrics)
Linda Hall, Ph.D., Professor (Biomedical Pharmacology)
Andrew T. Ishida, Ph.D., Professor (Neurobiology, Physiology, and Behavior and Ophthalmo-
lalogy)
Pete Janata, Ph.D., Assistant Professor (Psychology)
Lee-Way Jin, Ph.D., Associate Professor (Pathology)
Edward G. Jones, M.D., Ph.D., Professor (Psychiatry)
Paul S. Knopfelfer, Ph.D., Assistant Professor (Cell Biology and Human Anatomy)
Gary Knutson, Ph.D., Professor (Psychology)
Janine LaSalle, Ph.D., Professor (Medical Microbiology and Immunology)
Noelle L'Etoile, Ph.D., Assistant Professor (Psychiatry)
Bruce Lyeth, Ph.D., Professor (Neurological Surgery)
Richard Maddock, M.D., Professor (Psychiatry and Behavioral Sciences)
George (Ron) Mangun, Ph.D., Professor (Psychology, Neurology)
Kimberley McAllister, Ph.D., Associate Professor (Neurology, and Neurobiology, Physiology and Behavior)
Lee Miller, Ph.D., Assistant Professor (Neurobiology, Physiology, and Behavior)
Brian Mulloney, Ph.D., Professor (Neurobiology, Physiology, and Behavior)
Stephen Nolte, Ph.D., Assistant Professor (Psychiatry and Behavioral Sciences)
Pamela A. Pappone, Ph.D., Professor (Neurobiology, Physiology, and Behavior)
Isaac N. Pessah, Ph.D., Associate Professor (Molecular Biosciences)
David Pleasure, M.D., Ph.D., Professor (Neurology and Pediatrics)
J. Daniel Ragland, Ph.D., Associate Professor (Psychiatry and Behavioral Sciences)
Charan Ranganath, Ph.D., Associate Professor (Psychology)
Gregg H. Recanzone, Ph.D., Professor (Neurobiology, Physiology, and Behavior)
David Richman, M.D, Professor (Neurology)
Susan Rivera, Ph.D., Assistant Professor (Psychology)
Philip A. Schwartzkroin, Ph.D., Professor (Neurological Surgery)
Frank Sharp, MD, Professor (Neurology)
Karen Sigvardt, Ph.D., Adjunct Professor (Neurobiology)
Tony Simon, Ph.D., Associate Professor (Psychiatry and Behavioral Sciences)
Mitchell L. Sutter, Ph.D., Assistant Professor (Neurobiology)
Diane Swick, Ph.D., Associate Adjunct Professor (Neurobiology)
Jim Trimmer, Ph.D., Professor (Neurobiology, Physiology, and Behavior)
247. Topics in Functional Neurogenomics (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: graduate standing or consent of instructor. The theory, methods and principles of functional neurogenomics with emphasis on the relationship to molecular mechanisms of development and disease of the nervous system. (Same course as Neurobiology, Physiology, and Behavior 247.)—II. Choudhury

250. Biology of Neurology (2)
Lecture/discussion—1.5 hours. Prerequisite: consent of instructor. The properties and functions of non-neuronal or neuroglial cells in the mammalian central nervous system with relevance to neuronal development, physiology and related diseases. Offered in alternate years. (Same course as Cell Biology and Human Anatomy 250.) (S/U grading only.)—III. Kumari

261A. Topics in Vision: Eyes and Retinal Mechanisms (2)
Lecture/discussion—2 hours. Prerequisite: consent of instructor, course 261A recommended. Functions of the central visual pathways and their underlying mechanisms. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system. May be repeated for credit. (S/U grading only.)—II. Ishida

261B. Topics in Vision: Systems, Psychophysics, Computational Models (2)
Lecture/discussion—2 hours. Prerequisite: consent of instructor, course 261A, or consent of instructor. Causes and mechanistic bases of major blinding diseases. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system. May be repeated for credit. (S/U grading only.) Not offered every year.—II. Othausen

261C. Topics in Vision: Clinical Vision Science (2)
Lecture/discussion—2 hours. Prerequisite: courses 261A and 261B, or consent of instructor. Causes and mechanistic bases of major blinding diseases. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system. May be repeated for credit. (S/U grading only.)—II. Braitman

283. Neurobiological Literature (1)
Seminar—1 hour. Prerequisite: consent of instructor. Critical presentation and analysis of recent journal articles in neurobiology. May be repeated for credit. (S/U grading only.)—I, II, III. Mullaney, Willson

284. Development of Sensory Systems (1)
Seminar—1 hour. Prerequisite: consent of instructor. Presentation and discussion of recent literature on the development of sensory systems. May be repeated for credit. (S/U grading only.)—II, III. Chapman

285. Literature in Visual Neuroscience (2)
Seminar—2 hours. Critical presentation and discussion of current literature in visual neuroscience. (Same course as Neurobiology, Physiology, and Behavior 285.) May be repeated for credit if topic differs. (S/U grading only.)—I, II, III. Miller, L'Etoile

289. Topics in Molecular and Developmental Neurobiology (1)
Seminar—2 hours. Analysis and discussion of seminal and current research papers in molecular and developmental neurobiology. Different topics will be covered each quarter. In the past topics have included, “Synaptic vesicle dynamics,” “Neuronal...
Neurology

See Medicine, School of, on page 367.

Neurosurgery

See Medicine, School of, on page 367.

Nutrition

See Clinical Nutrition, on page 185; Food Service Management, on page 297; Nutrition; Nutritional Biology (A Graduate Group), on page 430; Nutrition Science, on page 430; and Internal Medicine—Clinical Nutrition and Metabolism (NCM), on page 386.

Nutrition

(College of Agricultural and Environmental Sciences)

Charles E. Hess, Ph.D., Chairperson of the Department

Department Office, 3135 Meyer Hall

(530) 752-4630; http://nutrition.ucdavis.edu

Faculty

Elizabeth Applegate, Ph.D., Senior Lecturer (SOE)

Kenneth H. Brown, M.D., Professor

Gary Cherr, Ph.D., Professor (Nutrition, Environmental Toxicology)

Andrew J. Clifford, Ph.D., Professor

Kathryn G. Dewey, Ph.D., Professor

M. C. Greenwood, Ph.D., Professor

Fawaz G. Haj, Ph.D., Assistant Professor

Carl L. Keen, Ph.D., Distinguished Professor (Nutrition, Internal Medicine)

Bo L. Lonnerdal, Ph.D., Distinguished Professor (Nutrition, Internal Medicine)

Roger McDonald, Ph.D., Professor

Patricia Olejiza, Ph.D., Associate Professor

Francene M. Steinberg, Ph.D., R.D., Associate Professor

Judith S. Stern, Sc.D., R.D., Distinguished Professor (Nutrition, Internal Medicine)

Emeriti Faculty

Lindsay H. Allen, Ph.D., Professor Emeritus

Louis E. Grivetti, Ph.D., Professor Emeritus

Janet King, Ph.D., Professor Emeritus

Robert B. Kucker, Ph.D., Professor Emeritus

Barbara O. Schneeman, Ph.D., Emeritus Professor

Frances J. Zeman, Ph.D., Emeritus Professor

Affiliated Faculty

Sean Adams, Ph.D., Assistant Adjunct Professor

Elleon Bonnel, Ph.D., Academic Administrator

Betsy Burri, Ph.D., Associate Adjunct Professor

Britt Burford-Freeman, Ph.D., Assistant Research Nutritionist

Paul A. Davis, Ph.D., Research Nutritionist

Cesar Fraga, Ph.D., Research Chemist

Heidrun Gross, Ph.D., Assistant Project Scientist

Wayne Hawkes, Ph.D., Assistant Adjunct Professor

M. Jane Heinig, Ph.D., Academic Administrator

Marjorie Henneman, Ph.D., Assistant Project Scientist

Peter Havel, Ph.D., D.V.M., Researcher

Ling Zhao, Ph.D., Assistant Project Scientist

Charles Stohs, Ph.D., Adjunct Professor

Cheryl Stohs, Ph.D., Assistant Professor

M. Jane Heinig, Ph.D., Academic Administrator

Wayne Hawkes, Ph.D., Assistant Adjunct Professor

Nancy Hudson, M.S., RD, Academic Coordinator/ Lector

Daniel Hwang, Ph.D., Adjunct Professor

Amy Block Jay, Ph.D., Specialist in Cooperative Extension

Lucia Kaiser, Ph.D., R.D., Associate Specialist in Cooperative Extension

Nancy Kerm, Ph.D., Adjunct Professor

Darshan Kelley, Ph.D., Adjunct Professor

Kevin Laugero, Ph.D., Assistant Adjunct Professor

Louse Lamothe, Ph.D., Assistant Researcher

John Newman, Ph.D., Assistant Adjunct Professor

Hagen Schroeter, Ph.D., Assistant Researcher

Gertrud Schuster, Ph.D., Assistant Adjunct Professor

Charles Stephensen, Ph.D., Adjunct Professor

Barbara Sutherland, Ph.D., Academic Administrator

Marilyn S. Townsend, Ph.D., R.D., Specialist in Cooperative Extension

Janet Uriu-Adams, Ph.D., Associate Researcher

Marta Van Loan, Ph.D., Associate Adjunct Professor

Ling Zhao, Ph.D., Assistant Project Scientist

Sheri Zinderberg-Cherr, Ph.D., Specialist in Cooperative Extension

Susan Zurino, Ph.D., Associate Adjunct Professor

Major Programs. See the majors in Clinical Nutrition, on page 185 and Nutrition Science, on page 430.

Minor Program Requirements:

The Department of Nutrition offers four minor programs open to students majoring in other disciplines who wish to complement their study programs with a concentration in the area of food and nutrition.

Note: If the student’s major program requires the same course in biochemistry and physiology, only one of the courses may duplicate credit toward the minor. Each program below lists replacement courses to fulfill the minimum unit requirement.

UNITS

Community Nutrition .................. 24

Preparation. Plan in advance to include the required course prerequisites.

Nutrition 111AV and 111B ............... 5

Nutrition 111A .................. 5

Nutrition 120A or 120BN .............. 4

Neurobiology, Physiology, and Behavior 101 ........................................... 5

Replacement courses; see note above


Preparation. Plan in advance to include the required course prerequisites.

Food Science and Technology 100A-100B, 101A-101B and 108 .................................. 13

Food Service Management 120, 120L ........................................... 12

Agricultural and Resource Economics 112 ............................................. 4

Replacement courses; see note above

Nutrition 10, 111AV, 111B, 114, 116A-116B, 120AN, or 120BN, Economics 1A-1B ...

UNITS

Nutrition and Food .......................... 24

Preparation. Plan in advance to include the required course prerequisites.

Nutrition 111AV and 111B ............... 5

Nutrition 120AN or 120BN .............. 4

Food Science and Technology 100A, 100B ........................................... 6

Neurobiology, Physiology, and Behavior 101 ........................................... 5

Replacement courses; see note above


UNITS

Nutrition Science .......................... 20

Preparation. Plan in advance to include the required course prerequisites.

Animal Biology 102 and 103, Biological Sciences 102 and 103 and Nutrition 111AV and 111B .................. 11-15

Neurobiology, Physiology, and Behavior 101 ........................................... 5

Replacement courses; see note above

Nutrition 114, 116A-116B, 117, 120AN or 120BN, 122, 123, 124, 201, 204.

Minor Adviser. Vita Cooper, J.D.

Graduate Study. Programs of study leading to the M.S. and Ph.D. degrees are available in Nutrition. For information on graduate study contact the Nutrition Graduate Group.

Courses in Nutrition (NU)

Lower Division Courses

10. Discoveries and Concepts in Nutrition (3)

Lecture—3 hours. Nutrition as a science; historical development of nutrition concepts; properties of nutrients and foods. Not open for credit to students who have taken an upper division course in nutrition. GE credit: SCEn. III, II, II. Applicable

11. Current Topics and Controversies in Nutrition (2)

Discussion—1.5 hours; term paper. Exploration of current applications and controversies in nutrition. Students read scientific journal articles and write summaries, as well as give brief oral presentations. Topics change to reflect current interests and issues. GE credit. Wrt.—II, III, II. Applicable

99. Individual Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

104. Environmental & Nutritional Factors in Cellular Regulation and Nutritional Toxicants (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 101; Biological Sciences 103 or Animal Biology 103. Cellular regulation from nutritional/toxicological perspective. Emphasis: role of biofactors on modulation of signal transduction pathways, role of specific organelles in organization/ regulation of metabolic transformations, major cofactor functions, principles of pharmacology/toxicology important to understanding nutrient/toxicant metabolism. (Same course as Environmental Toxicology 104.)—I. (I.) Oteiza

105. Nutrition and Aging (3)

Lecture—3 hours. Prerequisite: course 111AV and Animal Biology 103 or the equivalent. Role of nutrition in the aging process from both an organismal/...
Nutrition

118. Community Nutrition (4)
Lecture—4 hours. Prerequisite: course 101 or 111, and 116A. Emphasis on contemporary communities and of selected target groups in the United States and in developing countries. Nutrition programs and policy; principles of nutrition education.—(II.) (III.) (IV.) (P/NP grading only.)

119A. International Community-Based Nutritional Assessment (1)
Lecture/discussion—1 hour. Prerequisite: course 112 may be taken concurrently and consent of instructor. Issues and problems related to community-based nutritional assessment in a low-income country, major nutritional problems in low-income countries; ethical issues in human investigation; survey design, data collection and analysis; data analysis; preparation for international travel, cross-cultural communication, health, and safety while living abroad.—(II.) (III.) (IV.)

119B. International Community-Based Nutritional Assessment (6)
Lecture—2 hours; fieldwork—12 hours. Prerequisite: course 119A and consent of instructor. A six-week summer course in Peru. Implementation of a community-based nutritional assessment survey including development of the survey instrument, selection of the study sample, collection and verification of data, and analysis and interpretation of the results; the project may be carried out in pairs or trios; participation of students and faculty members of UC Davis and the collaborating foreign institution.—(P/NP grading only.)

120AN. Nutritional Anthropology (4)
Lecture—3 hours, discussion—1 hour. Prerequisite: course 119A and 119B. Historical and contemporary perspectives; the methodological approach to food and diet; field work methods; case histories that explore food patterns and their nutritional implications. GE Credit: Div. Sci, Eng, SocSci. (IV.)

120BN. Nutritional Geography (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Geography 2 recommended. Nutritional geography from historical and contemporary perspectives; the geographical approach to food and diet; cultural and environmental factors that influence dietary practices; food-related landscapes and patterns. GE Credit: Div. Sci, Eng, SocSci.

122. Ruminant Nutrition and Digestive Physiology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: upper division standing in Animal Biology 103 or consent of instructor. Anatomy and physiology of the rumen and other digestive organs and their role in the digestion of feedstuffs.—(I, II, III, IV.) (P/NP grading only.)

123. Comparative Animal Nutrition (3)
Lecture—3 hours. Prerequisite: Animal Biology 103. Restricted to upper division or graduate students. Comparative nutrition of animals; including laboratory, companion, zoo, and wild animals. Digestion and metabolic adaptations required for animal species to consume diverse diets ranging from grasses and leaves to nectar to insects and meat. Relation of nutrition to metabolic adaptations and physiological states, including growth, reproduction, and diseases.—(III.) (IV.) (P/NP grading only.)

123L. Comparative Animal Nutrition Laboratory
Laboratory—3 hours. Prerequisite: Animal Biology 103, course 123 may be taken concurrently. Laboratory exercises leading to written reports on establishment of nutritional requirements and formulation of complete diets for laboratory, companion, zoo and wild animals.—(III.) (IV.)

124. Nutrition and Feeding of Finishes (3)
Lecture—3 hours. Prerequisite: Biological Sciences 103 and Wildlife, Fish, and Conservation Biology 121. Principles of nutrition and feeding of fishes under commercial situations; implication of fish nutrition to the environment and conservation of endangered species.—(I.) (II.) (IV.)

127. Environmental Stress and Development in Marine Organisms (10)
Lecture—4 hours, laboratory—12 hours; discussion—2 hours. Prerequisite: Environmental Toxicology 101 or Biological Sciences 102 or the equivalent; Environmental Toxicology 114A or course 114 recommended. Course taught at Bodega Marine Laboratory. Effects of environmental and nutritional stress, including pollutants, on development and function in embryos and larvae of marine organisms. Emphasis on advanced experimental methods. (Same course as Marine Biology 127.) GE credit: Sci, Eng, SocSci. (IV.) (P/NP grading only.)

129. Journalistic Praxis in Nutrition (3)
Lecture—2 hours, discussion—1 hour. Prerequisite: course 111; a course in written or oral expression or consent of instructor. Critical analysis and discussion of current, controversial issues in nutrition; the use of journalistic techniques to interpret scientific findings for the lay public. Students will be required to write several articles for campus magazine. Course may be repeated for credit.—(III.) (IV.)

130. Experiments in Nutrition: Design and Execution (2)
Laboratory—6 hours. Prerequisite: consent of instructor; course 101, 110, 111, or 114 recommended. Experiments in current nutritional issues. Experimental design: students choose project and, independently or in groups of two-three, design a protocol, complete the project, and report findings. May be repeated for credit up to six times (three times per instructor) with consent of instructor.—(I, II, III, IV.)

190. Proseminar in Nutrition (1)
Seminar—1 hour. Prerequisite: senior standing; course 111. Discussion of human nutrition problems. Each term will involve a different emphasis among experimental, clinical, and dietetic problems of community, national and international scope. May be repeated twice for credit with consent of instructor.—(I, II, III, IV.) (P/NP grading only.)

190C. Nutrition Research Conference (1)
Discussion—1 hour. Prerequisite: upper division standing in Nutrition or related biological science; consent of instructor. Introduction to research findings and methods in nutrition. Presentation and discussion of research by faculty and students. May be repeated for credit.—(P/NP grading only.)

197. Tutoring in Nutrition (1-2)
Discussion/laboratory—3—6 hours. Prerequisite: Nutrition Science, Clinical Nutrition or related major. Completion of course 101. Tutoring of students in nutrition courses, assistance with discussion groups or laboratory sections, weekly conference with instructor in charge of course: written evaluations. May be repeated for credit. (P/NP grading only.)

198. Directed Study for Advanced Undergraduates (1-5)
Ge, Social Sciences, Div, Social Diversity; Writing Experience

Graduate Courses

201. Vitamin and Cofactor Metabolism (3)
Lecture—2 hours, discussion—1 hour. Prerequisite: one upper division nutritional biochemistry and physiology course. Review of studies and relationships involving the metabolic functions of vitamins. Comparative nutritional aspects and the metabolism and chemistry of vitamins and vitamin-like compounds.—(III.) Steinberg

203. Advanced Protein and Amino Acid Nutrition (3) Lecture—2 hours; discussion—1 hour. Prerequisite: one upper division nutritional biochemistry and phys- iology course. Nutritional significance of protein and amino acids, including studies of the influence of diet on protein digestion, absorption, meta- bolism, resistance to disease, and food intake. Study of dietary requirements and interrelationships among amino acids. — Ill. (III) Linné

204. Mineral Metabolism (2) Lecture—2 hours. Prerequisite: upper division nutrition or biochemistry course. Studies of metabolic functions and nutritional interrelationships involving minerals. — Ill. (III) Lönnerdal, Keen

219A. International Nutrition (3) Lecture—3 hours. Prerequisite: graduate standing: undergraduates only admitted with consent of instructor after completion of course 111AV. Epide- miology, etiology, and consequences of undernutri- tion, with particular emphasis on the nutritional problems of children and women in low income populations. Offered in alternate years. — II. Dewey

219B. International Nutrition (3) Lecture—3 hours. Prerequisite: course 219A. Inter- vention programs, assessment of present or ameliorating nutritional problems in low-income populations. Planning, implementing, and evaluating nutrition intervention programs. Offered in alternate years. — III. Dewey

230. Experiments in Nutrition: Design and Execution (2) Laboratory—6 hours. Prerequisite: consent of instruc- tor; courses 201, 202, 203, 204, or the equivalent recommended. Student selected projects to enhance laboratory skills, independently, or in groups of two- three students, design a protocol, carry out the proj- ect, analyze the results and report the findings. May be repeated for credit up to six times (limit of three times per instructor) with consent of instructor. — I, II, III, (I, II, III)

250. Metabolic Homeostasis (2) Lecture—2 hours; discussion—1.5 hours. Prerequi- site: passing the Nutrition Graduate Group Prelimi- nary Examination or consent of instructor. Preference given to students with advanced standing in the Nutrition Graduate Group. Regulatory mechanisms of carbohydrate, lipid, and protein homeostasis; mechanisms regulating metabolic enzyme regulation and of the metabolic hormones; homeostatic mechanisms and interactions; fuel-fuel interactions; nutrition energy balance.

251. Nutrition and Immunity (2) Lecture/dis cucussion—2 hours. Prerequisite: Pathol- ogy, Microbiology, and Immunology 126, Medical Microbiology 107 or the equivalent, Animal Biology 102. Cellular and molecular mechanisms underlying immunity and immune function, includ- ing modulation of immunocompetence by diet and effects of immune responses on nutritional needs. Lectures and discussion explore implications for resistance to infection, autotoxic effects, and cancer. Offered in alternate years. — (II) Klasing, Erickson, Stephensen

252. Nutrition and Development (3) Lecture—3 hours. Prerequisite: courses 201, 202, 203, 204, 205. Nutrition to prenatal and early postnatal development. — II. (II) Keen

253. Control of Food Intake (3) Lecture—2 hours; discussion—1 hour; 2 or 3 labora- tory demonstrations per quarter. Prerequisite: course 201 and 202 or consent of instructor. Comprehensive study of the biochemical, nutritional, behavioral, and physiological mechanisms controlling food intake. Subject matter will be approached through lectures, laboratory demonstration and discussions where students and staff will critically evaluate the liter- ature. Offered in alternate years.

254. Applications of Systems Analysis in Nutrition (3) Lecture—2 hours; discussion—1 hour. Prerequisite: course 202, Physiological Sciences 205A-205B or the equivalent. Application and interpretation of data and metabolism; principles of systems analysis. Evaluation of models of energy metabolism as applied in cur- rent feeding systems. Critical evaluations of mecha- nistic models used in nutritional research. Offered in alternate years. — II. Fadel

257. Selected Topics in Nutritional and Hormonal Control of Nitrogen Metabolism (2) Lecture—2 hours. Prerequisite: courses 201 through 204, Physiological Sciences 205A-205B or the equivalent. Quantitative and qualitative aspects of nitrogen metabolism; critical evaluation of dietary intake, hormones and diet-hormone interactions which affect nitrogen metabolism, including protein synthesis-degradation, amino acid synthesis-catabo- lism, nitrogen transaminase activity, and dependence of cur- rent literature. Offered in alternate years. — (I) Klasing, Calvert

258. Field Research Methods in International Nutrition (3) Lecture/discussion—3 hours. Prerequisite: graduate standing or consent of instructor. Issues and prob- lems related to implementation of nutrition field research in less-developed countries, including ethics; relationships with local governments, communi- ties, and scientists; data collection techniques and quality assurance; field logistics, research budgets; and other administrative issues. Offered in alternate years. — (I, II) Brown, Dewey

259. Nutrition and Aging (2) Lecture—2 hours. Prerequisite: three courses of 201, 202, 203 and 204. Interaction between nutrition and aging. Topics include physiological/biochemi- cal basis of aging, age-related changes affecting nutritional requirements, nutrition and mortality rate, assessment of nutritional status in the elderly, and relationship between developmental nutrition and the rate of aging. Offered in alternate years.


261. Lactation and Infant Nutrition (6) Lecture—4 hours; discussion—1 hour. Prerequisite: course 260. Overview of the physiological and bio- chemical processes of lactation and nutritional needs of both mother and infant. Develop- ment of skills in assessment, nutrition counseling, education and support of new mothers and their families. — (I, II) Heining

262. Child and Adolescent Nutrition (6) Lecture—5 hours; discussion—1 hour. Prerequisite: course 261. Relationships among nutrition, growth, and development during childhood and adoles- cence. Nutritional needs for normal and high-risk groups; psychological, social, and economic factors contributing to nutritional status. Nutritional needs and interventions for special groups, including obese children, athletes, and eating dis- ordered. — (III) Heining

263. Applied Research Methods in Maternal and Child Nutrition (4) Lecture—3 hours; term paper. Prerequisite: graduate standing; restricted to students enrolled in the MAS program and graduate students by consent of instructor. Application of epidemiological principles to the study of maternal and child nutrition. Topics include quantitative and qualitative study proce- dures, including study design, data collection, and related analytical techniques. — Heining

264A. Current Topics in Maternal and Child Nutrition: Principles of Adult Education (2) Seminar—2 hours. Prerequisite: graduate standing; restricted to students enrolled in the MAS program and graduate students by consent of instructor. Cur- rent scientific literature related to Maternal and Child Nutrition. Topics include methods and theories of adult education and critical thinking skills related to research evaluation. — Heining

264B. Current Topics in Maternal and Child Nutrition: Epidemiology and Evidence- Based Practice (2) Seminar—2 hours. Prerequisite: graduate standing; restricted to students enrolled in the MAS program and graduate students by consent of instructor. Cur- rent scientific literature related to Maternal and Child Nutrition. Topics include nutrition surveillance and monitoring, as well as public policy development and implementation. — Heining

270. Scientific Ethics in Biomedical Studies: Emphasis on Nutrition (3) Lecture—1 hour; discussion—1 hour; term paper. Scientific ethics in biomedical studies, especially nutrition. Discussion and case study presentations on scientific integrity, fraud, misconduct, conflict of inter- est, human and animal research protections. Not open for credit to students who have completed course 492B. — Steinberg

290. Beginning Nutrition Seminar (2) Lecture/discussion—1 hour; seminar—1 hour. Prere- quisite: first year graduate standing. Discussion and critical evaluation of topics in nutrition with emphasis on literature review and evaluation in this field. Students give oral presentations on relevant topics. — (I) Schneeman, Dewey, Conklin

290C. Research Conference (1) Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Major professors lead research discussions with graduate students. Research papers are reviewed and project propos- als presented and evaluated. Format will combine seminar and discussion style. (S/U grading only) — I, II, III, (I, II, III)

291. Advanced Nutrition Seminar (1) Seminar—1 hour. Prerequisite: second-year gradu- ate standing. Advanced topics in nutrition research. Multiple sections may be taken concurrently for credit. May be repeated for credit. (S/U grading only) — I, II, III, (I, II, III)

293A. Current Topics in Obesity, Food Intake and Energy Balance (3) Lecture—1 hour; seminar—1 hour; discussion—1 hour. Prerequisite: graduate standing or course 129. Undergraduates with upper division standing with at least one writing course may enroll with consent of instructor. Current research and its evaluation. Prin- ciples of experimental design and scientific back- ground for given article. Articles summarized for posting on Internet for use by healthcare profession- als. May be repeated for credit with consent of instructor. — (I) Stein

293B. Current Topics in Obesity, Food Intake, and Energy Balance with Special Topics (3) Lecture—1 hour; seminar—1 hour; discussion—1 hour. Prerequisite: graduate standing or course 129. Undergraduates with upper division standing with at least one writing course may enroll with consent of
74.9. The study of nutrition encompasses all aspects of the consumption and utilization of food and its constituents. Key areas of study include the biochemical reactions important to utilization of nutrients and food constituents and to the impact of diet on health and disease, and nutrition-related policy and public health issues. The nutrition science major includes two options for studying these areas: nutritional biochemistry and community nutrition.

The Program. Nutrition as it is taught on the Davis campus is a biological science and requires a complete background in chemistry and biology, along with calculus and either physics (nutritional biochemistry option) or economics (community nutrition option). These courses are generally completed during the first two years, and along with biochemistry, must be completed before most nutrition classes can be taken. During their junior and senior years, students in the nutritional biochemistry option take additional course work in biochemistry, genetics, microbiology, physiology, immunology, and/or toxicology. Students in the community nutrition option take additional course work in social and health-related sciences.

Career Alternatives. Both options are excellent preparation for professional or graduate training in medicine, public health, or other health sciences. The nutritional biochemistry option also provides preparation for technical work in nutrition in the animal, food, and pharmaceutical industries. The com-
Community nutrition option prepares students for jobs in administrative, teaching, or public health/public service positions. Students who complete the additional academic requirements for an internship in dietetics are also qualified for careers in dietetics following completion of an internship.

B.S. Major Requirements:

English Composition Requirement ........ 0-8
See College requirement.

Preparatory Subject Matter .......... 60-66
Anthropology 2 or Geology 2 or Sociology 3 .......... 4
Biological Sciences [1A, 1B & 1C] or [2A, 2B & 2C] .......... 14-15
Mathematics 16A-16B .......... 6
Physics 1A-1B (Nutritional Biochemistry option) or Economics 1A-1B (Community Nutrition option) .......... 6-10
Sociology 46A or Psychology 41 .......... 4
Statistics 13 or Agricultural Management and Rangeland Resources 120 .......... 4

Breadth/General Education .......... 6-24
Satisfaction of General Education requirement.

Depth Subject Matter .......... 57-58
Animal Biology 102, 103 .......... 10
Biological Sciences 101 .......... 4
Food Science and Technology 100A and 100B .......... 8
Neurobiology, Physiology, and Behavior 101, 101L .......... 8
Addition of Upper Division Nutrition .......... 5

Nutritional Biochemistry option:
Nutrition 117 .......... 6
Community Nutrition option:
Nutrition 118, 130/192 (2 units) .......... 6
Restricted Electives .......... 20
Select one of the two options.

Nutritional Biochemistry option:
Molecular and Cellular Biology 120 .......... 6
Additional courses in genetics, biochemistry, microbial biology, physiology, immunology, or toxicology, chosen from the following list in consultation with the faculty adviser .......... 14

Community Nutrition option:
Economics 100A, 100B, Agricultural and Resource Economics 100A-100B .......... 8
Additional courses chosen from the following list in consultation with the faculty adviser .......... 12

Unrestricted Electives .......... 8-38
Total Units for the Degree .......... 180

Major Adviser, B. L. Lonnerdal

Advising Center for the major is located in 3211 Meyer Hall (530) 752-2512

Dietetics Internship. To fulfill the academic requirements for an internship in Dietetics, choose the following courses from the categories in which they appear above: English 3 or University Writing Program 1, Psychology 1, Communication 1, Sociology 3 or Anthropology 2, Economics 1A or 1B, Nutrition 116A/LBL, 118. The following courses must also be added (some of which may meet restricted elective requirements): Agricultural and Resource Economics 112, Food Science and Technology 101A, 101B, Food Service Management 120, 120L, 122, Food Science and Technology 104, 104L. Students intending to apply for admission to a dietetic internship should contact the Advising office no later than the first quarter of the junior year for information on procedures.

Graduate Study. The Department of Nutrition offers programs of study and research leading to the M.S. and Ph.D. degrees in Nutrition. For information on graduate study contact the graduate adviser. See also Graduate Studies, on page 104.

Obstetrics and Gynecology

See Medicine, School of, on page 367.

Organizational Studies

See Sociology, on page 474.

Orthopaedic Surgery

See Medicine, School of, on page 367.

Otolaryngology

See Medicine, School of, on page 367.
Parks and Recreation

See Community and Regional Development, on page 188; Design, on page 200; Environmental Planning and Management (under Environmental Horticulture, on page 276); Landscape Architecture, on page 342; and Physical Education, on page 436.

Pathology

See Pathology (PMD), on page 393; Pathology, Microbiology, and Immunology, on page 432; and Plant Pathology, on page 446.

Pathology, Microbiology, and Immunology

See Veterinary Medicine, School of, on page 502.

Pediatrics

See Medicine, School of, on page 367.

Pharmacology and Toxicology

See Medical Pharmacology and Toxicology (PHA), on page 389; Molecular Biosciences (VMB), on page 308; and Pharmacology and Toxicology (A Graduate Group), on page 432.

Pharmacology and Toxicology (A Graduate Group)

Alan R. Buckpitt, Ph.D., Chairperson of the Group

Group Office, 4117 Meyer Hall (Department of Environmental Toxicology)

http://www.envtox.ucdavis.edu/pfx

Faculty. The 74 faculty in the graduate group are from more than 27 academic departments and organized research units within the College of Agricul- tural and Environmental Sciences, the School of Medicine and the School of Veterinary Medicine.

Graduate Study. The program of study and research leading to the Ph.D. degree emphasizes an interdisciplinary approach to graduate student train- ing. Many specialty areas in pharmacology and toxicology are represented in the research interests of the faculty. Graduate students can study areas of pharmacology and toxicology which emphasize the effects of chemicals in the environment, on human health, and on ecosystems. Molecular and analytical approaches are used to study reproductive, genetic and developmental, respiratory and neurological systems, as well as metabolic fate and pharmacokinet- ics. Career opportunities include teaching in professional schools and hospitals, laboratory research in academia, government, industry, environmental control, and agricultural and drug regulatory agen- cies. For detailed information on the program, con- tact the Group office, appropriate graduate adviser, or the group chairperson.

Individual courses are taught under departments of faculty in the group, including Environmental Toxicology, Molecular and Biological Sciences, Animal Physiology, Veterinary Medicine, and the School of Medicine.

Graduate Advisers. A.R. Buckpitt (Molecular Biosciences), J.A. Last (Pulmonary Medicine), M.G. Miller (Environmental Toxicology), K. Pinkerton (Institute of Toxicology and Environmental Health), R. Wu (Pulmonary Medicine)

Courses in Pharmacology and Toxicology (PTX)

Graduate Courses

201. Principles of Pharmacology and Toxicology I (5)

Lecture—5 hours. Prerequisite: Biological Sciences 102 and Neurobiology, Physiology, and Behavior 101. First of three courses presenting fundamental principles of pharmacology and toxicology. Introductory overview of basic concepts in pharmacology/toxicology, followed by in-depth blocks on fate processes of chemicals in the body, fate processes in tissue selective responses, selective toxicity employed therapeutically. —I. (I)

202. Principles of Pharmacology and Toxicology II (4)

Lecture—4 hours. Prerequisite: course 201. The second of three courses presenting fundamental principles of pharmacology and toxicology. Principles of pharmacodynamics and mechanisms of drug/toxicant actions. —II. (II)

203. Principles of Pharmacology and Toxicology III (4)

Lecture—4 hours. Prerequisite: courses 201 and 202. Integrated physiological systems, cardiovascular and nervous systems and how drugs and toxicants act to perturb normal function. —III. (III)

230. Advanced Topics in Pharmacology and Toxicology (1-3)

Lecture/discussion/seminar—1 hour each (course format can vary at option of instructor). Prerequisite: course 201 and consent of instructor. In-depth coverage of selected topics for graduate students in Pharmacology/Toxicology and related disciplines. Topics determined by instructor in charge for each quarter. —I, II, III. (I, II, III)

277. Life and Death Decisions at the Cellular Level (2)

Lecture—2 hours. Prerequisite: undergraduate or graduate introductory course in cell biology (such as Biological Sciences 104) and general biochemistry (Molecular and Cellular Biology 121 or 122) required; restricted to graduate standing or consent of instructor. Fundamental concepts in cell signaling; signaling pathways as related to cell death and a variety of human diseases including cancer, Alzheimer’s, and Parkinson’s. —III. (III) Goldkarn

290. Seminar (1)

Current topics in pharmacology and toxicology. (S/U grading only.) —I, II, III.

299. Research (1-12)

(S/U grading only)

Pharmacy

[College of Letters and Science]

James R. Griesemer, Ph.D., Chairperson of the Department

Department Office. 1241 Social Sciences and Humanities Building (530) 752-0607; http://pharmacy.ucdavis.edu

Faculty

Gerald Dworkin, Ph.D., Professor
Cody Gilmore, Ph.D., Assistant Professor
Michael Glanzberg, Ph.D., Associate Professor
James R. Griesemer, Ph.D., Professor
Brendan Jackson, Ph.D., Assistant Professor
George J. Motley II, Ph.D., Senior Lecturer
Robert May, Ph.D., Professor
Roberta Millstein, Ph.D., Associate Professor
Bernard Molyneux, Ph.D., Assistant Professor
Adam Sennett, Ph.D., Assistant Professor
Jan Szalif, Ph.D., Associate Professor

Emeriti Faculty

William H. Bossart, Ph.D., Professor Emeritus
Robert C. Cummins, Ph.D., Professor Emeritus
Joel I. Friedman, Ph.D., Professor Emeritus
Neal W. Gilbert, Ph.D., Professor Emeritus
Marjorie Greene, Ph.D., Professor Emerita
Michael Judiben, Ph.D., Professor Emeritus
John F. Malcolm, Ph.D., Professor Emeritus
Paul Teller, Ph.D., Professor Emeritus
Michael V. Wedin, Ph.D., Professor Emeritus
George Wilson, Ph.D., Professor Emeritus

The Major Program

Philosophy addresses problems and questions that arise in all areas of human thought and experience and in all disciplines. Recurring questions about the nature of value, the good life, right conduct, knowledge, truth, language, mind, and reality are central to philosophical study. Philosophy also investigates the methodologies and assumptions of the major disciplines in the university in order to deepen our understanding of the sciences, of mathematics, of art, literature, and history, and of religion and morality. It leads us to address issues about the nature of these subjects, about the methods of reasoning character- istic of them, and about the contributions they make to our understanding of ourselves and our world. Philosophy contributes to the liberal education of its students. The department employs an analytic approach to philosophical questions, which trains students to understand and evaluate arguments and to think and write precisely and clearly. These skills are of immense value in a variety of careers.

The Program. The Department of Philosophy offers courses in such areas as the theory of knowledge, metaphysics, logic, ethics, and political philos- ophy. In addition, upper division courses are offered in moral and political philosophy, and aesthetics, and in the philosophy of religion, of mind, of language, of mathematics, of law, and of the physical, biological, and social sciences.

The problems of philosophy have important roots in past. The history of philosophy is important not only as part of the heritage of educated persons, but also because it is relevant to contemporary issues. For these reasons, the department places great emphasis on the history of philosophy, providing courses on the major figures and traditions of western philos- ophy.

Career Alternatives. Students of philosophy learn to understand and evaluate arguments and to think and write precisely and clearly. These analyti- cal skills are assets in any career. Many of our majors have pursued graduate study in philosophy and have become philosophers in their own right. Others have pursued academic careers in related disciplines in the humanities and social sciences. Philo- sophy majors are well prepared for law, business, or other professional schools and have found
careers in computer programming, government service, teaching, the ministry, and social work.

A.B. Major Requirements:

Preparatory Subject Matter .......................... 16

One course from any of the following: .......................... 12
(a) General Philosophy: Philosophy 1
(b) Ancient Philosophy: Philosophy 21
(c) Early Modern Philosophy: Philosophy 22
(d) Philosophy of Mind: Philosophy 13
(e) Ethics: Philosophy 14, 15 or 24
(f) Philosophy of Science: Philosophy 30, 31, 32 or 28

Graduate Adviser, G.J. Mattey

Courses in Philosophy (PHI)

Lower Division Courses

1. Introduction to Philosophy (PHI)
 Lecture—3 hours; discussion—1 hour. Problems of philosophy through major writings from various periods. GE credit: ArtHum, Wrt.—I, II, III, IV.

2. Critical Reasoning (4)
 Lecture—3 hours; discussion—1 hour. Criteria of good reasoning in everyday life and in science. Topics to be covered may include basic principles of deduction and induction, fallacies in reasoning; techniques and aids to reasoning; principles of scientific investigation; aids to clarity. Not open to students who have completed course 6. GE credit: Wrt.

3. Philosophy East and West (4)
 Lecture—3 hours; discussion—1 hour. Comparative treatment of select theories in Eastern and Western philosophy, e.g., of self, God, being, knowledge, enlightenment. Topics selected from the following philosophers: Eastern—Buddhist, Confucian, Hindu, Taoist; and Western—Platonist, Aristotelian, Medieval Christian, Modern Rationalist/Empiricist, Kantian, Hegelian, Existentialist. GE credit: ArtHum, Div, Wrt.

4. Symbolic Logic (4)
 Lecture—3 hours; discussion—1 hour. Syntax and semantics of the symbolic language sentence logic. Symbols of sentence logic. Translation of truth tables and proof techniques to arguments in English. Not open for credit to students who have taken course 102, 113, 131, 134, or 135. GE credit: Div. Gilmore

5. Ethics (4)
 Lecture—3 hours; discussion—1 hour. Problems of ethics and moral decision. Not open for credit to students who have taken course 102, 113, 131, or 134. GE credit: Div. Gilmore

6. Social Problems in Contemporary Society (4)
 Lecture—3 hours; discussion—1 hour. Social problems and issues and positions in contemporary moral and social problems. Not open for credit to students who have taken course 102, 113, 131, 134, or 135. GE credit: Div. Gilmore

7. Political Philosophy (4)
 Lecture—3 hours; discussion—1 hour. GE credit: SciEng or SocSci, Wrt.—Molyneux.

8. Social Problems in Contemporary Society (4)
 Lecture—3 hours; discussion—1 hour. Social problems and issues and positions in contemporary moral and social problems. Not open for credit to students who have taken course 102, 113, 131, 134, or 135. GE credit: Div. Gilmore

9. Political Philosophy (4)
 Lecture—3 hours; discussion—1 hour. GE credit: SciEng or SocSci, Wrt.—Molyneux.

10. Metaphysics (4)
 Lecture—3 hours; discussion—1 hour. GE credit: SciEng or SocSci, Wrt.—Gilmere.

11. Theory of Knowledge (4)
 Lecture—3 hours; discussion—1 hour. GE credit: SciEng or SocSci, Wrt.—Gilmere.

12. Introduction to Symbolic Logic (4)
 Lecture—3 hours; discussion—1 hour. Syntax and semantics of the symbolic language sentence logic. Symbols of sentence logic. Translation of truth tables and proof techniques to arguments in English. Not open for credit to students who have taken course 102, 113, 131, 134, or 135. GE credit: Div. Gilmore

13. Minds, Brains, and Computers (4)
 Lecture—3 hours; discussion—1 hour. Contemporary theories of the nature of the mind. Not open for credit to students who have taken course 102, 113, 131, 134, or 135. GE credit: Div. Gilmore

14. Social Philosophy (4)
 Lecture—3 hours; discussion—1 hour. Social problems and issues and positions in contemporary moral and social problems. Not open for credit to students who have taken course 102, 113, 131, 134, or 135. GE credit: Div. Gilmore

15. Bioethics (4)
 Lecture—3 hours; discussion—1 hour. Critical analysis of normative issues raised by contemporary medical and biological sciences. Possible topics include euthanasia, abortion, reproductive technologies, genetic engineering, and for society? Is there a right of rebellion? GE credit: ArtHum, Wrt.—Molyneux.
103. Philosophy of Mind (4)
Lecture/discussion—3 hours; term paper. The relation between mind and body, our knowledge of other minds, and the explanation of mental acts. Discussion of such concepts as action, intention, and causation. GE credit: ArtHum, Wrt.—Molyneux

104. The Evolution of Mind (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one previous Philosophy course or instructor permission. The interpretation of human thought and behavior through the lens of evolutionary theory. Topics include the nature/nurture debate concerning cognitive and other mental capacities and traits, and the interaction of nature and nurture in learning and development. GE Credit: SocSci.

105. Philosophy of Religion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course in philosophy recommended. Logical, metaphysical, epistemological, and existential aspects of selected religious concepts and problems. GE credit: ArtHum, Wrt.—Gilmore, Szall

107. Philosophy of the Physical Sciences (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one previous course in physics background recommended. Nature of testability and confirmation of scientific hypotheses; nature of scientific laws, theories, explanations, and models. Problems of causality, determinism, indeterminism, and probability; the structure of scientific revolutions. GE credit: ArtHum or SciEng, Wrt.

108. Philosophy of the Biological Sciences (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course in biology or one course in philosophy. Scientific method in biology. Nature of biological theories, explanations, and models. Problems of evolutionary theory, genetics, and sociobiology. Science and human values. GE credit: ArtHum or SciEng, Wrt.—Griesemer, Millstein

109. Philosophy of the Social Sciences (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course in one of the social sciences recommended. The nature of the social sciences, their subject matter and methods. Similarities and differences between natural and life sciences. Predicting and explaining behavioral and social phenomena. Prerequisite: course 101, or 103, or 137.—Sennet

111. Philosophy and Time (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one upper division philosophy course. Philosophical problems of time and space. The philosophical implications of space–time theories, such as those of Newton and Einstein. Topics may include the nature of geometry, conventionalism, absolutist versus relationalist views of space and time, philosophical implications of relativity theory.—Gilmore

112. Intermediate Symbolic Logic (4)
Lecture/discussion—4 hours. Prerequisite: course 12 or consent of instructor. Predicate logic syntax and semantics. Basic proof techniques. Identity, functions, and definitions. Introduction to concepts of metalogic. —II (I) Jackson, Mattey

113. Metalogic (4)
Lecture/discussion—4 hours. Prerequisite: course 112, Mathematics 108, or the equivalent. The meta- logic of classical propositional and first-order predicate logic: Consistency, soundness and completeness of both propositional and predicate logic. Löwenheim-Skolem theorem for predicate logic. Undecidability of logic. Offered in alternate years. —III (II) Glanzberg, Mattey

114. History of Ethics (4)
Lecture/discussion—4 hours. Prerequisite: one philosophy course. Study of some classic texts from the history of ethics. Emphasis on central problems of ethics, taking the form either of a survey or a centered examination of selected historical figures. Readings from such philosophers as Aristotle, Butler, Hume, Kant, Mill, and Nietzsche. GE credit: ArtHum, Wrt.—Katz

115. Problems in Normative Ethics (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one course in philosophy. Moral philosophy studied through examination of moral problems and the moral implications of common sense intuitions that bear on them. Problems may include: animal rights, fetal rights, euthanasia, justice and health care, war, nuclear deterrence, world hunger, environmental protection. GE credit: ArtHum, Wrt.—Millstein

116. Ethical Theories (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one course in philosophy; one course in ethics recommended. Exploration of ethical concepts and problems in ethical theory through an examination of classical and contemporary philosophical theories of ethics. Among the theories that may be discussed are utilitarianism, virtue theory, theories of natural rights, Kantian ethical theory, and contractualism.

117. Foundations of Ethics (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one of courses 114, 115, 116, 101, or 137. Advanced investigation of ethical metaphysics, justification, ethics and the nature and foundations of morality. Among the topics that may be discussed are moral realism and antirealism, cognitivism and noncognitivism, types of relativism, moral skepticism, normative language and normative belief

118. Political Philosophy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course in philosophy. Intensive examination of some central concepts in political thought such as the state, sovereignty, rights, obligation, freedom, law, authority, and responsibility. GE credit: SocSci, Div, Wrt.

119. Philosophy of Law (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course in philosophy or consent of instructor. Philosophical theories of the nature of law, legal obligation, the relation of law and morals. Problems for law involving liberty and justice: freedom of expression, privacy, rights, discrimination and fairness, responsibility, and punishment. GE credit: SocSci, Div, Wrt.—Dworkin

123. Aesthetics (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one course in philosophy recommended. Nature of art, of artistic creation, of the work of art, and of aesthetic experience; nature and validity of criticism; relationship of art to its environment. GE credit: ArtHum, Wrt.

125. Theory of Action (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: one course in Philosophy. Survey of prominent contemporary approaches to leading problems in action theory. Problems include issues about the nature of intentional action and the conceptual character of explanations of actions in terms of the agent’s reasons. Offered in alternate years. GE credit: ArtHum, Wrt.

128. Rationality (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: at least one course in philosophy. Philosophical aspects of rationality in its various forms. Focus is on theoretical and practical reasoning and conditions for rational belief, choice, and action. Possible additional topics include rationality and human limitations; paradoxes of rationality; varieties of irrationality; rationality and objectivity.

131. Philosophy of Logic and Mathematics (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one course in logic or mathematics. Nature of formal systems and mathematical theories. Selected topics include logical and semantical paradoxes; foundations of mathematics; set theory, type theory, predicate logic; philosophy of geometry; philosophical implications of Gödel’s incompleteness results.—Glanzberg

134. Modal Logic (4)
Lecture/discussion—4 hours. Prerequisite: course 112, Mathematics 108, or the equivalent. Survey of the main systems of modal logic, including Lewis systems S4 and S5. "Possible worlds" semantics and formal proofs. Applications to epistemology, ethics, or temporality.—Mattey

135. Alternative Logics (4)
Lecture/discussion—4 hours. Prerequisite: course 12, Mathematics 108, or the equivalent. Alternative to standard truth-functional logic, including many-valued logics, intuitionistic logics, relevance logics, and non-monotonic logics.—Mattey

137. Philosophy of Language (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one course in philosophy or linguistics. Discussion of philosophical theories of the nature of language and work and philosophical problems arising from thinking about language. Emphasis on modern (1879–present) philosophical views on language.—Glanzberg

137A. Philosophy of Language: Theory of Reference (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in philosophy or linguistics. Survey of issues and views about the nature of terms, the sense of names, or how words refer to things. Topics include names and descriptions, the distinction between sense and reference, the puzzle of non-referring terms, causal theory of reference, and possiblity. Only two units of credit for students who have completed course 137.—Jackson

137B. Philosophy of Language: Truth and Meaning (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in philosophy or linguistics. Philosophical issues and positions concerning the meaning and use of language. Topics include the identification of meaning with truth conditions, the nature of propositions, theories of linguistic understanding, the roles of mind and world in determining meaning. Only two units of credit for students who have completed course 137.—Sennett

143. Hellenistic and Neo-Platonic Philosophy (4)
Lecture/discussion—4 hours. Prerequisite: course 21. Greek philosophy after Aristotle, including Epicureanism, Stoicism, Skepticism and Neo-Platonism. GE: ArtHum, Wrt.—Szall

145. Medieval Philosophy (4)
Lecture/discussion—3 hours; written reports. Prerequisite: course 21. Study of major philosophers in the medieval period. GE credit: ArtHum, Wrt.—Szall

151. Nineteenth Century European Philosophy (4)
Lecture/discussion—4 hours. Prerequisite: course 22N. Survey of the main movements in nineteenth century philosophy on the European continent. Idealism in Schopenhauer and Hegel, dialectical materialism in Marx, irrationalism in Kierkegaard, Nietzsche and Dostojevsky. Not offered every year. GE credit: ArtHum.—Mattey

156. Contemporary Analytic Philosophy (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one course in philosophy or linguistics. Exposition of central issues such as meaning/reference, analytic/synthetic, reductionism, formal and ordinary language, essential properties, ontological commitment, possible world semantics; influential works by philosophers such as Russell, Moore, Wittgenstein, Austin, Carnap, Quine, Putnam, Kripke, van Fraassen.
157. Twentieth Century European Philosophy (4) Lecture/discussion—4 hours. Prerequisite: one course in Philosophy. Survey of the main movements in twentieth century philosophy on the European continent, including phenomenology, existentialism, post-structuralism and post-modernism. Philosophers covered are Husserl, Heidegger, Sartre, Foucault, Derrida. GE credit: ArtHum.—Mattey

160. Pre-Socratics (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 22N. Course: the life and works of early philosophers. Topics include the refutation of skepticism, the nature and existence of mind and body, the existence of God, and the foundations of science. Not offered every year.—Mattey

161. Plato (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 21. An overview of Plato's most important contributions in metaphysics, epistemology, psychology, cosmology, ethics and political philosophy. Dialogues will be selected from Plato's middle and later writings. Offered in alternate years.

162. Aristotle (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 21. An overview of Aristotle's most central fields such as metaphysics, physics, ethics, logic, and psychology. Offered in alternate years.

168. Descartes (4) Lecture/discussion—4 hours. Prerequisite: course 22N. An analysis of the philosophical writings of René Descartes. Topics include the refutation of skepticism, the nature and existence of mind and body, the existence of God, and the foundations of science. Not offered every year.—Mattey

170. Leibniz (4) Lecture/discussion—4 hours. Prerequisite: course 22N. Survey of the philosophical writings of Gottfried Wilhelm Leibniz. Topics include Leibniz's logic, the essence of God, freedom, substance, and the relation between science and metaphysics. Not offered every year.—Mattey

172. Locke and Berkeley (4) Lecture/discussion—4 hours. Prerequisite: course 22N. A historical survey of the philosophical works of John Locke and George Berkeley. Topics include abstract ideas, existence of matter, primary and secondary qualities, essence, substance, the existence of God, and the essence of scientific knowledge. May be repeated for credit. Not offered every year.—Mattey

174. Hume (4) Lecture/discussion—4 hours. Prerequisite: course 22N. David Hume's Treatise of Human Nature and related writings. Topics include empiricism, space, causality, belief, skepticism, the passions, and morality. Not offered every year.—Mattey

175. Kant (4) Lecture/discussion—4 hours. Prerequisite: course 22N. Immanuel Kant's Critique of Pure Reason and related writings. Topics include the nature of human cognition, space and time, a priori concepts, substance, causality, human freedom, and the existence of God. Not offered every year.—Mattey

189A-K. Special Topics in Philosophy (4) Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in the area of the special topic. Special topics in (A) History of Philosophy, (B) Metaphysics, (C) Theory of Knowledge, (D) Ethics, (E) Political Philosophy, (F) Philosophy of Law, (G) Aesthetics, (H) Philosophy of Mind, (I) Philosophy of Science, (J) Philosophy of Language, (K) Logic. May be repeated up to eight units of credit. Not offered every year.

194HA-194HB. Honors Research Project (4-4) Tutoring—3 hours; term paper. Prerequisite: consent of instructor. Specifically designed to prepare students who are members of the honors program in Philosophy. Completion of honors research project under direction of an instructor. Consult departmental major adviser for list of instructors available in a given quarter.

198. Directed Group Study (1-5) (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only)

Graduate Courses

200A. Proseminar I (4) Seminar—3 hours; term paper. Prerequisite: consent of instructor; open only to students in their first quarter of the Philosophy Ph.D. program. Intensive study of core works in a selected area of philosophy. Intensive experience in philosophical writing, discussion, and presentation of written work. Limited enrollment.—I. (I)

200B. Proseminar II (4) Seminar—3 hours; term paper. Prerequisite: consent of instructor; only for students in their first quarter of Philosophy Ph.D. program. Intensive study of core works in a selected area of philosophy. Intensive experience in philosophical writing, discussion, and presentation of written work. Limited enrollment.—I. (I)

201. Metaphysics (4) Seminar—3 hours; term paper. Prerequisite: graduate standing in philosophy. Topics vary from quarter to quarter and may include the following: What are things? Do names refer to things? If so, how? Do things have essential properties? What is the nature of necessity? May be repeated for credit when topics differ and with consent of instructor.—Gilmore

202. Theory of Knowledge (4) Seminar—3 hours, term paper. Prerequisite: graduate standing in philosophy. Topics vary from quarter to quarter. Sample topics include belief, skepticism, justifiability, externalism, naturalized epistemology. May be repeated for credit with consent of instructor.—Mattey

203. Philosophy of Mind (4) Seminar—3 hours, term paper. Prerequisite: graduate standing or consent of instructor. Topics in the philosophy of mind such as the mind-body problem, mental representation, consciousness, intercategoricality. May be repeated for credit with consent of instructor.—Mattey

205. Philosophy of Mind Practicum (4) Practicum—12 hours. Prerequisite: consent of instructor. Specific research conducted and prepared for publication by students in a team setting. Topics include knowledge representation and learning in neural networks, the nature and formal properties of mental representation. May be repeated for credit when topics differ and with consent of instructor. (S/U grading only.)

207. Philosophy of Physics (4) Seminar—3 hours; term paper. Prerequisite: graduate standing in Philosophy or consent of instructor. Intensive treatment of one (or more) topic(s) in the philosophy of physics, such as foundations of space-time theories, the interpretation of quantum mechanics, or foundations of statistical mechanics. May be repeated for credit when topics differ and with consent of instructor.

208. Philosophy of Biology (4) Seminar—3 hours, term paper. Prerequisite: graduate standing or consent of instructor. Intensive treatment of one or more general topics in the philosophy of biology, such as foundations of evolutionary theory, reductionism in biology, sociobiology and cultural evolution. May be repeated for credit when topics differ and with consent of instructor.—Grisemer, Millstein

210. Philosophy of Science (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Treatment of one or more general topics of current interest in philosophy of science. Topics may include scientific explanation, theories of confirmation, scientific realism, reduction in physics and biology. May be repeated for credit when topics differ and with consent of instructor.

212. Philosophy of Logic and Mathematics (4) Seminar—3 hours; term paper. Prerequisite: course 112 or 113 or Mathematics 108 or 125 or the equivalent. Philosophical issues in logic and math. Topics may include nature of logical and mathematical truth or knowledge, correctness of logical systems, foundations of mathematics, metaphysical and epistemological presuppositions, applications to philosophical problems and formalization of philosophical theories. May be repeated for credit when topics differ and with consent of instructor.—Glanzberg

213. Advanced Logic for Graduate Students (4) Lecture/discussion—3 hours; extensive problem solving. Prerequisite: graduate standing in philosophy; enrollment in the Philosophy Ph.D. program. Intensive study of advanced logic, including set theory, metatheory of predicate logic, and modal logic.—I. (I) Glanzberg, Mattey

214. Ethics (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Topics may include morality and motivation, objectivity in ethics, the relationship between the factual and the moral. Topics vary from quarter to quarter. May be repeated for credit when topics differ and with consent of instructor.—Dworkin

217. Political Philosophy (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Advanced study in political philosophy. Topics vary but may include distributive justice, enforcement of morality by the state, equality, obligation to obey the law, social contract theory. May be repeated for credit when topics differ and with consent of instructor.—Glennberg, Jackson, May, Senett

237. Philosophy of Language (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of philosophical issues raised by language, such as the nature of semantic content, propositional attitude, verb of propositional attitude, feasibility and limitations of formal semantics and pragmatics for natural languages. May be repeated for credit when topics differ and with consent of instructor.—Glennberg

261. Plato (4) Seminar—3 hours; term paper. Prerequisite; graduate standing or consent of instructor. Advanced seminar designed for analysis of arguments, doctrines, and texts from Plato's works. Methods of argumentation and interpretation are especially stressed. Topics vary according to instructor. May be repeated for credit with consent of instructor.—Szaflarz

275. Kant (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Advanced seminar designed for analysis of arguments, doctrines, and texts from Kant's works. Methods of argumentation and interpretation are especially stressed. Topics vary according to instructor. May be repeated for credit with consent of instructor.

290. History of Philosophy (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Topics in the history of philosophy. Topics vary according to
Physical Education

[College of Letters and Science]
Suzanne C. Williams, M.S., Program Director

Program Office. 264 Hickey Gymnasium
(530) 752-1111

Committee in Charge
G. Robert Biggs, B.A. (Physical Education)
Kathleen M. DeYoung, B.A. (Physical Education)
Barbara A. Jahn, M.S. (Physical Education)
Susan Kauzlarch, Ph.D. (Chemistry) Distinguished
Graduate Mentoring Award
Kevin Salyer, Ph.D. (Economics)
Deanne M. Vochatzer, M.A. (Physical Education)
Jon E. Vochatzer, M.S. (Physical Education)
Suzanne C. Williams, M.S. (Physical Education)

Faculty
G. Robert Biggs, B.A., Supervisor
Kathleen M. DeYoung, B.A., Supervisor
Barbara A. Jahn, M.S., Supervisor
Deanne M. Vochatzer, M.A., Supervisor
Jon E. Vochatzer, M.S., Supervisor
Suzanne C. Williams, M.S., Supervisor

Affiliated Faculty
Carissa Adams, Ph.D., Lecturer/Coach
Alex Antipa, B.S., Lecturer
Stephen T. Bronson, M.S., Lecturer/Coach
Keith Buckley, M.A., Lecturer/Coach
Greg Chapla, B.A., Lecturer/Coach
Ping Chou, B.A., Lecturer/Coach
Greg Clink, M.A., Lecturer/Coach
Rozanne DeWeese, M.A., Lecturer/Coach
Steven Dater, Ph.D., Lecturer/Coach
Henry Fastenau, Lecturer
Tim Fuo, B.S., Lecturer/Coach
Adam Getchell, M.S., Lecturer
Jennifer Gross, B.A., Lecturer/Coach
Rick Henderson, B.S., Lecturer/Coach
Stephen F. Heringer, B.S., Lecturer
Jeff Hogan, B.A., Supervising Athletic Trainer/ Lecturer
Caitlin Hurst, B.M., Lecturer/Coach
Elaine Jones, M.S., Lecturer/Coach
Andrea Khoo, B.S., Lecturer
John Lavallee, M.Ed., Lecturer/Coach
Daryl Lee, M.S., Lecturer/Coach
Ron Manara, B.A., Lecturer/Coach
Bill Maze, M.B.A., Lecturer/Coach
Mike Moraski, M.A., Lecturer/Coach
Peter Neketalsil, M.A., Lecturer/Coach
Mark Munoz, B.S., Lecturer/Coach
Gerald Nunes, B.S., Lecturer
Greg Oriltz, B.A., Lecturer
Rex Peters, M.S., Lecturer/Coach
Jill Riedman, M.S., Athletic Trainer/Lecturer
Julienne Ratanasane, M.A., Lecturer
Felipe Restrepo, M.A., Lecturer/Coach
Maryclare Robinson, M.S., Lecturer/Coach
Dwayne Stinson, B.S., Lecturer/Coach
Sandy Simpson, B.S., Lecturer/Coach
Dana Sorenson, M.S., Lecturer/Coach
Gary Stewart, M.A., Lecturer/Coach
Byron Talley, M.A., Lecturer/Coach
Lisa Varnum, B.S., Athletic Trainer/Lecturer
Matt Vaughn, M.A., Lecturer/Coach
Bill Wagman, M.A., Lecturer/Coach
Cy Williams, M.A.T., Lecturer/Coach
Jamey Wright, M.S., Lecturer/Coach
Karen Yader, M.A., Lecturer/Coach
Lennie Zalesky, M.A., Lecturer/Coach

The Program of Study
The Program in Physical Education facilitates the development and offering of non-major courses related to physical activities and health, fitness and health, athletic training, teacher education, and organized sport. The Program is available as part of a student's general educational experience to enhance and broaden the understanding and experience of physical activity in the maintenance of life-time health and fitness.

The basic activities series includes Physical Education 1, fitness, lifetime, and sports skills. The PE 1 activity courses are instructional in nature, designed to introduce new skills to beginners or to improve existing skills. Physical Education 6 is offered for students participating in intercollegiate athletics. Additional lower division courses include those in special skill areas, such as life-saving and water safety, scuba diving, health and fitness, and athletic training. Upper division courses include advanced skills in scuba diving and courses that meet the mandated requirements for students pursuing teacher preparation and certification.

Teaching Credential Subject Representative. S. Williams

Class and Intercollegiate Use of Facilities. The incidental fee payable by all students at the time of registration entitles students to the use of the gymnasium, pool, showers, towels, lockers, tennis courts, and athletic fields. Equipment for games and sports are available for classes. Lockers must be turned in on the last day of class, i.e., before the final examination period. Fines are imposed for each formal transaction necessitated by failure of the student to comply with the regulations of the program.

Courses in Physical Education (PHE)

Lower Division Courses
1. Physical Activities (0.5)
   Laboratory—2 hours. Sections in: (a) sports skills, rules and strategy; (b) physical fitness and personal health; (c) recreation; (d) aerobic dance. May be repeated along with course 6 for a combined total of 6 units. (P/NP grading only)—I, II, III, (I, II, III.)

2. Preparation and Participation in ICA Competition (1)
   Discussion/laboratory—10-20 hours. Prerequisite: consent of instructor (coach). Preparation and participation in Intercollegiate Athletics. Development of fundamental and advanced individual and team skills. In-depth knowledge of rules and strategy. Advanced sports competition and Conference and NCAA levels. May be repeated along with course 1 for a combined total of 6 units. (P/NP grading only)—I, II, III, (I, II, III.)

3. Professional Physical Education Activities: Men and Women (1)
   Lecture—1 hour; or laboratory—2 hours. Fundamentals of: (a) coaching competitive athletics; (b) classroom teaching and coaching; and (c) classroom teaching and officiating. May be repeated for a total of six units. —I, II, (I, II, III.)

4. Student-Athlete Life Skills (1)
   Lecture—1 hour. Intended for student-athletes. Balancing academic and athletic demands. Academic, psychological, and sociocultural issues which influence success as a college student-athlete. May be repeated up to 3 times for credit. (P/NP grading only)—I, II, III, (I, II, III.)

15. Administration of Intramural Sports (2)
   Lecture—2 hours. Planning and administering intramural sports programs at the high school and college level.—I, (II) Colberg
Upper Division Courses

144. Principles of Health Education (2)
Lecture—2 hours. Prerequisite: course 44 and upper division standing or consent of instructor. Principles of teaching health education in the public schools. (P/NP grading only.)

150. Recreation in the Community (3)
Lecture—2 hours; discussion—1 hour; two Saturday field trips—8 hours. The nature and scope of community recreation programs in California emphasizing low income, highly populated areas, and poor rural communities.

192. Physical Education Internship (1-12)
Internship—3-36 hours; written project proposal and evaluation. Prerequisite: upper division standing and consent of instructor; enrollment dependent on availability of internship positions, with priority given to Exercise Science majors. Work experience in the application of physical activity programs to teaching, recreational, clinical or research situations under department faculty supervision. May be repeated for a total of 12 units (including course 92) but no internship units will be counted toward Exercise Science major. (P/NP grading only)—I, II, III, (I, II, III.)

197L. Tutoring in Physical Education (1-5)
Tutorial—1-1.5 hours. Prerequisite: consent of chairperson. Tutoring of students in lower division physical activity courses. Written reports on methods and materials required. May be repeated once for credit. (P/NP grading only)—I, II, III, (I, II, III,)

197T. Tutoring in the Community (1-5)
Tutorial—2-1.5 hours; discussion—1 hour. Prerequisite: upper division standing and consent of Department Chairperson. Tutoring in the community in physical education related projects under the guidance of the Physical Education faculty. Regular meetings with instructor in charge and written report required. May be repeated once for credit. (P/NP grading only)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor and Department Chairperson. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

Professional Courses

300. The Elementary Physical Education Program (2)
Lecture—1 hour; laboratory—2 hours; field trips to selected programs. Prerequisite: senior standing or credential student. Introduction to principles, theories, materials, and practices of elementary school physical education program. —III. (III)

380. Methods of Teaching Physical Education (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: course 142 and six units of course 7; or consent of instructor. The methods of teaching group and individual activities for grades K-12; program planning, class management, organization, and evaluation. (P/NP grading only)—S. Williams

Physical Medicine and Rehabilitation

See Medicine, School of, on page 367.
Preparatory Subject Matter .......................... 41-47
Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE ............................ 19-25
Depth Subject Matter ............................. 35-37
Physics 102 [1 unit] if taken ................................ 0-1
At least one course from 127, 140A, 129A, or 130A 4
Introductory Physics.............................................. 1

Total Units for the Major ..................................... 76-84

B.S. Major Requirements: .................................

Preparatory Subject Matter .......................... 50-56
Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE ............................ 19-25
Computer Science 30 (or equivalent programming course) 4
Chemistry 2A or 2HA (2B-2C or 2B2H-2HC, highly recommended) 5

Depth Subject Matter ............................. 59-65
Physics 102 [1 unit] or 104B ................................. 1-4
Physics 122 or 116A, 8 and C ............................... 4-12

Two courses from one specialty 
(Astrophysics/Condensed Matter, or Nuclear/Particle Physics) and one course from a different specialty. Lists of courses in each specialty are available from the department. 12

Additional upper division Physics courses excluding 137 and 160, for a total of 15 upper division Physics courses of 3 or more units each. With prior departmental approval, one course from mathematics, engineering, or natural science may be used to meet this requirement. May include only one course from 194A, 195, 199, 199 0-9

Total Units for the Major ..................................... 109-118

Astrophysics Emphasis .................................
Preparatory Subject Matter .......................... 50-56
Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE ............................ 19-25
Computer Science 30 (or equivalent programming course) 4
Chemistry 2A or 2HA (2B-2C or 2B2H-2HC, highly recommended) 5

Depth Subject Matter ............................. 59-65
Physics 102 or 104B ......................................... 1-4
Physics 122 or 157 ........................................... 4
Physics 151, 152, 153, 156 ................................ 16
Two elective courses from Physics 105B, 110C, 116A, 129A, 130A, 130B, 150 (only with an astrophysics topic and prior departmental approval), 154, 155, Geology 163, may include only one course from Physics 194A, 195, or 199 ................................................. 6-9

Total Units for the Major ..................................... 109-121

Recommended
Computer Science Engineering 40, Astronomy 25

Applied Physics .......................... B.S. Major Requirements: .................................
Preparatory Subject Matter .......................... 49-56
Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE ............................ 19-25
Computer Science 30 (or equivalent programming course) 4
Depending on area of concentration: 
Chemistry 2A or 2HA (2B-2C or 2B2H-2HC, highly recommended) or 
Computer Science 40 or 
Mathematics 22AL ............................................. 14-5

Depth Subject Matter ............................. 57-64
Physics 102 [1 unit] or 104B .................................. 1-4
Physics 122 or 116 C ......................................... 1-4

Further courses from approved lists within one of the following areas chosen in consultation with a major adviser, to bring total number of credits for Depth courses to 15 ................. 20-24

Lists of approved courses for concentrations in atmospheric physics, chemical physics, computational physics, geophysics, materials science, physical electronics, and physical oceanography are available from the Physics Department. 4-12

Total Units for the Major ..................................... 106-121

Recommended Electives ...............................
Astronomy: Astronomy 25
Computer and numerical analysis: Mathematics 128A or Applied Science Engineering 115
Statistics: Statistics 131 A
Advanced mathematics: Mathematics 108, 118AB, 119AB, 127ABC 185AB

Program Varies. Courses from other departments may be submitted for courses in the depth subject matter requirement by obtaining written permission from the Undergraduate Curriculum Committee Chairperson, as approved by the Department.

Major Advisers. Contact Department Undergraduate Majors office in 225 Physics/Geology Building, for adviser assignment.

Minor Program Requirements: ..........................
All courses in the minor have prerequisites equivalent to Mathematics 21A-21B-21C-21D and 22A-22B and Physics 9A-9B-9C-9D. Students considering the possibility of a minor should consult with a Physics major advisor before beginning course work in the minor program.

Graduate Study. The Department of Physics offers programs of study and research leading to the M.S. and Ph.D. degrees. Further information regarding requirements for these degrees may be obtained from the Chairperson, Department of Physics, One Shields Avenue, University of California, Davis, CA 95616.

Astronomy. In addition to the introductory Astronomy courses listed, Upper Division and graduate courses in Astronomy, Astrophysics and Cosmology are listed under Physics.

Courses in Astronomy (AST) .............................

Lower Division Courses ................................. 2
Introduction to Modern Astronomy and Astrophysics (4)

Lecture—3 hours, laboratory/discussion—2 hours.
Prerequisite: good facility in high school physics and mathematics (algebra and high trigonometry). Description and interpretation of astronomical phenomena using the laws of modern physics. Modern astronomical instrumentation. Gravitation, relativistic electromagnetism, atomic and nuclear processes in relation to the structure and evolution of stars, the solar system, galaxies, and the Universe. Not open to students who have received credit for course 199. GE Credit: SciEng.—I, III. (I, III.) Becker, Fassnacht, Knox, Lubin

10G. Introduction to Stars, Galaxies, and the Universe (3)

Lecture—3 hours. Non-numerical introduction to astrophysics of the Universe beyond our solar system using concepts of modern physics. Not open for credit to students who have taken Astronomy 2, the former Astronomy 10, any quarter of Physics 9 or 9H, or any upper-division physics course other than 137 or 136. GE credit: SocSci—III, III. (I, III.)

10L. Observational Astronomy Laboratory (1)

Laboratory—2.5 hours. Prerequisite: course 10G or 10S may be taken concurrently). Introduction to observations of the night sky using small telescopes in nighttime laboratory. Not open for credit to students who have completed course 2 or 10. GE Credit: SciEng.—II, III. (I, III.)

10P. Astronomy and the Solar System (3)

Lecture—3 hours. Introduction to naked eye and telescopic observations of events in the night sky: positions of sun, moon, planets throughout the year. Historical perspective on how our understanding of the solar system evolved to current non-mathematical
25. Introduction to Modern Astronomy and Astrophysics (3)
Lecture—3 hours; discussion—2.5 hours.
Prerequisite: Physics 1A or Astronomy 10.
Continuation of course 1A. Heat, optics, electricity, and modern physics. Not open for credit to students who have completed course 7A, 7B, 7C, 9C, or 9D.—II. (II.)

A. Principles of Physics (3)
Lecture—3 hours. Prerequisite: course 1A or 9A.
Continuation of course 1A. Heat, optics, electricity, and modern physics. Not open for credit to students who have completed course 7A, 7B, 7C, 9C, or 9D.—II. (II.)

Prerequisite: good facility in high school physics and mathematics (algebra and trigonometry). Description and interpretation of astronomical phenomena using the laws of mechanics and physics and observations by modern astronomical instruments. Gravity, relativity, electromagnetic radiation, atomic and nuclear processes, the structure and evolution of stars, galaxies and the universe. Not open to students who have received credit for course 2, 10G, or 10L.—I. (I) Fassnacht, Lubin

Courses in Physics (PHY)
Physics 10 is primarily a concept-oriented one-quarter lecture/discussion course requiring relatively little mathematical background.

Physics 1 is a two-quarter sequence requiring some mathematics (trigonometry). Either 1A alone or both quarters may be taken. The sequence is not intended to satisfy entrance requirements of a year of physics for professional schools, but will satisfy requirements of some 6 units of physics.

Physics 7 is a one-year (three-quarter) introductory physics course with laboratory intended for students majoring in the biological sciences. It has a calculus prerequisite. If you don’t need a full year of introductory physics, you should take one or two quarters of Physics 1 instead. Read the following information carefully if you are using Physics 7 to complete an introductory course you have already begun.

The sequence of material in Physics 7 is different from that in most traditionally taught introductory physics courses. Physics 7B is most like the first quarter or semester of traditionally taught courses which treat classical mechanics. Physics 7C is most like the last quarter or semester which, in traditionally taught courses, treats optics, electricity and magnetism, and modern physics. The content and sequence of Physics 7A is unlike that of most other traditionally taught courses.

If you have completed one introductory course or semester of a traditionally taught physics course and want to continue with Physics 7, you should first take (and will receive full credit for) Physics 7A. Then, either take 7B or continue with the last three weeks of material, or take 7B and receive reduced credit. Next, take 7C for full credit.

If you have taken two quarters of a year-long introductory physics course and have not had extensive work in mathematics, electricity and magnetism, and modern physics, you should take Physics 7C. In no case should you take Physics 7B without first taking Physics 7A. All other situations should be discussed directly with a Physics 7 instructor.

Students not intending to take the entire sequence should take Physics 1.

Physics 9 is a four-quarter sequence using calculus throughout and including laboratory work as an integral part. The course is primarily for students in the physical sciences and engineering.

Physics 9H is a five-quarter honors physics sequence, which may be taken instead of Physics 9. It is intended primarily for first-year students with a strong interest in physics and with advanced placement in mathematics. Some science and engineering preparatory prerequisites, Physics 9HA-9HE can be substituted for Physics 9A-9D.

Lower Division Courses

1A. Principles of Physics (3)
Lecture—3 hours. Prerequisite: trigonometry or consent of instructor. Mechanics. Introduction to general principles and analytical methods used in physics with emphasis on applications in applied agricultural and biological sciences and in physical education. Not open to students who have received credit for course 7B, or 9A.—I. (I)

1B. Principles of Physics (3)
Lecture—3 hours. Prerequisite: course 1A or 9A.
Continuation of course 1A. Heat, optics, electricity, and modern physics. Not open for credit to students who have received credit for course 7A, 7B, 7C, 9C, or 9D.—II. (II.)

7A. General Physics (4)
Lecture—1.5 hours; discussion/lab—5 hours.
Prerequisite: Mathematics 16B (may be taken concurrently). Introduction to general principles and analytical methods used in physics for students majoring in a biological science. Only two units of credit allowed to students who have completed course 9B, 9C, or 9D.—II. (II.)

7B. General Physics (4)
Lecture—1.5 hours; discussion/lab—5 hours.
Prerequisite: course 7A. Continuation of course 7A. Only two units of credit allowed to students who have completed course 9A, 9B, 9C, or 9D.—II. (II.)

7C. General Physics (4)
Lecture—1.5 hours; discussion/lab—5 hours.
Prerequisite: course 7B. Continuation of course 7B. Only two units of credit allowed to students who have completed course 9A, 9B, 9C, or 9D.—II. (II.)

9A. Classical Physics (5)
Lecture—3 hours; laboratory—2.5 hours; discussion—1 hour.
Prerequisite: Mathematics 21B. Intro-duction to general principles and analytical methods used in physics for students majoring in science and engineering majors. Classical mechanics. Only 2 units of credit to students who have completed course 1A or 7B. Not open for credit to students who have completed course 9HA—II. (II.)

9B. Classical Physics (5)
Lecture—3 hours; laboratory—2.5 hours; discussion—1 hour.
Prerequisite: course 9A, Mathematics 21C, 21D (may be taken concurrently). Continuation of course 9A. Fluids, waves, 1st, 2nd, 3rd, 4th, 5th, 6th. Thermodynamics; wave phenomena, optics. Only 2 units of credit to students who have completed course 7A. Not open for credit to students who have completed course 9HB, 9HC, or (Engineering) 105—II. (II, II.)

9C. Classical Physics (5)
Lecture—3 hours; laboratory—2.5 hours; discussion—1 hour.
Prerequisite: course 9B, Mathematics 21D, 22A (may be taken concurrently). Electricity and magnetism, results and Maxwell equations. Only 3 units of credit to students who have completed course 7C. Not open for credit to students who have completed course 9HB, 9HC, or (Engineering) 105—II. (II, II.)

9D. Modern Physics (4)
Lecture—3 hours; discussion—1.5 hours.
Prerequisi-te: course 9C and Mathematics 22A; Mathematics 228 recommended (may be taken concurrently). Introduction to physics concepts developed since 1900. Special relativity, quantum mechanics, atoms, molecules, condensed matter, nuclear and particle physics. Not open for credit to students who have completed course 9HB, 9HC, or 9HE—II. (II, III.)

9H. Foundations of Physics (5)
Lecture—3 hours; discussion/lab—4 hours.
Prerequisite: Mathematics 21B (may be taken concurrently) or consent of instructor. Classical mechanics. Same material as course 9A in greater depth. For students in physical sciences, mathematics, and engineering. Only 2 units of credit to students who have completed course 7B. Not open for credit to students who have completed course 9A—II. (II)

9HB. Honors Foundations of Physics (5)
Lecture—3 hours; discussion/lab—4 hours.
Prerequisite: Physics 9HA or 9A, Mathematics 21C (may be taken concurrently). Special relativity, ther-mal physics. Credit allowed to students who have completed course 9A. Only 2 units of credit to students who have completed course 7A. Not open for credit to students who have completed course 9B or 9D—II. (II.)

9HC. Honors Physics (5)
Lecture—3 hours; discussion/lab—4 hours.
Prerequisite: course 9HB or Mathematics 21D or 22A (may be taken concurrently). Waves, sound, optics, quantum physics. Continuation of Physics 9HB. Only 2 units of credit to students who have completed course 7C. Not open for credit to students who have completed course 9B or 9D—II. (II.)

9HD. Honors Physics (5)
Lecture—3 hours; discussion/lab—4 hours.
Prerequisite: course 9HC and Mathematics 21D. Electricity and magnetism; introduction of Physics 9HC. Not open for credit to students who have completed course 9C—II. (II)

9HE. Honors Physics (5)
Lecture—3 hours; discussion/lab—4 hours.
Prerequisite: course 9HD and Mathematics 22B (may be taken concurrently). Application of quantum mechanics. Not open for credit to students who have completed course 9D—II. (II.)

10. Topics in Physics for Nonscientists (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: high school algebra. Emphasis varies: survey of basic principles or a deeper exploration of some particular branch. Past topics included black holes, space-time, and relativity; Electromagnetism, history, and philosophy; energy and the environment; and natural phenomena. Check with the Department office for the current emphasis. No units of credit allowed if taken after any other physics course. GE credit: SciEng, Wrt.

30. Fractals, Chaos and Complexity (3)
Lecture/discussion—3 hours. Modern ideas about the unifying ideas of fractal geometry, chaos and complexity. Basic theory and applications with examples from physics, earth sciences, mathematics, population dynamics, ecology, history, economics, biology, computer science, art and architecture. Offered in alternate years. (Same course as Geol-ogy 30.) GE credit: SciEng. II. Rundle

49. Supplementary Lower in Work in Division Physics (1-3)
Students with partial credit in lower division physics courses may, with consent of instructor, complete the credit under this heading. May be repeated for credit.—I, II, III, (I, II, III)

90X. Lower Division Seminar (2)
Seminar—2 hours. Prerequisite: lower division standing and consent of instructor. Examination of a spe-cial topic in Physics through shared readings, discussions, written assignments, or special activities such as laboratory work. May be repeated for credit. Limited enrollment.

98. Directed Group Study (1-5)
Prerequisite: consent of instructor; primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

102. Computational Laboratory in Physics (1)
Laboratory—3 hours. Prerequisite: Mathematics 21D, 22A, 22B, Computer Science Engineering 30, course 9D or 9HD, course 104A concurrently. Introduction to computational physics and to the compu-tational resources in the physics department. Preparation for brief programming assignments required in other upper division physics classes. Not open for credit to students who have completed course 104B or 105AL.—II. (II)

104A. Introductory Methods of Mathematical Physics (4)
Lecture—3 hours; extensive problem solving. Prerequis-ite: courses 9B, 9C, 9D and Mathematics 21D, 22A, and 22B with grade C- or better or consent of instructor. Introduction to the mathematics used in upper-division physics courses, including applications to vector spaces, Fourier analysis, partial differen-tial equations.—II. (II)
104B. Computational Methods of Mathematical Physics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 104A with grade C- or better and course 105AL or consent of instructor. Introduction to the use of computational techniques to solve the mathematical problems that arise in advanced physics courses, complementing the analytical approaches emphasized in course 104A. —II. (III.)

104C. Intermediate Methods of Mathematical Physics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 104A with grade C- or better or consent of instructor. Applications of complex analysis, conditional probability, integral transformations and other advanced topics. Not offered every year.—II. (III.)

105A-105B. Analytical Mechanics (4-5)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 9B, 9C, 9D and Mathematics 21D, 22A, and 22B passed with grade C- or better, or consent of department; course 104A and 105A passed with a grade of C- or better or consent of department required for 105B. Principles and applications of Newtonian mechanics, introduction to Lagrange’s and Hamilton’s equations. —II. (III.)

105C. Continuum Mechanics (4)
Lecture—3 hours. Prerequisite: 104A and 105A passed with a grade of C- or better or consent of department. Stress, strain, important analogies between shock, sound, and the use of com- 115A. Applications of Quantum Mechanics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 115A passed with a grade of C- or better, or consent of department. Angular momentum and spin; hydrogen atom and atomic spectra; perturbation theory.—II. (III.)

116A. Electronic Instrumentation (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 9C and Math 22B or consent of instructor. Experimental and theoretical study of important analo- g electronics, computer interfacing, transmission lines, input impedance, feedback, amplifiers, oscilla- tors, noise. —I. (II.) Pellet

116B. Electronic Instrumentation (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 9C or 9HD or consent of instructor. Continuation of course 116A. Introduction to the use of digital electronics and microcomputers in experimental physics. Nonlinear electronics, integrated circuits, analog-to-digital and digital-to-analog converters, transducers, actuators. —II. (III.) Pellet

116C. Introduction to Computer-Based Experiments in Physics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 9D or 9HD and Math 22B or consent of instructor. Introduction to techniques for mak- ing physical measurements using computer-based instrumentation. —III. (IV.)

122. Advanced Laboratory in Condensed Matter Physics (4)
Lecture—8 hours. Prerequisite: course 115A or consent of the department. Experimental techniques and measurements in solid-state physics. Student per- forms three to six experiments depending on diffi- culty. Individual work is stressed. Thorough write-ups of the experiments are required.—II. (III.)

122B. Advanced Laboratory in Particle Physics (4)
Lecture—8 hours. Prerequisite: course 115A or consent of the department. Experimental techniques and measurements in nuclear and particle physics. Students perform three to six experiments depending on difficulty. Thorough write-ups of the experiments are required.—II. (III.)

123. Signals and Noise in Physics (4)
Lecture—3 hours; project—1 hour. Prerequisite: courses 9A, B, C, D and 104A, or consent of instruc- tor. Techniques of measurement and analysis designed to avoid systematic error and maximize signal/noise ratio. Illustrative examples of optimal fil- ters ranging from condensed matter to cosmology. Not open to students who have completed this course previously as course 198. —II. (IV.) Tyson

126. Introduction to Cosmology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 105A or consent of instructor. Introduction to cosmology.—I. (II.)

127. Introduction to Astrophysics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 105A passed with grade C- or better, or consent of instructor. Celestial mechanics, radia- tion, astrophysical measurements, electromagnetic processes, the sun, binary and variable stars, stellar structure and evolution, galaxies, cosmology.—II. (III.)

129A. Introduction to Nuclear Physics (4)
Lecture—3 hours; extensive problem solving. Prereq- uisite: course 115A passed with a grade of C- or better or consent of instructor. Survey of basic nuclear properties and concepts requiring introduc- tion of knowledge of quantum mechanics: nuclear models and forces, radioactive decay and detecting nuclear radiation and nuclear reaction products, alpha, beta and gamma decay.—II. (III.)

129B. Nuclear Physics, Extensions and Applications (4)
Lecture—3 hours, term paper. Prerequisite: course 129A. Continuation of course 129A. Nuclear reac- tions, neutrons, fission, fission product decay, introduc- tion to meson and particle physics, nuclear astrophysics, and applications of nuclear physics and techniques to mass spectrometry, nuclear medi- cine, and element analysis.—I. (II.)

130A-130B. Elementary Particle Physics (4-4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 115A passed with a grade of C- or better or consent of instructor. Properties and classifi- cation of elementary particles and their interactions. Experimental techniques. Conservation laws and symmetries. Strong, electromagnetic, and weak inter- actions. Introduction to Feynman calculus. Not offered every year.—II. (III.)

140A-140B. Introduction to Solid State Physics (4-4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 115A or the equivalent passed with a grade of C- or better or consent of instructor. Survey of fundamental ideas in the physics of solids, with selected device applications. Crystal structure, x-ray and electron diffraction, phonons, energy bands, Fermi surfaces, semiconductors, optical properties, magnetism, superconductivity.—II. (III.)

150. Special Topics in Physics (4)
Lecture—3 hours; project. Prerequisite: courses 9A, B, C, D or 9HA, HB, HC, HD, HE or consent of instructor. Topics vary, covering areas of contempo- rary research in physics. May be repeated for credit. Not offered every year.—I. (II. III.)

151. Stellar Structure and Evolution (4)
Lecture—3 hours; project. Prerequisite: courses 9A, B, C, D or consent of instructor. The chemical compo- sition, structure, energy sources and evolutionary his- tory of stars, with equal emphasis on both the observational data and theoretical models, including black holes, neutron stars and white dwarfs and the formation of substellar masses. Offered in alternate years.—III. (III.)

152. Galactic Structure and the Interstellar Medium (4)
Lecture—3 hours; project. Prerequisite: courses 9A, B, C, D and 105A concurrently or consent of instruc- tor. Star structure, content, and formation of our Milky Way galaxy, viz. its shape and size, the nature of the interstellar medium, stellar populations, rotation curves, mass determination and evidence of dark matter. Offered in alternate years.—III. Boe- shaar, Knox

153. Extragalactic Astrophysics (4)
Lecture—3 hours; project. Prerequisite: courses 9A, B, C, D, 104A and 105A or consent of instructor. Structure and evolution of galaxies and clusters of galaxies, including distance and mass determina- tion, galaxy types and environments, active galactic nuclei and quasars, gravitational lensing and dark matter, global cosmological properties. Not open to students who have completed course 127. Offered in alternate years. —II. Fassnacht

154. Astrophysical Applications of Physics (4)
Lecture—3 hours; project. Prerequisite: course 105AB, 110A; 110B and 115A concurrently; 112 or consent of instructor. Applications of classical and quantum mechanics, thermodynamics, statistical mechanics, and electricity and magnetism to astroph- physical settings such as the Big Bang, degenerate white dwarf and neutron stars, and solar neutrinos. Not open to students who have completed this course previously as course 198. Offered in alter- nate years. —III. Knox
153. General Relativity (4)
Lecture—3 hours; project. Prerequisite: course 104A and 105A or consent of instructor. Definition of the mathematical framework for the description of the gravitational field, introduction of the dynamical equations of Einstein governing its evolution; some of the key solutions, including black holes and expanding universes. Offered in alternate years. —II. Kaloper

156. Introduction to Cosmology (4)
Lecture—3 hours; project. Prerequisites: courses 9A, C, D, and 105A or consent of instructor. Contemporary knowledge regarding the origin of the universe, including the Big Bang and nucleosynthesis, microwave background radiation, formation of cosmic structure, cosmic inflation, cosmic acceleration and dark energy. Offered in alternate years. Not open to students who have completed course 126. —III. Albrecht

157. Astronomy Instrumentation and Data Analysis Laboratory (4)
Lecture—2 hours; laboratory—6 hours; project. Prerequisites: courses 9A, B, C, D. Experimental techniques, data acquisition and analysis involving stellar, nebular and galaxy digital imaging, photometry and spectroscopy. Analyzing time resolved changes in the solar atmosphere in the light of hydrogen alpha. Offered in alternate years. —III. Soo-Er

160. Environmental Physics and Society (3)
Lecture—3 hours. Prerequisite: course 90 or 7C, or course 10 or 1B and Mathematics 16B or the equivalent. Impact of human-kind on the environment will be discussed from the point of view of the physical sciences. Calculations based on physical principles will be made, and the resulting policy implications will be considered. [Same course as Engineering 160G] GE credit: SciEng or SocSci. —III. (II)

190. Careers in Physics (1)
Seminar—2 hours. Overview of important research areas in physics, discussions of research opportunities and internships, strategies for graduate school and industrial careers, the fellowship and assistantship selection process, preparation of resumes, personal statements, and letters of recommendation. Physics and Applied Physics majors only. (P/NP grading only).—I. (II)

194A-194HB. Special Study for Honors Students (4-4)
Independent study—12 hours. Prerequisite: consent of instructor required. Open only to Physics and Applied Physics majors with senior standing. Preparation of a senior thesis on a topic selected by the student with approval of the department. May be repeated for a total of 15 units. —I, II, III. (II, III, III)

197T. Tutoring in Physics and Astronomy (1-5)
Tutoring of students in lower division courses. Leading of small voluntary discussion groups affiliated with one of the department's regular courses. Weekly meetings with instructor. (P/NP grading only).—I, II, III. (II, III, III)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

200A. Theory of Mechanics and Electromagnetics (4)
Lecture—3 hours; independent study—1 hour. Prerequisite: courses 104A, 105B, and 110C or the equivalent; course 204A concurrently. Theoretical approaches in classical mechanics including the use of generalized coordinates and virtual work, variational calculus, Lagrangian equations; symmetries, conservation laws, and Noether theorem; Lagrangian density; Hamilton formalism; canonical transformations; Fossan brackets; and Hamilton-Jacobi equations. —I. (II)

200B-200C. Theory of Mechanics and Electromagnetics (4-4)
Lecture—3 hours; independent study—1 hour. Prerequisite: course 200A, and course 204B concurrently. Theoretical approaches in electromagnetics including static electromagnetic fields, Maxwell's equations; plane waves in various media; magneto-hydrodynamics; diffusion theory; radiating systems; and special relativity. —III. (III)

204A-204B. Methods of Mathematical Physics (4-4)
Lecture—3 hours; independent study—1 hour. Prerequisite: courses 104A and 104B or the equivalent. Linear vector space and functional analysis, complete sets of functions, complex variables, functional analysis, Green's functions, calculus of variations, introduction to numerical analysis. —III. (III)

210. Computational Physics (3)
Lecture—3 hours. Prerequisite: knowledge of Fortran or C. Analytical techniques to solve differential equations and eigenvalue problems. Physics content of course will be selected and adjusted according to background of students. —II. (II)

215A-215B-215C. Quantum Mechanics (4-4-4)
Lecture—3 hours; independent study—1 hour. Prerequisite: course 115B or the equivalent. Formal development and interpretation of non-relativistic quantum mechanics; its application to atomic, nuclear, molecular, and solid-state problems; brief introduction to relativistic quantum mechanics and the Dirac equation. —III. (III)

219A. Statistical Mechanics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 215B or the equivalent. Foundations of thermodynamics, equilibrium and quantum statistical mechanics with simple applications to properties of solids, real gases, nuclear matter, etc. and a brief introduction to relativistic quantum mechanics and the Dirac equation. —III. (III)

219B. Statistical Mechanics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 219A. Further applications of thermodynamics and classical and quantum statistical mechanics. The modern theory of fluctuations about the equilibrium state, phase transitions and critical phenomena. —I. (II)

223A. Group Theoretical Methods of Physics—Condensed Matter (3)
Lecture—3 hours. Prerequisite: courses 215A, 215B (215C is corequisite) or consent of instructor. Theory of groups and their representations with applications in condensed matter. Not offered every year.

223B. Group Theoretical Methods of Physics—Elementary Particles (3)
Lecture—3 hours. Prerequisite: courses 215A, 215B (215C is corequisite) or consent of instructor. Theory of groups and their representations with applications in elementary particle physics. Not offered every year.

224A. Nuclear Physics (3)
Lecture—3 hours. Prerequisite: course 215B. Comprehensive study of the nucleon-nucleon interaction including the deuteron, nucleon-nucleon scattering, polarization, determination of real parameters of S-matrix, and related topics. Not offered every year.

224B. Nuclear Physics (3)
Lecture—3 hours. Prerequisite: course 224A. Study of nuclear models, including shell model, collective model, unified model. Energy level spectra, static momenta, and electromagnetic transition rates. Not offered every year.

225C. Nuclear Physics (3)
Lecture—3 hours. Prerequisite: course 224B. Study of nuclear scattering and reactions including the optical model and direct interactions. Beta decay and an introduction to weak interactions. Not offered every year.

229A. Advanced Nuclear Theory (3)
Lecture—3 hours. Prerequisite: course 224C, Advanced topics in nuclear theory; theory of quantum-mechanical scattering processes. Exact formal theory and models for two-body scattering. Not offered every year.

229B. Advanced Nuclear Theory (3)
Lecture—3 hours. Prerequisite: course 229A, Advanced topics in nuclear theory; theory of quantum-mechanical scattering processes. Crystal structure, one-electron theory; transport and optical properties of semiconductors; phonons, electron-phonon scattering. —II. (II)

240A. Condensed Matter Physics A (3)
Lecture—3 hours. Prerequisite: course 215C, 219A; course 140AB or equivalent recommended. Topics in condensed matter physics: Crystal structure; one-electron theory; transport and optical properties of semiconductors; phonons, electron-phonon scattering. —I. (I)

240B. Condensed Matter Physics B (3)
Lecture—3 hours. Prerequisite: course 240A. Topics in condensed matter physics: transport and optical properties of metals and quantum structures; experimental measurement the Fermi surface and of phonon spectra. —II. (II)

240C. Condensed Matter Physics (3)
Lecture—3 hours. Prerequisite: course 240AB. Review of second quantization. Interacting electron gas, electron-phonon interaction and effects, including instabilities of electronic systems. Topics in the theory of superconductivity and magnetism. —III. (III)

241. Advanced Topics in Magnetism (3)
Lecture—3 hours. Prerequisite: courses 240A-240B and 240C-240D, or consent of instructor. Topics chosen from areas of current research interest. Not offered every year.

242. Advanced Topics in Superconductivity (3)
Lecture—3 hours. Prerequisite: courses 240A-240B and 240C-240D, or consent of instructor. Topics chosen from areas of current research interest. Not offered every year.

243A-243B-243C. Surface Physics of Materials (3-3-3)
Lecture—3 hours. Prerequisite: courses 140A-140B, 115A-115B or the equivalents, courses 215A, 240A, or the equivalents recommended. Experimental and theoretical fundamentals of surface and interface physics and chemistry, including electronic and magnetic structure, thermodynamics, adsorption kinetics, epitaxial growth, and a discussion of vari-
Physiology

245A. High-Energy Physics (3)
Lecture—3 hours. Prerequisite: course 230A. Phenomenology and systematics of strong, electromagnetic, and weak interactions of hadrons and leptons; determination of quantum numbers; quarks and quarkonia; deep inelastic scattering; the quark parton model; experiments at hadron colliders and electron-positron colliders.—I, II, III.

245B. High-Energy Physics (3)
Lecture—3 hours. Prerequisite: course 245A. Electroweak interactions; phenomenology of the Standard Model of SU(2)LxU(1); weak interaction data. May be repeated for credit with consent of instructor.—III.

245C. Collider Physics (3)
Lecture—3 hours. Prerequisite: course 245A; course 252B taken previously or concurrently, or consent of instructor. Collider physics. Topics include quark and gluon distribution functions and the computation of cross sections; large Hadron Collider and Internationa Linear Collider; collider and detector characteristics; extracting models from data; software tools for analyzing experimental data. May be repeated for credit with consent of instructor.—II, III.

246A. Supersymmetry: Theory and Phenomenology (3)
Lecture—3 hours. Prerequisite: courses 230A, 230B, 245A, 245B recommended, or consent of instructor. Constraining the minimal supermultiplet of particle physics; superfields; supersymmetry breaking the minimal supersymmetric standard model; supergravity. Collider phenomenology of supersymmetry. Dark matter phenomenology. Not offered every year.—III.

246B. Advanced Supersymmetry (3)
Lecture—3 hours. Prerequisite: course 246A. Advanced topics in supersymmetry. Topics include holonomy, the Affleck-Dine-Seiberg superpotential; Seiberg duality for SUSY QCD, dynamical SUSY breaking, Seiberg-Witten theory, superconformal field theories, supergravity, anomaly and gaugino mediation, and the ADS/CFT correspondence. Offered in alternate years.—II

250. Special Topics in Physics (3)
Lecture—3 hours. Prerequisite: consent of instructor. Topic varies. May be repeated for credit. Not offered every year.—II, III, III

252A. Techniques of Experimental Physics (3)
Lecture—3 hours. Introduction to techniques and methods of designing and executing experiments. Problems and examples from condensed matter research will be utilized. Not offered every year.

252B. Techniques of Experimental Physics (3)
Lecture—3 hours. Introduction to techniques and methods of designing and executing experiments. Problems and examples from nuclear and particle research will be utilized.—II, III, III

260. Introduction to General Relativity (3)
Lecture—3 hours. Prerequisite: courses 200A, 200B. An introductory relativistic, differential geometry and curved spacetime; the Einstein field equations; gravitational fields of stars and black holes; weak fields and gravitational radiation; experimental tests; Big Bang cosmology.—I

262. Early Universe Cosmology (3)
Lecture—3 hours. Prerequisite: second year standing in Physics graduate program or consent of instructor. Introduction to early universe cosmology: the Big Bang, inflation, primordial nucleosynthesis, dark matter, dark energy, and other topics of current interest.—I

263. Cosmic Structure Formation (3)
Lecture—3 hours. Prerequisite: course 260. Growth of structure from small density inhomogeneities in the early universe to the diverse structures observable today. Use of observable properties (cosmic microwave background, gravitational lensing, peculiar velocities, number counts) to constrain models of structure formation and fundamental physics.—III

265. High Energy Astrophysics and Radiative Processes (3)
Lecture—3 hours. Prerequisite: graduate standing in physics or consent of instructor. Survey course covering galactic and extragalactic X-ray and gamma-ray astronomy, radiative processes, and techniques of high-energy astrophysics.—I

266. Data Analysis for Astrophysics (3)
Lecture—3 hours. Prerequisite: graduate standing in physics or consent of instructor. Survey course covering measurement and signal analysis techniques for astrophysics and cosmology throughout the electromagnetic spectrum.—II

267. Observational Extragalactic Astronomy & Cosmology (3)
Lecture—3 hours. Prerequisite: graduate standing in physics or consent of instructor. Reading and discussion to help graduate students develop and maintain familiarity with the current and past literature on observational research and related areas. May be repeated for credit. (S/U grading only)—I, II, III, I, II, III

280. Seminar in Ethics for Scientists (2)
Seminar—2 hours. Prerequisite: graduate standing in any department of Science or Engineering. Analysis and discussion of topical and historical issues in the ethics of science, possibly including issues such as proper authorship, peer review, fraud, plagiarism, responsible collaboration, and conflict of interest. Limited enrollment. (Same course as Chemical Engineering and Materials Science 280 and Chemistry 280B.) (S/U grading only)—II, II, III

295. Introduction to Departmental Research (1)
Seminar—1 hour. Seminar to introduce first- and second-year physics graduate students to the fields of specialty and research of the Physics staff. (S/U grading only)—II

297. Research on the Teaching and Learning of Physics (3)
Seminar—3 hours. Prerequisite: graduate standing in Physics or consent of instructor. Discussion and analysis of recent research in how students construct understanding of physics and other science concepts and the implications of this research for instructional settings. III

298. Group Study (1-5)
Credit limited to 9 semester units. To be utilized. Not offered every year.

299. Research (1-12)
(S/U grading only)

Professional Courses

371. Teaching in an Active-Engagement Physics Discussion/Lab Setting (1)
Lecture/discussion—1 hour. Prerequisite: course 9D or equivalent; consent of instructor. Open to graduate students. May be repeated for credit. (S/U grading only)—I, II, III, I, II, III

390. Methods of Teaching Physics (1)
Lecture/discussion—1 hour. Prerequisite: graduate standing in Physics, consent of instructor. Practical experience in methods and problems related to teaching physics laboratories at the university level, including discussion of teaching techniques, analysis of quizzes and laboratory reports and related topics. Required of all Physics Teaching Assistants. May be repeated for credit. (S/U grading only)—I, II, III, I, II, III

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—I, II, III, I, II, III

Physiology

See Anatomy, Physiology and Cell Biology (APC), on page 505; Human Physiology (HPH), on page 383; Molecular, Cellular, and Integrative Physiology (A Graduate Group), on page 409; and Neurobiology, Physiology, and Behavior, on page 420.

Plant Biology

See Agricultural Management and Rangeland Resources, on page 132; Crop Science and Management, on page 198; Environmental Horticulture, on page 276; Plant Biology, on page 443; Plant Biology (A Graduate Group), on page 443; and Vegetable Crops, on page 502.
Plant Biology

(Chief of Biological Sciences)

William J. Lucas, Ph.D., Chairperson of the Department

Anne B. Britt, Ph.D., Chairperson of the Department of Plant Biology

Graduate Programs. See Plant Biology (A Graduate Program), on page 445.

Section Office. 1002 Life Sciences (530) 752-0617; http://www.plb.ucdavis.edu

Committee in Charge of the Major


Faculty

Faculty includes members of the Departments of Plant Biology, Molecular and Cellular Biology, and Evolution and Ecology in the College of Biological Sciences and the Department of Plant Sciences in the College of Agricultural and Environmental Sciences.

Primary Department Members

Anne Britt, Ph.D., Professor
Simon Chan, Ph.D., Assistant Professor
Lucia Carol Garcia, Ph.D., Assistant Professor
Katherine Dehesh, Ph.D., Professor
John J. Harada, Ph.D., Professor
Stacey Harmer, Ph.D., Assistant Professor
Bo Liu, Ph.D., Associate Professor
William J. Lucas, Ph.D., Professor
Julin Malafa, Ph.D., Assistant Professor
Terence M. Murphy, Ph.D., Professor
Sharonan O’Neill, Ph.D., Professor
Neelima Sinha, Ph.D., Professor
Alan J. Stemler, Ph.D., Professor
Venkatesan Sundaresan, Ph.D., Professor
Larry N. Vanderheof, Ph.D., Professor

Secondary Department Members

Judith Callis, Ph.D., Professor
James A. Doyle, Ph.D., Professor (Geology)
Marcy E. Etzler, Ph.D., Professor
Charles J. Gassner, Ph.D., Professor
Marcel Rejmanek, Ph.D., Professor
Raymond L. Rodriguez, Ph.D., Professor
Irwin H. Segel, Ph.D., Distinguished Professor
Maurenne L. Stansly, Ph.D., Professor
Donald R. Strong, Ph.D., Professor

Emeriti Faculty

Frederic T. Addicott, Ph.D., Professor Emeritus
Floyd M. Ashton, Ph.D., Professor Emeritus
David E. Beyer, Ph.D., Professor Emeritus
Bruce A. Bonner, Ph.D., Professor Emeritus
Paul A. Castellano, Ph.D., Professor Emeritus
Deborah P. Delmer, Ph.D., Professor Emerita
Emmanuel Epstein, Ph.D., Professor Emeritus
Richard H. Falk, Ph.D., Professor Emeritus
Hendrick J. Ketella, Ph.D., Professor Emeritus
Martha E. Mullet, Ph.D., Professor Emeritus
Dorothy W. Otvos, Ph.D., Professor Emerita
Paula J. Rogers, Ph.D., Professor Emerita
Thomas L. Rost, Ph.D., Professor
Annette S. Schachtman, distinguished Teaching Award
Robert M. Thornton, Ph.D., Senior Lecturer Emeritus
Academic Senate Distinguished Teaching Award
John M. Tucker, Ph.D., Professor Emeritus
Kenneth Wells, Ph.D., Professor Emeritus

Affiliated Faculty

John L. Bowman, Ph.D., Professor
Deborah Canington, Ph.D., Lecturer
Academic Federation Excellence in Teaching Award
Tom Gailler, Ph.D., Academic Coordinator
Andrew Grove, Ph.D., Adjunct Assistant Professor

The Major Program

As organisms that sequester carbon and convert solar energy to usable forms, plants are the primary source of food on the planet as well as important buffers against climate change. The Plant Biology major focuses on fundamental aspects of how plants function as organisms and interact with their environment. A wide variety of scientific disciplines are integrated within the Plant Biology major, including physiology, cell and molecular biology, development, genetics and genomics.

The Program. The plant biology major consists of Biosciences core covering the general principles of biology plus four plant-specific classes dealing with advanced aspects of plant biology including physiological, development, and anatomy. Two required electives allow students to tailor their degrees to suit their interests. Independent research in a laboratory setting is a requirement, and majors in Plant Biology are guaranteed this opportunity. Because of the value of plants as a model system for research in molecular genetics, cell biology, and biochemistry, Plant Biology makes an excellent minor or second major for student in these fields.

Career Alternatives. A degree in Plant Biology serves as an excellent launching point for a wide range of career options, including domestic and international opportunities in business, research and teaching in both governmental and private sectors. The program is excellent preparation for students wishing to enter graduate or other professional schools, including medicine, law (particularly environmental or patent law) or journalism. Plant biologists can work in the laboratory, in the field, in the forest, in botanical gardens or nurseries, in agricultural companies, or in biotechnology, pharmaceutical, energy or chemical industries, or in the area of environmental protection.

A.B. Major Requirements: 4 units

Preparatory Subject Matter: 34 units

Biology Sciences 2A-2B-2C .......................... 14
Chemistry 2A-2B, 8A-8B .......................... 16
Statistics 13 or 100 or 102 or [Plant Sciences 120] ............... 4

Depth Subject Matter: 41-42 units

Biological Sciences 101 .................................. 4
Plant Biology 102 or 108 .............................. 5
Evolution and Ecology 140 or Plant Biology 116 .................. 4-5
Plant Biology 105, 111, 112, 117 ................... 15
Additional upper division units in Plant Biology or related natural science courses ............................................. 13

Total Units for the Major: 75-76

Recommended

Chemistry 2C, Evolution and Ecology 100;
Plant Biology 119, and Plant Biology 148

For students with interests in specialized areas of plant biology (e.g. agricultural botany, ecology, systematics and evolution, morphology, plant physiology, etc.), certain substitutions, including courses in other departments, may be allowed upon prior consultation with a Plant Biology major advisor.

B.S. Major Requirements: 56-65 units

Preparatory Subject Matter: 34 units

Biology Sciences 2A-2B-2C .......................... 14
Chemistry 2A-2B, 8A-8B .......................... 16
Statistics 13 or 100 or 102 or [Plant Sciences 120] ............... 4

Mathematics 16A-16B or 18A-18B or 53A-53B ................................. 12
Mathematics 17A-17B .......................... 12

Recommended

Biological Sciences 101, 105 .......................... 10-13
Statistics 100 or 102 .............................. 4
Plant Biology 105, 111, 112 .......................... 11

Research internship: Plant Biology 92, 99, 189, 192, 199 or equivalent .......................... 3
Restricted electives .......................... 15

Upper division courses in plant biology or other fields relevant to the student’s interest chosen from the list below. The student’s academic advisor may approve additional courses as “restricted electives” at their discretion.

Total Units for the Major: 99-111

Course Lists

Ecology

Environmental Science and Policy 121, 123, 124, 150C, 151, 151L, 155, 155L; Evolution and Ecology 138; Hydrologic Sciences 122, 124; Plant Biology 117, 119; Plant Pathology 150; Plant Sciences 112, 130, 131, 134, 135, 137, 142.

Evolution and Diversity

Evolution and Ecology 100, 102, 140, 149; Plant Biology 102, 108, 116, 118, 143, 148; Plant Sciences 121.

Plant Genetics

Evolution and Ecology 110; Evolution and Ecology 100; Molecular and Cellular Biology 161, 164; Plant Biology 116, 117; Plant Pathology 120, 130; Plant Sciences 118, 142, 150, 152, 153, 157.

Plant Physiology, Development, and Molecular Biology

Biotechnology 160; Molecular and Cellular Biology 126; Plant Biology 113, 126; Plant Pathology 130; Plant Sciences 153, 157, 158.

Master Adviser. A. Stermer, Plant Biology Department office in 2220 Life Sciences

Minor Program Requirements: 18 units

Upper division courses, including at least one course from each of the following groups:

(a) Anatomy and Morphology: Evolution and Ecology 140; Plant Biology 105, 116, 118
(b) Physiology and Development: Plant Biology 111, 112, 123; Plant Pathology 130
(c) Evolution and Ecology: Evolution and Ecology 100; Plant Biology 102, 108, 117, 143
(d) Biochemistry and Molecular Genetics: Biotechnology 160; Plant Biology 113, 126; Plant Sciences 152, 154, 171, 172

Minor Adviser.Same as for major above.

Honors and Honors Programs. Students on the honors list may elect to include a maximum of 5 units of 194H in their major programs. Refer to the Academic Information chapter and the appropriate College section for Dean’s Honors List information.

Graduate Study. Consult the Plant Biology Graduate Group listing.

Courses in Plant Biology (PLB)

Lower Division Courses

90X. Plant Science Seminar (1-4)
Prerequisite: consent of instructor. Examination of a special topic in a small group setting. Not open for credit to students who have completed course Plant Sciences 90X. (Former course Plant Sciences 90X.)

92. Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Technical and/or professional experience on or off campus. Supervised by a member of the Plant Biology faculty. (P/NP grading only.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Quarter Offered: I—Fall; II—Winter; III—Spring; IV—Summer, 2009-2010 offering in parentheses.

General Education (GE) credit: Arthum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Social-Cultural Diversity; Wrt=Writing Experience.
Upper Division Courses

For questions about courses numbered 102 through 126, see the Plant Biology Department office in 1002 Kavya Sciences. For questions concerning courses numbered 1, 12, 140 through 188 and 196, see the Plant Science Advising Center in 1220 Plant and Environmental Sciences.

102. California Floristics (5)
 Lecture—3 hours; laboratory—8 hours. Prerequisite: Plant Sciences 2, Biological Sciences 1C, 2C, or equivalent course in Plant Sciences. Survey of the flora of California, emphasizing recognition of important vascular plant families and genera and use of taxonomic keys for species identification. Current understanding of relationships among families. Principles of plant taxonomy and phylogenetic systems. One Saturday field trip. (Same course as Plant Sciences 102.)—III. (III.) Potter

105. Developmental Plant Anatomy (5)
 Lecture—3 hours; laboratory—6 hours. Prerequisite: introductory plant biology (for example, Biological Sciences 1C). Survey of vascular plant structure and development. Current ideas and experimental evidence for developmental concepts.—I. (I.) Canington

108. Systematics and Evolution of Angiosperms (5)
 Lecture—3 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C. Diversity and classification of angiosperms (flowering plants) on a world scale, and current understanding of their origins and evolutionary relationships and trends within them based on morphological and molecular evidence. (Same course as Evolution and Ecology 108.) GE credit: SciEng.—III. (III.) Doyle

111. Plant Physiology (3)
 Lecture—3 hours. Prerequisite: Biological Sciences 1C, 2A, 2B, and 2C, Chemistry 88 and Physics 7C (either may be taken concurrently). Plant Biology 102 recommended. The plant cell as a functional unit. The processes of absorption, movement, and utilization of water and minerals. Water loss, translocation, photosynthesis, respiration.—I. (I.) Dehesh, Lucas

111D. Problems in Plant Physiology (1)
 Discussion—1 hour. Prerequisite: course 111 concurrently. Discussion of problems and applications relating to principles presented in course 111. Students will be assigned problems each week showing novel applications of principles described in course 111 and will prepare answers to be delivered orally during the class period. (P/NP grading only.)—I. (I.) Lucas, Dehesh

112. Plant Growth and Development (3)
 Lecture—3 hours. Prerequisite: Biological Sciences 1C, or 2A, 2B and 2C, Chemistry 88. Introduction to the mechanisms and control systems that govern plant growth and development and the responses of plants to the environment. Strong emphasis on vegetative development of flowering plants. GE credit: SciEng.—II. (II.) Harada, Sundaresan

112D. Problems in Plant Growth and Development (1)
 Discussion—1 hour. Prerequisite: course 112 concurrently. Discussion of problems and applications relating to principles presented in course 112. Students will be assigned problems each week showing novel applications of the principles described in course 112 and will prepare answers to be delivered orally during class period. (P/NP grading only.)—II. (II.) Harada, Sundaresan

113. Molecular and Cellular Biology of Plants (3)
 Lecture—3 hours. Prerequisite: Biological Sciences 1A and 1C, or 2A, 2B, 2C; 101; Biological Sciences 102 or equivalent recommended. Molecular and cellular aspects of the growth and development of plants and their response to biological and environmental stresses. Primary focus on processes unique to plants. Experimental approaches will be emphasized.—II. (III.) Harada

113D. Problems in Molecular and Cellular Biology of Plants (1)
 Discussion—1 hour. Prerequisite: course 113 concurrently. Discussion of topics and applications related to principles presented in course 113. Assigned topics each week show novel applications of the principles described in course 113; discussion of topics during class period. (P/NP grading only.)—III. (III.) Harada

116. Plant Morphology and Evolution (5)
 Lecture—3 hours; laboratory—6 hours. Prerequisite: introductory plant biology (e.g., Biological Sciences 1C, or 2A, 2B, and 2C); plant anatomy recommended (e.g., Plant Biology 105). Introduction to the form, development and evolution of vascular plants. Emphasis given to the form and development of reproductive structures in ferns and seed-producing plants as a basis for identifying search habitats and plant relationships. GE credit: SciEng.—II. (II.) Jernstedt

117. Plant Ecology (4)
 Lecture—3 hours; fieldwork—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C. Plant Biology 111 recommended. The study of the interactions between plants, plant populations or vegetation types and their physical and biological environment. Special emphasis on California. Four full-day field trips and brief write-up of class project required. (Same course as Evolution and Ecology 117.)—I. (I.) Pearcy

118. Introductory Phyology and Bryology (5)
 Lecture—3 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1A and 1C, or 2A, 2B, and 2C. Comparative morphology, physiology, development and reproduction of cyanobacteria, the major algal groups, and the bryophytes. Focus is on structure, function and evolutionary relationships. Ecological factors and commercial uses are considered. Laboratories include study of living organisms and identification exercises.—II. (II.) Canington

119. Population Biology of Weeds (3)
 Lecture—2 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C; introductory statistics recommended. Origin and evolution of weeds, reproduction and dispersal, seed ecology, modeling of population dynamics, interactions of weeds and crops, biological control. Laboratories emphasize design of competition experiments and identification of weedy species. (Same course as Evolution and Ecology 119) Not open for credit to students who have completed Plant Biology 121.—III. (III.) Rebertus

123. Plant-Virus-Vector Interaction (3)
 Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1C, 101; course 105, Plant Pathology 120, and Entomology 100 recommended. Analysis of the interactions necessary for viruses to infect plants. Interactions between pathogens involved in the plant-virus life cycle. Evolutionary aspects of the molecular components in viral infection and modern experimental approaches to the interplay of viral life cycles: offered alternate years. (Same course as Entomology 123/Plant Pathology 123.)—I. (I.) Lucas, Gilbertson, Ullman

126. Plant Biochemistry (3)
 Lecture—3 hours. Prerequisite: Biological Sciences 103 or 105. The biochemical processes and metabolic pathways. Discussion of methods used to understand plant processes, including use of transgenic plants. (Same course as Molecular and Cellular Biology 126.)—II. (II.) Abel, Callis

140. Culinary and Medicinal Herbs (3)
 Lecture/discussion—3 hours. Prerequisite: Biological Sciences 1C. Growth, identification, cultivation, and use of common culinary and medicinal herbs; herbal plant families; effects of climate and soils on herbs; herbal medicine; ecology and geography of herbs; herb garden design; secondary chemistry of active compounds. (Same course as Environmental and Resource Sciences 140.)—III. (III.) Georges

143. Evolution of Crop Plants (4)
 Lecture—3 hours; discussion—1 hour. Prerequisite: Plant Sciences 2 or Biological Sciences 1C or 2C. Origins of crops and agriculture, including main mechanisms of adaptation to crop diversity, dispersal of crops, genetic and physiological differences between crops and their wild progenitors, agriculture practiced by other organisms, and role and ownership of crop biodiversity. GE credit: Div, SciEng, Wrt.—III. (III.) Gepts

147. Survey of Plant Communities of California (4)
 Lecture/discussion—2 hours; fieldwork—3 hours; extensive writing. Prerequisite: Biological Sciences 1A or 1B or Molecular and Cellular Biology 10 recommended. Consent of instructor required prior quarter to course. Upper division standing required if enrollment must be limited. Selected plant communities analyzed for their structure and the relationship of their component species to the environment. Four weekend field trips required. GE credit: SciEng, Wrt.—III. (III.) Yount

148. Introductory Mycology (4)
 Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1A, 1B, 1C. Systematics, ecology, evolution, and morphology of fungi. Importance of fungi to humans. (Same course as Plant Pathology 148.)—I. (I.) MacDonaldo, Rizzio

189. Experiments in Plant Biology: Design and Execution (3)
 Laboratory/discussion—6 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C, or the equivalent courses in Plant Sciences, and consent of the instructor. Provides an opportunity for undergraduate students to formulate experimental approaches to current questions in plant biology and to carry out their proposed experiments. May be repeated for credit for a total of 12 units. (P/NP grading only)—I, II, III, (I, II, III)

190C. Research Conference in Plant Biology (1)
 Discussion—1 hour. Prerequisite: upper division standing in Plant Biology or related discipline; consent of instructor. Introduction to research methods in plant biology. Design of field or laboratory research projects, survey of appropriate literature, and discussion of research by faculty and students. May be repeated for credit. (P/NP grading only)—I, II, III, (I, II, III)

192. Internship (1-12)
 Internship—3-36 hours. Prerequisite: upper division standing; consent of instructor. Technical and/or professional experience on off campus. Supervised by a member of the Plant Biology Section faculty. (P/NP grading only)

194H. Special Study for Honors Students (1-5)
 Prerequisite: open only to majors of senior standing on honors list. Independent study of selected topics under the direction of a member or members of the staff. Completion will involve the writing of a senior thesis. (P/NP grading only)

1975. Tutoring in Plant Biology (1-5)
 Discussion—2-6 hours. Prerequisite: upper division standing and consent of instructor. Assisting the instructor by tutoring students in one of the Section’s regular courses. May be repeated for credit. (P/NP grading only)—I, II, III, (I, II, III)

198. Directed Group Study (1-5)
 Prerequisite: consent of instructor. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
 Prerequisite: consent of instructor. (P/NP grading only)
Plant Biology
(A Graduate Group)

Katyayon (Katie) Dehesh, Ph.D., Chairperson of the Group

Group Office, 1004 Life Sciences
(530) 752-7904 Fax (530) 752-5410 http://www.plb.ucdavis.edu/plbg

Faculty

Stefan Abel, Ph.D., Associate Professor
(Plant Sciences)

Douglas Adams, Ph.D., Associate Professor
(Viticulture and Enology)

Diane Beckles, Ph.D., Assistant Professor
(Plant Sciences)

Alan Bennett, Ph.D., Professor (Plant Sciences)
Alison Berry, Ph.D., Associate Professor
(Plant Sciences)

Arnold Bloom, Ph.D., Professor (Plant Sciences)

Donald Durzan, Ph.D., Professor
(Viticulture and Enology)

Doug Cook, Ph.D., Professor
(Viticulture and Enology)

Donna Goyal, Ph.D., Lecturer
(Molecular and Cellular Biology)

Ellen Harvey, Ph.D., Associate Professor
(Plant Sciences)

Judy Jernstedt, Ph.D., Professor
(Plant Biology)

J. Heinrich Liebh, Ph.D., Professor
(Pvon Plant Sciences)

J. Heinrich Liebh, Ph.D., Associate Professor
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J. Heinrich Liebh, Ph.D., Associate Professor
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J. Heinrich Liebh, Ph.D., Associate Professor
(Plant Sciences)
208. Plant Hormones and Regulators (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Plant Biology 111, 112, 117. Study of the mechanisms of physiological action of major classes of natural plant growth regulators. Primary consideration given to concepts that are of current research interest. Growth regulators in agriculture. Offered in alternate years. —II. Abel

210. Plant Ecophysiology (3)
Lecture—3 hours. Prerequisite: Plant Biology 111, 112, 117. Study of the mechanisms of physiological adaptation of plants to their environment. Offered in alternate years. —II. Peercy

211. Ecophysiological Methods (3)
Lecture—1 hour; laboratory—4 hours; individual project; one Saturday field trip to be arranged. Prerequisite: Plant Biology 111, 117, and consent of instructor. A laboratory and lecture course covering basic concepts underlying the research methods and instrumentation useful in plant ecophysiology. Offered in alternate years. —III.

212. Physiology of Herbicidal Action (3)
Lecture—3 hours. Prerequisite: Plant Biology 112, 122. Study of the fundamental mechanisms involved in the physiological action of herbicides. Detailed consideration of the fate of herbicides in plants. Offered in alternate years. —III.

214. Higher Plant Cell Walls (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Plant Biology 112, and a course in biochemistry. Lectures focus on the structure, analysis, synthesis, and development-related metabolism of cell walls. Discussions center on analysis of scientific papers related to lecture topics. Offered in alternate years. —I. Laboch, Nevin

217. Membrane Biology of Plants (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Plant Biology 112 and Biological Sciences 103, or consent of instructor. Structure, biogenesis, and function of plant cell membranes. Emphasis will be placed on the molecular basis of plant membrane functions and on the role of membranes in selected physiological processes. Offered in alternate years. —I. Laboch, Nevin

218A. Advanced Concepts in Plant Cell Biology: Cell Biogenesis (3)
Lecture/discussion—3 hours. Prerequisite: Biological Sciences 102, 103. Survey of molecular mechanisms underlying structural and functional differentiation of plant cell subcellular compartments. Topics include membrane and protein biosynthesis, protein targeting and turnover, and regulation of nuclear and organelle gene expression as related to the biogenesis of plant cell organelles. Offered in alternate years. —II. Bennett, Thog

218B. Advanced Concepts in Plant Cell Biology: Signal Transduction and Intracellular Communication (3)
Lecture—3 hours. Prerequisite: Biological Sciences 102, 103 or consent of instructor. Intracellular signal transduction pathways in the plant cells as well as longer term, adaptive responses which involve signals transmitted between plant cells. Weekly lectures and student-led discussions on current literature. Offered in alternate years. —III. Lucas, Dehesh

219. Reproductive Biology of Flowering Plants (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Plant Biology 111 and Biological Sciences 101. Fundamental mechanisms of reproductive biology of flowering plants, with special emphasis on genetic variation, evolution, and cultural practices. Offered in alternate years. (Former course Plant Sciences 270.) —I.

220. Plant Developmental Biology (4)
Lecture—3 hours; discussion—1 hour. Term paper. Prerequisite: plant anatomy, physiology, and biochemistry. A survey of the concepts of plant development and organization. Examines plant cells, tissues, and organs with special emphasis on experimental evidence for mechanisms regulating developmental processes. Offered in alternate years. —Bowman, Sinha

223. Special Topics in Scientific Method (2)
Discussion—2 hours. Examine the historical and philosophical background of the scientific method. Analyze the rational, perceptual, causal, creative and social aspects of scientific knowledge. Clarify the roles of reason, experimentation and creativity in scientific research. (S/U grading only). —I. Bradford

224. Water in Physiology and Ecology of Plants (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Hydrologic Science 124, or Plant Biology 111 and 117, or consent of instructor. Evapotranspiration and energy balance; water and component potentials; water transport to, within, and from plants; dynamics and regulation of water status; drought resistance; responses to water deficits and salinity; water use efficiency; adaptation to aridity; productivity in relation to water. Offered every fourth quarter. (Former course Plant Sciences 224.) —I. Hsiao

225. Methods and Instrumentation for Crop and Soil Science (3)
Lecture—1 hour; laboratory—3 hours; discussion—1 hour. Prerequisite: basic knowledge of plant physiology, soil science, chemistry and physics. Theory and practice of in situ sampling and instrumentation methods for crop science (broadly defined to include tree crops) and related aspects of soil science (e.g., moisture and fertility) and laboratory analysis. Offered in alternate years. —III.

227. Plant Molecular Biology (4)
Lecture/discussion—4 hours. Prerequisite: Molecular and Cellular Biology 121 or 161. Molecular aspects of higher plant biology with emphasis on gene expression. Plant nuclear and organelle genome organization, gene structure, mechanisms of gene regulation, gene transfer, and special topics related to development and response to biological and environmental stimuli. —I. Brit, Sinha

229. Molecular Biology of Plant Reproduction (3)
Lecture—3 hours. Molecular genetic basis of plant reproduction. Emphasis on understanding developmentally regulated gene expression as it relates to the major changes that occur during plant reproduction and on the genetic control of flowering. Offered in alternate years. —O’Neill

290A. Faculty Seminar (1)
Discussion—1 hour. Discussion of research area of seminar speakers in Plant Biology Graduate Group Seminar Series. Restricted to Plant Biology graduate students (PBGG). May be repeated six times for credit. (S/U grading only)—I, II, III (I, II, III)

290B. Seminar (1)
Seminar—1 hour. Seminars presented by visiting scientists on research topics of current interest. (S/U grading only)—I, II, III (I, II, III)

290C. Research Conference in Botany (1)
Discussion—1 hour. Prerequisite: graduate standing and/or consent of instructor. Presentation and discussion by faculty and graduate students of research projects in botany. May be repeated for credit. (S/U grading only)—I, II, III (I, II, III)

291. Graduate Student Seminar in Plant Biology (1)
Seminar—1 hour. Prerequisite: graduate standing. Student-given seminars on topics in plant biology, with critiques by instructor and peers. How to give a seminar, including preparation of visual and other teaching aids. Topic determined by instructor in charge. May be repeated for credit. (S/U grading only)—I, II, III (I, II, III)

297. Tutoring in Plant Biology (1-5)
Tutoring—3–15 hours. Offers graduate students, particularly those not serving as teaching assistants, the opportunity to gain teaching experience. (S/U grading only)

298. Group Study (1-5)
May be repeated up to four times for credit. (S/U grading only)

299. Research (1-12)
Prerequisite: graduate standing. (S/U grading only)

Professional Course

390. The Teaching of Plant Biology (2)
Discussion—2 hours. Prerequisite: graduate standing; concurrent appointment as a teaching assistant in Plant Biology. Consideration of the problems of teaching botany, especially of preparing for and conducting discussions, guiding student laboratory work, and the formulation of questions and topics for examinations. (S/U grading only)—I, II, III (I, II, III)

Plant Pathology

(Dean of Agricultural and Environmental Sciences)
Thomas R. Gordon, Ph.D., Chairperson of the Department

Department Office. 354 Hutchison Hall (530) 752-0300; http://plantpathology.ucdavis.edu/course/index.htm

Faculty
Richard M. Bostock, Ph.D., Professor
Douglas R. Cook, Ph.D., Professor
David G. Gligchirt, Ph.D., Professor
Thomas R. Gordon, Ph.D., Professor
Bruce Kirkpatrick, Ph.D., Professor
Johan Leveau, Ph.D., Assistant Professor
James D. MacDonald, Ph.D., Professor
Neal K. VanAlfen, Ph.D., Professor

Emeriti Faculty
Edward E. Butler, Ph.D., Professor Emeritus
Robert N. Campbell, Ph.D., Professor Emeritus
Themis Michailides, Ph.D., Lecturer
Neal K. VanAlfen, Ph.D., Professor Emeritus

Aphiled Faculty
Kendra Baumgartner, Ph.D., Lecturer (USDA)
Greg Browne, Ph.D., Lecturer (USDA)
Daniel Kluepfel, Ph.D., Lecturer (USDA)
Deborah A. Golino, Ph.D., Lecturer
W. Douglas Gubler, Ph.D., Lecturer
Themis Michailides, Ph.D., Lecturer
Adib Rowhani, Ph.D., Lecturer
Krishna Subbarao, Ph.D., Lecturer

Related Major Program. See the major in Plant Biology, on page 443.

Graduate work may be taken in Plant Biology. The Department of Plant Pathology offers programs of study and research leading to the M.S. and Ph.D. degrees. Information can be obtained from the Department of Plant Pathology.
obtained from the graduate adviser. See also the Graduate Studies, on page 102.

Graduate Advisers: R. M. Davis, L. Epstein, R. L. Gilbertson, B. C. Kirkpatrick

Courses in Plant Pathology (PLP)

Lower Division Course

40. Edible Mushroom Cultivation (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 10 or Microbiology 20 recommended. Principles and practices of growing edible mushrooms, including culture maintenance, basic mushroom substrate preparation, composting, spawn generation techniques, inoculation methods, harvesting, and pests and pest management. —II. (II) Davis

Upper Division Courses

120. Introduction to Plant Pathology (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1C, Microbiology 102 recommended. The nature, cause, and control of plant diseases. —I, III, III) Bostock, Falk, Gilbertson

123. Plant-Virus Vector Interaction (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1C, 101; Plant Biology 105, course 120, and Entomology 105 recommended. Analysis of the interactions necessary for viruses to infect plants. Interactions among insect vectors and host plants involved in the plant-virus life cycle. Evolutionary aspects of the molecular components in viral infection and modern experimental approaches to the interdiction of viral movement. Offered alternate years. (Same course as Entomology 123/Plant Biology 123.—I) Gilbertson, Lucas, Ullman

130. Fungal Biotechnology and Biochemistry (3)
Lecture—3 hours. Prerequisite: Plant Biology 119, Biological Sciences 103. How fundamental physiologic and biochemical activities of fungi impact the desired plant and the roles of these organisms in nature. Utilization and manipulation of fungi for biotechnological and industrial applications. —II. (II) Gilchrist

135. Field Identification of Mushrooms (1)
Field work; three-day mandatory field trip. Prerequisite: introductory course in biological sciences; course in mycology recommended. Collection and identification of mushrooms and other fleshy fungi based on macroscopic and microscopic features. (P/NP grading only.) —II. (II) Davis

140. Agricultural Biotechnology and Public Policy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: high school level biology, including genetics, Biological Sciences 10 recommended. Examination of the development and deployment of agricultural biotechnologies, particularly transgenic crops, microorganisms and animals, with consideration of conventional agriculture, public perceptions of technologies, food safety, environmental impact, public policies and regulations. GE credit: SciEng, Wrt — III. (III) Bruening, Newell-McGough, Williamson

148. Introductory Mycology (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1A, 1B, 1C. Systematics, ecology, evolution, and morphology of fungi. Importance of fungi to humans. (Same course as Plant Biology 148.—I) MacDonald, Rizzo

150. fungal Ecology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1C or equivalent. The ecological roles of fungi as saprobes, mutualists and parasites in native and managed ecosystems. Physiological and reproductive strategies associated with adaptations to diverse habitats. —II. (II) Gordon

151A.151B. Fungal Biodiversity in Natural Environments (4-4)
Lecture—1 hour, laboratory—6 hours, field work—three or four one-day-long weekend field trips. Prerequisite: introductory course in mycology (e.g., Plant Biology 148/course 148); Plant Pathology 150 (may be taken concurrently). Fungal biodiversity within a natural habitat. Fungi collected on field trips will be identified during laboratory periods. The ecological roles of the various fungal taxa are emphasized. Offered in alternate years. —III. (III) MacDonald

155. Ecology of Forest Diseases (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C. Tree diseases and their role in temperate and tropical forest ecosystems. Impacts of both native and exotic pathogens. Interactions between forest pathogens and insects. Approaches to management and regulation. One field trip is required. Offered in alternate years. —III. Rizzo

185. Advanced Mycology (2)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 120 recommended. The nature, cause, and control of plant diseases. Emphasis on molecular genetics. Offered in alternate years. —II.

205A. Diseases of Vegetable and Field Crops (3)
Lecture/discussion—3 hours; fieldwork—3 hours. Prerequisite: course 120 or 148. Study of diseases of vegetable and field crops with emphasis on etiology, epidemiology, diagnosis, and control. Field trips required. Offered in alternate years. —III. Davis

205B. Diseases of Vegetable and Field Crops—Summer Field Trip (1)
Fieldwork—3 hours. Prerequisite: courses 120 and 205A. Continuation of course 205A—four-day field trip investigating diseases of vegetable and field crops. (Deferred grading only; pending completion of sequence. S/U grading only.) —IV. (IV) Davis

206A-206B. Diseases of Fruit, Nut, and Vine Crops (3-1)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 120, Plant Biology 119. Course 205B may be taken concurrently. Clinical study of fruit, nut, and vine crops diseases with emphasis on etiology, epidemiology, diagnosis, and control. Offered in alternate years. (Deferred grading only; pending completion of sequence.) —III. (III) Kirkpatrick

208. Ecology of Plant Pathogens and Epidemiology of Plant Diseases (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 120 or the equivalent. Interaction between higher plants, plant pathogens, and the environment which is important in the occurrence and severity of plant disease. Emphasis is placed on the population dynamics and epidemiology of pathogens in the aerial and soil environment. Offered in alternate years. —III.

209. Principles of Plant Disease Control (3)
Lecture—3 hours. Prerequisite: course 120 or the equivalent. Discussion of the underlying principles and methods used for the control of plant diseases. Emphasis placed on application of epidemiological principles, biological (including host resistance), and chemical strategies to disease control. Offered in alternate years. —II.

210. Biochemistry and Molecular Biology of Plant–Microbe Interaction (4)
Lecture/discussion—4 hours. Prerequisite: Biological Sciences 101, 102, or the equivalent. Discussion of plant–microbe interactions, focused on the underlying cellular, biochemical, and molecular events that determine the disease state. Offered in alternate years. —II.

215X. Genetics and Molecular Biology of Plant Pathogens (4)
Lecture—3 hours; laboratory-discussion—3 hours. Prerequisite: course 120 and Biological Sciences 101. Genetic analysis of host–pathogen interdependencies, specificity, and host-specificity in plant pathogens, particularly fungi; application of molecular biology to the isolation and characterization of the genes involved; and to aspects of pathogenesis through research on techniques and problem-solving. Offered in alternate years. —II.

217. Molecular Genetics of Fungi (3)
Lecture—3 hours. Prerequisite: graduate standing in a biological science. Biological Sciences 101, 103, Molecular and Cellular Biology 161, Plant Biology 119, courses 130, 215X, Microbiology 215 recommended. Advanced treatment of molecular biology and plant pathology. Viruses as causal agents of fungal diseases; molecular approaches to fungal pathogenesis; avoidance of common research pitfalls. Offered in alternate years. —II.

224. Advanced Mycology (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 148 or Plant Biology 148 or consent of instructor. Systematics, evolution, and ecology of the fungi. Topics include molecular techniques and theories on classification of fungi, species concepts, sexual compatibility and vegetative compatibility. Laboratories emphasize various approaches to fungal identification. Offered in alternate years. —III. Rizzo

228. Plant Bacteriology (5)
Lecture—2 hours; laboratory—9 hours. Prerequisite: course 120, Microbiology 2 or the equivalent, Biological Sciences 102, 103. Study of bacteria which have a saprophytic, symbiotic, or parasitic association with higher and lower plants. Clinical and molecular methods for identification and classification of these bacteria. Offered in alternate years. —II. (II) Kirkpatrick, Gilbertson

230. Plant Virology (3)
Lecture—3 hours. Prerequisite: upper division or graduate course in molecular biology or graduate student in plant pathology. Viruses as causal agents of plant disease and as tools for manipulating plants; structures of virus particles; mechanisms of transmission, replication, and spread in the plant; cytopathology and molecular biology of susceptible and resistant reactions to virus infection; virus disease control. Only 2 units of credit to students who have completed Microbiology 262. Not open for credit to students who have completed course 228. Offered in alternate years. —II. Bruening, Falk

230L. Plant Pathology Laboratory (2)
Laboratory—6 hours. Prerequisite: course 230 (may be taken concurrently). Experimental approaches and methods for plant virus identification; investigation of plant virus infection cycles, disease induction, plant reaction to infection, and the structure of virus particles. Not open for credit to students who have completed course 226. —II. Bruening, Falk

290. Seminar (1)
Seminar—1 hour. Review and evaluation of current research in plant pathology. (S/U grading only.) —I, III, III, II, II, II.

290C. Advanced Research Conference (1)
Seminar—1 hour. Prerequisite: course 120 or consent of instructor. Presentation, evaluation, and critical discussions of research activities in the area of

Quarter Offered: I-Fall; II-Winter; III-Spring; IV-Summer. 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; DivH—Social-Cultural Diversity; Wrt—Writing Experience

Plant Pathology 447
Plant Physiology

See Plant Biology, on page 443, and Plant Biology (A Graduate Group), on page 445.

Plant Protection and Pest Management

See Integrated Pest Management (A Graduate Group), on page 332.

Plant Sciences (College of Agricultural and Environmental Sciences)

Department Office, 1210 Plant and Environmental Sciences [S30] 752-1703; http://www.plantsciences.ucdavis.edu/

Faculty

Steffen Abel, Ph.D., Professor
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Alison M. Berry, Ph.D., Professor
Arnold J. Bloom, Ph.D., Professor
Eduardo Blumwald, Ph.D., Professor
Kent J. Bradford, Ph.D., Professor
Patrick H. Brown, Ph.D., Professor
Andrew T. Leiser, Ph.D., Professor Emeritus
Lauren Fern, Ph.D., Professor
Kiyoto Uriu, Ph.D., Professor Emeritus
Raymond C. Valentine, Ph.D., Professor Emeritus
Ronald E. Voss, Ph.D., Lecturer Emeritus
Barbara D. Webster, Ph.D., Professor Emeritus
Steven A. Weintraub, Ph.D., Professor Emeritus
Lin L. Wu, Ph.D., Professor Emeritus
Masatoshi Yamaguchi, Ph.D., Professor Emeritus

Affiliated Faculty

Lars W. Anderson, Ph.D., Lecturer
Marita Cantwell, Ph.D., Lecturer and Specialist in Cooperative Extension
Tracy T. Chee, Ph.D., Lecturer and Agronomist
Carlos H. Cristaudo, Ph.D., Lecturer and Specialist in Cooperative Extension
Joseph M. DiTomaso, Ph.D., Lecturer and Specialist in Cooperative Extension
Richard Y. Evans, Ph.D., Lecturer and Specialist in Cooperative Extension
Steven A. Fennimore, Ph.D., Lecturer and Associate Specialist in Cooperative Extension
Louise Ferguson, Ph.D., Lecturer and Specialist in Cooperative Extension
Melvin R. George, Ph.D., Lecturer and Specialist in Cooperative Extension
Sham S. Goyal, Ph.D., Lecturer and Project Scientist
Timothy K. Hartz, Ph.D., Lecturer and Specialist in Cooperative Extension
James E. Hill, Ph.D., Lecturer and Specialist in Cooperative Extension
Husein A. Ajwa, Ph.D., Specialist in Cooperative Extension
Robert B. Hultmecher, Ph.D., Specialist in Cooperative Extension
Leland F. Jackson, Ph.D., Lecturer and Specialist in Cooperative Extension
Scott Johnson, Ph.D., Lecturer and Specialist in Cooperative Extension
Stephen R. Keiffer, Ph.D., Lecturer and Specialist in Cooperative Extension
Gurdev Khush, Ph.D., Professor Emeritus
W. Thomas Janini, Ph.D., Lecturer and Specialist in Cooperative Extension
Bruce Lampinen, Ph.D., Associate Specialist in Cooperative Extension
Kirk Larson, Ph.D., Pomologist and Specialist in Cooperative Extension
Thomas Ledig, Ph.D., Adjunct Professor
Muhammad Marrush, Ph.D., Lecturer
Greg McPherson, Ph.D., Lecturer
Elizabeth J. Mitcham, Ph.D., Lecturer and Specialist in Cooperative Extension
Jeffrey P. Mitchell, Ph.D., Lecturer and Specialist in Cooperative Extension
Lorence R. Oki, Ph.D., Lecturer and Assistant Specialist in Cooperative Extension
Dana E. Partilt, Ph.D., Lecturer, Ecologist
Daniel H. Putnam, Ph.D., Lecturer, Agronomist and Specialist in Cooperative Extension
 Trevor V. Suslow, Ph.D., Lecturer and Specialist in Cooperative Extension
Kenneth W. Tate, Ph.D., Lecturer and Specialist in Cooperative Extension
Steven R. Temple, Ph.D., Lecturer and Specialist in Cooperative Extension

Major Programs. See Agricultural Management and Rangeland Resources, on page 132, Biotechnol-
gen, on page 172, Crop Science and Management, on page 198, Ecological Management and Restora-
tion, on page 208, Environmental Horticulture and Urban Forestry, on page 277, and Plant Sciences, on page 448.

Related Courses. See the Biotechnology, Environmental Horticulture, Horticulture and Agronomy, and Plant Biology course listings.

Graduate Study. For related graduate study, see the M.S. degree program in International Agricul-
tural Development, and the M.S. and Ph.D. degree programs in the graduate groups of Horticulture and Agronomy, Plant Biology, Ecology, Genetics, Geog-
rphy, and Soils and Biogeochemistry. See also Graduate Studies, on page 104.

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer; 2009-2010 offering in parentheses


advanced plant pathology; primarily designed for graduate students. (S/U grading only)—I, II, III, (I, II, III)

291. Seminar in Molecular Plant Pathology (1)

Seminar—1 hour. Prerequisite: course 120 or consent of instructor. Review and evaluation of current literature and research in biochemistry and molecular biology of plant microbe interactions. May be repeated for credit. (S/U grading only)—I, II, (I, II)

292. Seminar in Soil Microbiology and Root Diseases (1)

Seminar—1 hour. Prerequisite: basic knowledge of soil microbiology and plant pathology. Critical reviews of current research papers related to soil microbiology and ecology, spoilborne plant pathogens, and/or biological control. May be repeated for credit. (S/U grading only)—II. Epstein

295. Seminar in Mycology (1)

Seminar—1 hour. Review and evaluation of current literature and research in mycology. May be repeated for credit. (S/U grading only)—II, (III)

Rizzo

298. Special Group Study (1-5)

299. Research (1-12)

(S/U grading only)
The Major Program

The Plant Sciences major is designed for students who are interested in a scientific understanding of how plants grow and develop in managed agricultural ecosystems and how plant products are utilized for food, fiber and environmental enhancement. Advances in science and technology have recommended new skills and options for using plants to address the issues associated with providing renewable food, fiber and energy resources for a growing global population while minimizing adverse impacts on the natural environment. Graduates in Plant Sciences are able to apply their skills and knowledge to a diverse range of agricultural and environmental goals or pursue advanced degrees in plant sciences.

The Program. The curriculum provides depth in the biological and physical sciences and a sound understanding of how plants obtain and utilize resources from their environment to sustain their growth and development. The influences of genetics, molecular sciences, social sciences, and agriculture are a central theme in the major.

Career Alternatives. Graduates from this program are prepared to pursue a wide range of careers, including various technical and management positions in agriculture and business enterprises, farming, or consulting; public, private, and non-profit agencies; Cooperative Extension; international development; teaching; or agricultural and environmental journalism and communication services. Graduates are qualified to pursue graduate study in the natural sciences in such plant biology, genetics, breeding, horticulture, agronomy, biotechnology, ecology, environmental studies, pest management, education, or business careers.

B.S. Major Requirements:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>Plant Sciences 100A, 100B, 100C</td>
<td>Plant Sciences</td>
<td>9</td>
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<tr>
<td>Plant Sciences 154</td>
<td>Pharmacology</td>
<td>4</td>
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<tr>
<td>Restricted Electives</td>
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<td>3-5</td>
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<tr>
<td>Select from: Plant Sciences 110A, 110B, 110C, 113, 114, 141, 151, 158, 170A, Environmental Horticulture</td>
<td>125</td>
<td>4</td>
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<tr>
<td>International Agricultural Development 170</td>
<td>International Agriculture</td>
<td>124</td>
</tr>
<tr>
<td>Agricultural and Resource Economics 100A, 130, 138, Biotechnology 150, 154</td>
<td>Agricultural and Resource Economics</td>
<td>4</td>
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<td>Select from: Agricultural and Resource Economics</td>
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<td>3-5</td>
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<tr>
<td>Plant Sciences 172</td>
<td>Plant Breeding</td>
<td>4</td>
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<tr>
<td>Plant Sciences 173</td>
<td>Crop Physiology</td>
<td>4</td>
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<tr>
<td>Plant Sciences 174</td>
<td>Crop Genetics</td>
<td>4</td>
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<tr>
<td>Plant Sciences 176</td>
<td>Crop Production</td>
<td>4</td>
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<tr>
<td>Restricted Electives</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Select from: Agricultural and Resource Economics 100A, 130, Food Science and Technology 107, 109, 131</td>
<td>Plant Sciences</td>
<td>151</td>
</tr>
</tbody>
</table>

Unrestricted Electives | 8-35

Total Units for the Major | 180

Major Adviser. K.J. Bradford

Advising Center for the major is located in 1220 Plant and Environmental Sciences (530) 752-1715.

Courses in Plant Sciences (PLS) (Formerly course Agricultural Management and Rangeland Resources, Agronomy, Crop Science and Management, Ecological, Plant, and Environmental Sciences). Lower Division Courses

1. Agriculture, Nature and Society (3) Present undergraduate course regarding the relationship between nature and society and its role in our search for a productive, lasting and hospitable environment. Several full-period field trips provide hands-on learning. Not open for students who have completed Agricultural Management and Rangeland Resources. (Former course Agricultural Management and Rangeland Resources 1) | I (I, III, IV) | Gradziel

2. Botany and Physiology of Cultivated Plants (4) Lecture—3 hours; discussion; laboratory—3 hours. Prerequisite: high school coursework in biology and chemistry recommended. A holistic introduction to the underlying botanical and physiological principles of cultivated plants and their response to the environment. Includes concepts behind plant selection, cultivation, and utilization. Laboratories include discussion and interactive demonstrations. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 2. (Former course Agricultural Management and Rangeland Resources 2) | II (II, III, IV) | Saltveit, Marrush

5. Plants for Garden, Orchard and Landscape (2) Lecture—1 hour; laboratory—3 hours. Prerequisite: non-majors. Hands-on experience with plants cultivated for food, environmental enhancement and personal satisfaction. Topics include establishing a vegetable garden, pruning and propagation activities, growing flowers and ornamental plants, and the role of plants in human health and well-being. Not open for credit to students who have completed Plant Biology 1 or Plant Sciences 2. (Former course Plant Biology 1) | I, II, III, IV | Marrush

8. Fruits and Nuts of California and the World (3) Lecture—3 hours. Field trip seventh week of quarter. Biological and environmental principles of tree-crop agriculture emphasizing California production. Topics include temperate and subtropical species, biotechnology and genetic improvement, environmental physiology, plant and crop growth, pest and disease control, consumer issues, and open for credit to students who have completed Plant Sciences 10. (Former course Plant Sciences 10) | GE Credit: SciEng, WR | II (II, III, Polito)

14. Introduction to Current Topics in Plant Biology (4) Discussion—3 hours; term paper. Introduction to scientific methods and current understanding of genetics, metabolism, and cellular structure in plants, with special emphasis on topics related to society, such as herbal medicines and genetically modified organisms. Designed for students not specializing in biology. Not open for credit to students who have completed Plant Biology 11. GE Credit: SciEng, W, R | — I (I, II, III) | Hunt


49. Organic Crop Production Practices (3) Lecture—1 hour; discussion—1 hour; laboratory—3 hours. Principles and practices of organic production of annual crops. Including organic crops, soil, and pest management, cover cropping, composting, seeding, transplanting, irrigation, harvesting and marketing. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 49. (Former course Agricultural Management and Rangeland Resources 49) | I (I, III, IV) Van Horn

92. Internship (1-12) Internship—36 hours. Prerequisite: consent of instructor. Work experience in off-campus in subject areas pertaining to plant and environmental sciences. Internship supervised by faculty member. May be repeated for credit. (P/NP grading only) | I, I, III, IV | Van Horn

98. Directed Group Study (1-5) Prerequisite: consent of instructor; primarily for lower division students. (P/NP grading only) | I, II, IV, III, IV | Van Horn

Special Study for Undergraduates (1-5) Prerequisite: consent of instructor; primarily for lower division students. (P/NP grading only) | I, II, IV, III, IV | Van Horn

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer. 2009-2010 offering in parentheses.

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Social-Cultural Diversity, Wrt—Writing Experience.
105. Concepts in Pest Management (3) Lecture—2 hours, laboratory/discussion—3 hours. Prerequisite: Biological Sciences 1C, 2C, or course 100A. Introduction to the ecological principles of integrated pest management, biology of different classes of pests and the types of losses they cause, population and economic evaluation of advantages and disadvantages of different techniques used for pest management, IPM programs. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 110A. (Former course Agricultural Management and Rangeland Resources 105.)

110A. Principles of Agronomic Crop Production in Temperate and Tropical Systems (3) Lecture—3 hours. Prerequisite: course in general botany or course 2 recommended. Fundamentals of field crop production in temperate and tropical climates. Resource utilization and economic, political and social problems are considered in relation to technological problems and their influences on agricultural development. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 110A. (Former course Agricultural Management and Rangeland Resources 110A.)—II. (II.) Brown, Shackel

110B. Management of Agronomic Crops in Temperate and Tropical Systems (3) Lecture—3 hours. Prerequisite: course in general botany or course 2; course 110A recommended. Application of agronomic principles in production of temperate and tropical crops. Specific crops discussed with reference to management and efficient use of physical and biological resources. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 110A. (Former course Agricultural Management and Rangeland Resources 110B.)—II. (II.) Brown, Shackel

110C. Crop Management Systems for Vegetable Production (4) Lecture—2 hours, laboratory—3 hours, discussion—1 hour. Prerequisite: course 2; course 110A recommended. Horticultural principles applied to production and management systems for vegetable crops. Laboratory and discussion will illustrate efficient field management and resource use practices. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 110C. (Former course Agricultural Management and Rangeland Resources 110C.)—I. Bloom, Marrush

110L. Principles of Agronomy Laboratory (1) Laboratory—3 hours. Prerequisite: course 110B (may be taken concurrently). Field-oriented introduction to principles of agronomic crop production. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 110L. (Former course Agricultural Management and Rangeland Resources 110L.)—II. (II.) Strong

112. Forage Crop Ecology (3) Lecture—3 hours. Prerequisite: course 2, Biological Sciences 1C, 2C, or consent of instructor. Forages as a world resource in food production. Ecological principles guiding the adaptation, establishment, growth and management of perennial and annual forages, including pastures, rangelands and hay, aspects of forage quality which affect feeding value to livestock. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 112. (Former course Agricultural Management and Rangeland Resources 112.) Offered in alternate years. —III. (III.) Strong

113. Biological Applications in Fruit Tree Management (2) Lecture—1 hour, laboratory—2 hours. Prerequisite: course 2, Biological Sciences 1C, 2C, or equivalent. The physiology, growth, development and environmental requirements of fruit trees and the cultural practices used to maintain them. Emphasis on the application of biological and horticultural knowledge of commercially important temperate zone fruit tree species. Not open for credit to students that have completed Plant Biology 173. (Former course Plant Biology 173.)—II. (II.) Delong

114. Biological Applications in Fruit Production (2) Lecture—1 hour, laboratory—3 hours. Prerequisite: course 2, Biological Sciences 1C or 2C, course 113. Reproductive biology of temperate zone fruit trees, application of biological principles of fruit production, tree nutrition and orchard management for optimizing cropping. Laboratories emphasize hands-on work with orchard tree systems that are done specifically to produce the crop. Not open for credit to students who have completed Plant Biology 174. (Former course Plant Biology 174.)—II. (II.) Delong

120. Applied Statistics in Agricultural Science (4) Lecture—3 hours, discussion/lab—3 hours. Prerequisite: upper division standing. Application of statistical methods to design and analysis of research trials for plant, animal, behavioral, nutritional, and consumer sciences. Basic concepts and statistical methods are presented in lectures, laboratories emphasize data processing techniques, problem solving, and interpretation of specialized software. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 120. (Former course Agricultural Management and Rangeland Resources 120.) GE credit: SciEng.—I. (I.) Teuber

121. Systems Analysis in Agriculture and Resource Management (4) Lecture—2 hours, discussion/lab—2 hours. Prerequisite: course 21 or equivalent computer experience, Mathematics 16A. The process of systems analysis and dynamic simulation of biological and environmental systems, use of systems analysis for development of optimal management strategies for agricultural and environmental systems. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 121. (Former course Agricultural Management and Rangeland Resources 121.) GE credit: SciEng, Wrt.—II. (II.) Teuber

130. Rangelands: Ecology, Conservation and Restoration (3) Lecture—3 hours. Prerequisite: Biological Sciences 1C, introductory ecology course and junior standing recommended. Introduction to the ecological principles and processes important for an understanding of the dynamics of range ecosystems. Emphasis on ecological and evolutionary aspects of range management strategies for conserving biological diversity and environmental quality in rangelands. Offered in alternate years. GE credit: SciEng, Wrt. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 130. (Former course Agricultural Management and Rangeland Resources 130.)—II. (II.) Rice

130L. Rangelands: Ecology, Conservation and Restoration (3) Lecture—3 hours. Prerequisite: Biological Sciences 1C, introductory ecology course and junior standing recommended. Introduction to the ecological principles and processes important for an understanding of the dynamics of range ecosystems. Emphasis on ecological and evolutionary aspects of range management strategies for conserving biological diversity and environmental quality in rangelands. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 130. (Former course Agricultural Management and Rangeland Resources 130.)—II. (II.) Rice

131. Identification and Ecology of Grasses (2) Lecture—7.5 hours; laboratory—20 hours; discussion—5 hours. Prerequisite: Biological Sciences 1C or course 2; Plant Biology 102 and junior standing recommended. Taxonomy and identification of western grasses. Development of skills in using plant identification keys. Ecology and evolution of grasses in grazing ecosystems. Given the week following spring quarter. Not open for credit to students who have completed Agricultural Management and
Rangeland Resources 131. (Former course Agricultural Management and Rangeland Resources 131.) Offered in alternate years.—II. Rice

134. Comparative Ecology of Major Rangeland Systems (3)
Lecture—3 hours. Prerequisite: course 130 or the equivalent; Environmental Science and Policy 100 recommended. Study of desert ecosystems, plant communities, and successional cycles. Discussion of current rangeland management strategies. One mandatory Saturday field trip. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 134. (Former course Agricultural Management and Rangeland Resources 134.)

135. Ecology and Community Structure of Grassland and Savanna Herbivores (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A or 1B and course 2, or Biological Sciences 1C, general ecology course [Environmental Science and Policy 100 recommended]. Feeding ecology of grassland herbivores and its importance in the evolution of herbivore communities and social systems. Optimal foraging, interspecific interactions, and primary production. Prerequisites: dryland ecosystems and accidental interactions among natural and managed grassland and savanna systems. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 135. (Former course Agricultural Management and Rangeland Resources 135.)—II. Demment

141. Ethnobotany (4)
Lecture—3 hours; laboratory/discussion—2 hours. Prerequisite: course 2, Biological Sciences 1C or 2C. Relationships between plants and people, including human perceptions, management, and uses of plants, influences of plants on human cultures, and effects of human activity on plant ecology and evolution. Concepts, questions, methods, and research traditions in ethnobotanical research. Not open for credit to students who have completed Plant Biology 141. (Former course Plant Biology 141.) Offered in alternate years. GE Credit: SciEng, SocSci. Wrt.-I. Potter

142. Ecology of Crop Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Plant Sciences 2 or Biological Sciences 1C or 2C; Mathematics 16A or Physics 1A, or consent of instructor. An introduction to ecological concepts and their application in agricultural systems. Prerequisite: dryland ecosystems and accidental interactions among natural and managed grassland and savanna systems. Not open for credit to students who have completed Plant Biology 142. (Former course Plant Biology 142.) GE Credit: SciEng.—II. Bloom

144. Trees and Forests (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or Biological Sciences 1C or 2C. Biological structure and function of trees as organisms; understanding of forests as communities and as ecosystems; use of forests by humans; tree phenology, photosynthesis, respiration, soil processes, life histories, diseases, biodiversity, and affectors of ecosystem productivity, competition, adaptation, nutrient cycling, energy relations and contemporary issues such as climate change. Not open for credit to students who have completed Plant Biology 144. (Former course Plant Biology/Environmental Horticulture 144.) (Same course as Environmental and Resource Sciences 144.)—I. J. Blodsoe, Berry, Rice

145. Sierra Nevada Flora (3)
Lecture/laboratory—3 hours; fieldwork—5 hours. Prerequisite: Plant Sciences 102 or 108 or Evolution and Ecology 121 or Environmental Horticulture 105. An introduction to the flora of the Sierra Nevada. Basic plant identification, the principal plant communities, and species of the Sierra Nevada. Class offered in the first 2 weeks in July in the Sierra Nevada. Offered in alternate years. Not open for credit to students who have completed Plant Biology 145. (Former course Plant Biology 145.)—III. Ronald

146. Rhizosphere Ecology (3)
Lecture—3 hours. Prerequisite: upper division standing and equivalent to courses 131 or 141 or 2C or equivalent. Effects of the root-ecosystem on plant growth, soil formation, and agricultural sustainability. Evolution and modification of the organic, biochemical, and physical characteristics of rhizosphere soils. Not open for credit to students who have completed Plant Biology 146. (Former course Plant Biology 146.) Offered in alternate years.—III. Philip

150. Sustainability and Agroecosystem Management (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Soil Science 10, Chemistry 2A, and course 2, Biological Sciences 1C. Analytical and experimental analysis of agricultural production and food systems with primary emphasis on biophysical processes. General concepts governing the functioning of temperate and tropical agroecosystems in relation to resource availability, ecological sustainability, and socioeconomic viability. Comparative ecological analyses of agroecosystems. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 150. (Former course Agricultural Management and Rangeland Resources 150.)—II. St. Clair

151. Plants: Natural Product Chemistry (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Biological Sciences 101 and 103, or the equivalent. Traditional biochemical and modern genetic approaches for studying plant-derived compounds such as isoprenoids, alkaloids, and phenylpropanoids. The impact of plant-derived compounds on biological processes in ecology, evolution and nutrition. Not open for credit to students who have completed Plant Biology 150. (Former course Agricultural Management and Rangeland Resources 150.)—III. Brown, Richards

162. Urban Ecology (3)
Lecture/discussion—3 hours. Prerequisite: a course in general or plant ecology (course 142, Plant Biology 117 Environmental Science and Policy 100, or Environmental Science and Policy 111). Application of fundamental ecological and evolutionary concepts and approaches to the landscape and ecosystem ecology of urban ecosystems. Social and urban planning and decision-making. Not open for credit to students who have completed Plant Biology 162.—II. I. F. Cadnesso

170A. Fruit and Nut Cropping Systems (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 2, Biological Sciences 1C, or consent of instructor. Overview of production and handling systems of major pomological crops, analysis of current cultural and harvesting problems and concerns associated with commercial fruit growing. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 170A. (Former course Agricultural Management and Rangeland Resources 170A.) Offered in alternate years.—I. Gradelz

170B. Fruit and Nut Cropping Systems (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 2, Biological Sciences 1C, or consent of instructor. Overview of production and handling systems of major pomological crops, analysis of current cultural and harvesting problems and concerns associated with commercial fruit growing. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 170B. (Former course Agricultural Management and Rangeland Resources 170B.) Offered in alternate years.—III. Gradelz

171. Principles and Practices of Plant Propagation (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 2, Biological Sciences 1C or 2C. Principles and practices of propagating plants covering aseptic techniques, tissue culture, somatic embryogenesis, and propagation of plants cultivated for their ornamental value, species to drought, flooding, nutrient deficiencies, salinity, toxic ions, extreme temperatures, etc. Not open for credit to students who have completed Plant Biology 157. (Former course Plant Biology 157.)

158. Mineral Nutrition of Plants (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 100A or Plant Biology 111 or Environmental Horticulture 102 or Viticulture and Enology 110. Evolution and scope of mineral nutrition, the essential elements and their roles in mineral metabolism, deficiencies and toxicities; genetic variation in plant nutrition; and understanding ecologic effects of nutrient availability or deficiency. Not open for credit to students who have completed Plant Biology 158. (Former course Plant Biology 158.)—II. I. Brown, Richards

160. Agroforestry: Global and Local Perspectives (3)
Lecture/discussion—3 hours. Prerequisite: course 2 or Biological Sciences 1C; Plant Biology 142 or a general ecology course [Environmental Science and Policy 100]. Traditional and evolving uses of trees in agriculture and ecosystems, their multiple roles in environmental stabilization and production of food, fuel, and fiber, and socioeconomic barriers to the adoption and implementation of agroforestry practices. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 160. (Same course as International Agricultural Development 160.) Offered in alternate years.—I. Gradelz

172. Postharvest Physiology and Technology (4)
Lecture—3 hours; laboratory/discussion—2 hours. Prerequisite: general plant science background (e.g., courses 2, 12); course 196 recommended. Overview of physiological and nutritional responses to maturation and senescence of plant products and their responses to postharvest stresses. Targeted
approaches and technologies to maintain product quality and limit postharvest disorders. Not open for credit to students who have completed Plant Biology 172. [Former course Plant Biology 172.—I. (I) Negre-Zakharov, Reid, Salveit]

174. Microbiology and Safety of Fresh Fruits and Vegetables (3) Lecture—3 hours. Prerequisite: course 2 or Biological Sciences 1C or 2C. Principles of weed science including: Weed biology and ecology, methods of weed management, biological control, herbicides and herbicide resistance. Weed control in managed and natural ecosystems, invasive species. Laws and regulations. Application of herbicides. Sight identification of common weeds. Not open for credit to students who have completed Plant Biology 176. [Former course Plant Biology 176.—II. (III) Fischer]

178. Biology and Management of Aquatic Plants (3) Lecture—3 hours. Prerequisite: course 2, Biological Sciences 1C or 2C; Chemistry 88 or 118B; course 100C, Plant Biology 111, Environmental Horticulture 101, or Biological Sciences 122 recommended. Brief survey of common and invasive fresh water plants and macroalgae, their reproductive modes, physiology, growth (photosynthesis, nutrient utilization), development (hormonal interactions), ecology, modes and impacts of invasion, and management. Two Saturday field trips required. Offered in alternate years. Not open for credit to students who have completed former course Plant Biology 178. [Former course Plant Biology 178.—II. (I) Anderson]

180. Introduction to Geographic Information Systems (4) Laboratory—3 hours; laboratory/discussion—3 hours. Prerequisite: course 21 or equivalent familiarity with computers, course 120 or the equivalent, Mathematics 16A. Management and analysis of georeferenced data. Spatial database management and modeling. Applications to agriculture, biological resource management and social sciences. Cartographic modeling, vector and raster-based geographic information systems. Not open for credit to students who have completed Agriculture Systems and Environment 132 or Agricultural Management and Rangeland Resources 132 or 180. [Former course Agricultural Management and Rangeland Resources 180.] [Same course as Applied Biological Systems Technology 180.—I. (I) Plant]

188. Undergraduate Research Proposal (3) Lecture—3 hours. Prerequisite: upper division standing. Preparation and review of a scientific proposal. Problem definition, identification of objectives, literature survey, hypothesis generation, design of experiments, analysis-planning, proposal outline and preparation. [Same course as Bio-technology 188.] GE Credit: Writ.—RI. III. (III)

189L. Laboratory Research in Plant Sciences (2-5) Laboratory—3–12 hours; discussion—1 hour. Prerequisite: course 188 and consent of instructor. Formulating experimental approaches to current questions in Plant Sciences; performance of proposed experiments. Not open for credit. [Former course 112E for credit. (P/NP grading only)—I, II, III. (II, II, II)]

190. Seminar on Alternatives in Agriculture (2) Seminar—2 hours. Prerequisite: upper division standing. Seminar on topics related to alternative agricultural systems and the relationship of agriculture to the environment and society. Scientific, technological, social, political and economic perspectives. May be repeated for credit. [Former course Agricultural Management and Rangeland Resources 190.] (P/NP grading only)—II. (II) Van Horn

190C. Research Group Conference (1) Discussion—1 hour. Prerequisite: advanced standing; consent of instructor. Weekly conference on research problems and related issues in the plant sciences. May be repeated for credit. (P/NP grading only)—I, II, III, IV. (II, II, II, III)

192. Internship (1-12) Internship—3–36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience on or off campus in subject areas pertaining to plant and environmental sciences. Internship supervised by a faculty member. (P/NP grading only)—I, II, III, IV. (II, II, II, IV)

194H. Senior Honors Thesis (2-6) Independent study. Prerequisite: senior standing; overall GPA of 3.250 or higher and consent of master adviser. Two or three successive quarters of guided research on a subject of special interest to the student. (P/NP grading only; deferred grading only, pending completion of thesis.)

196. Postharvest Technology of Horticultural Crops (4) Lecture/discussion—45 hours; fieldwork—45 hours. Prerequisite: upper division or graduate student standing. Intensive study of postharvest considerations and current procedures and challenges in postharvest handling of fresh vegetables, and ornamentals in California. Scheduled first two weeks immediately following last day of spring quarter. Not open for credit to students who have completed Plant Biology 196. [Former course Plant Biology 196.—P/NP grading only.—III. (III) Mitcham]

197T. Tutoring in Plant Sciences (1-5) Tutorial—1-5 hours. Prerequisite: upper division standing, completion of course being tutored or the equivalent, consisting of small voluntary discussion or lab groups affiliated with one of the department’s regular courses. May be repeated for up to eight units of credit. (P/NP grading only.)

198. Directed Study (I-5) (P/NP grading only)—I, II, III, IV. (I, II, II, IV)

199. Special Study for Advanced Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only)—I, II, III, IV. (I, II, II, IV)

Graduate Courses

205. Experimental Design and Analysis (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 120 or equivalent; knowledge of statistics. Design and analysis of experiments. Not open for credit to students who have completed Agronomy 205. [Former course Agronomy 205.—II. (II) Dubcovsky]


211. Principles and Practices of HPLC (2) Lecture—1 hour; laboratory—3 hours. Prerequisite: undergraduate physics and chemistry; Biological Sciences 102, 104 or equivalent; knowledge of basic principles and theory of HPLC involving various modes of separation and detection. Optimization of separation using isocratic and gradient elution. Development practical knowledge about the use, maintenance and troubleshooting of HPLC equipment, including HPLC columns. Development of new HPLC methods. Not open for credit to students who have completed Agronomy 211. [Former course Agronomy 211.—III. (III) Griffin]

212. Postharvest Biology and Biotechnology of Fruits and Nuts (3) Lecture—3 hours. Prerequisite: course 172. Review of postharvest biology of fruits and nuts and biotechnological approaches to address postharvest challenges. Morphology, biology and postharvest handling of fruits and nuts are presented along with current research, including biotechnology, and discussion of future research needs and opportunities. Offered in alternate years. Not open for credit to students who have completed Pomology 212. —(III) Mirmak, Zakharov

213. Postharvest Physiology of Vegetables (3) Lecture—2 hours; discussion—1 hour. Prerequisite: Plant Biology 112 or 172. Comparative physiology of harvest vegetables. emphasis on maturational, senescence, compositional changes and physiological disorders and affects of environmental factors. Concepts and research procedures. Not open for credit to students who have completed Vegetable Crops 212. [Former course Vegetable Crops 212.] Offered in alternate years. —(III) Salveit

220. Genomics and Biotechnology of Plant Improvement (3) Lecture—3 hours. Prerequisite: Biological Sciences 101 or the equivalent. Integration of modern biotechnology and classical plant breeding including the impact of structural, comparative and functional genomics on gene discovery, characterization and exploitation. Also covers molecular markers, plant transformation, hybrid production, disease resistance, and novel output traits. Not open for credit to students who have completed Vegetable Crops 220. [Former course Vegetable Crops 220.] [Same course as Genetics 220.—Michelmore]

221. Genomics and Breeding of Vegetable Crops (3) Lecture—3 hours. Prerequisite: Biological Sciences 101 or equivalent. Preview of genome structure, mapping, gene tagging and development of other genetic resources applied to improvement of major vegetables. For graduate students contemplating a career in modern vegetable breeding and biotechnology. Not open for credit to students who have completed Vegetable Crops 221. [Former course Vegetable Crops 221.—III. (III) Quiros]

222. Advanced Plant Breeding and Genetics (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: course 205; Genetics Graduate Group 201D or Animal Genetics 107; Plant Biology 134. Philosophy, methods, and problems in developing improved plant species. Topics include evolution, origin and breeding of crops, variation analysis, progeny testing, breeding methodology, index selection, germplasm conservation, and breeding for stress resistance. Laboratories include tours of breeding facilities and calculation and interpretation of quantitative data. Not open for credit to students who have completed Agronomy 221. [Former course Agronomy 221.] Offered in alternate years. —(III) Teuber

290. Seminar (1-2) Seminar—1–2 hours. Topics of current interest related to Plant Sciences. (S/U grading only)—I, II, III, IV. (I, II, II, IV)

290C. Research Conference (1) Discussion—1 hour. Prerequisite: consent of instructor. (S/U grading only)—I, II, III, IV. (I, II, II, III)

297T. Tutoring in Plant Science (1-5) Tutoring—1–5 hours. Prerequisite: graduate standing; consent of instructor; completion of course to be tutored or the equivalent. Designed for graduate students who desire teaching experience but are not teaching assistants. May be repeated for credit for a total of five units. Some course may not be tutored more than once. (S/U grading only)

298. Group Study (1-5)

299. Research (1-12) Prerequisite: consent of instructor. (S/U grading only)—I, II, III, IV. (I, II, II, IV)
The Program. The Department of Political Science offers two major programs: political science and political science-public service. The political science major aims to provide the student with a broad understanding of political concepts, political institutions, political behavior, and political processes. The political science-public service major is for students who desire opportunities for practical hands-on experience in their major. It differs in particular from the political science major in its internship requirement and its focus on the American political system.

Internships and Career Alternatives. Both the proximity of UC Davis to the state capitol and the programs offered by the UC Davis Washington Center afford exceptional internship possibilities in local, state, and national government offices, providing students with actual experience in politics and government service while still attending school. A student who majors in political science acquires research and analytic skills relevant to many professional fields. Consequently, the majors offered in political science are valuable not only in providing students with a better understanding of politics and political systems, but also as a first step toward careers in teaching, law, management, government, urban planning, journalism, politics, administration, or for graduate studies in numerous fields.

Political Science

A.B. Major Requirements:

Preparatory Subject Matter

Three lower division Political Science courses from: 1, 2, 3, 4

Political Science 51 [required course] 4

Statistics 13, 32, 102 [or equivalent] 4

One course from Economics 1A, Economics 1B or Philosophy 3

One course from History 4C, 8, 9A, 10C, 15, 17A or 17 B 4

Depth Subject Matter

Four courses in one of the fields of concentration listed below 12

Three courses in another field of concentration listed below 12

Two courses in another field of concentration listed below 8

Depth and Concentration


Comparative Politics (courses with Political Science 2 as a prerequisite): Political Science 126, 140, 142, 144-145, 147-149, 178-179, 1968

International Relations (courses with Political Science 3 as a prerequisite): Political Science 120-126, 129, 130-132, 134, 137, 139, 196C, International Relations 131

Political Theory (courses with Political Science 4 as a prerequisite): Political Science 111-119, 187, 1960

Total Units for the Major

72-73

Political Science—Public Service

A.B. Major Requirements:

Preparatory Subject Matter

One course from Political Science 1, 5, or 7 4

Two courses from Political Science 2, 3, or 4 8

Statistics 13 [or equivalent] 4

Political Science 111 4

Recommended: Economics 1A-1B.

Depth Subject Matter

Two courses chosen from Political Science 100, 104, 105, 106, 113, 110, 114.

Internship, Political Science 192A, 192B, or 192W 7-10

Research paper, Political Science 193 2-4

Fields of concentration 24

Select six upper division courses from two or three fields of concentration listed below with at least two courses in each field selected; at least 16 of the units must be in political science. Core Program courses may not be counted toward this requirement.

Fields of Concentration


Field 2 (Policy implementation and evaluation: Political Science 180, 183, 187; Economics 131

Field 3 (Policy interpretation—Substance and procedures [public/pre-law]: Political Science 150, 151, 152, 153, 155

Field 4 (Policy areas: (a) Urban policy and implementation: Political Science 100, 102, Environmental Horticulture 110, Environmental Science and Policy 173

(b) Environmental policy and implementation: Political Science 107, Environmental Science and Policy 160, 161, 166, 168A, 168B, 172, 179

(c) Environmental policy and implementation: open field that might include courses relevant to health care, welfare, education, community development, transportation, science and technology, etc.; requires approval of Political Science—Public Service adviser.

Total Units for the Major

68

Major Advisers. Consult Department office.

Minor Program Requirements:

Political Science - 24

Six upper division courses: Three courses in one of the fields of concentration and three courses outside of that field.

Public Affairs Internship Program. This program is open to upper division students in any major who want to obtain an internship in the area of government and public service. Information and applications are available from the Political Science Department in 1273 Social Sciences and Humanities Building.

Graduate Study. The Department of Political Science offers a program of graduate study and research leading to a Ph.D. degree or an M.A./J.D. joint degree. The M.A./J.D. joint degree is only in conjunction with UC Davis School of Law. Information concerning admission to these programs and requirements for completion are available in the Graduate Program Coordinator office.

Graduate Adviser. Consult Graduate Program Coordinator office.

American History and Institutions. This University requirement may be satisfied by passing any one of the following Political Science courses: 1, 5, 100, 101, 102, 103, 104, 105, 106, 108, 109, 113, 130, 131, 160, 163; see also under University requirements.

Quarter Offered: I=Fall, II=Winter, III=Spring, IV=Summer; 2009-2010 offering in parentheses.

Courses in Political Science (POL)

Lower Division Courses

1. American National Government (4)
   Lecture—3 hours; discussion—1 hour. Survey of American national government, including the constitutional system, political parties, elections, the presidency, Congress, and the courts. GE credit: SocSci, Wrt.—II, III.

2. Introduction to Comparative Politics (4)
   Lecture—3 hours; discussion—1 hour. Introduction to basic concepts in political analysis and application of them in comparative studies of selected countries. Coverage is given to cultural and other informal dimensions of politics as well as to more formal political and governmental structures. GE credit: SocSci, Wrt.—II, III.

3. International Relations (4)
   Lecture—3 hours; discussion—1 hour. International conflict and cooperation, including the Cold War, nuclear weapons, and new techniques for understanding international politics. GE credit: SocSci, Wrt.—II, III.

4. Basic Concepts in Political Theory (4)
   Lecture—3 hours; discussion—1 hour. Analysis of such concepts as the individual, community, liberty, equality, justice, and law as developed in the works of the major political philosophers. GE credit: SocSci, Wrt.—I.

5. Contemporary Problems of the American Political System (4)
   Lecture—3 hours; discussion—1 hour. In-depth treatment of selected problems and issues of American politics, governmental institutions, and policies. GE credit: SocSci, Wrt.—II.

6. Contemporary Issues in Law and Politics (4)
   Seminar—4 hours. A seminar which focuses on the political dimensions of American law and institutions. Examines the role of courts in resolving contemporary issues, and the role of politics including abortion, capital punishment, and civil rights. Limited enrollment. Open to students having no more than 40.1 units. GE credit: SocSci, Wrt.—II.

7. Scientific Study of Politics (4)
   Lecture—3 hours; discussion—1 hour. Introduction to the basic principles of scientific study of politics. Research design and empirical analysis of data with applications to different methodological approaches and different substantive areas in political science. GE credit: SocSci, Wrt.—I, II, III.

90X. Lower Division Seminar (4)
   Seminar—4 hours. Prerequisite: lower division standing or consent of instructor. Students will read, discuss and write about some of the most significant texts in political science in order to develop a foundation for the study of politics. Limited enrollment.

99. Special Study for Undergraduates (1-5)
   Prerequisite: consent of instructor. (P/NP grading only)

Upper Division Courses

100. Local Government and Politics (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, upper division standing or consent of instructor. Political and governmental structures of local communities in the United States, including cities, counties, and special districts. Emphasizes sources and varieties of community conflict, legislative and executive patterns, expertise, decision making, and the politics of structure. Observation of local governing boards. GE credit: SocSci, Wrt.

102. Urban Public Policy (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Study of decision making in standing in Political Science or consent of instructor. Political and economic relationships among central cities, suburbs, and regional, state, and federal governments. Focuses upon policy areas such as poverty, transportation, welfare, and housing, and upon who governs and who benefits from the policies in these areas. GE credit: SocSci, Wrt.

104. California State Government and Politics (4)
   Lecture—3 hours; research paper. Prerequisite: course 1. The California political system. Political culture, elections and parties, direct democracy, legislature, governor, executive branch, courts, finances, state-local relations, and policy issues.

105. The Legislative Process (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Analysis of the legislative process with emphasis on the United States Congress; legislative organization and procedures, legislative leadership and policy making, legislators and constituents, relations between Congress and other agencies. GE credit: SocSci, Wrt.—II.

106. The Presidency (4)
   Lecture—3 hours; discussion—1 hour; optional term paper. Prerequisite: course 1. The American presidency’s origins and development; presidential power and influence as manifested in relationships with Congress, courts, parties, and the public in the formulation and implementation of foreign and domestic policy; nominations, campaigns, and elections. GE credit: SocSci, Wrt.—II, III.

107. Environmental Politics and Administration (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or consent of instructor. Introduction to the environment as a political issue in the United States and to the development of administrative mechanisms for handling environmental problems. Changing role of Congress, the presidency, the bureaucracy, and the courts in environmental policy formulation and implementation. GE credit: SocSci, Wrt.

108. Policy Making in the Public Sector (4)
   Lecture—3 hours; research paper. Prerequisite: course 1. The theoretical rationale for governmental activity, program evaluation, PPBS, positive theories of policy making, the quantitative study of policy determinants, implementation, and proposals for improved decision making. GE credit: SocSci, Wrt.

109. Public Policy and the Governmental Process (4)
   Lecture—3 hours; research paper. Prerequisite: course 1. The processes of formulating public policy, including individual and collective decision making, political exchange, competition, bargaining, coalition formation and the allocation of public goods, resources and opportunities. GE credit: SocSci, Wrt.—II.

110. The Strategy of Politics (4)
   Lecture/discussion—4 hours. Introduction to game theory. Explanation of the behavior of individuals in strategic interaction. Rational and behavioral approaches. Applications to political science and other fields. (1.)

111. Systematic Political Science (4)
   Lecture/discussion—4 hours. Philosophical basis of modern political science; major specific approaches; selected concepts relevant to modern political concerns; and research design and execution. (1.)

112. Contemporary Democratic Theory (4)
   Lecture—3 hours; term paper. Prerequisite: course 4. Major contemporary attempts to reformulate traditional democratic theory, attempts to replace traditional theory by conceptual models derived from modern social science findings. Offered in alternate years. GE credit: SocSci, Wrt.

113. American Political Thought (4)
   Lecture—3 hours; term paper. Prerequisite: course 4. Origins and development of American political thought; principles of American thought as they emerge from the founding period to the present. GE credit: SocSci, Wrt.

114. Quantitative Analysis of Political Data (4)
   Lecture—3 hours; term paper. Logic and methods of analyzing quantitative political data. Topics covered include central tendency, probability, correlation, and non-parametric statistics. Particular emphasis will be placed on understanding the use of statistics in political science research. Offered in alternate years. GE credit: SocSci, Wrt.

115. Medieval Political Thought (4)
   Lecture—3 hours; term paper. Prerequisite: course 114. Examination of the nature of medieval political thinking. Emphasis will be upon the thoughts of the major political thinkers of the period, rather than upon political history. GE credit: SocSci, Wrt.

116. Foundations of Political Thought (4)
   Lecture/discussion—3 hours; term paper. Prerequisite: course 4. Analysis and evaluation of the seminal works of a major political philosopher or of a major problem in political philosophy. May be repeated once when topic differs. Offered in alternate years. GE credit: SocSci, Wrt.—II.

117. Marxism (4)
   Lecture—3 hours; discussion—1 hour. Examination of the political and social philosophy of Karl Marx, with reference to the development of Marxism in the nineteenth and twentieth centuries.

118A. History of Political Theory: Ancient (4)
   Lecture—3 hours; term paper. Prerequisite: course 4. Critical analyses of classical and medieval political philosophers such as Plato, Aristotle, Cicero and St. Thomas. GE credit: SocSci, Wrt.—I.

118B. History of Political Theory: Early Modern (4)
   Lecture—3 hours; term paper. Prerequisite: course 4. Critical analyses of the works of early modern political philosophers such as Machiavelli, Montaigne, Hobbes, Locke and Hume. GE credit: SocSci, Wrt.—II.

118C. History of Political Theory: Late Modern (4)
   Lecture—3 hours; term paper. Prerequisite: course 4. Critical analyses of the works of late modern political philosophers such as Rousseau, Kant, Hegel, Tocqueville, Mill, Marx and Nietzsche. GE credit: SocSci, Wrt.—II.

119. Contemporary Political Thought (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: course 4. Contemporary political thought from the end of the nineteenth century to the present. Emphasis upon an individual philosopher, concept, or philosophical movement, e.g., Nietzsche, Continental political thought, Rawls and justice, theories of distributive justice, feminist theory.

120. Theories of International Politics (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: course 3, upper division standing or consent of instructor. Major contemporary approaches to the study of international politics, including balance of power, game theory, Marxist-Leninist theory, systems theory, and decision-making analysis.

121. The Scientific Study of War (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: course 3, course 111 or Statistics 13; upper division standing. Analysis of political processes involved in the initiation, conduct and termination of modern interstate warfare. GE credit: SocSci, Wrt.

122. International Law (4)
   Lecture—4 hours. Prerequisite: course 3. Selected topics in international law; territory, sovereign immunity, responsibility, the peaceful settlement or nonsettlement of international disputes. GE credit: SocSci, Wrt.—II.

123. The Politics of Interdependence (4)
   Lecture—3 hours; term paper. Prerequisite: course 3, upper division standing or consent of instructor. In the past several decades, growing economic interdependence has generated new problems in international relations. Course deals with difficulties in...
124. The Politics of Global Inequality (4)
Lecture—3 hours; term paper. Prerequisite: course 3, upper division standing; course 123 recommended. Long-standing division of the global system into rich and poor populations poses many important problems in international political economy. Course presents a theoretical background to North-South issues and analyses of current problems in economic and political relations. GE credit: SocSci, Div., Wrt.—I., II., III.

126. Ethnic Self-Determination and International Conflict (4)
Lecture—3 hours; individual meetings with students to discuss term papers. Prerequisite: course 3. Compares the claims of the state and ethnic peoples in countries undergoing internal conflicts, e.g., South Africa, Northern Ireland. Analyzes the role of the international community in facilitating the peaceful resolution of conflicts. GE credit: SocSci, Div., Wrt.—I. (II.)

129. Special Studies in International Politics (4)
Lecture—3 hours; term paper. Prerequisite: course 3, upper division standing. Intensive examination of one or more special problems in international politics. May be repeated once for credit when different topic is offered. GE credit: SocSci, Wrt.—II. (III.)

130. Recent U.S. Foreign Policy (4)
Lecture—3 hours; term paper. Prerequisite: course 3, upper division standing or consent of instructor. Broad survey of the development of U.S. foreign policy. Survey of the formation of policy during and after World War II, and the introduction to analytic tools and concepts useful for understanding of current foreign policy issues. GE credit: SocSci, Wrt.—II. (III.)

131. Analysis of U.S. Foreign Policy (4)
Lecture—3 hours; term paper. Prerequisite: course 3, upper division standing or consent of instructor. Detailed presentation and examination of the formulation of execution of U.S. foreign policy. Survey of numerous factors influencing policy outcomes and how such determinants vary according to policy issue areas. GE credit: SocSci, Wrt.

132. National Security Policy (4)

133. Africa and U.S. Foreign Policy (4)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 3 or consent of instructor; upper division standing. Overview of American foreign policy toward Africa. Relationship to global adversities. Legacies of colonialism. Challenge of national self-determination and white racism. Policies on non-alignment, producer cartels, multinational corporations, colonial integration and trade and aid relations.

135. International Politics of the Middle East (4)
Lecture—3 hours; term paper. Prerequisite: course 3 or consent of instructor; upper division standing. International politics of the Middle East as a microcosm of world politics. The Middle East as a regional system. Domestic and International Politics in the Middle East. Changing Political Structures in the Middle East: Superpower involvement in the Middle East. —I. (II.)

136. The Arab-Israeli Conflict (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 3 or International Relations 1; restricted to upper division standing. Causes, course, and implications of Arab-Israeli conflict. Competing Israeli and Arab narratives, politics of force, diplomacy, domestic politics and A1 conflict, superpowers and the A1 conflict, A1 conflict and world politics, political solutions.—II. (III.)

137. International Relations in Western Europe (4)
Lecture—4 hours. Prerequisite: course 3, upper division standing. Analysis of European unity, problems of the Atlantic alliance, Atlantic political economy, East-West relations, communism in Western Europe and the relationship between domestic politics and foreign policy. —II. (III.)

139. Special Studies in Foreign Policy (4)
Lecture—3 hours; term paper. Prerequisite: course 3, upper division standing or consent of instructor. Extensive examination of one or more special problems in foreign policy. May be repeated once for credit when different topic is offered. GE credit: SocSci, Wrt.—II. (III.)

140A. Comparative Political Institutions: Electoral Systems (4)
Lecture/discussion—4 hours. Prerequisite: course 2 or consent of instructor. Upper division standing. The factors shaping political parties and their role in democratic representation. GE Credit: SocSci, Wrt. Offered in alternate years.—II. (III.)

140B. Comparative Political Institutions: Parties (4)
Lecture/discussion—4 hours. Prerequisite: course 2 or consent of instructor. Upper division standing. The factors shaping political parties and their role in democratic representation. GE Credit: SocSci, Wrt. Offered in alternate years.—Adams, Andrews

140C. Comparative Political Institutions: Legislatures (4)
Lecture/discussion—4 hours. Prerequisite: course 2 or consent of instructor. Upper division standing. Examination of legislatures from a comparative perspective. GE Credit: SocSci, Wrt. Offered in alternate years.—III. Andrews

142A. Comparative Development: Political Development in Modernizing Societies (4)
Lecture/discussion—4 hours. Prerequisite: course 2 or consent of instructor; upper division standing. Nature and sequence of political development; its economic and social concomitants; role of elites, military, bureaucracy, and party systems; social stratification and group mobilization and political participation; instability, violence, and the politics of integration. Offered in alternate years. GE credit: SocSci, Jackman

142B. Comparative Development: Politics and Inequality (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor; upper division standing. Linkages between politics and the distribution of social and economic goods. Impact of civil rights legislation, the politics of welfare states, and the effects of political participation on the distribution of goods. Offered in alternate years. GE Credit: SocSci, Jackman—II. (III.)

143. Latin American Politics (4)
Lecture—3 hours; term paper. Prerequisite: course 2. Issues related to democratic consolidation in Latin America. Topics include transitions to democracy, the role of left party systems, political economy and political behavior. GE credit: SocSci, Wrt.

143A. Latin American Politics (4)
Lecture/discussion—4 hours; term paper. Prerequisite: course 2. Issues related to democratic consolidation in Latin America. A regional focus on South America. Topics include transitions to democracy, the role of the military, political economy, and political behavior. GE Credit: Div, SocSci, Wrt.—Zechmeister

143B. Mexican Politics (4)
Lecture/discussion—4 hours. Prerequisite: course 2. Introduction to the politics of contemporary Mexico. Focus on rise, fall, and aftermath of Mexico’s one-party dominant system. GE Credit: Div, SocSci, Wrt.—Zechmeister

144. Russian Politics and Policy (4)
Lecture/discussion—4 hours. Prerequisite: course 2 or consent of instructor. Evolution of political institutions and public policy in Russia and the creation of new institutions. GE credit: SocSci, Wrt.—III. (IV.)

144A. Politics of Post-Communist Countries: East European Politics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor; restricted to upper division standing. Post-communist democratization, state-building and economic reform in East European states. GE Credit: SocSci, Wrt.—III. (IV.)

144B. Politics of Post-Communist Countries: Russia (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor; restricted to upper division standing. Democratization, state-building and economic reform; creation of new institutions; impacts of Soviet rule. GE Credit: SocSci, Wrt.—III. (IV.)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor; course 134 recommended; upper division standing. GE Credit: SocSci, Div., Wrt.—II. (III.)

146B. Politics of Africa: Development in Africa (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor; course 134 recommended; upper division standing. Political and economic development within Sub-Saharan Africa; States and institutions, democracy, party systems, military coups/rebellion, bureaucracy/corruption, regime, ethnicity, national/regional integrations, trade unions, economic development strategies, class formation, and women’s roles and ideology. Offered in alternate years. GE Credit: SocSci, Wrt.—Rothchild

147A. West European Politics (4)
Lecture/discussion—4 hours. Prerequisite: course 2 or consent of instructor; course 134 recommended; upper division standing. GE credit: SocSci, Div., Wrt.—II. (III.)

147B. West European Politics: British Politics (4)
Lecture/discussion—4 hours. Prerequisite: course 2 or consent of instructor; upper division standing. The evolution, politics, and contemporary problems of Britain’s political system. GE credit: SocSci, Wrt.—II. (III.)

147C. West European Politics: French Politics (4)
Lecture/discussion—4 hours. Prerequisite: course 2 or consent of instructor. Upper division standing. The evolution, politics, and contemporary problems of selected political systems of Western Europe. Offered in alternate years. GE credit: SocSci, Wrt.

147D. West European Politics: German Politics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor; pass 1 restricted to upper division Political Science and International Relations majors. Evolution, politics and contemporary problems of Germany’s political system. GE credit: SocSci, Wrt.—II. (III.)

148A. Government and Politics of East Asia: China (4)
Lecture—4 hours. Prerequisite: course 2 or consent of instructor. Evolution of political institutions and political culture in China with emphasis on the present—1970 period. Primary sources, modernization and political efficacy. Offered in alternate years.—(I.) Montinola
148B. Government and Politics in East Asia: Japan (4)
Lecture-discussion—4 hours. Prerequisite: course 2 or consent of instructor. Upper division standing. Examination of Japanese politics, with an emphasis on the postwar period. Particular emphasis on political parties, elections, political economy, and social problems. Offered in alternate years. GE Credit: Div, SocSci. —Scheiner

148C. Government and Politics in East Asia: Southeast Asia (4)
Lecture—4 hours. Prerequisite: course 2 or consent of instructor. Upper division standing. Evolution of political institutions and economy of selected nations in Southeast Asia. Emphasis on imperial history, nation building in multicultural communities, and contrasts in economic performance. GE Credit: Div, SocSci. Offered in alternate years. —Montinola

149. Politics of Development in Africa (4)
Lecture—4 hours. Prerequisite: course 2 or consent of instructor; course 134 recommended. Political and economic development within Sub-Saharan Africa. States and institutions, democracy, party systems, dictatorship, rule, bureaucracy, corruption, race/ethnicity, national/regional integrations, trade unions, economic development strategies, class formation, and women's roles and ideology.

150. Judicial Politics and Constitutional Interpretation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or consent of instructor; course 134 recommended. The nature and functions of law; law as an instrument of morality. Offered in alternate years. GE Credit: Div, SocSci, Wrt. —Needham

151. The Constitutional Politics of the First Amendment and the Right to Privacy (4)
Lecture—3 hours; discussion—1 hour or seminar—1 hour. Prerequisite: course 150. The constitutional politics surrounding such issues as the right to free expression, associational rights, the right to free exercise of religious beliefs, and the right to privacy. GE credit: SocSci, Wrt.—II.

152. The Constitutional Politics of Equality (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150. Constitutional politics of equality in the American political system; issues surrounding constitutional doctrine and judicial policymaking; special attention on racial and sexual equality. Offered in alternate years. GE credit: SocSci, Div, Wrt.—III.

153. The Constitutional Politics of the Justice System (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150. Constitutional politics of the American criminal justice system; the issues surrounding constitutional doctrine and judicial policymaking on issues such as search and seizure, arrest, trial, incarceration, and other issues of due process. Offered in alternate years. —Kunitz

154. Legal Philosophy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 4, upper division standing. Analysis of the nature and functions of law; law as an instrument of social control; the relationship between law and morality. Offered in alternate years.

155. Judicial Process and Behavior (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, upper division standing. Analysis of the behavior of judges and juries in the political process. Techniques of judicial decision making. Relationships among courts and other decision-making bodies. Offered in alternate years. GE credit: SocSci, Wrt.—II.

160. American Political Parties (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Analysis of the structured operations of the party system in the United States; party functions and organization, candidate processes, campaigns and elections, party trends and reforms. GE credit: SocSci, Wrt.—II.

161. Comparative Political Parties (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or upper division standing in Political Science or consent of instructor. Systematic analysis of contemporary issues in American political development; historical determinants of political change; the timing and character of institutional development; conditions for successful political parties; and their influence on political parties in selected nations in Southeast Asia. Emphasis on imperialism, nation building in multicultural communities, and contrasts in economic performance. GE Credit: Div, SocSci. Offered in alternate years.

162. Elections and Voting Behavior (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Analysis of American elections and partisan behavior; political socialization, political participation, partisanship and individual and group determinants of voting. GE credit: SocSci, Wrt.—I.

163. Group Politics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Groups, institutions, and individuals, especially in American politics. Historical and analytical treatment of group theory as applied to interest groups (especially labor, business, agriculture, science, military); to racial, ethnic, and sectional groups; to party, public and legislative groups, bureaucracies. GE credit: SocSci, Wrt.—I.

164. Public Opinion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing and course 1 or 5, or consent of instructor. Nature of public opinion in America as it is “supposed to be.” Distribution of opinions among different publics and the significance of that distribution for system stability and institutions. Opinion polling and its problems. GE credit: SocSci, Wrt.—I.

165. Mass Media and Politics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Organization of and decision making within the media; media audiences and the effect of the media on attitudes governing the government to the media (censorship, secrecy, freedom of the press, government regulation); the media in election campaigns. GE credit: SocSci, Wrt.—I.

166. Women in Politics (4)
Lecture—3 hours; discussion—1 hour or seminar—1 hour. Prerequisite: course 1. The role of women in American politics. Historical experiences; contemporary organization or strategies; women as legislative concerns; the impact of differences in social class, race, and ethnicity upon the involvement of women in politics. GE credit: SocSci, Div.

168. Chicano Politics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Political aspects of the Chicano life in America; examines the Chicano's political role as it has been historically defined by different groups in society and the Chicano's survival in his/her political environment. GE credit: SocSci, Div.

170. Political Psychology (4)
Seminar—3 hours; term paper. Prerequisite: course 1. Social psychological theories of how voters form political attitudes and to what extent such attitudes translate into behaviors.

171. The Politics of Energy (4)
Lecture/discussion—4 hours. Prerequisite: course 1, upper division standing. Analysis of nature and performance of political processes for making energy choices at the international, national and state levels. Emphasis interaction of energy policy with other political goals and the ability of governmental institutions to overcome constraints on policy innovation.

172. American Political Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, some background in American politics is strongly recommended. Systematic analysis of contemporary issues in American political development: historical determinants of political change; the timing and character of institutional development; conditions for successful political parties; and their influence on political parties in selected nations in Southeast Asia. Emphasis on imperialism, nation building in multicultural communities, and contrasts in economic performance. GE credit: Div, SocSci. Offered in alternate years.

174. Government and the Economy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, upper division standing in Political Science or consent of instructor. Systematic analysis of contemporary issues in American political development: historical determinants of political change; the timing and character of institutional development; conditions for successful political parties; and their influence on political parties in selected nations in Southeast Asia. Emphasis on imperialism, nation building in multicultural communities, and contrasts in economic performance. GE Credit: Div, SocSci, Wrt.—III.

175. Science, Technology, and Policy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1. Analysis of policy processes and the use of scientific expertise for making decisions about technology. Topics include funding of basic research, relationship of science to technological development, science and society, technological risks, technology assessment and scientists and politics. GE credit: SocSci, Wrt.—III.

176. Racial Politics (4)
Seminar—3 hours; term paper. Prerequisite: Course 1. Race, racial attitudes and racial policies in the United States with a special emphasis on African Americans. GE credit: SocSci, Div.

179. Special Studies in Comparative Politics (4)
Seminar—4 hours. Prerequisite: course 2, consent of instructor and upper division standing. Intensive examination of one or more special problems appropriate to comparative politics. May be repeated once for credit.

180. Bureaucracy in Modern Society (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 2, upper division standing in Political Science or consent of instructor. Role of bureaucracy in a democratic society. The bureaucracy as a political actor, its influence on politics, the bureaucracy's impact on the operation of government, the bureaucracy and the economy, the bureaucracy and the integrity of public service. GE credit: SocSci, Div.

183. Administrative Behavior (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or consent of instructor. The implications for American public administration of developing concepts about behavior in organizations.

187. Administrative Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or consent of instructor. Historical and critical analysis of the principal theories of organization and management of public agencies in the light of such concepts as decision making, bureaucracy, authority and power, communication, and control; an examination of the role of government bureaucracies in the total society. GE credit: SocSci, Wrt.—III.

190. International Relations (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: open to majors in International Relations, or consent of instructor. Analysis and evaluation of substantive issues in contemporary international relations. Readings drawn from current academic and non-academic periodicals.

192A. Internship in Public Affairs (5)
Prerequisite: enrollment dependent on availability of intern positions with highest priority assigned to students with Political Science—Public Service major; upper division standing. Supervised internship and study in political, governmental, or related organizations. (P/NP grading only) GE credit: SocSci, Wrt.

192B. Internship in Public Affairs (5)
Prerequisite: course 192A; enrollment dependent on availability of intern positions with highest priority assigned to students with Political Science—Public Service major; upper division standing. Supervised internship and study in political, governmental, or related organizations. (P/NP grading only) GE credit: SocSci, Wrt.

192W. Internship in the UC Davis Washington Center Program (7)
Internship—28 hours. Prerequisite: junior or senior standing, admission in the UC Davis Washington Center undergraduate program, course 192W con-
193. Research in Practical Politics (2)

Research project—6 hours. Prerequisite: courses 192A, 192B, open only to Political Science/Public Policy majors and minors, or special permission of the instructor. Independent study supervised by a faculty member. Topic, research plan, and detailed schedule are to be approved by the instructor. May be repeated once for credit when topic differs.—I, II, III.

193W. Washington Center Research Seminar (4)

Seminar—4 hours. Research draws on resources uniquely available in Washington, DC. Supervised preparation of extensive paper. (Same course as UC Davis Washington Center 193.) GE credit: Wrt.—I, II, III.

194A-194HB. Special Study for Honors Students (4-4)

Seminar—2 hours; independent study—2 hours. Prerequisite: major in Political Science with upper division GPA of 3.500 or higher in the major. Directed research. Preparation of a senior honors thesis under the direction of faculty adviser. (Deferred grading only, pending completion of sequence.)—II.

195. Special Studies in American Politics (4)

Seminar—4 hours. Prerequisite: consent of instructor and upper division standing. Intensive examination of one or more special problems appropriate to American politics. Such problems may be repeated once for credit when topic differs.—I.

196A. Seminar in American Politics (4)

Seminar—3 hours; term paper. Prerequisite: upper division political science major or consent of instructor. Intensive reading, discussion, research, writing in American politics. Topics may include Congress, the Presidency, the Supreme Court, federalism, voting behavior, interest groups, ethnic groups or other topics with a more specialized content than normal course offerings. May be repeated once for credit when topic differs.—I, II, III.

196B. Seminar in Comparative Politics (4)

Seminar—3 hours; term paper. Prerequisite: upper division political science major or consent of instructor. Intensive reading, discussion, research, writing in comparative politics. Topics may include one country or geographical area, political institutions or behavior in cross-national, political development, or other topics that are more specialized than normal course offerings. May be repeated once for credit when topic differs.—I, II, III.

196C. Seminar in International Relations (4)

Seminar—3 hours; term paper. Prerequisite: upper division political science major or consent of instructor. Intensive reading, discussion, research, writing in international relations including study of international political institutions (UN, EU, NATO) or interstate relations (war, trade, immigration) and other topics with a more specialized content than normal course offerings. May be repeated once for credit when topic differs.—I, II, III.

196D. Seminar in Political Theory (4)

Seminar—3 hours; term paper. Prerequisite: upper division political science major or consent of instructor. Intensive reading, discussion, research, writing in political theory. Topics may include study of a single political thinker, a group of related thinkers, development of political concepts, or other topics with more specialized content than normal course offerings. May be repeated once for credit when topic differs.—I, II, III.

196E. Seminar in Research Methods (4)

Seminar—3 hours; term paper. Prerequisite: upper division political science major or consent of instructor. Intensive reading, discussion, research, and writing in selected topics in research methods such as research design, statistics, game theory, may be repeated once for credit when topic differs.—I, II, III.

198. Directed Group Study (1-5)

Seminar—4 hours. Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduate Students (1-5)

Seminar—4 hours. Prerequisite: course 192W. May be repeated once for credit when topic differs.—I, II, III.

Graduate Courses

201. Urban Government and Politics (4)

Seminar—4 hours. Survey and analysis of the literature in the field of local government and politics in the United States. Approaches to the study of political reform, local autonomy, community power, representation, expertise, service delivery, policymaking and political change. Offered in alternate years.

202. American State Government and Politics (4)

Seminar—4 hours. Survey and analysis of the literature in the field of state government, politics, and policy. Approaches to the study of the American states as political systems, including their governing institutions and processes and their role in the Federal system. Offered in alternate years.

203A. American Government: The Presidency (4)

Seminar—4 hours. Thorough overview of the current research on political executives, with particular emphasis on the American presidency. Two principal goals: the development of important and innovative student research programs; and adequate preparation for qualifying examinations.—I, II.

203B. American Government: Congress (4)

Seminar—4 hours. Thorough review of the current research on Congress, with particular emphasis on political representation. Two principal goals: the development of important and innovative student research programs; and adequate preparation for qualifying examinations.—I, II.

203C. American Government: Courts (4)

Seminar—4 hours. Survey and analysis of the literature in the field of American government with a focus on courts. Emphasis on the development and testing of theories of behavior and processes.

207. Environmental Public Policy (4)

Seminar—4 hours. Analysis of the interface between the world of academic reflection about ecological and environmental problems, and the world of practical action. Evaluation of alternative approaches to policy analysis and recommendation. Individual research, including field research, will parallel discussion of the literature.

208. Policy Analysis (4)

Seminar—4 hours. Social science techniques applied to public policy formation and evaluation.—I, II.

209. The American Political System (4)

Seminar—4 hours. Analysis of selected theoretical and empirical issues posed by contemporary research in American government and politics.—I, II.

210. Research Design in Political Science (4)

Seminar—3 hours; discussion/laboratory—1 hour. Prerequisite: graduate standing. Basic methodology of research in political science. Topics include: logic of empirical research, overview of research design approaches for political science research.

211. Research Methods in Political Science (4)

Seminar—3 hours; discussion/laboratory—1 hour. Prerequisite: graduate standing. Introduction to research methods critical to basic empirical investigations in political science.—I, II.

212. Quantitative Analysis in Political Science (4)

Seminar—4 hours. Prerequisite: course 211. Topics usually covered in an introductory statistics course with an emphasis on an empirical political science—descriptive statistics for samples, probability and probability distributions, hypothesis testing, ANOVA, bivariate regression, and introduction to multiple regression analysis.—I, II.

213. Quantitative Analysis in Political Science II (4)

Seminar—4 hours. Prerequisite: courses 211, 212. More advanced topics in the use of statistical methods, with emphasis on applications. Topics include: properties of least squares estimates, problems in multiple regression, and advanced topics (regression analysis, simultaneous models, time-series analysis, etc.)—I, II.

214A. Research in Political Science (4)

Discussion—2 hours; lecture—1 hour; term paper. Prerequisite: course 213. Research seminar sequence required of all Ph.D. students. Design, execution, and defense of an original piece of research in political science, culminating in a paper of publishable quality. (Deferred grading only, pending completion of sequence.)—I, II.

214B. Research in Political Science (4)

Discussion—2 hours; lecture—1 hour; term paper. Prerequisite: courses 212 and 214A; advanced level graduate students in the Department of Political Science only. Research seminar sequence required of all Ph.D. students. Design, execution, and defense of an original piece of research in political science, culminating in a paper of publishable quality. (Deferred grading only, pending completion of sequence.)—I, II.

215. Introduction to Modeling Political Behavior (4)

Seminar—3 hours. Prerequisite: courses 211 and 212. Introduction to formal and game theoretic anal- yses of politics. Students will learn basic game tho- rny and modeling skills. We examine the benefits of modeling, and look at examples of formal analysis in a variety of political science sub-fields. Offered in alternate years.—I.

216. Qualitative Research Methods (4)

Seminar—3 hours; term paper. Methodology for uti- lizing theoretically-oriented case studies and con- trolled comparison of a small number of cases to develop and test theories. Students will learn basic game the- ory and modeling techniques as well as interpretation of classic works. Offered in alternate years.—I.

217. Social Choice Theory and Spatial Modeling (4)

Seminar—4 hours. Introduction to social choice the- ory and formal spatial modeling including Arrow's Theorem, the paradox of voting, cycling and agenda control. Focus on mastering modeling tech- niques as well as interpretation of classic works. Offered in alternate years.—I.

218. Topics in Political Theory (4)

Seminar—3 hours; term paper. Topics will vary and may be the work of a single theorist, time period, or political concept, such as justice. Offered in alternate years.—I.

219A. Political Theory Sequence (4)

Seminar—3 hours; term paper. Survey of the great works in ancient and medieval political theory including such writers as Plato, Aristotle, Cicero, St. Augustine, Aquinas, Alfarabi and Marsilius. Discussion of various interpretations of these authors. Offered in alternate years.—I.

219B. Political Theory Sequence (4)

Seminar—3 hours; term paper. Survey of the great works in early modern to contemporary political the- ory including such writers as Machiavelli, Hobbes, Locke, Rousseau, Marx, Mill, Nietzsche, and Rawls. Discussion of various interpretations of these authors. Offered in alternate years.—I, II.

219C. Contemporary Political Theory (4)

Seminar—3 hours; term paper. Survey of important works in contemporary political theory including such writers as Nietzsche, Heidegger, Arendt, Rawls, Nozick, Sandel. May be repeated for credit if topic differs.—III.

Political Science
220. Seminar in Political Theory (4) Seminar—3 hours; term paper. Prerequisite: graduate standing. Introduction to political theory and current debates over its study. Readings from and textual interpretations of political theory including the Federalist Papers and major works by thinkers such as Plato, Aristotle, Machiavelli, Hobbes, Locke, Rousseau, and Rawls. Other readings addressing issues of textual interpretation. —I.

223. International Relations (4) Seminar—3 hours; term paper. —I.

225. The International System (4) Seminar—3 hours; term paper. Analysis of the international system by means of theory formulation and integration; critique of research designs; use of various techniques of data generation and analysis. —III.

226. Seminar in International Political Economy (4) Seminar—4 hours. Research in international political economy. Structure of the global economy, as well as specific dimensions of international economic relations, including trade, capital flows, global production structures, and migration. Offered in alternate years. —I.

229. Theories of International Relations (4) Seminar—3 hours, term paper. Central concepts, debates, and paradigms in international relations; overview of research in international security and international political economy; interstate and intrastate war; cooperation and conflict resolution; trade and finance; relations between domestic and international politics, norms and institutions. Open to political science graduate students only unless consent of instructor. Offered in alternate years. —III.

Goldman

230. American Foreign Policy (4) Seminar—3 hours; term paper. —III.

231. U.S. Political Culture and Foreign Relations (4) Seminar—3 hours; term paper. Relates U.S. political culture to formulation of foreign policy. Analyzes American ideological preferences in historical perspective, contemporary public opinion, decision making and implementation. Concludes by examining links between foreign policy behavior and democratic process. Offered in alternate years. —II.

241. Communist Political Systems (4) Seminar—4 hours. Prerequisite: course 141 or the equivalent, or consent of instructor. Systematic analysis of theories and methods used in the study of comparative politics. —II.

242. Seminar in Comparative Politics (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Systematic survey of theories and methods used in the study of comparative politics. —III.

243. Comparative Institutional Change (4) Seminar—4 hours. Comparison of institutional changes in countries of the former Soviet Union and Eastern Europe during the period of transition to democracy. Special attention to institutions of mass representation—electoral and party systems and national legislatures. Offered in alternate years. —III.

246. Policymaking in Third-World Societies (4) Seminar—3 hours. Prerequisite: graduate standing or consent of instructor. Included in an analysis of policymaking process in Third-World countries are such topics as political resources, institutional structures, mechanisms of decision making, resource allocations, planning, and budgeting, implementation, and distribution of world resources. Offered in alternate years. —I.

250. Policy Development and Impact in U.S. Courts (4) Seminar—3 hours; term paper. Prerequisite: graduate standing. Thorough overview of the literature regarding courts as policymaking institutions of government, with emphasis on the formation and implementation of judicial policy. Differences and similarities across the judicial, congressional, and executive branch policy processes. Offered in alternate years. —II.

260. Political Parties (4) Seminar—3 hours; term paper. Survey of selected topics in American and comparative parties. —II.

261. Political Behavior (4) Seminar—3 hours; term paper. Survey of selected topics in political behavior and public opinion. —III.

274. Political Economy (4) Seminar—4 hours. Politics of economic policy as reflected in taxation, spending and regulation; impact of prices, employment, and growth on political demands; government responses to economic conditions; electoral politics and the political business cycle. Offered in alternate years. —III.

279. Political Networks: Methods and Applications (4) Seminar—3 hours; term paper. Prerequisite: graduate standing. Structure of political networks, social-matrices and affiliation networks; general networks characteristics: density, centralization, polarization, interdependence, dyadic and triadic characteristics; structural and role equivalence; subsets of networks: cliques, blocks and bloc modeling; characteristics of individuals in networks: centrality and prestige. —II. (II.)

280. Bayesian Methods for Social and Behavioral Sciences (4) Seminar—3 hours; lab—1 hour. Prerequisite: course 212 or equivalent; graduate standing. Methodology seminar introducing students to quantitative methods to issues and problems in political science and other social and behavioral sciences. Offered in alternate years. —I.

281. Statistical Computing Issues in Political Science (4) Seminar—3 hours; discussion/lab—1 hour. Prerequisite: course 212 or equivalent; graduate standing. Methodology seminar introducing computing issues in empirical models for political science and other social and behavioral sciences. Offered in alternate years. —I.

282. Advanced Modeling of Political Behavior (4) Seminar—3 hours; term paper. Prerequisite: course 215 or equivalent; graduate standing or consent of instructor. Applications of formal theory to political science. Review of relevant contributions in other social sciences. Consideration of advanced techniques in game theory. Rational and behavioral approaches. —III.

283. Organizational Behavior (4) Seminar—4 hours. Organizational behavior as it relates to public sector decision making. —I, II.

290A. Research in American Government and Public Policy (4) Seminar—4 hours. Special research seminar on selected problems and issues in the study of American government and public policy. May be repeated up to 6 times for credit if taught by different instructor. —I, II, III.

290B. Research in Political Theory (4) Seminar—4 hours. Special research seminar on selected problems and issues in the study of political theory. —I, II, III.

290C. Research in International Relations (4) Seminar—4 hours. Special research seminar on selected problems and issues in the study of international relations. —I, II, III.

290D. Research in Judicial Politics (4) Seminar—4 hours. Prerequisite: graduate standing in political science or consent of instructor. Contemporary research on judicial politics, judicial institutions, jurisprudence, and judicial behavior. —I, II, III.

290E. Research in Political Parties, Politics, and Political Behavior (4) Seminar—4 hours. Special research seminar on selected problems and issues in the study of political parties, politics, and political behavior. —I, II, III.

290F. Research in Comparative Government and Policy (4) Seminar—4 hours. Special research seminar on selected problems and issues in the study of comparative government and policy. —I, II, III.

290G. Research in Methodology (4) Lecture—3 hours; term paper. Prerequisite: course 212. Special research seminar on selected problems and issues in methods in political science. May be repeated three times for credit if topic varies. —I, II, III, (I, II, III)

297. Internships in Political Science (2) Seminar—2 hours. Prerequisite: open only to persons who have internships or other positions in governmental agencies, political parties, etc. Application and evaluation of theoretical concepts through work experience or systematic observation in public and political agencies. May be repeated for credit. (S/U grading only.)

298. Group Study (1-5) (S/U grading only)

299. Research (1-12) (S/U grading only)

299D. Directed Reading (1-12) (S/U grading only)

Professional Courses

390. The Teaching of Political Science (1) Seminar—1 hour. Prerequisite: graduate student standing in Political Science. Methods and problems of teaching political science at the undergraduate level. (S/U grading only.) —I, II, III.

396. Teaching Assistant Training Practicum (1-4) Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.) —I, II, III.

Pomology

See Plant Sciences, on page 448.

Population Biology

(A Graduate Group)

Jay Rosenheim, Ph.D., Chairperson of the Group


Faculty

David J. Begun, Ph.D., Professor
Monique Borgerhoff Mulder, Ph.D., Professor
Louis W. Botsford, Ph.D., Professor
Tim Caro, Ph.D., Professor
Howard V. Cornell, Ph.D., Professor
Jonathan A. Eisen, Ph.D., Professor
James R. Griesemer, Ph.D., Professor
Richard K. Grasberg, Ph.D., Professor
Susan P. Harrison, Ph.D., Professor
Charles H. Langley, Ph.D., Professor
Alan M. Hastings, Ph.D., Professor
Richard Karban, Ph.D., Professor
Artym Kopp, Ph.D., Assistant Professor
Sharon P. Lawler, Ph.D., Assistant Professor
Eric D. Sanford, Ph.D., Assistant Professor
Thomas W. Schoener, Ph.D., Professor
Sebastian Schreiber, Ph.D., Professor
Mark W. Schwartz, Ph.D., Professor
H. Bradley Shaffer, Ph.D., Professor

Quarter Offered: I—Fall, II—Winter, III—Spring, IV—Summer; 2009-2010 offering in parentheses

Arthur M. Shapiro, Ph.D., Professor
Andrew Sih, Ph.D., Professor
John A. Stinchcombe, Ph.D., Professor
Maureen L. Stanton, Ph.D., Professor
Sharon Y. Strauss, Ph.D., Professor
Donald R. Stroud, Ph.D., Professor
Catherine A. Toft, Ph.D., Professor
Michael Turelli, Ph.D., Professor
Geerat J. Vermeij, Ph.D., Professor
Peter C. Wainwright, Ph.D., Professor
Philip S. Ward, Ph.D., Professor
Truman P. Young, Ph.D., Professor

Emeriti Faculty
Hugh Dingle, Ph.D., Professor Emeritus
John H. Gillespie, Ph.D., Professor Emeritus
Leslie D. Gottlieb, Ph.D., Professor Emeritus
Timothy G. Prout, Ph.D., Professor Emeritus
Judy A. Stamps, Ph.D., Professor Emeritus

Affiliated Faculty
Peter L. Chesson, Ph.D., Adjunct Professor
Sergey V. Nuzhdin, Ph.D., Associate Professor

Graduate Study. The Graduate Group in Population Biology emphasizes programs of study and research leading to the Ph.D. degree. The Group considers the biology of all living things as the broad discipline that blends ecology, evolution, population genetics and systematics into a unified field. The course curriculum consists of first-year core courses offered by the faculty, seminar courses, and advanced courses in population biology, and related disciplines, chosen in consultation with a guiding committee.

Graduate Adviser. Consult the Population Biology Graduate Group office.

Courses in Population Biology (PBG)

Graduate Courses

200A. Principles of Population Biology (5)
Lecture—3 hours; discussion—2 hours. Prerequisite: course 231 concurrently and consent of instructor. Principles of single and species ecology and evolution. Topics include ecology of individuals, population growth models, structured populations, life history strategies, stochastic populations, basic population genetics theory, deleterious alleles in natural populations, and molecular population genetics. —II. (I, II)

200B. Principles of Population Biology (6)
Lecture—5 hours; discussion—1 hour. Prerequisite: course 200A. Principles of multi-species communities. Topics include competition, mutualism, metapopulations, food webs and trophic cascades, interactions between simple ecological communities, island biogeography, succession, and large-scale patterns. —II. (II)

200C. Principles of Population Biology (6)
Lecture—5 hours; discussion—1 hour. Prerequisite: course 200B. Principles of microevolution and macroevolution. Topics include evolutionary quantitative genetics, analysis of hybrid zones, speciation, the fossil record, biogeography, and phylogenetic reconstruction. —III. (III)

203. Advanced Evolution (3)
Lecture—1 hour; discussion—2 hours. Prerequisite: graduate standing. Adaptation and speciation, and biochemical and morphological evolution in plants and animals with emphasis on the appropriateness of different methods of analysis. Offered in alternate years.

206. Ecology of Insect Parasitoids (4)
Lecture—3 hours; seminar—1 hour. Prerequisite: introductory animal ecology or behavior. Insect parasitoids will be investigated as model systems to address current topics in behavioral, population, and evolutionary ecology. Theory will be synthesized and critical empirical tests of ecological hypotheses emphasized. (Same course as Entomology 206.) Offered in alternate years.

207. Plant Population Biology (3)
Lecture—2 hours; laboratory/discussion—1 hour. Prerequisite: advanced undergraduate ecology course (e.g., Environmental Science and Policy 100, Evolution and Ecology 101, Entomology 104, Plant Biology 117), and advanced undergraduate course in genetics and/or evolution (e.g., Biological Sciences 101 or Evolution and Ecology 100). Introduction to theoretical and empirical research in plant population biology. Emphasis placed on linking ecological and genetic approaches to plants population biology. (Same course as Ecology 207.) Offered in alternate years. —II. (I)

212. Topics in Invertebrate Evolution (2)
Seminar—2 hours. Prerequisite: graduate standing or consent of instructor and Evolution and Ecology 112-112L, courses in evolutionary biology, systematics, and ecology highly recommended. Advanced seminar that critically examines problems relevant to evolutionary and genetic approaches to plant population biology. (Same course as Ecology 207.) Offered in alternate years. —II. Rice

220. Spatio-Temporal Ecology (2)
Lecture/discussion—2 hours. Prerequisite: course 200B or Ecology 204 or Evolution and Ecology 104 or Environmental Science and Policy 121 or consent of instructor. Spatiotemporal ecological theory focusing on population persistence and stability, predator-prey and host-parasite interactions, species coexistence and diversity maintenance, including effects of environmental variation, spatial and temporal scale, life-history traits and nonlinear dynamics. Topics vary. (Same course as Ecology 220.) May be repeated for credit. (S/U grading only.)—III. (II)

221. Animal Behavior, Ecology and Evolution (3)
Lecture—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 102, Evolution and Ecology 100, 101 or the equivalent, graduate standing, and consent of instructor. The interface between animal behavior, ecology and evolution. New developments in behavioral ecology and development and testing of hypotheses in this discipline. (Same course as Animal Behavior 221.)—I

224. Field Reconnaisance for Population Biologists (3)
Fieldwork—6 hours. Prerequisite: graduate student in Population Biology, or consent of instructor. Biweekly field trips to acquaint students with plant and animal communities, biodiversity, and ecological and evolutionary opportunities in northern and central California. May be repeated for credit. (S/U grading only.)—II

225. Terrestrial Field Ecology (4)
Seminar—1 hour; field work—12 hours. Prerequisite: introductory ecology and introductory statistics, or consent of instructor. A field course conducted over spring break and four weekends at Bodega Bay emphasizing student projects. Ecological hypothesis formulation and testing, and written and oral presentation of results will be stressed. (Same course as Ecology/Entomology 225.)—II, III. (II, III)

231. Mathematical Methods in Population Biology (3)
Lecture—3 hours. Prerequisite: Mathematics 16C or 21C or the equivalent. Mathematical methods used in population biology. Linear and nonlinear difference equations and differential equation models are studied, using stability analysis and qualitative methods. Partial differential equation models are introduced. Applications to population biology model stresses. (Same course as Ecology 231.)—I

250A. Interdisciplinary Approaches to Biological Invasions (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing. An integrative consideration of biological invasions, including an overview of concepts from ecology, ecological theory, evolution, genetics, population, and other areas. Emphasis on potential contributions of each area for interdisciplinary problem solving. —II. (II)

250B. Interdisciplinary Approaches to Biological Invasions (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing. An integrative consideration of biological invasions, including an overview of concepts from history, sociology, communications, law, policy, management, and other areas. Emphasis on potential contributions of each area for interdisciplinary problem solving. —II. (II)

251. Collaborative Project in Biological Invasions (3)
Project; discussion—1 hour. Prerequisite: course 250A, 250B, or equivalent, and consent of instructor. A year-long interdisciplinary collaborative project focusing on biological invasions, resulting in a paper or other suitable product presented at a symposium at the conclusion of the project. May be repeated up to five times. (S/U grading only.)—II, III, (II, III)

270. Research Conference in Evolutionary Biology (1)
Seminar—1 hour. Prerequisite: consent of instructor. Critical presentation and evaluation of current literature and ongoing research in evolutionary biology. May be repeated for credit. (S/U grading only.)—I, II, III, (I, II, III)

280. Advanced Animal Behavior (2)
Seminar—2 hours. Prerequisite: graduate standing and consent of instructor, courses in animal behavior (Neurobiology, Physiology, and Behavior 102 or the equivalent), and either evolution (Evolution and Ecology 100 or the equivalent) or ecology (Evolution and Ecology 101 or the equivalent). Reading, reports and discussion on current topics in animal behavior, with a focus on topics that lie at the interface between animal behavior, ecology and evolution. (Same course as Animal Behavior 287.) May be repeated twice for credit.

290. Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Seminars presented by visiting lecturers, UC Davis graduate students and faculty. May be repeated for credit. (S/U grading only.)—I, II, III, (II, III)

290C. Research Conference in Population Biology (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor; concurrent enrollment in course 299. Presentation and discussion of faculty and graduate student research in population biology. May be repeated for credit. (S/U grading only.)—I, II, III, (II, III)

292. Topics in Ecology and Evolution (1)
Seminar—1 hour. Prerequisite: graduate standing. Seminar presented by visiting lecturers, UC Davis faculty and graduate students. May be repeated for credit. (Same course as Ecology 296.) (S/U grading only.)—I, II, III, (II, III)

296. Seminar in Geographical Ecology (2)
Seminar—2 hours. Prerequisite: Evolution and Ecology 100 or 101 or consent of instructor. Recent developments in theoretical and experimental biogeography, historical biogeography and related themes in systematics, the biology of colonizing species, and related topics. May be repeated for credit. (S/U grading only.)—I, II, III, (II, III)

298. Group Study (1-5)
Prerequisite: consent of instructor. Groups focusing on projects in animal behavior, ecology and evolution. —I, II, III, (I, II, III)

Quarter Offered: I—Fall, II—Winter, III—Spring, IV—Summer. 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Socio-cultural Diversity; Wrt=Writing Experience
Population Health and Reproduction

See Veterinary Medicine, School of, on page 502.

Precision Agriculture

[College of Agricultural and Environmental Sciences]
The Department of Biological and Agricultural Engineering offers a minor in Precision Agriculture, the latest farming concept that optimizes fertilizer, pesticide, and water use, while minimizing environmental concerns.

Minor Program Requirements:
This minor acquaints students with recent developments and their applications to agriculture, in geographic information systems (GIS), global positioning systems (GPS), variable rate technologies (VRT), crop and soil sensors, and remote sensing. The minor prepares students for challenging positions in site-specific crop management as we enter the "information age" in agriculture.

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Precision Agriculture .................................. 20
Applied Biological Systems Technology 145, 175, 180... 10
Select 10 or more units from Plant Sciences 120 or Statistics 100, Plant Sciences 110A or Plant Biology 112, Environmental and Resource Sciences 186, Soil Science 109... 10
Minor Advisers. S.K. Upadhyaya, D.K. Giles

Preventive Veterinary Medicine

See Veterinary Medicine, School of, on page 502.

Psychiatry

See Medicine, School of, on page 367.

Psychology

[College of Letters and Science]
Keith F. Widman, Ph.D., Chairperson of the Department
Department Office. 135 Young Hall
(530) 752-1880; http://psychology.ucdavis.edu

Faculty
Karen L. Bales, Ph.D., Assistant Professor
Shelley Blozis, Ph.D., Assistant Professor
John P. Capitano, Ph.D., Professor
Cameron S. Carter, M.D., Professor
Richard G. Cox, Ph.D., Professor
Robert A. Emmons, Ph.D., Professor
Emilio Ferrer, Ph.D., Assistant Professor
Simona Ghetti, Ph.D., Assistant Professor
Gail S. Goodman, Ph.D., Professor
Katharine Grof Estes, Ph.D., Assistant Professor
Kevin Grimm, Ph.D., Assistant Professor
Gregory M. Herrel, Ph.D., Professor
Petra Janata, Ph.D., Assistant Professor
Joel T. Johnson, Ph.D., Professor
Leah A. Krubitzer, Ph.D., Professor
Kristin Lagattuta, Ph.D., Assistant Professor
Debra L. Long, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Steven Luck, Ph.D., Professor
George R. Mangun, Ph.D., Professor
Sally P. Mendloz, Ph.D., Professor
Research Faculty
Lisa Oakes, Ph.D., Professor
Donald H. Owings, Ph.D., Professor
Cynthia Pickth, Ph.D. Associate Professor
Robert B. Post, Ph.D., Professor
Charen Ranganathan, Ph.D., Associate Professor
Susan Rivera, Ph.D., Assistant Professor
Richard W. Robins, Ph.D., Associate Professor
Jeffrey Schank, Ph.D., Associate Professor
Phillip R. Shaver, Ph.D., Professor
Jeffrey W. Sherman, Ph.D. Professor
Dean K. Simonton, Ph.D., Professor
UC Davis Prize for Teaching and Scholarly Achievement
Stanley Sue, Ph.D., Professor
UC Davis Prize for Teaching and Scholarly Achievement
Tamara Swaab, Ph.D., Associate Professor
Ross Thompson, Ph.D., Professor
Brian Trainor, Ph.D., Assistant Professor
Matthew Traxler, Ph.D., Associate Professor
David Whitney, Ph.D., Assistant Professor
Keith F. Widman, Ph.D., Professor
Andrew P. Yonezumas, Ph.D., Professor
Nolan Zane, Ph.D., Professor
Emeriti Faculty
Linda P. Accredolo, Professor Emerita
Harrius B. Bastian, Ph.D., Professor Emeritus
Alan C. Bils, Ph.D., Professor Emeritus
Karen P. Erickson, Ph.D., Professor Emerita
Albert A. Harrison, Ph.D., Professor Emeritus
Kenneth R. Henry, Ph.D., Professor Emeritus
Neal E. Kroll, Ph.D., Professor Emeritus
Peter R. Maier, Ph.D., Professor Emeritus
William A. Mason, Ph.D., Professor Emeritus
G. Mitchell, Ph.D., Professor Emeritus
Robert M. Murphy, Ph.D., Professor Emeritus
Thomas Natozanos, Ph.D., Professor Emeritus
Theodore E. Parks, Ph.D., Professor Emeritus
Robert Sommer, Ph.D., Professor Emeritus
Charles T. Tari, Ph.D., Professor Emeritus
Affiliated Faculty
Katherine Gibb, Ph.D., Lecturer
Jacqueline Horn, Ph.D., Lecturer
Elizabeth Post, Ph.D., Lecturer
Joanna Scheib, Ph.D., Adjunct Assistant Professor
Eva Schaepler, Ph.D. Lecturer

The Major Programs
The psychology program at UC Davis is broad and includes students and faculty with a variety of interests. The department has developed around five major areas of emphasis: Developmental Psychology, which involves the study of changes in behavior and abilities that occur as development proceeds and includes such topics as imaging the development of the brain, development of self esteem, problem solving, attachment theory, symbolic representation in infants and children, development of children's understanding of mental states; Perception-Cognition, which involves the study of awareness and thought, and includes such topics as perception, learning, memory, and consciousness; Psychobiology, which involves the study of the biological correlates of behavior and includes such topics as psychological, sensory processes, health psychology, and animal behavior; Social-Personality Psychology, which involves the study of the individual in his or her social environment and includes such topics as personality theory, abnormal psychology, individual differences, developmental psychology, and social psychology; and Quantitative which involves the study of linear models and psychometrics which includes topics, such as experimental design and the analysis of variance, regression analysis, and multivariate analysis.

The department offers the Bachelor of Arts (B.A.) program for students interested in the liberal arts and the Bachelor of Science (B.S.) program geared for students with an interest in either biology or mathematics. The main objective of both programs is to expand the scope of contemporary psychology. In addition to completing a number of common core courses for their degree, students may take special courses on such far-ranging topics as sex differences, genius and creativity, environmental awareness, and organizational psychology. The department strongly encourages students to become involved in individual research projects under the direction of faculty members and to participate in our internship program to broaden your experiences and understanding of the field of psychology.

Preparatory Requirements. Before declaring a major in psychology, students must complete the following courses with a combined grade point average of at least 2.500. All courses must be taken for a letter grade. (Students in the Bachelor of Science, Biology program must complete Biological Sciences 2A–B.:

- Psychology 1, 41.................................8 units
- Statistics 13 or 102..........................4 units
- Biological Sciences 2A or
- Biological Sciences 10 and one course from Anthropology 1, Molecular and Cellular Biology 10; Neurobiology, Physiology, and Behavior 10..............................4 or 8 units

Career Alternatives. A degree in psychology provides broad intellectual foundations which are useful to the graduate for the development of careers in a variety of areas, including social work, the ministry, teaching, business, and counseling. An undergraduate education in psychology also provides excellent preparation for graduate study in psychology. Individuals with degrees in psychology may enter graduate programs to prepare for teaching, research, or clinical/counseling careers in psychology, or may go on to professional schools for training in veterinary and human medicine, law, and other professions.

A.B. Major Requirements:

Preparatory Subject Matter................. 20-25
- Psychology 1 or the equivalent........... 4
- Psychology 41.................................. 4
- Statistics 13 or 102..........................4

Strongly recommended that Psychology 41 and Statistics 13 or 102 be completed in the first year.

- Biological Sciences 2A; or a combination of Biological Sciences 10 and one course from Anthropology 1, Molecular and Cellular Biology 10, or Neurobiology, Physiology, and Behavior 10..............................4-8

- One course in sociology or cultural anthropology; may be lower or upper division, minimum of 4 units.................. 4-5

Depth Subject Matter............................. 40
Two courses from two of the following four groups and one course from another containing two groups...................... 23-24
- Group A: Psychology 100, 130, 131, 132, 135
- Group B: Psychology 101, 113, 121, 122, 123, 126, 127, 129
- Group C: Psychology 151, 152, 154, 161, 162, 168
- Group D: Psychology 140, or Human Development 100A or 100B, Psychology 141/Human Development 101, Psychology 142/Human Development 102

Additional units to achieve a total of 40 upper division units in psychology.............. 16-17

A maximum of 12 approved upper division Human Development units can be credited.
B.S. Major Requirements:

Preparatory Subject Matter: 50-59

Psychology 1 or the equivalent............4
Psychology 41..................................4
Statistics 13 or 102..........................4

Strongly recommended that Psychology 41 and
Statistics 13 or 102 be completed in
the first year:

Mathematics 16A-16B or 17A-17B or
21A-21B...............................6-8
Physics 10 or 7A-7B..........................4-8
Biological Sciences 2A, 2B..................8
Chemistry 2A, 2B.............................10
Chemistry 8A-8B or 118A-118B or
128A-128B.................................6-8

One course in sociology or cultural
anthropology; may be lower or upper
division, minimum of 4 units..........4-5

Depth Subject Matter: 49

Seven Psychology courses distributed as
specified:

Group A: two courses from Psychology
100, 130, 131, 132, 135..................8

Group B: three courses from Psychology
101, 113, 121, 122, 123, 126, 127, 129
.................................................11-12

Group C: one course from Psychology
151, 152, 154, 161, 162, 168..............4

Group D: one course from Psychology 140
(or Human Development 100A or 100B),
Psychology 141/Human Development 101,
Psychology 142/Human Development 102
.................................................4

Additional units to achieve a total of 40 upper
division units in psychology............12-13
(A maximum of 12 approved upper division
Human Development units can be
credited toward satisfaction of the 40-unit
requirement.)

Biological Sciences 100-109..........................4
Neurobiology, Physiology, and Behavior
101, 102, 103..................................10

Total Units for the Major: 99-108

Recommended

Psychology 180B, 199; on a
psychobiological topic, Anthropology 154A,
Environmental Science and Policy 110,
Evolution and Ecology 100, 101.

Mathematics Emphasis

B.S. Major Requirements:

Preparatory Subject Matter: 44-59

Psychology 1 or the equivalent............4
Psychology 41..................................4
Statistics 13 or 102..........................4

Strongly recommended that Psychology 41
and Statistics 13 or 102 be completed in
the first year:

Mathematics 21A, 21B, 21C, 21D.............12
Computer Science Engineering 30 or
Computer Science Engineering 10........4
Chemistry 10 or 2A-2B or 2A-2BII.......................410
Physics 10 or 7A-7B..........................4-8
Biological Sciences 2A; or a combination
of Biological Sciences 10 and one course
from Anthropology 1, Molecular and Cellular
Biology 10, or Neurobiology, Physiology, and
Behavior 10....................................4-8

One course in sociology or cultural
anthropology; may be lower or upper
division, minimum of 4 units..........4-5

Depth Subject Matter: 49

Five Psychology courses, distributed as
specified:

Group A: two courses from 100, 130, 131,
132, 135......................................8

Group B: two courses from Psychology
101, 113, 121, 122, 123, 126, 127, 129
.................................................7-8

Group C: one course from Psychology 151,
152, 154, 161, 162, 168.................8

or

Group D: one course from Psychology 140
(or Human Development 100A or 100B),
Psychology 141/Human Development 101,
Psychology 142/Human Development 102
.................................................4

Additional units to achieve a total of 40 upper
division units in psychology............11-12

A maximum of 12 approved upper division
Human Development units can be credited
toward satisfaction of the 40-unit
requirement.

Psychology 102A..............................5
One course from Psychology 103B, 104, or
the equivalent................................4

One course sequence from Statistics 106–
108, 130A-130B, 131A-131B..............8

Graduate Study. The Department offers programs
of study and research leading to the Ph.D. degree
in psychology. Detailed information regarding gradu-
ate study may be obtained by writing the Graduate
Adviser, Department of Psychology.

Graduate Adviser. See Class Schedule and Reg-
istration Guide.

Courses in Psychology (PSC)

Lower Division Courses

1. General Psychology (4)

Lecture—4 hours. Introduction emphasizing empiri-
cal approaches. Focus on perception, cognition, per-
somenality and social psychology, and biological
aspects of behavior. Only 2 units of credit allowed
for students who have completed course 15 or 16.
Not open for credit to students who have completed
Shaver, Johnson, Capitanio, Thompson, Tavano-
Hall, Traxler

20. Freshman Psychology Seminar (4)

Seminar—4 hours. Prerequisite: freshman standing.
Instructor will acquaint students with his or her pro-
gram of research, the development of scientific ques-
tions from the literature, and the application of research
methods to examine these questions. Criti-
cal thinking will be encouraged via expository writ-
ing and brief presentations.

41. Research Methods in Psychology (4)

Lecture—3 hours; autotutorial. Prerequisite: course 1 or
the equivalent. Statistics 13 or 102 recom-
menid. Introduction to experimental design,
test, questionnaires, field and observational
methods, reliability, and statistical inference.—I, II,
III, (II, III) E. Post

415. Research Methods in Psychology (4)

Lecture/laboratory—10 hours. Web virtual lecture—
10 hours. Prerequisite: course 1 or equivalent. In-
duction to experimental design, seminars, question-
naires, observational research, quantitative
approaches, case studies, data analysis, sam-
pling, descriptive statistics, and statistical inference.
Limited enrollment. Not open for credit to students
who have taken course 41—II.

90X. Lower Division Seminar (1-2)

Seminar—1-2 hours. Prerequisite: lower division
standing and consent of instructor. Examination
of a special topic in Psychology through shared readings,
discussions, written assignments, or special activities
such as fieldwork or laboratory research. May not be
repeated for credit. Limited enrollment.

98. Directed Group Study (1-5)

Primarily for lower division students. (P/NP grading
only)

99. Special Study for Lower Division

Students (1-5)

(P/NP grading only)

Upper Division Courses

100. Introduction to Cognitive Psychology

(4)

Lecture—4 hours. Prerequisite: courses 1 and 41.
Introduction to human information processing,
mental representation and transformation, imagery,
attention, memory, language, processing, concept
formation, problem solving, and computer simula-
tion. Not open for credit to students who have com-
pleted former course 136.—I, II, III, (II, III) Gibbs,
Kroll, Long, Luck

101. Introduction to Psychology (4)

Lecture—4 hours. Prerequisite: courses 1, 41. Sur-
vey and integration of the relationshi-
ship between behavior and biological processes,
including physiology, genetics, development, ecology, and evolu-
tion.—I, II, III, (II, III) Coss, Krubitzer, Owings,
Scharf, Trainor

103A. Statistical Analysis of Psychological Data (5)

Lecture—4 hours; laboratory—2 hours; term paper.
Prerequisite: course 1, 41 and Statistics 13 or 102.
Pass 1 open to Psychology majors. Design and statis-
tical analysis of psychological investigations and the
interpretation of quantitative data in psychology. Not open for credit to students who have completed course 102. —II, III, Widaman.

103B. Statistical Analysis of Psychological Data (4)
Lecture—4 hours. Prerequisite: course 103A and Statistics 3 or 102. Pass 1 open to Psychology majors. Probability and sampling distributions, hypothesis testing, statistical inference, one-way and two-way analysis of variance, nonparametric statistics, with applications in psychology. Not open for credit to students who have completed course 105. —II, III, (II, III) Blazier, Ferrer, Grimm, Widaman.

104. Applied Psychometrics: An Introduction to Measurement Theory (4)
Lecture—4 hours. Prerequisite: upper division standing in Psychology. Courses 41 and 100, Statistic 13. Examination of the basic principles and applications of classical and modern test theory. Topics include test construction, reliability theory, validity theory, factor analysis and latent trait theory. —II, III, Widaman.

107. Questionnaire and Survey Research Methods (4)
Lecture/discussion—2 hours; laboratory/discussion—2 hours. Prerequisite: consent of instructor; course 1, course 41 or an equivalent course on social or behavioral research methods. Introduction to survey and questionnaire research methods with emphasis on how to ask questions. Social and psychological factors that influence survey response. Practical aspects of fielding survey and questionnaire research. Limited enrollment. Not offered every year. —II, III, Grimm.

109. Interactive Computer Programming for Psychological Experiments (4)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 41 and one of course 100, 130, or 132 and consent of instructor. Instruction in programming with an emphasis on programming desktop computers as an interactive research tool. Not open for credit to students who have completed course 181. (Former course 120.)

113. Developmental Psychobiology (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: course 101. The biology of behavioral development; survey and integration of the organismic and environmental processes that regulate the development of behavior. —II, III, (II, III) Schank, Owings.

120. Agent-Based Modeling (4)
Lecture/laboratory—4 hours. Prerequisite: course 100 or 101. Introduction to agent-based computer simulation and analysis with emphasis on learning how to model animals, including humans, to achieve insight into social and group behavior. Limited enrollment. —Schank.

121. Physiological Psychology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 1, 41, 101. Pass 1 open to Psychology majors. Relationship of brain structure and function to behavior, motivation, emotion, language, and learning in humans and other animals. Methodology of physiological psychology and neuroscience. Not open for credit to students who have completed course 108. (Former course 108B.) —II, III, (II, III) Bailes, Krubitizer.

122. Advanced Animal Behavior (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 101 or Neurobiology, Physiology, and Behavior 102. Pass 1 open to Psychology majors. Advanced integrative and other biological principles of behavioral organization, emphasizing historical roots, current research directions, conceptual issues and controversies. Laboratory exercises on the description and analysis of the behavior of captive and free living animals. (Same course as Neurobiology, Physiology, and Behavior 150.) Not open for credit to students who have completed course 150. (Former course 150) Owings, Sibley.

123. Hormones and Behavior (3)
Lecture—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101 and either course 101 or Neurobiology, Physiology, and Behavior 102. Pass 1 open to Psychology majors. Endocrine physiology with an emphasis on the principles of behavior. Fundamental to animal behavior and social behavior, including the effects of hormones and various behaviors engaged in by the organism during its lifetime. Role of hormones in behavioral homeostasis, social behavior, reproductive behavior, parental behavior, adaptation to stress. (Same course as Neurobiology, Physiology, and Behavior 152.) Not open for credit to students who have completed course 152. (Former course 152.)

124. Comparative Neuroanatomy (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: course 101 or Neurobiology, Physiology, and Behavior 100 or 101. Overview of the neuroanatomy of the nervous system in a variety of mammals and non-mammalian species. Examine changes or modifications to neural structures as a result of morphological or behavioral specializations. (Same course as Neurobiology, Physiology, and Behavior 124.) —II, (III) Krubitizer, Recanzone.

126. Health Psychology (4)
Lecture—4 hours. Prerequisite: course 1, 41, 101. Pass 1 open to Psychology majors only. Psychobiological factors influencing health and illness. Topics include stress and coping, personality and health, symptom perception and reporting, heart disease, cancer, compliance, and health maintenance and promotion. Not open for credit to students who have completed course 160. —II, III, (II, III) Capitainio, Emmons.

127. Animal Cognition (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: courses 1, 41, 101. Pass 1 open to Psychology majors. Review of the historical backdrop, theoretical issues, and scientific methods of studying animal cognition in a wide range of species. Emphasis on learning processes, pattern recognition, and the neurobiology of learning and memory. Not open for credit to students who have completed course 134. (Former course 134.) —II, (III) Cross.

128. Information Processing Models in Neuroscience and Psychology (4)
Lecture—3 hours; term paper. Prerequisite: Mathematics 16B, Physics 78, course 101 or Neurobiology, Physiology, and Behavior 100. Pass 1 open to Psychology majors. Basic mathematical modeling techniques used in neuroscience and psychology. Specific topics include linear systems theory, Fourier transforms, neural networks, adaptive systems, probabilistic inference theory. Emphasis on understanding information processing in neural systems. (Same course as Neurobiology, Physiology, and Behavior 163.) Not open for credit to students who have completed course 163. (Former course 163.) —II, (III) Olohsen.

129. Sensory Processes (4)

130. Human Learning and Memory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1, 41, 100, and either Statistics 13 or 102; or consent of instructor. Consideration of major theories of human learning and memory with critical examination of relevant experimental data. —II, III, (II, III) Ranganath, Yelonias.

131. Perception (4)
Lecture—3 hours; independent library work. Prereq- uisite: courses 1, 41. The cognitive organizations related to perception and the changes mediated through sensory channels. The perception of objects, space, motion, events. —II, III, (II, III) Post, Whitney.

132. Language and Cognition (4)
Lecture—3 hours, term paper. Prerequisite: courses 1, 41, 100; or consent of instructor. Introduction to the cognitive processes involved in language comprehension and production. Topics include the biological foundations of language, speech perception, word recognition, syntax, reading ability, and prag- matics. —II, III, (II, III) Tavor, Travaler.

135. Cognitive Neuroscience: The Biological Foundations of the Mind (4)
Lecture—3 hours; writing. Prerequisite: courses 1, 41, and 100 or 131; or consent of instructor; course 101, 121, or 129 required. Biological foundations of higher mental processes including attention, memory, language, higher-level perceptual and motor processes, and consciousness. Emphasis on the neural mechanisms underlying the substrates of human cognition, and the relationship of mind to brain. —I, II, (II, III) Janata, Mungin, Ranganath.

136. Psychology of Music (4)
Lecture/discussion—3 hours; term paper. Prerequi- site: courses 1, 41, 100 or 131 or Music 6C; or consent of instructor. Introduction to the mental and neural representations of musical structures and processes involved in perceiving, remembering, and composing music. GE credit: Wrt.—II, III, (II, III) Ghetti, Gibbs, Goodman, Lagattuta, Oakes.

141. Cognitive Development (4)
Lecture—3 hours; term paper. Prerequisite: Human Development 100A or 100B or course 140. Pass 1 restricted to Human Development or Psychology majors. Theories, methods, evidence, and debates in the field of cognitive development, such as nature/nurture, constraints on learning will be evaluated. —II, III, (II, III, III) Ghetti, Gibbs, Goodman, Graf Estes, Lagattuta, Rivera.

142. Social and Personality Development (4)
Lecture—3 hours; term paper. Prerequisite: Human Development 100A or 100B or course 140. Pass 1 open to Human Development or Psychology majors. Social and personality development of children, infancy through adolescence. Topics include the development of personal identity, self-understanding, sex-role identity, and antisocial behavior. Emphasis on the interface between biological and social factors. (Same course as Human Development 101.) GE credit: Wrt.—II, III, (II, III) Chen, Ghetti, Gibbs, Goodman, Graf Estes, Lagattuta, Rivera.

143. Infant Development (4)
Lecture—3 hours; lecture/discussion—1 hour; exten- sive writing. Prerequisite: courses 1 and 41, and either course 140 or Human Development 100A. Psychological development in infancy. Topics include physical and motor development, sensory and ner- vous system development, and memory and cognitive development. Emphasis on theoretical and empirical research, and practical methods for understanding infant development. —II, (III) Oakes.

146. The Development of Memory (4)
Lecture—3 hours; term paper. Prerequisite: courses 1, 41, Pass 1 open to Psychology majors. Theory and research on memory development with focus on infancy and childhood. Not open for credit to students who have completed course 132. —II, III, (II, III) Ghetti, Goodman, River.

148. Developmental Disorders (4)
Lecture/discussion—3 hours; term paper. Prerequi- site: courses 1, 41, and either 140 or 141 or Human Development 100A or 100B. Current scientif- ical knowledge of the influences of biological, cogni- tive, and environmental factors on the emergence of disorders with onset in childhood. Examples include autism spectrum, ADHD, dyxisia and dyscal-
151. Social Psychology (4) Lecture—4 hours. Prerequisite: courses 1, 41. Pass 1 open to Psychology majors. Behavior of the individual in the group. Examination of basic psychological processes and social situations, varying surveying various problems of social interaction; group tensions, norm-development, attitudes, values, public opinion, status. Not open for credit to students who have completed course 145. (Former course 145—I, II, III, Ill., Ill., III.) Johnson, Pickett, Shaver, Sherman

152. Social Cognition (4) Lecture—4 hours. Prerequisite: courses 1 and 41. Examines how social factors influence how we attend to, encode, and process information and how these mental processes affect subsequent judgments and behavior.—I, II, III, (I, II, Ill.) Johnson, Pickett, Shaver, Sherman

153. Psychology and Law (4) Prerequisite: courses 1, 41. Pass 1 open to Psychology majors. Current theoretical and empirical issues in the study of psychology and law. Topics include eyewitness testimony, child abuse, jury decision making, gender and the law, and psychological aspects of violent crime, defense strategy, and criminal procedure. Not open for credit to students who have completed course 147. (Former course 147.) GE credit: SocSci, Writ.—I, II, III, (I, II, Ill.) Emmons, Robins, Shaver

165. Introduction to Clinical Psychology (4) Lecture—4 hours. Prerequisite: courses 1, 41, 168, and either 140 or 151. Major theoretical formulations in the history of clinical psychology, from classical psychology to contemporary existential and behavioral modification. A survey of major theoretical formulations, based on lectures, films, and tapes, of what clinical psychologists do, including methods of appraisal, professional roles, and approaches to treatment.—I, II, III, (I, II, Ill.) Horn, Sue, Zane

168. Abnormal Psychology (4) Lecture—4 hours. Prerequisite: courses 1, 41. Descriptive and functional account of behavioral disorders, with primary consideration given to neurotic and psychotic disorders. Not open for credit to students who have completed course 115. (Former course 115 offered in alternate years.)—III. Goodman, Johnson

154. Psychology of Emotion (4) Lecture—4 hours. Prerequisite: course 1, 41. Pass 1 open to Psychology majors. Introduction to current theories of emotion and bodily feelings with special reference to self-knowledge. Not open for credit to students who have completed course 143. (Former course 143—I, II, III, Ill., Ill.) Robins, Shaver

155. Environmental Awareness (4) Lecture—4 hours. Prerequisite: course 1, Pass 1 open to Psychology majors. Interactions of people and the environments they construct. Research methods used to study environmental attitudes, values, and behaviors and studies of current research in environmental psychology. Not open for credit to students who have completed course 144. (Former course 144.) GE credit: SocSci.—I, (II) Coos

157. Stereotyping, Prejudice, and Stigma (4) Lecture/discussion—3 hours; term paper. Prerequisite: Psychology 151. Social psychological underpinning of stereotyping, prejudice, and stigma from sociocultural, motivational, and cognitive perspectives. Topics include: origins, maintenance, change, effects on person perception and memory, and the automaticity/controllability of stereotyping and prejudice. Offered in alternate years.—Sherman


159. Gender and Human Reproduction (4) Lecture—4 hours. Prerequisite: course 1 and 41. Pass 1 open to Psychology majors. Psychology of reproduction. Reproductive events over the course of an individual’s life, including sexual development, mate choice, relationships, and reproduction. Biological and social psychological explanations at the levels of mechanism and evolutionary function. Not open for credit to students who have completed former course 149. [Formally course 149—I, II, Ill.] Scheib

161. Psychology of the Self (4) Lecture—4 hours. Prerequisite: courses 1 and 41. Psychological theory and research on the self. Topics include: self-knowledge, self-esteem, self-regulation, self-presentation, cognitive and emotional aspects of the self, and the role of the self in shaping social interaction.—I, III, Ill., Ill., Ill., Ill. (I, II, Ill.) Pickert, Robins

162. Personality Theory (4) Lecture—4 hours. Prerequisite: courses 1, 41. Pass 1 open to Psychology majors. Theories of Freud, Erikson, and other major twentieth-century contemporary approaches. Not open for credit to students who have completed course 147. (Former course 147.) GE credit: SocSci, Writ.—I, II, III, (I, II, Ill.) Emmons, Robins, Shaver

190. Seminar in Psychology (4) Seminar—4 hours. Prerequisite: junior or senior standing; major in psychology or consent of instructor. Intensive treatment of a special topic or problem of psychological interest. May be repeated for credit in different subject area.—I, II, III, (I, II, Ill.)

190X. Upper Division Seminar (1-2) Seminar—1-2 hours. Prerequisite: upper division standing and consent of instructor. In-depth examination at an upper division level of a special topic in Psychology. Emphasis on student participation in learning. May not be repeated for credit. Limited enrollment.

192. Fieldwork in Psychology (1-6) Fieldwork—1-6 hours. Prerequisite: upper division standing in psychology and consent of instructor. Supervised internship off and on campus, in community and institutional settings. Maximum of four units may be used towards satisfaction of upper division major requirement. May be repeated once for credit. Limited enrollment (P/NP grading only.)

194HA-194HB. Special Study for Honors Students (1-2) Independent study—9 hours. Prerequisite: senior standing in Psychology and qualifications for admission into college honors program, and consent of instructor; at least one course from 180A, 180B, 180C or 199 strongly recommended. Directed research. Supervised reading, research and writing leading to submission of a Senior Honors thesis under the direction of faculty sponsor. (Deferred grading only; pending completion of sequence.)

197T. Tutoring in Psychology (1-3) Tutoring—1-3 hours. Prerequisite: upper division standing and consent of instructor. Intended for advanced undergraduate students who will lead discussion sections in Psychology courses. May be repeated for credit for a total of 8 units. (P/NP grading only.)

198. Directed Group Study (1-5) Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5) (P/NP grading only.)

Graduate Courses

200. Proseminar in Psychology (3) Seminar—2 hours; independent study—1 hour. Prerequisite: graduate standing in Psychology or consent of instructor. Introduces graduate study to graduate students to research activities of departmental faculty. (S/U grading only.)—I, II

201. Research Preceptorship (4) Laboratory—3-4 hours; discussion—3-5 hours. Prerequisite: consent of instructor. May be repeated for credit. (S/U grading only.)—I, II, III, (I, II, Ill.)

202. Research Seminar (1) Seminar—1 hour. Prerequisite: graduate standing in Psychology. Presentation of graduate research to program faculty and graduate students. May be repeated for credit. (S/U grading only.)—I, II, III, (I, II, Ill.)

204A. Statistical Analysis of Psychological Experiments (4) Lecture—4 hours. Prerequisite: Statistics 102 or the equivalent and graduate standing in Psychology or consent of instructor. Probability theory, sampling distributions, statistical inference, and hypothesis testing using standard parametric and nonparametric approaches. Analysis of variance, factorial and repeated measures, and tests of trends. Not open for credit to students who have completed course 206.—I, Ferrer, Widaman

204B. Causal Modeling of Correlational Data (4) Lecture—4 hours. Prerequisite: course 204A or the equivalent or consent of instructor. Examination of how to make causal inferences from correlational data.
data in the behavioral sciences. Emphasis on testing rival causal models using correlations among observed variables with multiple regression analysis, discussion advances to path analysis and related techniques.—II. Simonton

204C. Applied Psychometrics and Measurement Theory
Lecture—4 hours. Prerequisite: course 204A or the equivalent or consent of instructor. Examination of the basic principles and applications of classical and modern test theory. Topics include test construc-
tion, reliability theory, factor analy-

204D. Advanced Statistical Inference from Psychological Experiments (4)
Lecture—4 hours. Prerequisite: course 204A or the equivalent or consent of instructor. Advanced topics in statistical inference, which may include probability theory, sampling distributions, statistical inference and hypothesis testing, nonparametric statistics, Bayesian approaches, and advanced issues in analysis of variance. Not open for credit to students who have completed course 205. (Former course 204.) Offered in alternate years.—III. Wida-
man

205A. Applied Multivariate Analysis of Psychological Data
Lecture—4 hours. Prerequisite: three courses from 204A, 204B, 204C, 204D or the equivalents, or consent of instructor. Review of the major methods of multivariate data analysis for psychological data. Statistical routines using a linear algebra-based comput-
ing language. Topics include multivariate analysis of variance, discriminant analysis, canonical analy-
sis factor analysis, and component analysis. Not open for credit to students who have completed course 207B. (Former course 207B.) Offered in alternate years.—II. Ferrer

205B. Factor Analysis (4)
Lecture—4 hours. Prerequisite: graduate standing, course 204A and 204B or the equivalent or consent of instructor. Theory and methods of factor analysis including exploratory factor analysis, confirmatory factor analysis, and principal component analysis. Offered in alternate years.—II. Wida-
man

205C. Structural Equation Modeling (4)
Lecture—4 hours. Prerequisite: graduate standing, course 204A and 204B or the equivalent or consent of instructor. Theory and methods of structural equation modeling, confirmatory factor analysis, and multiple-group modeling. Offered in alternate years.—II. Ferrer, Grimm, Wida-
man

205D. Multilevel Models (4)
Lecture—4 hours. Prerequisite: course 204A, gradu-
ate standing or consent of instructor. Introduction to statistical techniques for the analysis of normal, hier-
archically structured data, such as cross-sectional clustered data or repeated measures data. Topics include hierarchical linear models, latent growth curve models, and how these methods handle unbal-
anced data and missing data.—II. (II.) Bizoz

207. Survey and Questionnaire Research Methods (4)
Lecture/discussion—4 hours. Prerequisite: comple-
tion of a course on social or behavioral research methods, graduate standing. Survey and question-
naire research methods with emphasis on how to ask questions. Cognitive, motivational, and social pro-
cesses that influence how respondents answer ques-
tions; sampling techniques, Internet resources, practical aspects of administering a survey and question-
naire research. Not offered every year.—I. Herak

208. Physiological Psychology (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. A conceptual analysis of the physiology of the nervous system and neurochemistry to an understanding of animal and human behavior.

209A. Introduction to Programming: Matlab (4)
Lecture/lab—3 hours. Prerequisite: graduate standing or consent of instructor. The Matlab pro-

209B. Matlab Programming (4)
Lecture/lab—3 hours. Prerequisite: course 209A or the equivalents. Practical applications of programming in MATLAB, including data visualization, numerical methods. Not offered every year.—II. Granott

210. Fundamentals of Cognitive Neuroimaging (3)
Lecture/discussion—3 hours. Prerequisite: basic knowledge of inferential statistics and experimental psychology. Introduction to empirical foundations and methodologies of neuroimaging, emphasizing generally and functional magnetic resonance imaging (fMRI) for study cognition. Topics include MTR, the relationship between neural activity and BOLD response, clinical design, and analysis of fMRI data. Ranganathan

211. Advanced Topics in Neuroimaging (2)
Seminar—2 hours. Prerequisite: Psychology 210 or consent of instructor. Critical presentation and dis-
cussion of the most influential advanced issues in neuroimaging, emphasizing fMRI design and analysis and the integration of fMRI with EEG/MEG. Limited enrollment. (Same course as Neuroscience, Psychology, and Behavior 211 and Neuroscience 211.) (E/ U grading only.—II. (II.) Miller

212A. Developmental Psychology: Cognitive and Perceptual Development (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor, completion of undergraduate or graduate course on developmental psychology or human development. Theories and empirical find-
ings concerning human cognitive and perceptual development, including processes of perception, memory, concepts (e.g., theory of mind, concepts about num-

212B. Developmental Psychology: Social, Emotional, and Personality Development (4)
Seminar—4 hours. Prerequisite: graduate standing, course 204A and 204B or the equivalent or consent of instructor. Examination of the common underlying cognitive and development processes and methodology of neuroimaging, emphasizing fMRI design and analysis and the integration of fMRI with EEG/MEG. Limited enrollment. (Same course as Neuroscience, Psychology, and Behavior 211 and Neuroscience 211.) (E/ U grading only.—II. (II.) Miller

213. Topics in Social Psychology (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Theory and research in social psychology.—I. (III.) Johnson, Pick-
ett, Rubins

214. Personality (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Theory and research in human personality.—II. (II.) Emmons, Rubins

215. Comparative Psychology (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. The study of animal behavior in an evolutionary and comparative framework.—II. Owings

216. Topics in Genetic Correlates of Behavior (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Critical study in a selected area of psychology. May be repeated for credit when topics differ. Offered in alternate years.

217. Cognitive Neuroscience (4)
Lecture—3 hours, discussion—1 hour. Prerequisite: graduate student standing in psychology or consent of instructor. Core course for neuroscience. Neurobiological bases of higher mental function including attention, memory, language, and consciousness. One of three in a three-quarter sequence. (Same course as Neuroscience 220.)—I. (III.) Owings

218B. Fundamentals of Animal Behavior (5)
Lecture/discussion—4 hours, discussion—1 hour. Prerequisite: consent of instructor; course 209A. Sur-

219. History of Psychology (4)
Lecture—2 hours, seminar—2 hours. Prerequisite: graduate standing in psychology or consent of instructor. A lecture-seminar on the history of psy-

220. History of Psychology (4)
Lecture—2 hours, seminar—2 hours. Prerequisite: graduate standing in psychology or consent of instructor. A lecture-seminar on the history of psy-

Quarter Offered: I—Fall, II—Winter, III—Spring, IV—Summer; 2009-2010 offering in parentheses
General Education (GE) credit: ArtsHum—Arts and Humanities; SciEng—Science and Engineering, SocSci—Social Sciences, Div—Social-Cultural Diversity; Wrt—Writing Experience
Quantitative Biology and Bioinformatics

(College of Biological Sciences)

The interdisciplinary minor in Quantitative Biology and Bioinformatics is an integrative program that introduces students to the quantitative and computational approaches that are redefining all disciplines in the biological sciences, from molecular and cell biology, through genetics and physiology, to ecology and evolutionary biology. Students in this minor will learn research tools that apply mathematical and computational methods, increase their insight into the strengths and limitations of quantitative approaches, and develop the interdisciplinary perspective that is now the foundation of modern biological research and training.

The minor in Quantitative Biology and Bioinformatics is open to all undergraduates regardless of major and is sponsored by the College of Biological Sciences.

Minor Program Requirements:

UNITs

Quantitative Biology and Bioinformatics .......................... 18-24

Core Courses ....................................................... 8-12

Programming: Computer Science Engineering 10 or 30 or the equivalent* .................... 4

Quantitative Biology: Biological Sciences 132 or Mathematics 124 .................... 4

Bioinformatics: Computer Science Engineering 124 .................... 4

Quantitative and Computational Preparation .......................... 4

Complete one course from the following:

Applied Science Engineering 115;

Computer Science Engineering 122;

Mathematics 128A, 128B, 128C, 135A;

Statistics 130A, 131A, 141A

Restricted Electives ..................... 6-8

Complete two or more courses from the following list to achieve a total of 18-24 units:

Biomedical Engineering 117, 141, 151;

Biology 150, Computer Science Engineering 165A, 166, Evolution and Ecology 102, 103, 104, 175;

Molecular and Cellular Biology 123, 143;

Neurobiology, Physiology, and Behavior 105, 163;

one course from Environmental Science and Policy 121 or Wildlife, Fish, and Conservation Biology 122;

one course from Molecular and Cellular Biology 182 or Neurobiology, Physiology, and Behavior 131

Restrictions. No more than two upper division courses from a single department may be offered in satisfaction of the minor requirements. Only one course used to satisfy a requirement for the minor may be applied toward a student’s major.

*The programming requirement may be satisfied by previous experience and therefore may not entail college course credit. Please see your minor adviser for this determination and its possible impact on your unit requirements for the minor.

Minor Adviser. Consult the College of Biological Sciences Dean’s office in 202 Life Sciences, (530) 752-0410.

Radiology

See Medicine, School of, on page 367.

Range Science

(College of Agricultural and Environmental Sciences)

Faculty. See Plant Sciences, on page 448.

Religious Studies

(College of Letters and Science)

Naomi Janowitz, Ph.D., Program Director
Program Office. 524 Sproul Hall (530) 752-4999; http://religions.ucdavis.edu

Committee in Charge

Catherine Chin, Ph.D. (Religious Studies)

Allison Coudert, Ph.D. (History)

Mark Elmore, Ph.D. (Religious Studies)

Naomi Janowitz, Ph.D. (Religious Studies)

Whalen Lai, Ph.D. (Religious Studies)

Jay Mechling, Ph.D. (American Studies)

Flagg Miller, Ph.D. (Linguistic Anthropology)

Brenda Schildgen, Ph.D. (Comparative Literature)

Baki Teyzan, Ph.D. (Religious Studies, History)

Archana Venkatesan, Ph.D. (South Asia Studies)

Keith Watenpaugh, Ph.D. (History)

Faculty

Catherine Chin, Ph.D., Assistant Professor

Allison Coudert, Ph.D., Professor

Mark Elmore, Ph.D., Assistant Professor

Naomi Janowitz, Ph.D., Professor

Whalen W. Lai, Ph.D., Professor

Flagg Miller, Ph.D., Assistant Professor

Baki Teyzan, Ph.D., Assistant Professor

Archana Venkatesan, Ph.D., Assistant Professor

Keith Watenpaugh, Ph.D., Associate Professor

Emeriti Faculty

Lincoln D. Hurst, Ph.D., Professor Emeritus

The Major Program

Majoring in religious studies provides an opportunity to explore and analyze, from an academic perspective, the written and oral traditions of diverse religious traditions.

The Program. The major introduces students to the academic study of religion. The religious studies major offers a broad choice of courses, including history, philosophy, sociology, anthropology, American studies, classics, and medieval studies. For some students, religious studies is an appropriate second major and might combine well with anything from philosophy to international agricultural development, from history to international relations.

Career Alternatives. The emphasis in religious studies courses on developing analytical thinking skills and clear written expression is an asset for many career goals. As a strong liberal arts program, the major can lead to research and/or teaching on all levels in the field of religion. Because the major integrates so many academic areas, it is also an excellent background for graduate programs, especially in the humanities, and for professional schools including law, business, and foreign service.
A.B. Major Requirements:

Preparatory Subject Matter:........... 20
At least one course from each of the following groups:........... 20
(a) Religious Studies 1, 2
(b) Religious Studies 21, 23, 40, 60, 70, 75
Anthropology 2 or, with approval from adviser, a lower division course related to religion from African American and African Studies, American Studies, Philosophy, Native American Studies, or other departments. 4

Depth Subject Matter:................. 40
Five upper division Religious Studies courses plus Religious Studies 100........... 24
Two upper division History courses related to religion........... 8
Sociology, philosophy, anthropology........... 8

Total Units for the Major............. 64

Recommended. A reading knowledge of a foreign language is highly recommended. Consult the major adviser for a complete list of recommended upper division related courses.

Course Equivalents. The major advisers have a list of lower and upper division courses that can be substituted for courses suggested above.

Major Advisers. A. Coudert, M. Elmore, F. Miller, K. Watenpaugh

Minor Program Requirements:

Religious Studies.......................... 20
Lower division course.................... 4
Upper division courses................. 16
Religious Studies 100 required.

Some substitutions from other departments or programs allowed with consent of adviser.

Jewish Studies. Students interested in Jewish studies should contact D. Biale of History.

Courses in Hebrew (HEB)

Lower Division Courses

1. Elementary Hebrew (5)
   Lecture/discussion—4 hours; laboratory—1 hour. Speaking, listening, comprehension, reading and writing fundamentals of modern Hebrew. Prerequisite: course 2 or consent of instructor. Students who have successfully completed, with a C- or better, Hebrew 2 or 3 in the 10th or higher grade in high school may receive credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student’s P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed. 1-2

2. Elementary Hebrew (5)
   Lecture/discussion—4 hours; laboratory—1 hour. Prerequisite: course 1 or the equivalent. Speaking, listening, comprehension, reading and writing fundamentals of modern Hebrew. 1-2

3. Elementary Hebrew (5)
   Lecture/discussion—4 hours; laboratory—1 hour. Prerequisite: course 2 or the equivalent. Speaking, listening, comprehension, reading and writing fundamentals of modern Hebrew. 1-2

21. Intermediate Mod Hebrew I (5)
   Lecture/discussion—5 hours. Prerequisite: course 2 or consent of instructor. Development and refinement of grammar, composition, and language skills required for reading literary texts and conversing about contemporary topics at an advanced level. History of the Hebrew language. Not open to students who have taken courses 100 or 100A. 1-2

22. Intermediate Modern Hebrew II (5)
   Lecture/discussion—3 hours. Prerequisite: course 21 or consent of instructor. Continued development and refinement of grammar, composition, and language skills required for reading literary texts and conversing about contemporary topics at an advanced level. History of the Hebrew language. Not open to students who have taken course 101 or 100B. 1-2

23. Intermediate Modern Hebrew III (5)
   Lecture/discussion—3 hours. Prerequisite: course 22 or consent of instructor. Further development of language skills required for reading literary texts and conversing about contemporary topics at an advanced level. History of the Hebrew language. 1-2

Upper Division Courses

100AN. Advanced Modern Hebrew I (4)
   Lecture/discussion—3 hours; term paper. Prerequisite: course 23 or consent of instructor. Students who have taken course 100A as 2nd year Hebrew may take course 100AN. 1-2

100BN. Advanced Modern Hebrew II (4)
   Lecture/discussion—3 hours; term paper. Prerequisite: course 100AN or consent of instructor. Students who have taken course 100B as 2nd year Hebrew may take course 100BN. 1-2

100CN. Advanced Modern Hebrew III (4)
   Lecture/discussion—3 hours; term paper. Prerequisite: course 100BN. Students who have taken course 100C as 2nd year Hebrew may take course 100CN. 1-2

100CN. Third year Hebrew. Advanced grammar and composition. Focus on reading of literary texts, oral skills and accuracy in writing. 1-2

100CN. Third year Hebrew. Advanced grammar and composition. Focus on reading of literary texts, oral skills and accuracy in writing. 1-2

100C. The Qur’an and Its Interpretation (4)
   Lecture/discussion—3 hours; term paper. Introduction to topics central to the Qur’an, including Muhammad, the Qur’an, Islamic law, theology, philosophy, cosmology, warship, and mysticism. Race and gender in Islam, Islamic revival, and varying experiences of Islam in different historical and cultural settings. Offered in alternate years. GE credit: ArtHum, DivSci, Wrt.—II. 1-2

105. The Qur’an and Its Interpretation (4)
   Lecture/discussion—3 hours; term paper. Introduction to topics central to the Qur’an, including Muhammad, the Qur’an, Islamic law, theology, philosophy, cosmology, warship, and mysticism. Race and gender in Islam, Islamic revival, and varying experiences of Islam in different historical and cultural settings. Offered in alternate years. GE credit: ArtHum, DivSci, Wrt.—II. 1-2

108. Hinduism (4)
   Lecture—3 hours; writing. Hindu tradition from ancient to modern times. Multiplicity of religious forms within Hinduism with mention of Jainism, Buddhism, and Sikhism and their relation to the mainstream of Hindu religion. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II. 1-2

109. Human Rights (4)
   Lecture/discussion—3 hours; term paper. Introduction to the interdisciplinary study of the origins, evolution, denial and protection of Human Rights. GE credit: ArtHum, Div, Wrt.—II. 1-2

200. Directed Group Study (1-5)
   Prerequisite: consent of instructor. May be repeated for credit in a different subject area. GE credit: ArtHum, Div, Wrt.—II. 1-5

99. Special Study for Lower Division Undergraduates (1-5)
   (P/NP grading only.)

Upper Division Courses

100. Study of Religion: Issues and Methods (4)
   Lecture—3 hours; term paper. Principal issues and methods of Religious Studies and associated fields. 1-3
102. Christian Origins (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 40 or consent of instructor. Offered in alternate years. (I.) Hurst

103. Christianity, 600-1700 (4)
Lecture/discussion—3 hours; extensive writing. The spread of Christianity in the medieval world; the split between Eastern and Western Christianity; Christian reactions to Judaism and Islam; the Reformations and wars of religion. Offered in alternate years. GE credit: ArtHum, Div, SocSci, Wrt.—II. Coudert

110. Life, Meaning and Identity (4)
Lecture—3 hours; term paper. Prerequisite: course 1 or 2 or upper division standing. Study of religious literature for meaning and for personal identity; how religions frame the problems of life; how cultural and personal crises affect youthfulness; the nature and structure of dreams, myths, and ideals. Offered in alternate years. —II. Lai

115. Mysticism (4)
Lecture—3 hours; term paper. Prerequisite: one lower division Religious Studies course [except 10, 98, or 99]. Historical and descriptive analysis of selected key figures in mystical traditions and readings of representative mystical texts. Analytic term paper. Offered every three-four years. GE credit: ArtHum, Div, Wrt.—(II.)

120. Religion, Magic and Science (4)
Lecture—3 hours; term paper. Prerequisite: course 21 or 40 or consent of instructor. Survey of the magic, religion, and science from the middle ages to the present. Contrast between modern scientific methodology and religious and magical thinking. (Same course as Science and Technology Studies 120.) Offered in alternate years. GE credit: ArtHum, Div, Wrt.—(II.) Coudert

122. Studies in Biblical Texts (4)
Lecture—3 hours; term paper. Prerequisite: course 21 or 40 or consent of instructor. Study of the Prophets or writings from critical, historical, and religious perspectives. May be repeated once for credit in different subject area. —III. (Ill.) Janowitcz

124. Topics in Judaism (4)
Lecture—3 hours; term paper. Prerequisite: course 23. Examination of selected aspects of Jewish life, religion, or literature. Potential topics include: Jewish Perspectives on Jesus; The Golem; History and Legends of the Prophet Elijah in Late Antique Judaism and Early Christianity. May be repeated for credit when topic differs. —II.

125. Dead Sea Scrolls, Apocrypha, and Pseudepigrapha (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 21 or 40 or consent of instructor. Survey of the Dead Sea Scrolls, apocryphal and pseudepigraphical writings of Judaism and Christianity and their historical, social, and religious importance. GE credit: Wrt.—II. Janowitcz

130. Topics in Religious Studies (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one from course 1, 2, 3A, 3B, or 3C or consent of instructor. Thematic study of a phenomenon in more than one religious tradition or of the relationship between religion and another cultural phenomenon. Topics may include archeology and the Bible, women and religion, religion and violence. May be repeated for credit when topic differs. —II. III.

135. The Bible and Film (4)
Lecture—2 hours; term paper; film-viewing—3 hours. Prerequisite: Humanities 10 recommended. Examination of the uses of the Judeo-Christian scriptures in film. Topics include dramatic depictions of biblical stories, the tension between science and religion, allegorical treatments of biblical themes, and the problems of representation. —III. Hurst

140. Christian Theology (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 40; course 102 recommended. Historical and systematic introduction to Christian doctrine, with an emphasis on traditions and the problem of orthodoxy and heresy. —I. (II.) Hurst

Lecture—3 hours; discussion—1 hour. Prerequisite: course 40. Life and thought of the early Church as reflected by the Synoptic Tradition—Matthew, Mark, Luke and Acts. Offered every third year to alternate with 141B. GE credit: ArtHum, Div. —Hurst

141B. New Testament Literature: John (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40. Life and thought of the early Church as reflected by the Johannine Tradition—the Gospel and letters of John. Offered every third year to alternate with 141A, 141C. GE credit: ArtHum, Wrt.—III. Hurst

141C. New Testament Literature: Paul (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40. Life and thought of the early Church as reflected by the Pauline tradition—the letters of Paul. Offered every third year to alternate with 141A, 141B. GE credit: ArtHum, Wrt.—(II.) Hurst

145. Contemporary American Religion (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 40 and History 178 recommended. Examination of several major movements and phenomena in twentieth-century American religion. Offered in alternate years. —II.

150. Religious Ethics (4)
Lecture/discussion—4 hours, term paper. Prerequisite: course 40. Study of the religious bases of ethics through concentration on the ethical tracts of one major tradition, or through a comparison of the attitudes of two or more traditions to a common ethical issue. Offered every three years. —II. (II.) Lai

160a. Introduction to Islamic Thought (4)
Lecture—3 hours; extensive writing. Prerequisite: course 60 recommended. The development of Islamic thought from the first centuries of Islam to the eighteenth century. Theology, philosophy, ethics, Sufism, historiography, political theory, fundamentalism, al-Ghazzali, Rumi, Moli, Abul Wathab. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—II. Tezcan

161. Modern Islam (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 60 or consent of instructor. The response of Islam to modernity: secularism, reformism, fundamentalism. Islam and imperialism, women, media and immigration, colonialism, Islam in America and Europe. GE credit: ArtHum, Div, Wrt.—II. Tezcan

162. Introduction to Islamic Law (4)
Lecture—3 hours; extensive writing. Prerequisite: course 60 recommended. The development of Islamic law in the formative centuries of Islam, ca. 600-1000, as well as its adaptation to changing economic, social, and political conditions in subsequent periods. Legal schools, legal theory, the Shari‘a, reformist movements, human rights. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt.—II. Tezcan

165. Islam in Asia (4)
Lecture/discussion—3 hours; extensive writing. Islam as a lived religion in the Indian subcontinent, Central Asia, China, and Southeast Asia. Emphasis is on primary sources studied comparatively and historically. GE credit: ArtHum, Div, Wrt.—III. Hurst

167. Iraq (4)
Seminar—3 hours; term paper. Origins, causes and ethical challenges of conditions in Iraq; larger historical, cultural and ethical dimensions of mass violence, war, liberation, neoliberalism, terrorism and resistance. —III. (III.) Watampaugh

170. Buddhism (4)
Lecture—3 hours; term paper. Buddhism in its Pan-Asian manifestations, from its beginning in India to its development in Sri Lanka and Southeast Asia, Central Asia, China and Japan; teachings and practices, socio-political and cultural impact. Offered in alternate years. —III. Lai

172. Ch’an (Zen) Buddhism (4)
Lecture/discussion—3 hours, term paper. Doctrines and methods of the Ch‘an Buddhism, both ancient and modern. Review of ritual techniques, including meditation. —II. Lai

189. Senior Colloquium (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor. Primarily for seniors in Religious Studies. Discussion in depth of a problem in religion which requires the methods of several disciplines and is important in the encounter between religions. —II, (II.)

190. Seminar (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor; required of all Religious Studies majors. Allows majors to integrate their disciplined study of the field. Emphasis on current scholarly debate about the methods for analyzing and comparing diverse religious traditions. —(I.)

194HA-194HB. Special Study for Honors Students (1-5)
Independent study. Open only to majors of senior standing who qualify for honors program. Guided research, under the direction of a faculty member approved by the Program Director, leading to a senior honors thesis on a religious studies topic. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

201. Methods and Issues in Religious Studies (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Focuses on controversies in the study of comparative religion. How is religion best defined? Are there methods unique to the study of religion? What does the study of religion contribute to the study of society in general? May be repeated twice for credit when topic differs. Offered in alternate years. —II. Coudert

212. Religion and Violence (4)
Seminar—3 hours; term paper. Comparative and critical study of the ideological, cultural, and theological relationship between forms of violence and religion and religious practice. Offered in alternate years. —(II.) Watampaugh

299. Directed Research (1-12)
(S/J grading only.)

Russian

(College of Letters and Science)
Gail E. Finney, Ph.D., Program Director

Program Office. 524 Sproul Hall (530) 752-4999; http://russian.ucdavis.edu

Committee in Charge
Carlee Arnett, Ph.D., (German and Russian) Winder McConnell, Ph.D. (German and Russian)
Oliga Stuchebokhrov, Ph.D., Associate Professor (German and Russian)

Faculty
Oliga Stuchebokhrov, Ph.D., Assistant Professor Emeriti

Yuri Druzhnikov, Ph.D., Professor Emeritus James Gallant, Ph.D., Lecturer Emeritus
Daniel Rancour-Laferriere, Ph.D., Professor Emeritus Valerie A. Tumins, Ph.D., Professor Emerita

The Major Program

The Russian major introduces students to a culture rich in art, music, theater, film, language, and literature. The major offers an opportunity to learn skills...
needed to enter the fields of foreign affairs, world politics, and international trade, or to begin graduate work in literature, history, cultural studies and international relations.

The Program. The major program instructs students in speaking, understanding, reading, and writing the Russian language. The program also acquaints students with the intellectual and cultural contributions of the Russian world through the study of its literature, traditions, and institutions.

Internships and Career Alternatives. Russian majors may participate in internships where they can serve as translators and interpreters for schools and business firms throughout Northern California. Upon graduation, many Russian majors enter the business world or enter graduate programs in Slavic studies and international relations. The program encourages students to supplement their Russian studies with courses in related fields such as international relations, political science, computer science, cultural studies, or economics in order to maximize their career possibilities.

A.B. Major Requirements:

<table>
<thead>
<tr>
<th>Preparatory Subject Matter</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russian 1 through 6, or the equivalent</td>
<td>0-27</td>
</tr>
<tr>
<td>Russian 41 or 42</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth Subject Matter</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russian 101A, A, 101B, 101C</td>
<td>12</td>
</tr>
<tr>
<td>Russian 102 or 103 or 104 or 105</td>
<td>4</td>
</tr>
<tr>
<td>Russian 150</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional upper division units chosen in consultation with advisor.

| Total Units for the Major | 44-71 |

Major Adviser. Olga Stuchebrubkov

Minor Program Requirements:

<table>
<thead>
<tr>
<th>Russian</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russian 101A, 101B, 101C</td>
<td>12</td>
</tr>
</tbody>
</table>

Honors and Honors Program. The honors program comprises at least one quarter of study under course 149H, which will include a research paper. See also the University and College requirements.

Study Abroad. Students who have completed one or two years of Russian language study can participate in the Education Abroad Program (EAP) in Moscow. Many of our students also participate in summer, semester, and year-long programs sponsored by CIEE and ACTR in St. Petersburg and Moscow.

Teaching Credential Subject Representative. Staff; see the Teaching Credential/M.A. Program on page 109.

Prerequisite credit. Credit normally will not be given for a course if that course is the prerequisite for a course already completed.

Courses in Russian (RUS)

Lower Division Courses

Course Placement. Students who have learned Russian at home must consult the department for placement instructions. Students with two years of Russian in high school normally continue in Russian 2; those with three years, Russian 3; those with four years, Russian 4.

1. Elementary Russian (5)

Discussion—5 hours; laboratory—1 hour. Introduction to Russian grammar and development of all language skills in a cultural context with special emphasis on oral and aural communication. (Students who have successfully completed Russian 2 or 3 in the 10th or higher grade in high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student's P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.) (I.)

1A. Accelerated Intensive Elementary Russian (15)

Lecture/discussion—15 hours. Special 12 week accelerated, intensive summer session course that combines the work of courses 1, 2, and 3. Introduces to Russian grammar and development of all language skills in a cultural context with special emphasis on oral and aural communication. Not open to students who have completed course 1, 2, or 3—IV. (IV) Arnett

2. Elementary Russian (5)

Discussion—5 hours; laboratory—1 hour. Prerequisite: course 1. Continuation of grammar and language skills developed in course 1. (II.)

3. Elementary Russian (5)

Discussion—5 hours; laboratory—1 hour. Prerequisite: course 2. Continuation of grammar and language skills developed in course 2. (III.)

4. Intermediate Russian (4)

Discussion—4 hours; laboratory—1 hour. Prerequisite: course 3. Grammar review and conversational practice. (I.)

5. Intermediate Russian (4)

Discussion—4 hours; laboratory. Prerequisite: course 4. Grammar review. Introduction to literature. Conversational practice. (II.)

6. Intermediate Russian (4)

Discussion—4 hours; laboratory. Prerequisite: course 6. Continuation of course 5. Grammar review. Intermediate conversation and continued reading of literature. (III.)

10. Elementary Conversation (2)

Discussion—2 hours. Prerequisite: course 1; course 2 or 3 (concurrently). Conversational practice to improve pronunciation and master spoken idioms. May be repeated for credit up to a maximum of 6 units. (II, III, IV.)

15. Russia Today and Tomorrow (4)

Lecture/discussion of basic issues that pertain to the former totalitarian superpower which is in transition to democracy, the conflicts in Russia, its civilization and intellectual history up to including the present day and its tendencies for the future. GE credit: ArtHum, Div.—III.

41. Survey of Nineteenth-Century Russian Literature (in English) (4)

Lecture—3 hours. Introduction to dominant literary trends, major literary figures and landmarks of Russian prose and poetry from the period of Sentimentalism through Romanticism and Realism to the beginnings of Modernism. Offered in alternate years. GE credit: ArtHum, Div.—III.

42. Survey of Twentieth-Century Russian Literature (in English) (4)

Lecture—3 hours. Introduction to major literary trends such as Symbolism, Acmeism, Futurism, Neorealism, and Socialist Realism. Offered in alternate years. GE credit: ArtHum, Div.—II.

44. Children's Literature in Russia (4)

Lecture—3 hours; term paper. Knowledge of Russian not required. History and theory of children's literature, with special reference to Russian and Soviet examples. Analysis of genres, technique, and folklore elements, contrasts between Russian and Western literature. Students will write their own literature for children. Offered in alternate years. GE credit: ArtHum, Div.—II.

45. Russian Fantasy and Science Fiction (4)

Lecture/discussion—3 hours; intensive writing. Genres of fantasy and science fiction in Russian literature from pre-revolutionary to post-Soviet times. Topics include the role of science and the supernatural in literature, history of science fiction. GE credit: ArtHum, Div.—IV. (III.) Stuchebrubkov

98. Directed Group Study (1-5)

Discussion—1-5 hours. (P/NP grading only.)

105. Advanced Russian Conversation (4)

Conversation—3 hours; preparation of texts—1 hour. Prerequisite: course 6. Intensive conversational practice and discussion based on current events and contemporary texts. Offered in alternate years. GE credit: ArtHum, Div.—II.

121. Nineteenth-Century Russian Prose (in English) (4)

Lecture—3 hours; term paper. Development of prose from Pushkin and Gogol through Dostoevsky and Turgenev to Maxim Gorky. Other authors are selected sequentially: Turgenev, Goncharov, Pisemsky, Saltykov, Chekhov. Romanticism, the Natural School, critical realism, and psychological realism are covered. Offered in alternate years. GE credit: ArtHum, Div.—II.

123. Twentieth-Century Russian Prose (in English) (4)

Lecture—3 hours; term paper. Examination of various trends including Acmeism, Symbolism, Neorealism, and Socialist Realism in development of prose. Readings from such writers as Gorky, Zamiatin, Sholokhov, Pasternak, and Solzhenitsyn. Offered in alternate years. GE credit: ArtHum, Div.—II.

126. The Russian Theater (in English) (4)

Lecture—3 hours; discussion—1 hour. The main works of Russian dramatists from Gogol to the present, including Turgenev, Tolstoy, Chekhov, Gorky, Mayakovsky, Bulgakov, Sholokhov. Offered in alternate years. GE credit: ArtHum, Div.—II.

127. Nineteenth-Century Russian Poetry (4)

Discussion—3 hours; term paper. Prerequisite: course 6. Introduction to the principles of Russian verse, followed by historical and poetic analysis of the following figures: Derzhavin, Zhukovsky,
128. Twentieth-Century Russian Poetry (4)
Discussion—3 hours; term paper. Prerequisite: course 6. Introduction to principles of Russian versification followed by historical and poetic analysis of the following figures: Briusov, Blok, Akhmatova, Mandelstam, Eessen, Mayakovsky, Khlebnikov, Pasternak, Evtushenko, Voznesensky, and Brodsky. Conducted in Russian. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—II.

129. Russian Film (4)
Lecture/discussion—3 hours; term paper; film viewing—3 hours. Prerequisite: completion of Subject A requirement. History of Russian film, film and social revolution, the destruction of Stalin, disdiant visions; film and the collapse of the Soviet empire; gender and the nation in Russian film. In English; films with English subtitles. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—III.

130. Contemporary Russian Culture (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Current trends in Russian culture and the relationship between arts and politics. Topics include history of censorship, official and dissident art, recent changes in the cultural scene. Knowledge of Russian not required. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—III.

131. Literature of Revolution (4)
Lecture—3 hours; essays. Prerequisite: History 3 or 4C, and/or any introductory literature course. Study of impact of revolution on society and culture, the major artistic, political and historical works surrounding the Russian revolutions of 1905 and 1917. Offered in alternate years. GE credit: ArtHum, Wrt.—I.

132. Nature and Culture in Russia (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: any introductory course in environmental studies. History of the environmental movement in Russia from the 1920's to the present, showing the influence of Stalinism on environmental ethics; concepts of society and nature in Russian literature and film; international implications of Russian environmental policy. Knowledge of Russian is not required. GE credit: ArtHum, Div, Wrt.—II.

133. Pushkin’s Eugene Onegin (4)
Lecture/Discussion—2 hours; term paper. Prerequisite: course 101C, or consent of instructor. Detailed analyses of Pushkin’s novel Eugene Onegin; its style, syntax, and links to Russian history and culture. GE credit: ArtHum, Div, Wrt.—III.

134. Pushkin (in English) (4)
Lecture/discussion—3 hours; term paper. The life and works of Pushkin, the most prominent poet of Russia. Evaluations of Pushkin by both Russian and Western scholars. Images of Pushkin and the official myths that surround him. No knowledge of Russian required. GE credit: ArtHum, Div, Wrt.—II.

135. Dostoevsky (in English) (4)
Lecture—3 hours. Reading and analysis of Dostoevsky’s principal works such as Crime and Punishment, The Idiot, The Brothers Karamazov, and The Diary. Study of social and political views as reflected in Dostoevsky’s works. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—III.

136. Tolstoy (in English) (4)
Lecture—3 hours. Study of Leo Tolstoy’s literary evo-

142. Women’s Autobiography (in English) (4)
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: any introductory Russian literature course in literature. An examination of Russian women’s autobiography from the 18th through the 20th centuries, emphasizing the way in which the genre of autobiography serves as a means of the writer’s creation of herself, as opposed to her definition by others. Offered in alternate years. GE credit: ArtHum, Div, Wrt.

148. Directed Group Study (1-5)
(P/NP grading only)

149. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)
subject matters. The minor for the program includes, in addition to Science and Society courses, upper division courses that fulfill the College of Agricul-
tural and Environmental Sciences and the College of Letters and Science in the areas of history and phil-
osophy of science, policy and decision making, communication of science, and culture, ethics and
applications.

Minor Program Requirements:

UNITS
Science and Society ........................................... 22-27
Science and Society 1 ........................................... 4
Science and Society 2, 5, 15, 20, 30, 90A, 90B, 90C or 90X ........................................... 2
One course from each of the four following areas:

- History and Philosophy of Science: Community and Regional Development 118, 162, History 185A, 185B, History and Philosophy of Science 150, Nature and Culture 100, Philosophy 107, 108, or 109 ........................................... 4
- Policy and Decision Making: Agricultural and Renewable Resources 120, 147, 150, Consumer Science 100, Environmental Sciences 165, Political Science 175, Sociology 155, or 181 ........................................... 3
- Communication of Science: Agricultural Education 120, Agricultural Management and Rangeland Resources 122, Anthropology 120, Communication 115, 130, 133, 138, 140, Community and Regional Development 174, Economics 163, Political Science 165 ........................................... 3
- Culture, Ethics and Applications: Agricultural Management and Rangeland Resources 101, Community and Regional Development 142, Environmental Science and Policy 126, 164, Fiber and Polymer Science 110, International Agricultural Development 104, Plant Biology 151, Plant Pathology 140, or Sociology 144 ........................................... 3
Science and Society 120 ........................................... 3

Minor Adviser. D. M. Rizzo


Courses in Science and Society (SAS)
Lower Division Courses

1. Critical Inquiry into Contemporary Issues (4)
   Lecture/discussion—3 hours; discussion—1 hour. Contemporary issues, including global population trends, economic and environmental changes, cultural diversity and biodiversity, nutrition and food safety, fiber and textiles, changing consumer cul-
tures. Inquiry College designates ethics, multiple disciplines, and multiple perspectives. GE credit: Sci-
Eng or SocSci, Div, Wrt.—I. (I.) Caswell-Chen

2. Feeding the Planet: Influences on the Global Food System (3)
   Lecture/discussion—3 hours. Scientific principles and dynamic interactions involved in food produc-
tion, food processing, nutrition, shelf life and market-
ing from differing viewpoints. Physical, biological and social sciences that influence the availability and safety of the food supply worldwide. GE credit: SciEng or SocSci, Wrt.—II. (II.) Bruening, Bostock, Davis

3. Science, Technology and Society (4)
   Lecture—4 hours. Impact of developments in science and technology on the individual in society and how economics, politics, culture and values affect techno-
ological development. Not open for credit to students who have completed former course Applied Behav-
aral Sis 18. GE credit: SciEng or SocSci, Wrt.—III. (III.)

4. Water in Popular Culture (3)
   Lecture—2 hours; discussion—1 hour. Importance of water in many aspects of society as revealed through films and literature. Film credit: Div, SocSci, Wrt.—I. (I.) Pasternack

5. Pathways to Discovery: Science and Society (3)
   Lecture/discussion—3 hours. Highlights a current issue and/or controversy found in contemporary society and looks at how this problem impacts and is affected by the physical, social and biological sci-
cenes. Course varies with topic offered. May be repeated twice for credit. Course not offered every year. GE credit: SciEng or SocSci, Wrt.

7. Terrorism and War (4)
   Lecture—3 hours; discussion—1 hour; term paper. Exploration of terrorism and war from science and social science perspectives. Global and national patterns and linkages with issues and groups; biological, chemical, nuclear, and environ-
mamental terrorism; intelligence gathering and espio-
gy; military strategy; genocide, ethnic wars; clash of civilizational and nation building; and future glo-
bal scenarios. GE credit: Div, SocSci, Wrt.—III. (III.) Carey

8. Water Quality at Risk (3)
   Lecture—2 hours; discussion—1 hour. Natural and human threats to the quality of Balance of science and policy in all aspects of attaining, maintaining, and managing water quality, water contamination. Decoding popular media coverage of water quality and water contamination. GE credit: SciEng, SocSci, Wrt. (Same course as Environmental and Resource Sciences 8.)—II. (II.) Hennessy

9. Crisis in the Environment (3)
   Lecture—3 hours. Explores contemporary environ-
nmental issues by examining the causal, effects and solutions to a wide range of environmental problems facing the global ecosystem. Integrated discussion of political, societal and economic impact linkages with environmental problems. GE Credit: SciEng, SocSci, Wrt.—III. (III.) Dahlgren

10. Water, Power, Society (3)
    Lecture—2 hours; discussion—1 hour. Water resources issues. How water has been used to gain and wield sociopolitical power in the United States and California as related to current and future sustainability of water quantity and quality. Roles of science and policy in solving water prob-
lems. (Same course as Environmental Science 10.) GE credit: SciEng, SocSci, Wrt.—III. (III.) Fogel

11. California Geography (3)
    Lecture—2 hours; discussion—1 hour; term paper. Introduction to cultural/societal patterns of California
and their relationship to natural resources, biomes, geomorphology, and physiography. Focus on diversity of California’s environments and their impacts on and alterations by human activities. Environ-

12. Plants and Society (4)
    Lecture—3 hours; extensive writing—3 hours. Pre-
requisite: high school biology. Dependence of human societies on plant and plant products. Plants as resources for food, fiber, health, enjoyment and environmental services. Sustainable uses of plants for food production, raw materials, bioenergy, and environmental conservation. Global population growth and future food supplies. Not open for credit to students who have completed Plant Biology 12. (Former course Plant Biology 12.) (Same course as Plant Sciences 12.) GE Credit: Div, SciEng, SocSci, Wrt.—II. (II.) Fischer, Jasieniuk, Nevin

15. AIDS and Society (4)
    Lecture—3 hours; discussion—1 hour. Biology of HIV trans-
mission and AIDS and how a biological agent acts on and influences the structure of contemporary society. Includes the psychology of risk and stigma, gender issues, changes in social relationships and public policy. GE credit: SciEng or SocSci, Div, Wrt.—III. (III.) Radke

18. GIS and Society (3)
    Lecture—2 hours; Laboratory—3 hours; term paper or discussion—3 hours. Geographic Information Systems (GIS) as a spatial technology and a tool for change in society. Evaluate physical, biological and social impact of GIS in the context of case studies such as land, water and community planning. GE Credit: SciEng, SocSci, Div, Wrt.—III. (III.) Wallender

20. Genetics and Society (4)
    Lecture—3 hours; discussion—1 hour. Not open for credit to students who have completed course 140. Basic concepts of genetics, modern methods of bio-
technology, the process of scientific discovery and the public perception of the process; present and future impact of genetics on society. GE credit: Sci-
Eng or SocSci, Wrt.—II. (II.) Cook, Epstein, Ron-
ald

25. Global Climate Change: Convergence of Biological, Geophysical, & Social Sciences (3)
    Lecture—2 hours; discussion—1 hour. Causes of global climate change and its biological, geophysical, and social consequences of such change. Meth-
ods used by different scientists for predicting future events. Complexity of global affairs. Decision mak-
ing under uncertainty. GE Credit: Div, SciEng, SocSci, Wrt.—II. (II.) Bloom

30. Mushrooms, Molds, and Society (3)
    Lecture/discussion—3 hours. Fungi as organisms with which humans interact daily, societal issues aris-
ing from these interactions. Fungi in medicine, reli-
gion, agriculture, and industry, as well as cultural perceptions of fungi. GE credit: SciEng or SocSci, Wrt.—II. (II.) Gordon, Rizzo

40. Photography: Bridging Art and Science (3)
    Lecture/discussion—2 hours; studio—3 hours. Pho-
tography is used to explore the common ground be-
 tween art and science. Photographic processes, creativity and aesthetics, chaos and order, principles of space, time and light. Photographic interpretation and documentation of the natural world. GE Credit: Art/Arth, Div, SciEng, SocSci, Wrt.—II. (II.) Nathan

42. Earth, Water, Science and Song (3)
    Lecture—2 hours; studio—3 hours. Earth, water and soil science with performing arts. Creative com-
munication of scientific concepts and facts through exercises in song writing and poetry. Design, discuss and conduct public performances related to the func-
tioning of the natural world. GE Credit: Art/Arth, Sci-
Eng.—II. (II.) Silk

90A. Issues in Environmental and Resource Sciences (2)
    Seminar—2 hours; two Saturday field trips. Prerequi-
site: limited to lower division students. Discussion of historical and current issues in environmental and resource sciences. Lectures, reading and field trips will provide background for selected topics. —I. (I., I.)

90B. Observing and Writing in Biology (2)
    Seminar—1 hour; laboratory—1 hour; term paper. Students will observe the interactions between micro-
scopical organisms, conduct simple laboratory experi-
ments, describe and analyze observations and discuss scientific observations and writing.

90C. Herbal Medicine: Relevance for the 21st Century (2)
    Seminar—2 hours. Medicinal usage of plants from biological, historical, and cultural perspectives. Broard contexts of holistic and scientific paradigms for understanding herbal medicine. Saturday field trip to teach herb identification. —II. (II.)
90D. Saving Endangered Plant Species: Problems and Prospects (2) Seminar—2 hours. Endangered plant species illustrate the value of conservation biology. Topics include societal issues and plant germplasm conservation, comparisons to animal conservation issues, and the economics of and justification for preserving endangered plants. I (I) Parfitt

90E. Biotechnology—a New Era, a New Struggle (2) Seminar—2 hours. Animal biotechnology and its applications. Discussion topics include potential societal impacts of various technologies, factors shaping public opinion, and ethical and moral questions arising from new biotechnology applications. I (I) Murray

90F. Food Distribution in a Hungry World (2) Seminar—2 hours. The biological, technological, environmental, and socioeconomic factors related to food distribution systems at local, regional, national, and international levels. The potential for increasing worldwide food supply by reducing losses between harvest and consumption. I (I)

90G. Science, Society, and the Environment (2) Seminar—2 hours. Contemporary environmental issues, scientific approaches to addressing these issues, and accompanying societal and ethical considerations. I (I) Williams

90X. Lower Division Seminar (1-4) Seminar—1-4 hours. Prerequisite: lower division standing and consent of instructor. Examination of a special topic in Science and Society through shared readings, discussions, written assignments, or special activities such as fieldwork, laboratory work, etc. May be repeated for credit. Limited enrollment. I (I, II, III, IV, III)

91A. Explorations in Science and Society: Cultures and Identities (2) Seminar—1 hour; extensive writing or discussion—1 hour. Prerequisite: participation in the summer Special Transitional Enrollment Program (STEP) or consent of instructor; course 1 concurrently. Exploration of linkages among identity and culture, multi-disciplinary inquiry, and agricultural and environmental science issues. I (I)

91B. Explorations in Science and Society: Lectures and Collaborations (2) Seminar—1 hour; extensive writing or discussion—1 hour. Prerequisite: course 91A or consent of instructor. Extends understanding of culture and identity to issues of food production, collaboration, and social action in science and society. Includes a mandatory two and half day retreat. II (II)

91C. Explorations in Science and Society: Engagement (2) Seminar—1 hour; internship—3 hours. Prerequisite: course 91B or consent of instructor. Explorations of the concept of engagement in science and society from philosophical and practical perspectives. Exploration of the concept of engagement based on lectures, self-reflection, discussions and three hours of K-12 school internships per week. III (III)

92. Internship in Science and Society (1-12) Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Supervised internship on and off campus, in the community, or in institutional settings. [P/NP grading only]

97T. Tutoring in Science and Society (2-3) Discussion/lecture—6.9 hours. Prerequisite: lower division standing; completion of course being tutored; consent of instructor. Tutoring in undergraduate Science and Society courses. Assisting with leading discussion groups under supervision of instructor(s) and peer assistants. Acting as liaison between the students and course instructor(s) to foster effective communication and interaction. May not be repeated. [P/NP grading only]

98. Directed Group Study (1-5) Prerequisite: consent of instructor. [P/NP grading only]

99. Special Study for Undergraduates (1-5) Discussion—3-15 hours. Prerequisite: lower division standing and consent of instructor. [P/NP grading only]

Upper Division Courses

105. Organismal Interactions in Everyday Life (3) Lecture—2 hours; discussion/laboratory—1 hour. Prerequisite: Biological Sciences 10 or 1A. Ecology and evolution of organismal interactions and their importance to human health and welfare and a sustainable environment. Students will debate environmental issues on scientific, political, and ethical grounds. GE credit: SciEng, Wrt.

120. Science and Contemporary Societal Issues (3) Lecture/discussion—3 hours. Prerequisite: upper division standing and consent of instructor. Study of a special issue/problem emphasizing critical thinking with information drawn from several disciplines. Multiple instructors illustrate the necessity of an interdisciplinary and cooperative approach in solving important issues. Topics will vary. May be repeated once for credit. Course not offered every year. GE credit: SciEng or SocSci, Wrt. II (III)

130. Contemporary Leadership (4) Lecture—3 hours; seminar—1 hour. Prerequisite: consent of instructor. Leadership, including issues, skills, and practices as they relate to individuals, organizations, diverse social settings and communities. Written assignments, personality styles for collaborative work, and ethics. Limited enrollment. II, III, IV (I, III, II)

135S. Biodiversity and Society in South Africa (4) Lecture/discussion—3 hours; term paper or discussion—2 hours; fieldwork—2 hours. Prerequisite: acceptance into the Quarter Abroad Program “Biodiversity & Conservation in South Africa” and attendance in South Africa. Biodiversity in social context of South Africa; race, politics and conservation; use of indigenous plants and animals; weeds; water issues; ecotourism; weekend and other field trips. Not offered every year. GE credit: Div, SciEng, SocSci, Wrt. II (II) Cranston, Gullan

140. Genetics and Social Issues (4) Lecture/discussion—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1A, 1B, 1C. Social issues arising from the development and use of modern methods of biotechnology. Presentation, evaluation, and critical discussions of the present and future impact of genetics on society. Not open for credit to students who have completed course 20. GE credit: SocSci, Wrt. II (II) Epstein

190X. Science & Society Seminar (1-4) Seminar—1.4 hours. Prerequisite: upper division standing and consent of instructor. In-depth examination of an upper division or special topic in Science and Society. Emphasis upon student participation in learning. May be repeated for credit. Limited enrollment. [P/NP grading only]: I, II, III, IV (I, II, III, IV)

190Y. Second Year Seminar (2-3) Seminar—2 hours, laboratory—1 hour. Prerequisite: upper division standing and consent of instructor. Limited to second year students in Science and Society. Advanced research methods in science and society. GE credit: SocSci, Wrt.

199. Special Study in Science and Society (1-5) Prerequisite: upper division standing and consent of instructor. [P/NP grading only]

Graduate Courses

298. Group Study (1-5) Prerequisite: consent of instructor. May be repeated for credit when topic differs. [S/U grading only]

299. Graduate Research (1-12) Prerequisite: graduate student and consent of instructor. May be repeated for credit. [S/U grading only]

Professional Course

390. Teaching Methods in Science and Society (1) Discussion—1 hour. Prerequisite: graduate level and consent of instructor. Practical experience in methods and problems related to teaching Science and Society courses. Discussion of critical pedagogies specific to teaching of science-societal issues, preparing for and conducting discussion sessions, analyses of texts and supporting material, formulation of assignments, exams. May be repeated for credit. [S/U grading only]: I, II, III, IV (I, II, III)

Science and Technology Studies

(Conference of Colleges and Letters and Science)
Joseph Dumit, Ph.D., Program Director
Program Office, 1240 Social Sciences and Humanities Building (530) 752-9621, http://sts.ucdavis.edu

Committee in Charge

Thomas Beamish, Ph.D. (Sociology)
Joan Cadden, Ph.D. (Philosophy)
Patrick Carroll, Ph.D. (Sociology)
Timothy Choy, Ph.D. (Anthropology, Science and Technology Studies)
Carolyn de la Pena, Ph.D. (American Studies)
Joseph Dumit, Ph.D. (Anthropology, Science and Technology Studies)
James Griessemer, Ph.D. (Philosophy)
Roberta Millstein, Ph.D. (Philosophy)
Colin Milburn, Ph.D. (English)
Benjamin S. Orlove, Ph.D. (Environmental Science and Policy)
Daniel Stolzenberg, Ph.D. (History)

The Major Program

The Science and Technology Studies (STS) major is designed to facilitate the analysis and synthesis of science, technology, and medicine in a way that actively creates connections between the varieties of perspectives and concerns in the humanities and the sciences. The STS major studies science, technology, medicine, and their social, political, economic, and cultural contexts as its objects of study. As such, the STS major draws on the research programs of faculty in a wide range of departments, including American Studies, Anthropology, Economics, Environmental Science and Policy, History, Philosophy, Political Science, Science and Technology Studies, and Sociology. Students in STS pursue a broader understanding of science than is available within traditional science majors and is also suitable for students in the social sciences interested in interpreting science, technology and medicine as part of society and culture.

The Program. Graduation with a degree in Science and Technology Studies requires completion of introductory courses in the social sciences and humanities, in the natural sciences, and introductory, laboratory and seminar courses in STS. Upper division work includes twelve units from each of two different, complementing areas of concentration (“modules”) and twelve units (plus prerequisites) providing depth, concentration and field work opportu-
nities in the sciences. The modules are: (1) Cultural Studies of Science and Technology; (2) Ethics, Values, and Science Policy; (3) History and Philosophy of Science; IV. Medicine, Society, and Culture. Courses in the modules require careful selection to make the best of this STS major. Prerequisites for courses in the sciences can be extensive and require substantial advance planning for timely completion. Students are encouraged to take advantage of facilities from historical, philosophical, sociological, political, anthropological, and cultural perspectives. STS provides students with the broader social, cultural and political ramifications of science, technology and medicine such as law, journalism, public policy, economics, government, and science education. Careers that students of STS from many universities nationwide have pursued, in addition to academic careers in STS, include employment in: systems engineering, Web site design, science museums, nonprofit health organizations, government service, libraries, law, medicine, veterinary medicine, dentistry, nursing, teaching, public health administration, media companies, management consultant practice, and the Peace Corps.

A.B. Major Requirements

**Preparatory Subject Matter** ........................................ 16
Science and Technology Studies 1 ................................. 4
Science and Technology Studies 20 ............................. 4
Eight units selected from American Studies 1,
Environmental Studies 1; Nature and Culture 1; Philosophy 30, 31, 32; Science and Society 1, 2, 3, 5 .................................................. 8

**Depth Subject Matter** ............................................ 44-46
Twelve units each from the following four modules: .................. 24
1. *Cultural Studies of Science and Technology: Community and Regional Development 118, 162; History 139A, 139B; Nature and Culture 100, 180; Science and Technology Studies 130A, 131, 150; Sociology 176 .......................... 12
2. (Ethics, Values, and Science Policy: Agricultural and Resource Economics 120, 147; Environmental Studies 1; Nature and Culture 1; Philosophy 30, 31, 32; Science and Society 1, 2, 3, 5)........................................... 8

**Courses in Science and Technology Studies (STS)**

**Lower Division Courses**

1. *Introduction to Science, Technology, and Medicine Studies (4)*
Lecture—2 hours; discussion—1 hour. History, philosophy, sociology, politics, and cultural studies of science, technology, and medicine. Emphasis on a broad range of perspectives. GE credit: SciEng or SocSci. —Carroll

Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 recommended. Methodological issues concerning the historical, philosophical, sociological, ethical, and political analysis of science, technology, and medicine. Detailed case studies to illustrate different methods of analysis. GE credit: SciEng or SocSci. —Wirt.

32. *Drugs, Science and Culture (4)*
Lecture—3 hours; discussion—1 hour. Drugs, science, society, and culture: a critical perspective. Emphasis on roles of science, government, and the media in shifting attitudes toward alcohol, marijuana, Prozac and other pharmaceuticals; drugs, war on drugs, global trade in sugar, opium, cocaine. (Same course as Anthropology 131—III.)—Dumit

98. *Directed Group Study (1-5)*
Prerequisite: consent of instructor (F/NP grading only)

99. *Special Study for Undergraduates (1-5)*
Prerequisite: consent of instructor (F/NP grading only)

**Upper Division Courses**

109. *Visualization in Science (4)*
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 1 or 20 or Anthropology 2. Anthropological approaches to scientific visualization techniques and representations. Examination of different visualization techniques toward understanding the work involved in producing them, critical assessment of their power and limits, especially when visualizations are used socially to make claims. Offered in alternate years. (Same course as Anthropology 109.) GE credit: SocSci. —Wirt.

120. *Religion, Magic and Science (4)*
Lecture—3 hours; extensive writing. Religion, magic, and science from the middle ages to the present. Contrast between modern scientific methodology and religious and magical thinking. (Same course as Religious Studies 120.) Offered in alternate years. GE credit: A HistHum; ArtHum; Div.

130A. *From Natural History to the History of Nature (4)*
Lecture/discussion—3 hours; term paper. Prerequisite: History 135A recommended. Evolution and development of natural history as a discipline from Aristotle to Linnaeus. Considers ancient views of nature and its Renaissance rediscovery; the emergence of biology, botany, geology, and zoology, the history of taxonomy and classification. GE credit: ArtHum or SciEng, Wrt.

130B. *History of Modern Biology (4)*
Lecture/discussion—3 hours; term paper. Prerequisite: course 130A recommended. Development of modern biology from pre-Darwinian roots to the present. Considers emergence of modern biological specialties and consolidation of biological theory around evolutionary ideas. History of allied fields such as genetics, paleontology, embryology, ecology, systematics and molecular biology. GE credit: ArtHum or SciEng, Wrt. —Griesemer

150. *Gender and Science (4)*
Lecture/discussion—3 hours; term paper. An interdisciplinary approach to the interactions between gender and science. Topics include the biological and cultural construction of sexual difference, the role of women as practitioners of science, and feminist approaches to science. GE credit: SocSci, Div. —Wrt.

161. *Time: Measurement and Mechanism (4)*
Lecture/discussion—3 hours; term paper. Prerequisite: course 1. Cultural concepts of time; units and instruments of time measurement; historical differences in the social organization of time; and time measurement in twentieth-century science. GE credit: SocSci, Wrt.

163. *History of Communication Technologies (4)*
Lecture/discussion—3 hours; term paper. History of communication technologies from the late Middle Ages to the 20th century. Questions of technology, knowledge, power, and culture. Particular attention to questions about information and truth. Offered in alternate years. GE credit: SocSci.

164. *Writing Science (4)*
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3, or equivalent. Texts and writing practices in the production of scientific knowledge. Surveys the literary structure of scientific arguments, history of scientific genres, rhetoric and semiotics in scientific culture, graphical systems in the experimental laboratory; narratives of science, including science fiction. (Same course as English 164.) GE credit: Wrt. —Milburn

165. *Built Environments (4)*
Lecture—3 hours, extensive writing. Built environments, which are designed to support forms of life. Their role as carriers of cultural memory and in turn-
Sexuality Studies

(College of Letters and Science)
http://wims.ucdavis.edu/wgsite/sexualitystudies/default.html

The interdisciplinary minor in Sexuality Studies offers students a unique opportunity to study the human-made aspects of sexual identities, desires, and practices, which differ across cultures and historical moments, and are not reducible to biology or anatomy. The minor in Sexuality Studies core and elective courses have sexuality at their center. Additional courses invite students to integrate their study of sexuality with issues of gender, race and ethnicity, class, politics and activism, literature and popular culture, law, and other domains. The minor is sponsored by the Program in Women and Gender Studies.

Minor Program Requirements:

Sexuality Studies ......................... 18-20
Two Elective courses from Field A:
Women and Gender Studies 170 .......... 4
Two Elective courses from the following:
Anthropology 139 BN, English 186,
Epidemiology and Preventative Medicine
163, History 184, Human Development 12,
Psychology 158, Science and Society 15,
Women and Gender Studies 70 .......... 7-8
Two Elective courses from Field B (below) or seminars/individual study by petition to achieve a total of 18-20 units:
American Studies 115, Asian American
Studies 112, Chicana/o Studies 160,
English 166, German 145, History 132,
Political Science 152, Sociology 120,
Women and Gender Studies 140, Women
and Gender Studies 179 .......... 7-8

Restrictions.
(a) Students may take no more than one lower division course to satisfy requirements for the minor.
(b) To satisfy the interdisciplinary component of the minor, students must either split their coursework roughly equally between two programs/departments or take coursework in at least three programs/departments.
(c) Students may petition the minor adviser to accept Special Topics courses and Capstone/Senior Seminars as additional courses, as long as their course of study follows the minor’s lower-division restriction and interdisciplinary requirements.
(d) Students may petition the minor adviser to accept up to four units of registered individual study, group study or internship towards the minor program, as long as their course of study follows the minor’s lower-division restriction and interdisciplinary requirements.

Advising: Program in Women and Gender Studies, 2222 Hart Hall (530) 752-4686

Social and Ethnic Relations

(College of Letters and Science)

The interdisciplinary minor in Social and Ethnic Relations explores the racial, ethnic, class and gender aspects of human relations in the modern world. Students study human societies and cultures from a multi-ethnic perspective and across established academic departmental lines. The minor is jointly sponsored by African American and Chicana/o Studies, Asian American Studies, Native American Studies, and Women and Gender Studies.

Minor Program Requirements:

Social and Ethnic Relations .................. 24
Select one course from each of the following six groups to total 24 units.
(a) African American and African Studies
100; Anthropology/Native American
Studies 134, Women’s Studies 102
(b) African American and African Studies
123, 133, 145A
(c) Asian American Studies 1, 100, 110,
133
(d) Chicana/o Studies 130, 132
(e) Native American Studies 1, 10, 115,
119, 130A, 130B, 130C, 157, 180
(f) Women’s Studies 103, 104, 180

Advising: Contact Women and Gender Studies in 2222 Hart Hall (530) 752-4686

Restrictions. (a) Courses applied toward the satisfaction of a major may not also be offered in satisfaction of the minor. (b) No more than four units (one course) may be lower division.

Social Sciences

(College of Letters and Science)
Marianne Page, Ph.D., Program Director
Program Office, 108 Sproul Hall (530) 752-4001

Committee in Charge
Eric Grodsky, Ph.D. (Sociology)
Michael Kurlenda, Ph.D. (School of Education)
Marianne Page, Ph.D. (Economics)
Kimberlee Shauman, Ph.D. (Sociology)
Randolph Siverson, Ph.D. (Political Science)
Ann Stevens, Ph.D. (Economics)

Emeriti Faculty
Nigel Allan, Ph.D. Professor Emeritus
Dennis J. Dingemans, Ph.D., Senior Lecturer Emeritus
Howard F. Gregor, Ph.D., Professor Emeritus
Frederick J. Simoons, Ph.D., Professor Emeritus
Kenneth Thompson, Ph.D., Professor Emeritus

The Program of Study
The Program in Social Sciences promotes the development of innovative curricular initiatives across the social sciences, including offering broadly conceived, integrative undergraduate-level and graduate-level courses. Faculty affiliated with the program are often engaged in interdisciplinary teaching and research.

Social Theory and Comparative History

(College of Letters and Science)
Eric Rauchway, Ph.D., Program Director and Professor (History)
Program Office. Center for History, Society, and Culture, 5211 Social Sciences and Humanities Building (530) 752-3046

Committee in Charge
Carolyn de la Pena, Ph.D., Associate Professor (American Studies)
Alan Olimsted, Ph.D., Professor (Economics)
Eric Rauchway, Ph.D., Professor (History)
John T. Scott, Ph.D., Professor (Political Science)
Kimberlee Shauman, Ph.D., Associate Professor (Sociology)
Alan M. Taylor, Ph.D., Professor (Economics)

Graduate Study. The program comprises course work and research leading to the Ph.D. with a designated emphasis in Social Theory and Comparative History.
History. The program provides theoretical training and interdisciplinary perspective to Ph.D. candidates in the nine participating departments and graduate groups (Anthropology, Comparative Literature, Cultural Studies, Economics, English, Geography, History, Political Science, and Sociology). Students from other departments are also welcome. All students must fulfill all Ph.D. requirements of their home department. The additional requirements leading to the degree in Sociology include: (1) four graduate courses (Social Theory and Comparative History 250, Sociology 242A, and two courses sponsored by the Social Theory and Comparative History program, one of which must be offered by a department other than the student's home department); (2) presentation of a Social Theory and Comparative History field as one area of specialization in the department of Ph.D. qualifying examination; (3) an oral discussion, following the passage of the Ph.D. qualifying examination, based on the student's dissertation prospectus; (4) completion of the dissertation to the satisfaction of the student's thesis committee, one of whose members will be a representative of the Social Theory and Comparative History program.

Graduate Adviser. Consult the Program Director, Program office, or see http://chsc.ucdavis.edu for advising and detailed information on application and requirements.

Courses in Social Theory and Comparative History (STH)

Graduate Courses

250. Research in Social Theory and Comparative History (STH)

Seminar—3 hours, term paper. Prerequisite: admission to Social Theory and Comparative History Designated Emphasis. Theoretically informed research in comparative history. Students read exemplary works and learn to frame their own research projects. Presentations include Center for History, Society, and Culture faculty and visitors discussing current research. (2, 4)

290. Advanced Topics in Social Theory and Comparative History (4)

Seminar—3 hours, term paper. Prerequisite: consent of instructor and History 204 or Sociology 242A. Interdisciplinary study of particular substantive problems in social theory and comparative history. Topics vary. (I, II, III, I, II, III)

295. Advanced Group Research in Social Theory and Comparative History (1)

Discussion—1 hour. Prerequisite: consent of instructor. Participation in research workshops sponsored by the Center for Comparative Research for History, Society, and Culture. May be repeated for credit. (S/U grading only)—I, II, III, (I, II, III)

The Sociology Journal Editorial Workshop (1-4)

Workshop—1 hour, independent study—3 hours. Reading and offering workshop critiques of papers submitted for publication. Reading and discussion of other relevant work in history and the social sciences. May be repeated for credit up to 36 units or with consent of instructor. (S/U grading only)—I, II, III, (I, II, III)

Sociology

(College of Letters and Science)

Vicki Smith, Ph.D., Chairperson of the Department Department Office, 1282 Social Sciences and Humanities Building (530) 752-0782, http://sociology.ucdavis.edu

Faculty

Thomas D. Beamish, Ph.D., Associate Professor Nicole W. Biggart, Ph.D., Professor (Sociology, Management) Fred Block, Ph.D., Professor

Patrick Carroll, Ph.D., Associate Professor Lawrence E. Cohen, Ph.D., Professor Natalia Deeb-Nish, Ph.D., Assistant Professor Robert Faris, Ph.D., Assistant Professor Diane H. Felmlee, Ph.D., Professor T. Ryken Grady, Ph.D., Associate Professor Laura Grindstaff, Ph.D., Associate Professor Eric Gradyk, Ph.D., Assistant Professor Draw Hallmann, Ph.D., Assistant Professor John R. Hall, Ph.D., Professor Bruce D. Haynes, Ph.D., Associate Professor Mary Jackman, Ph.D., Professor Carole E. Joffe, Ph.D., Professor David J. Kyle, Ph.D., Associate Professor Ming-Cheng Lo, Ph.D., Associate Professor William McCarthy, Ph.D., Professor Michael McQuarrie, Ph.D., Assistant Professor Dina G. Okamoto, Ph.D., Associate Professor Kimberly A. Shauman, Ph.D., Associate Professor Xiaoling Shu, Ph.D., Associate Professor Vicki Smith, Ph.D., Professor Eddy U. Tan, Ph.D., Professor Diane L. Wolf, Ph.D., Professor

Emeriti Faculty

James C. Cramer, Ph.D., Professor Emeritus Bruce M. Hackett, Ph.D., Professor Emeritus Carl C. Jorgensen, Ph.D., Professor Emeritus John F. Lolland, Ph.D., Professor Emeritus Lyn H. Lolland, Ph.D., Research Professor and Professor Emeritus John T. Walton, Ph.D., Research Professor and Professor Emeritus

Affiliated Faculty

Debora Paterniti, Ph.D., Associate-Adjunct Professor Norman Skonovd, Ph.D., Lecturer

The Major Programs

Sociology is the study of human society in all its manifestations. Its aim is to discover the structure and human interaction, to identify the main forces that sustain social groups, and to determine the conditions that transform social life. Sociology, like any science, is a disciplined, intellectual quest for knowledge about the fundamental nature of things.

The Program. The Department of Sociology offers two major programs, Sociology and Sociology–Organizational Studies. Students selecting the Sociology major may choose from four options in the major. The General emphasis allows students to obtain a broad understanding of the concepts, methods, and theories of sociology. Students with a particular interest in Law and Society or Social Services may choose a more specialized program of courses and practical experience within the sociology major. The Comparative Studies and World Development emphasis provides a sociological perspective on social and economic changes throughout the world, with a stress on relationships between “developed” and “underdeveloped” societies. In their junior year, students are encouraged to consider the Education Abroad Program—especially one in a developing country.

The Sociology–Organizational Studies major develops a broad understanding of the political, social, and economic organizations that comprise modern society. This major emphasizes a sociological perspective, but incorporates a multidisciplinary field of study. The major introduces students to a range of theories and methods that social scientists use in the analysis of organizations.

Career Opportunities. In the Sociology major, the General option is for students desiring a solid liberal arts education as well as those interested in graduate work in the social sciences. Options in Law and Society or Social Service prepare students for careers in such areas as law, corrections, social work or counseling. The Comparative Studies and World Development emphasis prepares students for graduate training leading to careers in international fields. Majors in Sociology–Organizational Studies will be prepared for a variety of career options, particularly in the field of management. The major specifically meets entry requirements for programs of professional training leading to a Masters degree in public or private management, and may also lead to further study in any of the disciplinary areas incorporated in the major.

Sociology

A.B. Degree Requirements:

General emphasis: UNITS

Preparatory Subject Matter

Sociology 1, 46A, and 46B (or the equivalents)……………………………………… 13
Sociology 2, 3, 4, 5 or 11…………………………………………………………… 4
Anthropology 118, 128, 130, 132, 135, 134, 140, 145A, 145B, 147, 148, 150, 152, 153, 173, 174, 175, 176
(P) Stratification and Social Differentiation: Sociology 130, 132, 140…………………… 4
Organizations and Institutions: Sociology 118, 131, 146, 180A
Social Dynamics: Sociology 104, 141, 143A, 170…………………………………… 4

Select three upper division courses from one of the following clusters; not counting courses taken to fulfill requirement B……………………… 12

(1) Individual, Culture and Society: Sociology 102, 120, 122, 125, 126, 127, 128, 129, 131, 132, 134, 135, 137, 143B, 148, 150, 152, 153, 172, 173, 174, 175, 176
(2) Stratification and Social Differentiation: Sociology 104, 141, 143A, 170…………………………………… 4
(P) Stratification and Social Differentiation: Sociology 104, 141, 143A, 170…………………………………… 4
(P) Student-initiated thematic cluster: developed with a faculty adviser and approved by the Sociology Undergraduate Curriculum Committee

(D) Eight units of Sociology beyond courses taken to fulfill above requirements, and outside of the course cluster used to fulfill requirement C…………………………………… 8
(E) One integrative course (prerequisite: senior standing and completion of requirement for Preparatory Subject Matter, Depth Subject Matter, requirement A, and at least two of the courses for requirement B). Choose from Sociology 190X, 191, 192/ 193A, 194B, 195

Total Units for the Major……………………………………… 73

Law and Society emphasis:

Preparatory Subject Matter

Sociology 1, 3 or 11, 46A and 46B (or the equivalents)……………………………………… 17
Anthropology 2 or 20…………………………………………………………………… 4
Select from History 4A, 4B, 4C, 8, 9A, 9B, 9C, 10, 15, 17A, 17B……………………… 4
Select from Philosophy 5, 14, 24……………………………………………………… 4

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer; 2009-2010 offering in parenthesis.
Depth Subject Matter .......................... 44
Sociology 100 and 155......................... 8
Select four courses from the following
categories ........................................... 32
Individual Culture and Society: Sociology
125, 126, 135 ................................. 4
Stratification and Social Differentiation:
Sociology 130, 132, 140, 175 ................. 4
Organizations and Institutions: Sociology
118, 131, 146, 160,180 A ................. 4
Crime and Social Dynamics: Sociology
120, 150, 151, 152, 171 ........................ 12
Crime and Social Dynamics: Sociology
120, 150, 151, 152 ............................... 12
Stratification and Social Dynamics:
Sociology 118, 137, 148, 156, 157; 
African American and African Studies 123,
145A, 145B; Chicana/o Studies 130, 132; 
Native American Studies 117, 118 ............ 4
Legal Studies: Asian American Studies 155; 
English 107, Environmental Science and 
Policy 161, Environmental Toxicology 138, 
Hydrology 150; Philosophy 119; Political 
Science 122, 151, 152, 154; Psychology 
153; Women’s Studies 140 ........................ 4
Methodology: Prerequisite—senior standing 
and completion of requirement for 
preparatory subject matter; select one 
course from Sociology 190X, 192/193, 
194HA/194HB, 195 ............................. 4
Total Units for the Major....................... 73
Social Services emphasis:
Preparatory Subject Matter ............... 28
Sociology 2, 46A and 46B (or the 
equivalents) ...................................... 16
Psychology 1 ...................................... 4
Select from African American and 
African Studies 10, 11; Asian American 
Studies 1, 2; Chicana/o Studies 10, 20; Native 
American Studies 1, 10; Sociology 111 .......... 8
Depth Subject Matter ......................... 44
Sociology 131, 140, 185 ........................ 12
Select four units of upper division psychology:
Psychology 140, 142, 151, 158 ............... 4
Select seven courses distributed as 
specified ........................................... 28
Social Issues: Sociology 104, 120, 122, 
124, 139, 142A, 144, 146, 150, 152, 
153, 154, 155, 160, 170, 171 .................. 8
Social Interaction: Sociology 126, 127, 
128, 143B, 148, 157 ............................ 4
Regional Focus, three courses from one of the 
categories ........................................... 32
Sociology 100 and 155 ......................... 8
Select from Anthropology 120A, 120B, 
122A, 122B, 124A, 124B, 126A, 126B, 
130A, 130B, 132, 136, Native American 
Studies 120, 133; Political Science 143, 
Spanish 170, 172, 173
(3) Middle East: Anthropology 142; History 
112A, 112B, 113, 190A, 190B, 190C, 
193A, 193B; Jewish Studies (see an 
advisor); Middle Eastern Studies (see 
an advisor); Religious Studies 162; Women’s 
Studies 185
(4) Asia-China & Japan: African American 
and African Studies 107C; Anthropology 
148A, 148B, 148C, 149A, 149B; East 
Asian Studies 171; History 191 [series], 
194A, 194B, 194C, Political Science 
148A, 148B; Religious Studies 
165, 170, 172
Total Units for the Major....................... 107
Sociology—Organizational Studies
A.B. Degree Requirements:
Preparatory Subject Matter ............... 24-25
Sociology 1 or 2, 5 or 11, 46A and 
46B (or the equivalents) ...................... 16-17
Economics 1A and 1B ....................... 8
Depth Subject Matter .......................... 44
Sociology 180A ................................. 4
Sociology 106 (or its equivalent) .......... 4
Select from, Cal Poly: Sociology 156 ............... 4
Select six courses from below, at least three 
courses from Sociology ........................ 24
Agricultural and Resource Economics 112, 
American Studies 125; Community and 
Regional Development 151/151L, 152, 
154, 156, 158, 162, 164, 168, 
Economics 116, 121A, 121B, 151A, 
151B, History 185B, 194D; Political 
Science 107, 180, 187; Sociology 100, 
103, 124, 138, 139, 141, 154, 159, 
160, 180B, 181, 183, 185, 187
Select from Sociology 128, 130, 132, 
134, 140, 145A, 145B, 172 ............... 4
Methodology: Prerequisite—senior standing 
and completion of requirement for 
preparatory subject matter; select one course 
from Sociology 190X, 192/193, 
194HA/194HB, 195 ............................. 4
Total Units for the Major....................... 70-71
Major Advisers. Consult the Departmental 
Advising office in 1282 Social Sciences and Humanities 
Building.
Minor Program Requirements:
Students in other disciplines may elect to minor in 
Sociology by choosing a sociological subject 
emphases below. On transcripts, the minor will 
appear as a minor in Sociology.

Sociology ........................................... 20

Sociology—General emphasis
Select from Sociology 100, 126, 140, 170, 
180A, 180B, 181A, 183, 187, 188 .............................. 8
One course from any three clusters; see 
class lists under Sociology Major—General 
Emphasis ........................................... 12

Sociology—Organizational Studies emphasis
Sociology 180A and 180B ....................... 8
Select from Agricultural and Resource 
Economics 112; American Studies 125; 
Communication 134, 136; Community 
and Regional Development 162, 163, 164, 
Economics 100; Political Science 180, 181, 
183, 187, 188; Psychology 183 ............... 8
Select from Anthropology 122; History 174A, 
179, 187A, 187B, 194D; Sociology 118, 
139, 141, 156, 159, 175, 181, 183 ........ 4

Sociology—Social Service emphasis
Sociology 185, plus 4 units selected from 
Sociology 131, 132, 145B ....................... 8
Select from Sociology 129, 130, 133, 134, 
140, 172
Four units from Social Issues cluster and four 
units from Social Interaction cluster; see 
class lists under Sociology Major—Social 
Service emphasis ................................ 8

Sociology—Law and Society emphasis
Sociology 155, plus one of Sociology 120, 
150, 152 ................................. 8
One of Sociology 129, 130, 131, 132, 
133, 134, or 172 ............................... 4
One of Sociology 118, 139, 140, 141, 
145A or 145B, 180A or 180B, or 185 ............................. 4
One of Sociology 100, 122, 124, 126, 128, 
143A or 143B, 156, 157, or 191 ............................. 4
Minor Advisers. Consult the departmental Advising 
ofice in 1282 Social Sciences and Humanities 
Building.

Honors Programs. An Honors Program is avail-
able to Sociology and Sociology—Organizational 
Studies majors who have demonstrated excellence in 
their field of study. To be eligible for the program, 
students must have a grade-point average of 3.500 
in the major and the recommendation of a faculty 
sponsor familiar with their work. In addition to 
meeting the standard major requirements, students are 
encouraged to take a 199 course with their sponsor 
in the spring of their third year, prior to the seminar 
courses. The honors student writes an honors thesis 
and participates in a two-quarter honors seminar 
(course 194HA/194HB). Successful completion of 
the Honors Program, when combined with College 
GPA requirements, enables the graduate with Highest Honors or with High Honors. 
Applications for the program are due in August before 
the student begins their fourth year.

Honors Program Advisor. Drew Halfmann, 
dhalfmann@calpoly.edu

Graduate Study. The Department offers programs 
of study and research leading to the M.A. and Ph.D. 
degrees in sociology. Further information regarding 
graduate study may be obtained at the Department 
of Graduate Admissions or on our Web site.

Graduate students in Sociology have the opportunity to 
pursue designated emphases in Critical Theory, 
Social Theory and Comparative History, Native 
American Studies, Economy, Justice and Society, 
and Feminist Theory and Research. See these headings 
for further details on these interdisciplinary pro-
grams.

Graduate Advisers. Consult the Graduate Pro-
gram Coordinator in 1287 Social Sciences and 
Humanities Building.

Quarter Offered: I-Tall, II-Winter, III-Spring, IV-Summer, 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Social-Cultural Diversity; Wrt—Writing Experience
Courses in Sociology (SOC)

Lower Division Courses

1. Introduction to Sociology (5)
   Lecture—4 hours; discussion—1 hour. Principles and basic concepts of sociology. The study of groups, culture, collective behavior, classes and caste, community and economic status, and personality. GE credit: SocSci—II, III, IV, V, VI.

2. Self and Society (4)
   Lecture—3 hours; discussion—1 hour. Principles and basic concepts of sociological social psychology. Includes the study of the character of the self, identity, roles, socialization, identity change, emotion and social interaction. GE credit: SocSci, Wrt.—I, II, III, IV, V, VI.

3. Social Problems (4)
   Lecture—3 hours; discussion—1 hour. General sociological consideration of contemporary social problems in relation to sociocultural change and programs for improvement. GE credit: SocSci, Wrt.—II, III, IV, V, VI.

4. Immigration and Opportunity (4)
   Lecture—3 hours; discussion—1 hour or term paper. Social and demographic analysis of immigration: motives and experiences of immigrants; immigration and social mobility; assimilation, discrimination, and social change; multicultural societies. Detailed study of immigration into the U.S., with comparative studies of Europe, Australia, and other host countries. GE credit: SocSci, Div. Wrt.—III, IV, V, VI.

5. Global Social Change: An Introduction to Macrosociology (4)
   Lecture—3 hours; discussion—1 hour. An introduction to change and diversity in world history, including the United States, examining labor market discrimination and the role of social policies in shaping labor markets. GE credit: SocSci, Div. Wrt.—II, III, IV, V, VI.

11. Sociology of Labor and Employment (4)
   Lecture—3 hours; discussion—1 hour. Labor and employment issues in the contemporary United States with some use of historical and comparative materials. Topics will include strategies pursued by employers and states, examining labor market discrimination and the role of social policies in shaping labor markets. GE credit: SocSci, Div. Wrt.—II, III, IV, V, VI.

25. Sociology of Popular Culture (4)

30A. Intercultural Relations in Multicultural Societies (3)
   Lecture—1.5 hours; discussion—1.5 hours. Macrostructural analysis of contemporary multicultural societies; immigration and assimilation in comparative perspective; social construction of racial and ethnic group identities; ethnicity and gender; group conflict and cooperation; controversies surrounding multiculturalism. First course in a two-course Multicultural Immersion Program. GE credit: SocSci, Div.—I, II.

30B. Intercultural Relations in Multicultural Societies (3)
   Lecture—1.5 hours; discussion—1.5 hours. Prerequisite: course 30A. While consent of instructor. Socio-psychological analysis of personal experiences living in a multicultural society; confronting or rejecting group identity or stereotypes; managing and reducing conflict; cross-cultural communication; promises and problems of diversity at UC Davis. Second course in a two-course Multicultural Immersion Program. GE credit: SocSci, Div.—II, III.

46A. Introduction to Social Research (4)
   Lecture—3 hours; discussion—1 hour or term paper or project (instructor’s option). Examination of the methodological problems of social research. Selection and definition of problems of investigation, data gathering techniques, and sampling.—I, II, III, IV, V, VI.

46B. Introduction to Social Research (4)
   Lecture—3 hours; discussion—1 hour or term paper or research project. Data analysis techniques, measurement, scaling, multiple analysis, and quantitative methods of social research.—II, III, IV, V, VI.

90X. Lower Division Seminar (1-2)
   Seminar—1-2 hours. Prerequisite: lower division standing and consent of instructor. Examination of a special topic in sociology through shared readings, discussion, written assignments, or special activities such as fieldwork, laboratory work, etc. May not be repeated for credit. Limited enrollment.

98. Directed Group Study (1-5)
   Prerequisite: consent of instructor. Primarily intended for lower division students. (P/NP grading only.)

Upper Division Courses

100. Origins of Modern Sociological Theory (4)
   Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: introductory course in Sociology recommended. California’s distinctive society and culture; sociological analyses of topical issues concerning diversity, environment, cities.

103. Evaluation Research Methods (4)
   Lecture—3 hours; field research or project (instructor’s option). Prerequisite: course 46A or 46B, or Statistics 13 or the equivalent. Surveys applications of research methods to the evaluation of social programs, primarily emphasizing methodological issues, e.g., research design and data collection; uses of evaluation research are also discussed and placed in theoretical context. Participation in an evaluation project.—III, IV.

104. The Political Economy of International Migration (4)
   Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: upper division standing. Analysis of worldwide patterns of migration; sociological theories of international and transnational migration. Focus in economical, political, and social impact of immigration and potential for international and regional cooperation. (Same course as International Relations 104).—II, III.

106. Intermediate Social Statistics (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: course 46B or Statistics 13 or the equivalent. Intermediate-level course in statistical analysis of social data, emphasizing the logic and use of statistical measures, procedures, and mathematical models especially relevant to sociological analysis. (I, II, III, IV, V, VI.

118. Political Sociology (4)
   Lecture—3 hours; discussion—1 hour or term paper or research project. Relation of social cleavages and social cohesion to the functioning of political institutions; the social bases of local and national power structures; social sources of political movement; analysis of concepts of alienation, revolution, ideology, ruling class, and elite.—I, II, III, IV, V, VI.

120. Deviance (4)
   Lecture—3 hours; term paper or discussion. Social structural sources, institutional practices and microprocesses associated with illegality, evil, disease, immorality, disability, racial and class differences, citizenship, and the body. Special emphasis on expert knowledge and the production and management of social difference. Graduate seminar.—I, II, III, IV, V, VI.

122. Sociology of Adolescence (4)
   Lecture—3 hours; discussion—1 hour or term paper or research project. Chronological age and social status; analysis of social processes bearing upon the socialization of children and adolescents. The emergence of “youth cultures.” Generational succession as a cultural problem.—II, III.

123. American Society (4)
   Lecture—3 hours; discussion—1 hour or term paper or research project. The demographic and social structure of American society and population, with emphasis on ethnic and class groups as bases for political and economic interest. Attention to selected current social controversies.

124. Sociology of Education (4)
   Lecture—3 hours, term paper or discussion—1 hour (instructor’s option). Education and the social structure. Class size, curriculum, and economies of scale. Relations between families and schools in socialization; familial ascertainment and educational achievement. Education and industrialization. Organizational and occupational structure of schools. Discussion of selected social controversies.—I, II.

125. Sociology of Culture (4)
   Lecture/discussion—3 hours; term paper. Sociological approaches to study of historical and contemporary culture and mass media, and their structuring in relation to social actors, interests, etc. The structure of culture, power, the production of culture, audiences, and the significance of culture in processes of change. GE credit: SocSci.—III.

127. Sociology of Death (4)
   Lecture—3 hours; discussion—1 hour or term paper or project (instructor’s option). Prerequisite: course 1 or the equivalent. Overview of attitudes toward, structural effects of, and methods of coping with death and death-related behaviors. Particular attention to the work of Erving Goffman and to principles of field observation and qualitative analysis. GE credit: Wrt.—II.

128. Interpersonal Dynamics (4)
   Lecture—3 hours; discussion—1 hour or term paper or project (instructor’s option). Prerequisite: one course from courses 1, 2, 3, 5, 8, 10, Asian-American Studies 1, 20. Analysis of the influences of cultural differences and racial stratification on interpersonal interaction in instrumental settings (e.g., work, education, political action) and intimate settings (e.g., friendship, love, marriage, family). Minority/majority relationships. GE credit: Div. Wrt.—III.

129. Sociology of Black Experience in America (4)
   Lecture—3 hours; discussion—1 hour or research or term paper (instructor’s option). Survey of historical and contemporary theoretical sociological perspectives on the Black experience in United States. Emphasis on comparisons of class, race, and gender phenomena in social structural and functional perspectives and mainstream perspectives of specific sociologists. GE credit: Div.—I, II.

130. Race Relations (4)
   Lecture—3 hours; discussion—1 hour or term paper or research project. Functional cultural Immersion Program: the central definitions of race and racial groups. Analysis of racial conflict, oppression, and other forms of ethnic stratification. Models of ethnic interaction and social change. Emphasis on racial controversies within the U.S. GE credit: Div.—I, II, III.
131. The Family (4)
Lecture—3 hours; discussion—1 hour. Contempo-
rary family life in historical and cross-cultural per-
spective. How different family forms arose, their
significance today and prospects for further family
change. Attention to power relations within and
beyond the family, with particular implications of
family transformation. GE credit: SocSci, Div, Wrt. —
I, II, III. (I, II, III.)

132. The Sociology of Gender (4)
Lecture—3 hours; discussion—1 hour. Analysis of
biological, cultural and structural conditions un-
derlying the status and roles of men and
women in contemporary society, drawing on a his-
torical and comparative perspective. GE credit: Soc-

133. Sexual Stratification and Politics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 132 or the equivalent or consent of instruc-
tor. Analysis of origins, dynamics, and social implica-
tions of sexual stratification. Examination of classical
and contemporary theorists such as Engels, Freud,
J.S. Mill, de Beauvoir, Juliet Mitchell, D. Dinnerstein.
Attention to selected issues in social movements for
and against sexual equality. GE credit: Div, Wrt.

134. Sociology of Racial Ethnic Families (4)
Lecture—3 hours; discussion—1 hour or term paper.
Asian American, Black, Chicano, and Native Ameri-
can family life in comparative historical perspective.
Family life and labor roles are considered in
relation to socio-historical dynamics. Offered in alter-
ate years. GE credit: Div, Wrt.

135. Social Relationships (4)
Lecture—3 hours; discussion—1 hour or term paper.
Prerequisite: course 1, 2 or 3, and upper division
standing. Social and cultural factors influencing
friendships and intimate relationships. Topics include
relationship development, relationship mainte-
nance, and relationship loss. GE credit: Div, Wrt. —
II. (I, II.)

137. African American Society and Culture
1790-1990 (4)
Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 1, Political and social transfor-
mations of African American communities between
1790 and 1990, as seen through film, literature,
and music. Topics include: Black consciousness,
Afro-Slave culture, the Harlem Renaissance, and
contemporary Hip Hop. — II. (I.)

138. Economic Sociology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
Economics 1A or 1B and upper division standing in
the social science major. A survey of the rapidly growing
field of economic sociology. Focus on variations in the
ways that markets are organized. The relation-
ship between individual and collective rationality
will also be emphasized. — I, II, III. (I, II, III.)

139. Corporations and Society (4)
Lecture—3 hours; discussion—1 hour; term paper.
Prerequisite: course 1 or 2 or 3, and upper division
standing. The study of the history and power of the
modern corporation; corporate organization; poli-
tics, the state, and the corporation; labor unions and
the labor process; competition, regulation and inter-
national markets; the multinational and conglomer-
ate corporation; and mass markets and consumerism.
— I, II, III. (I, II.)

140. Social Stratification (4)
Lecture—3 hours; discussion—1 hour or term paper
or research project (instructor’s option). Systems of
social ranking, theories of stratification; power, pres-
tige, culture, and styles of life of various social
classes; social mobility and its consequences for
social structure. — I, II, III. (I, II.)

141. Industrialization and Social Change (4)
Lecture—3 hours; discussion—1 hour or term paper
or research project. Selected technological and
social factors. Preconditions of economic develop-
ment and industrialization. Social, political, and cul-
tural issues at various levels of economic
development. Major historical differences and major
current trends. Emphasis either on highly industrial-
ized countries or on less developed countries. GE
credit: Wrt. — II, III. (II, III.)

143A. Urban Society (4)
Lecture—3 hours; discussion—1 hour or term paper
or project (instructor’s option). Prerequisite: course 1
or the equivalent. Theories of city origins. Analysis
of the historic process of urbanization and of var-
city types. Comparison of American and European
experience of metropolization, counterurbanization,
and neighborhood change. Consideration of compet-
ing theories of urban growth and change and
vying visions of the urban future. Offered in alternate
years. — I, II. (II.)

143B. Sociology of City Life (4)
Lecture—3 hours; discussion—1 hour or term paper
or project (instructor’s option). Prerequisite: course 1
or the equivalent; course 143A recommended. Criti-
cal dissection of the “loss of community” issue.
Analysis of the organization of primary ties in the city,
the cultural and urban public life and of the learning of
city skills. Offered in alternate years. GE credit:
Wrt.—III.

144. Agriculture and Society (4)
Lecture—3 hours; discussion—1 hour or term paper
or research project. Consideration of starting in
the social sciences or one year of course work in
agricultural and environmental sciences. Develop-
ment of agriculture as a major enterprise in modern
society. The relationship and interrelation in the late
force and family farms. Analysis of issues including
mechanization, migrant labor, corporate farming,
and public resource policy. Offered in alternate years.
— I.

145A. Sociology of Third World
Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 1; upper division standing. Introduction to
theories and contemporary issues in the sociology of
development. Topics such as urbanization, rural/
agrarian change, class, status groups, international
division of labor, sectoral shifts, international capital,
informal economy, gender, and political processes
are analyzed within a comparative-historical frame-
work. GE credit: Div, Wrt.—II. (I.)

145B. Gender and Rural Development in
the Third World (4)
Seminar—4 hours. Prerequisite: course 1; upper
division standing. Political-economic analysis of
women and work during the process of socioeco-
nomic change in the world with particular attention to
the family/farm unit of production. Offered in alternate
years. GE credit: Div, Wrt.—II. (I.)

146. Sociology of Religion (4)
Lecture—3 hours; discussion—1 hour or term paper
or research project. Relationship between social
structures and religious beliefs. The religious setting of
the major world religions. Religious innovators and insti-
tutionalization (churches, sects, cults). Secularization
in the modern world and the rise of secular ideol-
ologies. Offered in alternate years. GE credit: SocSci,
Div, Wrt. — II.

147. Sociological Perspectives on East Asia
(4)
Lecture—3 hours; discussion—1 hour or term paper
or research project. Sociological theories and con-
cepts applied toward understanding East Asian soci-
ety. Emphasis on the political structure, stratification,
and economy in China and Japan. Analysis of histor-
al and contemporary demographic and cultural differ-
ences. Offered in alternate years. — II. (III.)

148. Collective Behavior (4)
Lecture—3 hours; discussion—1 hour or term paper
or project (instructor’s option). Prerequisite: course 1
or the equivalent; course 143A recommended. Study of
behavior of human crowds and masses in extraordinary circumstances, including crowd panics, mass scares, collective pro-
tests, riots, revolutionary situations, ecstatic and revivai
gatherings, crazes, fads, and fashions. — I.

149. Religion and American Society (4)
Lecture—3 hours; class project. Historical, contempo-
ant survey of religious experiences and organiza-
tions and their relation to U.S. social and cultural patterns. Civil religion, religious pluralism, minority
and deviant communities, religious migration, U.S.
religions as a social institution, religion, politics,
and social stratification. Offered in alternate years.
GE credit: Div, Wrt.—III.

150. Criminology (4)
Lecture—3 hours; discussion—1 hour or term paper
or research project. Study of juvenile delinquency in
relation to the family, community, and institutional
structures. Consideration of processing of the delinquent by formal agencies of control. — I, II, III, (I, II, III.)

151. The Sociology of Childhood (4)
Lecture—3 hours; term paper. Prerequisite: upper
division standing. Contemporary childhood in histor-
ical, cross-cultural, and global perspectives. Examine
changes in understanding of the nature of childhood
and “best interests of the child” by class, gender, gen-
der, geographic region, and historical period. — I.

154. Sociology of Health Care (4)
Lecture—3 hours; discussion—1 hour or term paper
or research project. Overview of sociological research in medicine and health care, with emphasis on
the organizational, institutional, and social psy-
chological aspects. — I, III. (II.)

155. Sociology of Law (4)
Lecture—3 hours; discussion—1 hour or term paper
or research project. Law considered as social con-
trol; relation of legal institutions to society as affect-
ing judicial decision making and administration of justice. Lawyers as an occupational group. Legal
reform. — I, III. (I, III.)

156. Social Movements (4)
Lecture—3 hours; discussion—1 hour or term paper
or project (instructor’s option). Analysis of several
aspects of social movements, such as forms of organiza-
tion, ideology, recruitment, leadership, strategies
and tactics, development, effects. Frequent use
of sound and film materials. GE credit: Soc-

157. Social Conflict (4)
Lecture—3 hours; discussion—1 hour or term paper
or project. Analysis of the causes, dynamics, and
regulation of social conflict within and between vari-
ous kinds of social groupings with particular refer-
ence to nonviolent methods of waging and
regulating conflict. — I.

159. Sociology of Occupations (4)
Lecture—3 hours; discussion—1 hour or term paper
or research project. Analysis of the institutional
matrix of occupations; collegial and client
relationships; occupational social controls; career
lines, and occupational-related self-defini-
tions; occupational politics. — II, III. (II, III.)

160. Sociology of the Environment
(4)
Lecture—3 hours; term paper. Prerequisite: upper
division standing in Sociology recommended. Pro-
duction, consumption, and urban expansion. Basic
social logics surrounding curbing problems of
resource scarcity (environmental extractions) and
excess wastes (environmental additions). Ways that
society can change and reorganize itself to become
environmentally conscious and hence ecologi-
cally sustainable. — II, III. (I, II, III.)

Quarter Offered: I-Tall. II- Winter, III-Spring, IV-Summer; 2009-2010 offering in parentheses

Sociology 477
170. Population (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Introduction to the study of human population, including theories and statistical measures; social causes and consequences of population trends; changes in population structure; geographical distribution, migration, socio-cultural dimensions of fertility. GE credit: SocSci.

171. Sociology of Violence and Inequality (4)
Lecture/discussion—4 hours. Prerequisite: upper-division standing or consent of instructor. How systems of social inequality organize the practice of violence. Definitions of violence and issues affecting the social control of violence. Analysis and comparison of different forms of violence associated with race, class, gender relations and social organization. —II. (III) 

172. Ideology of Class, Race and Gender (4)
Lecture—4 hours. Examination of popular belief systems that accompany relations between social classes, whites and blacks, and men and women in the United States. How society attempts to justify each relationship, and how ideologcal conflicts resolve. —II. 

173. Sociology of the Jewish Experience (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: upper division standing required. The sociology of Jewish life, analyzing challenges to Jewish identity and community in the diaspora. Diversity within the Jewish community. Americanization, women, new immigrants, post-Holocaust Jewish identity, and Black-Jewish relations. Offered in alternate years. —III. 

174. Social Communication (4)
Lecture—3 hours; term paper. Prerequisite: course 1 or 2. Examines the relationship between the media and social structures. History of media-state relations. Media as reflektor and shaper of values. Emphasis on current European and Marxist pluralist theories rather than on content analysis. Offered in alternate years. —III. 

175. Sociology of Knowledge, Science, and Scientific Knowledge (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: upper division standing preferred. Social, cultural, and historical dimensions of knowledge, especially scientific knowledge. Problems, methods, and theory in sociology of scientific knowledge. Laboratory and historical case studies. Scientific and technical knowledge in institutional and organizational contexts. [Same course as Science and Technology Studies 176.] —I. (III) 

180A. Complex Organizations (4)
Lecture—3 hours; discussion—1 hour or term paper on research project. Prerequisite: course 180A or consent of instructor. Focus on the study of human organization, including theories and statistical measures; social causes and consequences of population trends; changes in population structure; geographical distribution, migration, socio-cultural dimensions of fertility. GE credit: SocSci. 

180B. Complex Organizations (4)
Lecture—3 hours; discussion—1 hour or term paper or research project. Prerequisite: course 180A or consent of instructor. Focus on the study of human organization, including theories and statistical measures; social causes and consequences of population trends; changes in population structure; geographical distribution, migration, socio-cultural dimensions of fertility. GE credit: SocSci. 

181. Social Change Organizations (4)
Lecture—3 hours; discussion—1 hour or term paper. Prerequisite: course 1. Analysis of organizations with social change and improvement goals and programs, emphasizing voluntary associations and grassroots citizen groups. Topics treated include formal, decision-making strategies, and power structures. —I. (III) 

194HA-194HB. Special Study for Honors Students (4-4)
Seminar—3 hours; term paper. Prerequisite: senior standing and admission to the Honors Program. Directed reading, research and writing culminating in the preparation of a Senior Honors Thesis under direction of faculty advisor. (Deferred grading only pending completion of sequence.) —I. (II. (III.) 

195. Special Topics in Sociological Analysis (4)
Seminar—3 hours; term paper. Prerequisite: upper division standing and consent of instructor. In-depth examination of topics in sociiology. Emphasis on student research and writing. May be repeated for credit when topic differs. —I. (II. (III.) 

197. Tutoring in Sociology (1-4)
Tutorial—3-12 hours. Prerequisite: upper division standing, completion of appropriate course with distinction. Activities vary depending on the nature of the course assignment. May include (but not limited to) tutoring on course material, advising on projects and papers, and leading discussion groups. (P/NP grading only.) 

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.) 

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: open to seniors only. (P/NP grading only.) 

Graduate Courses 

201. Social Research (4)
Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Survey of sociological inquiry, taught as a practical course. Philosophy of social science research and research agendas and research problem formulations; research process; explanations. Interpretation; study design; concept formation, measure, sampling, data acquisition, inference, rhetoric and presentation of findings. 

206. Quantitative Analysis in Sociology (4)
Lecture—4 hours. Prerequisite: course 106. Survey of the statistical models and methods that serve as a foundation for quantitative research in sociology, with an emphasis on multivariate regression analysis, as well as measurement theory and time series analysis. (S/U grading only.) —II. 

207A-207B. Methods of Quantitative Research (4-4)
Lecture—3 hours; paper. Prerequisite: course 106 or the equivalent. Principles of study design, examination of measurement, survey research methods and multivariate analysis. Course will stress actual practice of techniques. Students will carry out quantitative data analysis using packaged computer programs. (Deferred grading only, pending completion of sequence.) 

208. Topics in Advanced Quantitative Methods in Social Science (4)
Seminar—3 hours; term paper. Prerequisite: course 206 or the equivalent and graduate standing; major graduate student. Analysis of the logic and application of an advanced statistical model; the particular model chosen may vary. Emphasis on the model's assumptions, its strengths and weaknesses, its application to sociological problems, and the relationship between methods and social theory. May be repeated up to 12 units for credit. Offered in alternate years. 

215. Economy, Politics, and Society (4)
Seminar—3 hours; paper. Prerequisite: consent of instructor. Open to graduate students in sociology and related disciplines. Course introduces students to topics and selected issues in the related fields of economic and political sociology and political economy. 

Quarter Offered: I—Fall; II—Winter; III—Spring; IV—Summer. 2009-2010 offering in parenthesis. 

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Sociological Sciences; Div—Social-Cultural Diversity; Wrt—Writing Experience.
220. Deviance, Law, and Social Control (4)
Seminar—3 hours; projects. Prerequisite: course 120 or consent of instructor. Report and discussions of literature on selected forms of deviance in relation to law and formal social control. Agency contacts and exploratory research projects.

224. Sociology of Education (4)
Seminar—3 hours; term paper. Prerequisite: course 206 or the equivalent recommended. Overview of sociological theories accounting for the form, role, and evolution of educational systems. Emphasis on empirical research on education and social stratification and application to educational policy. Topics include tracking, racial/ethnic achievement inequalities, school organization, and the immigrant experience.

225. Cultural Sociology (4)
Seminar—3 hours, term paper. Explores the varied ways in which culture is understood in the social sciences and the research questions that follow from contrasting viewpoints. The approach is historically informed and focused on changing cultural forms in relation to industrialization and postmodernism. Offered in alternate years.

226. Sociological Social Psychology (4)
Seminar—3 hours; seminar paper—1 hour. Prerequisite: graduate standing or consent of instructor. Advanced study of the varying approaches, methods, issues and topical concerns of sociological social psychology. Analysis of central and representative historical and contemporary works.

227. Sociology of Reproduction (4)
Lecture—3 hours; discussion—1 hour. Recent social science scholarship in such areas as teenage pregnancies, family planning, abortion, adoption, AIDS, and new reproductive technologies; focus on the current situation in the United States. Offered in alternate years.

230. Ethnic (Race) Relations (4)
Lecture—3 hours; term paper. Advanced study of the determinants of ethnic groupings and their interrelationships. Major theme will be the patterns of ethnic stratification and causes of ethnic conflict. Specific focus upon dominance and resistance to dominance, influence of social science research.

233. Gender, Culture, and Local/Global Transformation (4)
Seminar—3 hours; term paper. Focus on critical approach to women and development; analyze local transformations with global connections within specific cultural contexts. Course covers theory, methodological issues, and relationships between theory and practice in alternate years.

234. Gender, Family, and Society (4)
Seminar—3 hours; seminar paper. Prerequisite: graduate standing or consent of instructor. Major theoretical traditions and concerns in family sociology and sociology of gender. Analysis of selected classical and contemporary works representative of functionalist, Marxist, psychoanalytic, feminist and critical theoretical approaches to these subjects (e.g., Engels, Parsons, Freud, Horkheimer, Goode, Lasch, Millich). Emphasis on macro and historical questions.

242A-242B. Comparative Methods in Historical Sociology (4-4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative approaches to major historical phenomena such as nationalism, bureaucratization, feudalism, and capitalism; the relevance of psychological and sociological theories to historical interpretation; the verifiability of historically grounded hypotheses; the meaning of analogy, correspondence and causality. [If offered in alternate years, credit to be given only when a student has not received credit in a preceding offering.] Offered in alternate years.

243. Urban Society (4)
Seminar—3 hours; term paper. Broad overview of the issues and concerns of the field of urban sociology; special emphasis on the human experience of urban living in contemporary, cross-cultural or historical settings.

245. Developing Societies (4)
Seminar—3 hours, term paper or project. Prerequisites: graduate standing or consent of instructor. Study with problems of developing societies. Analysis of social and economic problems of developing societies from the standpoint of theory and research on modernization and underdevelopment. Nature of third world dependency and interdependence in the global political economy. Offered in alternate years.

248. Social Movements (4)
Seminar—3 hours; term paper. Analysis of current issues in and contributions to the study of collective behavior and social movements; particular focus upon the strategies and tactics of social movements.

254. Sociological Issues in Health Care (4)
Seminar—3 hours; term paper. Prerequisite: open to graduate or professional students. Sociological perspectives and methods directed to health care issues. Students select topics for supervised research. The course will have a theme (described in advance) each time it is offered. Paper on research will be required. (S/U grading only.)

255. Sociology of Law (4)
Seminar—4 hours. Prerequisite: consent of instructor. Analysis of the nature of the legal process and its impact on society and social change. The nature and functions of law, the organization and administration of law, and the capacity of law to affect social behavior.

265A. Classical Sociological Theory (4)
Lecture—3 hours; discussion—1 hour. Introduces graduate students to the work of the main classical thinkers in the tradition of social theory, such as Marx, Durkheim, Weber, Simmel, Freud, G.H. Mead, and Parsons, locating them within the historical, cultural, and philosophical milieu in which their ideas originated.

265B. Theory in Contemporary Sociology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 265A. Explores the uses of theories in contemporary sociology by tracing their connections with classical sociological writings and their relations to broader theoretical concerns of contemporary social thought, with particular emphasis on relevance to the current historical, cultural and social milieu.

270. Social Demography (4)
Seminar—4 hours. Prerequisite: course 170 or consent of instructor. How social institutions affect and are affected by the level and variation of mortality, migration, and fertility. Special emphases on the determinants of fertility-related attitudes and behaviors, on less-developed countries, and on contemporary empirical studies.

280. Organizations and Institutions (4)
Seminar—4 hours. Theory of formal organizations and bureaucracies. Methods of research in organizational and institutional studies. Historical and comparative analysis of political, religious, educational, military, and economic structure.

290. Seminar (4)
Seminar—3 hours; term paper. (S/U grading only.)

292A-292B. Field Research (4-4)
Seminar—3 hours; field trips. Prerequisite: graduate standing in Sociology or consent of instructor. The process of collecting, analyzing and reporting qualitative data. Emphasis on application of principles; each participant completes a fieldwork project. (Deferred grading only, pending completion of sequence.)

293. Proseminar in Sociology (2)
Seminar—2 hours. Prerequisite: freshman Sociology graduate students only. Introduction to graduate training in sociology. A seminar designed to introduce students entering graduate work in the department to its ongoing research activities. (S/U grading only.)—I, II, III.

295. Speciﬁcal Topics Seminar (4)
Lecture/discussion—3 hours, term paper. Prerequisite: graduate standing or consent of instructor. Research topics in Sociology. Specific topic will vary according to faculty interest and student demand. May be repeated for credit when topic differs.—I, II, III, (I, II, III).

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only.)

299. Individual Study (1-12)
(S/U grading only.)

Professional Courses

390A. The Teaching of Sociology (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: graduate standing. Practical instruction in devising course syllabi, lectures and assignments for Associate-Instructors and others interested in college teaching. Discussion of pedagogical methods of teaching qualitative and quantitative courses. Pedagogical issues involved in critical sociological analysis. (S/U grading only.)—II, (II).

390B. The Teaching of Sociology (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: graduate standing. Practical instruction in devising course syllabi, lectures and assignments for Associate-Instructors and others interested in college teaching. Discussion of pedagogical methods of teaching qualitative and quantitative courses. (S/U grading only.)—II, (II).

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III, (I, II, III).

Professional Course

466. Research Paper Workshop (2)
Workshop—1.5 hours; discussion—0.5 hours. Prerequisite: Master of Arts standing. A workshop to assist advanced graduate students in the preparation of an original research paper. Students present their research papers and discuss issues in theory, research design, data, empirical inference, and verbal and written presentation of a professional research paper. (S/U grading only.)

Soil Science

See Geology, on page 305; Soil Science, on page 479; Soils and Biogeochemistry (A. Graduate Group), on page 481; and Soil and Water Science, on page 481.

Soil Science

[College of Agricultural and Environmental Sciences]

1 Faculty. See Land, Air, and Water Resources, on page 342.

Major Programs. See the major in Soil and Water Science, on page 481.


UNITS

Soil Science 479

Soil Science 479

Courses selected from Soil Science 105, 107, 109, 111, 112, 118, 120, Biological Science 157, Plant Biology 158, Hydrology 159, 1124, 134, .... 

Minor Adviser. R.J. Southard (Land, Air, and Water Resources)

Graduate Study: Programs of study leading to the M.S. and Ph.D. degrees in Soils and Biochemistry are available. Information regarding these programs can be obtained from the graduate advisers, at http://soils.ucdavis.edu/ and in the Graduate Announcement. See also Graduate Studies, on page 104.

Graduate Adviser. R. Zasoski (Land, Air, and Water Resources)

Courses in Soil Science (SSC)

Questions pertaining to the following courses should be directed to the instructor, to the Resource Sciences Teaching Center in 1152 Plant and Environmental Sciences Building [530] 752-1669, or see undergraduate and graduate Soils and Biochemistry courses at http://lawr.ucdavis.edu/undergrad_sws.htm or http://lawr.ucdavis.edu/graduate_sbg.htm.

Lower Division Courses

10. Soils in Our Environment (3) Lecture—3 hours; independent study. Soils in our global ecosystem; soils as natural bodies formed by interactive processes; soil response to use and management; sustainable use of soil resources; role of soils in agricultural and environmental issues; role of soils in our daily lives. Limited enrollment.

109. Sustainable Nutrient Management (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: course 100 or the equivalent. Availability of nutrients in organic and conventional agricultural, vineyard, orchard and plantation forest soils; management of fertilizers, cover crops, compost, sewage sludge and manures for crop production; and prudent loss to the environment is emphasized. —III. (III.) Horwath

111. Soil Microbiology (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 1C and Biological Sciences 1C. Major groups of microorganisms in soil, their interactions, and their responses to environmental variables. Role of microorganisms in cycling of nutrients. Plant-microbe relationships. Transformations of organic and inorganic pollutants. —II. (II.) Scow

112. Soil Ecology (3) Lecture—2 hours; laboratory/discussion—2 hours. Prerequisite: Biological Sciences 1B, 1C, course 100. The biology and ecology of soil communities, emphasizing the soil food web and litter decomposition. Role of specific biota, ranging from microorganisms to earthworms. Applications to restoration, remediation, ecosystem science, and agriculture. GE credit: WE, H, N

118. Soils in Land Use and the Environment (4) Lecture—4 hours; discussion—1 hour; one-one day field trip. Prerequisite: course 100 or consent of instructor. Soils as components in land use planning and environmental quality. Topics include: soil survey reports, remote sensing, land capability classification, soil erosion/corrosion, waste disposal on soils and soil reclamation. —III. (III.) Singer

120. Soil Genesis, Morphology, and Classification (5) Lecture—4 hours; laboratory—3 hours (includes one-weekend field trip). Prerequisite: course 100; Geology 50 recommended. Recognition and description of soils; chemical, biological and physical processes of soil formation. Factors of soil formation. Interactions of soils with diverse ecosystems. Introduction to soil classification. Practice using soil taxonomy. Practical experience describing soil properties in the field. —II. (II.) Southard

192. Soil Science Internship (1-12) Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in soil science. Internship supervised by a member of the faculty. (P/NP grading only.)

Upper Division Courses

100. Principles of Soil Science (5) Lecture—3 hours; laboratory—3 hours; term paper. Prerequisite: Chemistry 2A-ZB, Physics 1A-B, Biological Sciences 1A; Geology 50, Biological Sciences 1C recommended. Soil as part of natural and managed ecosystems and landscapes. Solid, liquid, and gas phases and their interactions in the soil. Water, gas and heat movement in soil. Soil biology. Plant nutrient acquisition and use. Soil development, management and use. —I. (I.) Singer

102. Soil and Water Chemistry (5) Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 100 or the equivalent. Soil solution and solid-phase chemistry of soils in relation to agricultural and environmental concerns. Interactions between soil solids, precipitates and solution phases: mineralogy, ion exchange, adsorption, weathering and buffering, soil colloidal behavior, models of solution and solid-phase interactions. —II. (II.)

105. Field Studies of Soils in California Ecosystems (5) Prerequisite: courses 100 and 120, or equivalent recommended. Field-based studies of soils in California ecosystems, away from campus, throughout California. Emphasis on description and classification of soils; relationships among soils, vegetation, geology, and climate. Physical, chemical, and biological processes in soils on the landscape, and the role of soils in land use. May be repeated one time for credit. —IV. (IV) Amundson, Dahlgren, O'Green, Singer, Southard


208. Soil-Plant Interrelationships (3) Lecture—3 hours. Prerequisite: course 100, Plant Biology 111 or consent of instructor. Plant needs, occurrence and reactions of water and mineral nutrients in soils; root systems and their growth in soils; mass flow and diffusion mechanisms in nutrient acquisition; models related to uptake to soil and plant characteristics; nutrient assimilation and crop quality. Offered in alternate years. —III. Richards

210. Physiology and Ecology of Mycorrhizal Symbioses (3) Lecture/discussion—3 hours. Prerequisite: Plant Biology 111 or consent of instructor; course 100 recommended. Structure, function and evolutionary development of mycorrhizal fungi and the root-fungus symbiosis. Emphasis on regulation of carbon and nutrient exchanges between host and symbiont. Course integrates mycorrhizal physiology and ecology in an ecosystem context. Offered in alternate years. —II. Bledsoe

211. Advanced Soil Microbiology (3) Lecture—3 hours. Prerequisite: Chemistry 8A-BB, course 111; Biological Sciences 102, 103 or an equivalent course recommended. Microbial metabolism of organic chemicals in soil, both natural and xenobiotic. Decomposition of organic matter. Kinetics of microbial processes in soil. Offered in alternate years. —III. Scow

216. Physical Geochemistry (3) Lecture—3 hours. Prerequisite: course 102 or Chemistry 110A or Geology 115 and Mathematics 119. First half emphasizes equilibrium thermodynamics, including choices of standards, potential solutions, and use of the Gibbs-Duhem relation. Second half covers geochemical kinetics including simple rate laws, transition state theory, solute diffusion, and experimental methods. —I. (I.) Case

218. Soil Erosion and Conservation (3) Lecture—2 hours; discussion—1 hour. Prerequisite: graduate standing; courses 118, 120. Processes of soil erosion by wind and water in agricultural areas, and methods of soil conservation will be discussed. Methods of predicting rates of soil erosion will be considered. Offered in alternate years. —III. (III.) Singer

219. Ecosystem Biogeochecmy (4) Lecture—3 hours; laboratory/discussion—2 hours. Prerequisite: introductory courses in ecology/biology and soils recommended; undergraduates accepted with consent of instructor. Multidisciplinary analysis of energy and nutrient transfers within terrestrial ecosystems. Examination of processes and the intra-and inter-system interactions between the atmosphere, biopshe, lithosphere and hydrosphere. Laboratory section uses biogeochemical simulation models in examine case studies. (Same course as Ecology 219.) —III. (III.) Dahlgren

220. Pedology (3) Lecture—3 hours. Prerequisite: consent of instructor; course 120 recommended. Topics selected from studies of soil-forming processes, soil-geomorphic relations, mineral weathering, new developments in soil classification, and development of pedologic theory. Topics vary from year to year. May be repeated once for credit. Offered in alternate years. —II. Southard

222. Organic Chemistry of Soil (3) Lecture—3 hours. Prerequisite: Chemistry 8A, 8B, Mathematics 16A, 16B, course 100 or the equivalent. Structure and function of organic matter, biodegradation, biochemical and humic substance formation, relationship of organic matter to nutrient cycling and sustainability in agricultural and natural ecosystems, reactions of organics with humics in soil, and soil and water, methods for characterization. Offered in alternate years. —II. Horwath

290. Special Topics in Soil Science (1) Seminar—1 hour. Prerequisite: graduate standing. Oral presentation and discussion of scientific material and procedures for review and criticism of publications. [S/U graded only]—I, III. (I, III.

298. Group Study (1-5) Prerequisite: consent of instructor.
Soils and Biogeochemistry (A Graduate Group)

Kate M. Scow, Ph.D., Chairperson of the Group
Group Office, 1152 Plant & Environmental Sciences Building
(530) 752-1669; http://soils.ucdavis.edu/

Faculty
Caroline Bledsoe, Ph.D., Professor
Eduardo Blumwald, Ph.D., Professor
Patrick Brown, Ph.D., Professor
William Casey, Ph.D., Professor
Randy Dahlgren, Ph.D., Professor
Joe DiTomaso, Ph.D., Professor
Valerie Eviner, Ph.D., Assistant Professor
Graham Fogg, Ph.D., Professor
Mark Grismer, Ph.D., Professor
Graham Fogg, Ph.D., Professor
Jan Ho, Ph.D., Chairperson
Linda Egan, Ph.D., Associate Professor
Caroline Bledsoe, Ph.D., Professor
Graham Fogg, Ph.D., Professor
Michael Singer, Ph.D., Professor
Wendy Silk, Ph.D., Professor
Emilio Bejel, Ph.D., Chairperson
Marta E. Altisent, Ph.D., Professor
Miguel Marino, Ph.D., Professor
Mark Matthews, Ph.D., Professor
Diana Zainen, Ph.D., Professor
Emilio Bejel, Ph.D., Chairperson
Marta E. Altisent, Ph.D., Professor
Miguel Marino, Ph.D., Professor
Mark Matthews, Ph.D., Professor
Diana Zazen, Ph.D., Professor

Emeriti Faculty
Theodore Hisao, Ph.D., Professor Emeritus
André Lauchi, Ph.D., Professor Emeritus
Roland Meyer, Ph.D., Professor Emeritus
Dennis Rolston, Ph.D., Professor Emeritus
Robert Zierenberg, Ph.D., Professor Emeritus

Soil and Water Science
This major will be discontinued as of Fall 2008; see Environmental Science and Management, on page 280.

Graduate Admissions Office, Krassi Hristova (Land, Air, and Water Resources), (530) 752-2412; khristova@ucdavis.edu

Soil and Water Science
This major will be discontinued as of Fall 2008; see Environmental Science and Management, on page 280.

College of Agricultural and Environmental Sciences
Faculty, See under Land, Air, and Water Resources, on page 342.

The Major Program
Soil and water science is concerned with the use and protection of our land and water resources. The major provides a sound scientific basis for managing soil and water resources to benefit urban use, agriculture, forestry, and the environment.

The Program. Major programs include land use, soil survey, soil management and conservation, plant nutrition, diagnostic technology, irrigation and drainage, water resources management, water quality, and related environmental problems; for example, the emphasis on water quality would include more than the minimum number of units of physical and biological sciences, while an emphasis in resources economics and land-use planning would include more courses in the social, political, and economic areas.

Internships and Career Alternatives. Before they graduate, many students receive practical work experience through student internships with state and federal agencies, soil and plant labs, and growers. Students also have the opportunity to work on research projects with faculty members and to develop individual research or study topics. Graduates are qualified for managerial and technical positions in advising, planning, land appraisal, resource conservation and research and teaching with private, governmental, and international organizations involved with soil and water development, use, and conservation. Graduates are prepared to continue in master’s and doctoral programs in soil science, hydrologic science, ecology, policy and plant physiology.

B.S. Major Requirements:

UNITS

English Composition Requirement......4-12
See College requirement................0-8
Communication 1.............................4
Preparatory Subject Matter.............73-74
Biological Sciences 1A, 1B, 1C or 2A, 2B, 3C..................14-15

Chemistry 2A-2C and a more advanced course in mathematics, and one of the following: 16

Agricultural Management and Rangeland Resources 21 or Engineering 5 or one of the following: 18
Ecology course with adviser’s approval......3
Economics 1A, 1B, 1C..........................3
Geology 50...................................3
Mathematics 16A, 16B.......................6
Physics 7A-7B-7C............................12
Statistics 13, 100 or Agricultural Plant Sciences 120.................................4

Additional physical sciences, biological sciences, and/or mathematics with approval of adviser......6

According to major requirement..........................6-24

At least one upper division course from each of the following areas, with approval of adviser: 5
(1) environmental law, (2) environmental economics and decision making......9

Depth Subject Matter..........................30

Soil Science 100...............................4

Environmental and Resource Sciences 100, 101B, 101C....................6

Additional upper division units in soil science and hydrologic science..............20

Restricted Electives............................27

To supplement or expand areas of student interest selected with approval of adviser......24
Special study or experience, 192 or 199 course in the major area.................3

Unrestricted electives.........................3-20

Total Units for the Degree..............180

Major Adviser, W. Horwath (Land, Air, and Water Resources)

Advising Center for the major is located in 1152 Plant & Environmental Sciences Building (530) 752-1669. Contact Merlyn Potters at mmpotters@ucdavis.edu.

Graduate Study. Graduate programs are available in Environmental Policy, Soils and Biogeochemistry, Ecology and Hydrologic Sciences. Detailed information can be obtained from the Graduate Advisers and the Graduate Announcement. See also Graduate Studies, on page 104.

Courses. For specific courses of instruction in this major, see course listings under Atmospheric Science, Plant Sciences, Environmental and Resource Sciences, Soil Science, and Hydrologic Science.


Spanish

(Dean of Letters and Science)
Emilio Bejel, Ph.D., Chairperson of the Department
Department Office. (Spanish and Classics) 616 Sproul Hall (530) 752-0835; http://spanish.ucdavis.edu

Faculty
Marta E. Altisent, Ph.D., Professor
Samuel G. Armstrong, Ph.D., Professor
Emilio Bejel, Ph.D., Professor
Leopoldo Berrucci, Ph.D., Professor
Robert Blake, Ph.D., Professor
Travis Bradley, Ph.D., Assistant Professor
Cecilia Colonbi, Ph.D., Professor
Michael Lazazzara, Ph.D., Assistant Professor
Linda Egan, Ph.D., Associate Professor

Quarter Offered: I—Fall, II—Winter, III—Spring, IV—Summer 2009-2010 offering in parentheses

General Education (GE) credit: ArtsHum = Arts and Humanities; SccEng = Science and Engineering; SocSci = Social Sciences; Div = Social-Cultural Diversity; Wrt = Writing Experience
The Spanish major program assures proficiency in all four language skills—speaking, understanding, reading, and writing—and acquaints students with the intellectual and cultural contributions of the Spanish-speaking world through a study of its language, literature, and traditions.

The Program. The department’s lower division program gives students a solid foundation in the Spanish language, either through the traditional elementary and intermediate language series or through an accelerated three-course sequence of Spanish for native speakers. Linguistics 1 introduces students to a systematic study of language in general and serves as an introduction to upper division courses in Spanish linguistics. At the upper division level, students receive a broad introduction to basic concepts and the practice of literary and cultural criticism and to the four areas of study represented in the department’s curriculum: Spanish linguistics, Spanish literature and culture, Latin-American literature and culture, and Hispanic literatures and cultures in the United States. Students are encouraged to work closely with the department’s academic advisers in designing a program of studies tailored to their individual needs and interests. Many students combine the Spanish major with another major in the humanities or social sciences.

Career Alternatives. The program, alone or in combination with other major programs, may lead to advanced study of the language or literature and culture of Spanish America, and to careers not only in teaching, but also in other professions such as library science, law, medicine, and in government, social service, business, or international relations.

A.B. Major Requirements:

Preparatory Subject Matter ............ 4-37

Spanish 1, 2, 3, 21 or 21S, 22 or 22S, 23 or 23S, and 24 or 24S .................. 0-33
Spanish 31, 32, 33 .................................................. 0-15
Linguistics 1 .................................................. 4

In consultation with a departmental adviser and with the consent of the department chairperson, Linguistics 1 may be taken concurrently with upper division courses.

Depth Subject Matter ............... 45-48

One course in at least four of the following five areas: ................................. 19-20
Spanish 100, 100S, 141, 141S, 170 or 170S
Spanish 111N, 113, or 116 ........................................... 3-4
Spanish 130, 131N, 134A or 142 ....................................... 4
Spanish 150N, 151N, 157, 159 or 159S ........................................ 4
Spanish 117, 174, 176, or 177 ........................................ 4

Students planning to take Spanish 110 should do so at the beginning of the upper division sequence or concurrently with Spanish 100, 100S, 141, 141S, 170 or 170S.

Seven elective courses to be chosen in consultation with the student’s major adviser. .......................... 26-28

Students may, with the approval of their adviser, take up to two elective courses outside the department in such programs as Anthropology [Anthropology 144, 146, Chicana/o Studies (Chicana/o Studies 154, 155, 156, 160, 170, 171), Comparative Literature (Comparative Literature 152, 165, Education (Educación 151, 152), History (History 159, 160, 161A, 161B, 164, 165, 166A, 166B, 167, 168, 169, 170), Linguistics 160, Native American Studies (Native American Studies 120, 133, 184)], Art History (Art History 151), African American and African Studies (African American and African Studies 107A, 180). A maximum of six units of course 199 may be counted toward the major. Course 199 cannot be used to replace regular departmental courses.

Total Units for the Major .................. 49-85

Major Advisers. Consult Department.

Advising. Given the great flexibility in the Spanish major, it is important that students design their programs in close consultation with their major adviser. This is especially important for students who intend to use their major as preparation for graduate study, for those who are planning a teaching career, and for those who wish to take advantage of our EAP options.

Minor Program Requirements:

Spanish 100, 100S, 141, 141S, 170, or 170S ........................................... 4
Spanish 111N, 113, or 116 ........................................... 3-4
Spanish 130, 131N, 134A, or 142 ....................................... 4
Spanish 150N, 151N, 157, 159 or 159S ........................................ 4
Spanish 117, 174, 176, or 177 ........................................ 4

Consul a departmental adviser if any of these courses are to be taken abroad.

Honors Program. Candidates for high or highest honors in Spanish must write a senior thesis under the direction of a faculty member. For this purpose, honors candidates must enroll in at least six units of Spanish 194D during the two quarters. Normally, a student will undertake the honors project during the first two quarters of the senior year; other arrangements must be authorized by the department chair. Only students who, at the end of their junior year (135 units), have attained a cumulative GPA of 3.500 in courses required for the major will be eligible for the honors program. The requirements for earning high and highest honors in Spanish are in addition to the regular requirements for the major in Spanish.

Education Abroad Program Options. The department encourages its majors to consider study in a Spanish-speaking country with our Education Abroad Program (EAP). It is now possible for our students to complete significant portions of the Spanish major in the EAP centers at both the lower (Preparatory Subject Matter) and upper division levels through newly introduced options.

UC Davis Quarter Abroad (UCQDA). The Quarter Abroad Program offers programs in Mendola, Argentina and in Madrid, Spain. These programs aim at providing students with opportunities to increase their knowledge of the Spanish language and the Latin American culture by experiencing the life-learning challenges of living and studying abroad.

Students will earn 15-22 UC Davis units toward the Spanish major, minor, or foreign language require-

ment. Each program has an upper division course taught by the UC Davis Program Director focusing on history, culture and society.

For more information, contact C. Colombe or see http://quarterabroad.ucdavis.edu.

Teaching Credential Subject Representative. C. Colombe; see the Teaching Credential/M.A. Pro-
gram on page 109.

Graduate Study. The department offers courses leading to the M.A. degree in Spanish to students who have completed with distinction the A.B. degree in Spanish, or the equivalent. Candidates will be recom-
manded for admission to graduate studies in Spanish if they provide proof of meeting the requirements of the Graduate Studies office and the Department of Spanish. The Department also offers programs of study and research leading to the Ph.D. degree. Detailed information may be obtained by writing to the Chairperson or the Graduate Director of the Spanish Department.

Graduate Adviser. Consult Department.

Prerequisite Credit. Credit normally will not be given for a course if that course is the prerequisite of a course already successfully completed. Exceptions can be made by the Department Chairperson only.

Courses in Portuguese (POR)

161. Luso-Brazilian Literature and Culture (4)

Lecture/discussion—3 hours; term paper. Prerequi-
site: first year Portuguese or the equivalent. Colonial Brazilian literature survey. Readings include the 16th-18th centuries manuscripts and books of cultural importance in a society dominated by censorship and with no printing presses. Study of the role liter-
ary Academies played in the so-called “culture of manuscripts.”—III. (I.) Bernucci

162. Introduction to Brazilian Literature (4)

Lecture/discussion—3 hours; term paper. Prerequi-
site: first year Portuguese or the equivalent. Narra-
tive and poetic texts of the 19th and 20th centuries in Brazil. In-depth and comparative study of Roman-
tic and (Ne) Naturalist movements as a forum for discussion about literary tradition and modernity in Latin America.—III. (II.) Bernucci

20th C Masters in Brazilian Literature (4)

Lecture/discussion—3 hours; term paper. Prerequi-
site: first year Portuguese or the equivalent. Over-
view of modern Brazilian literature from early 20th C to the poetry by João Cabral de Melo Neto and the Concretists (1960s), including European avant-
garde movements and literary and cultural manifes-
tos leading to a revolutionary body of literature.—II. (II.) Bernucci

Courses in Spanish (SPA)

Course placement. Students with two years of high school Spanish normally take Spanish 2, those with three years take Spanish 3, and those with four years take Spanish 21. It is recommended that trans-
fer students who have successfully completed a two-
year sequence at the junior college level continue their study by taking Spanish 24, 24S, 100, 100S, 141, 141S, 170, or 170S. Consult a departmental adviser.

Lower Division Courses

1. Elementary Spanish (5)

Lecture/discussion—5 hours, laboratory—1 hour. Introduction to Spanish grammar and development of all language skills in a cultural context with special emphasis on communication. Not open for credit to students who have completed course 15. Students who have successfully completed 2 or 3 in the 10th or higher grade of high school may receive unit credit for this course on a P/NP grading basis only. Although a passing grade will be charged to the student’s P/NP option, no petition is required. All other students will receive a letter grade unless a P/NP petition is filed.—I, II, III, (I, II, III.)
15. Elementary Spanish (5)  
Lecture/discussion—5 hours; laboratory—1 hour.  
Intermediate Spanish: Grammar and development of all language skills in a cultural context with special emphasis on communication. Offered in a Spanish-speaking country under the supervision of a UC Davis faculty/lecturer. Not open for credit to students who have completed course 1. —III.

2. Elementary Spanish (5)  
Lecture/discussion—5 hours; laboratory—1 hour.  
Prerequisite: course 1 or 1S. Continuation of courses 1 and 1S in the areas of grammar and basic language skills. Not open for credit to students who have completed course 25.—II, III. (I, II, III)

25. Elementary Spanish (5)  
Lecture/discussion—5 hours; laboratory—1 hour.  
Prerequisite: course 1 or 1S. Continuation of Spanish 1 in the areas of grammar and basic language skills. Offered in a Spanish-speaking country under the supervision of UC Davis faculty/lecturer. Not open for credit to students who have completed course 2.—III.

2V. Elementary Spanish (5)  
Lecture/discussion—2 hours; web electronic discussion—3 hours. Prerequisite: course 1 or 1S. Continuation of courses 1 and 1S in the areas of grammar and basic language skills. Hybrid format combining classroom instruction with technologically based materials. Not open to students who have taken course 2 or 2S. Not open for credit to students who have completed course 25.—II, III. (I, II, III, IV)

3. Elementary Spanish (5)  
Lecture/discussion—5 hours; laboratory—1 hour.  
Prerequisite: course 2 or 2S. Completion of grammar sequence and continuing practice of all language skills using cultural texts. Not open for credit to students who have completed course 3.—II, III. (I, II, III)

35. Elementary Spanish (5)  
Lecture/discussion—3 hours; laboratory—1 hour.  
Prerequisite: course 2 or 2S. Completion of grammar sequence and continuing practice of all language skills using cultural texts. Offered in a Spanish-speaking country under the supervision of UC Davis faculty/lecturer. Not open for credit to students who have completed course 3.—III. (II, III)

3V. Elementary Spanish (5)  
Lecture/discussion—2 hours; web electronic discussion—3 hours. Prerequisite: course 2, 2S, or 2V. Completion of grammar sequence and continuing practice of all language skills using cultural texts. Hybrid format combining classroom instruction with technologically based materials. Not open to students who have taken course 3 or 3S.—II, III. (I, II, III, IV)

8. Elementary Spanish Conversation (2)  
Discussion—3 hours. Prerequisite: course 3; course 21 [concurrently] recommended. Designed to develop oral communication skills. Emphasis on increasing vocabulary, improving listening comprehension, pronunciation, accuracy and grammar control. Practice of everyday situations. Not open to native speakers or to upper division students.—II, III. (I, II, III)

21. Intermediate Spanish (5)  
Lecture/discussion—5 hours; laboratory—1 hour.  
Prerequisite: course 3 or 3S. Review and development of the grammar, vocabulary and composition acquired in the first year through exercises and reading of modern texts. Students transferring from other institutions are recommended to start the second year program at this point. Not open for credit to students who have completed course 21 S.—II, III. (I, II, III, IV)

215. Intermediate Spanish (5)  
Lecture/discussion—5 hours; laboratory—1 hour.  
Prerequisite: course 3 or 3S. Review and development of the grammar, vocabulary and composition acquired in the first year through exercises and reading of modern texts. Students transferring from other institutions are recommended to start the second year program at this point. Not open for credit to students who have completed course 21 S.—II, III. (I, II, III)

22. Intermediate Spanish (5)  
Lecture/discussion—3 hours; laboratory—1 hour.  
Prerequisite: course 21 or 21S. Continuation of course 21 and 21S. Focus on more difficult grammar concepts and further practice on composition. Development of all language skills through exercises and reading of authentic texts. Not open for credit to students who have completed course 22 S.—I, II, III. (I, II, III)

22S. Intermediate Spanish (5)  
Lecture/discussion—3 hours; laboratory—1 hour.  
Prerequisite: course 21 or 21S. Continuation of course 21 and 21S. Focus on more difficult grammar concepts and further practice on composition. Development of all language skills through exercises and reading of authentic texts offered in a Spanish-speaking country under the supervision of UC Davis faculty. Not open for credit to students who have completed course 22.—II, III. (I, II, III)

23. Spanish Composition I (4)  
Lecture—3 hours; extensive writing. Prerequisite: course 22 or 22S. Development of writing skills by way of reading, discussion, and analysis of authentic materials, literary texts, and videos. Selective review of grammar, vocabulary, individual and group projects. Not open for credit to students who have completed course 23 S.—I, II, III. (I, II, III)

23S. Spanish Composition I (4)  
Lecture—3 hours; extensive writing. Prerequisite: course 22. Development of writing skills by way of reading, discussion, and analysis of authentic materials, literary texts, and videos. Selective review of grammar. Composition, journals, individual and group projects. Course is taught in a Spanish-speaking country. Not open for credit to students who have completed course 23.—II, III. (I, II, III)

24. Spanish Composition II (4)  
Lecture—3 hours; extensive writing. Prerequisite: course 23 or 23S. Development of advanced level writing skills, with particular emphasis on how to write argumentative prose, essays, and research papers. Introduction to the analysis of literary genres. Compositions, journals, individual and group projects. Not open for credit to students who have completed course 24 S.—I, II, III. (I, II, III)

24S. Spanish Composition II (4)  
Lecture—3 hours; extensive writing. Prerequisite: course 23 or 23S. Development of advanced level writing skills, with particular emphasis on how to write argumentative prose, essays, and research papers. Introduction to the analysis of literary genres. Compositions, journals, individual and group projects. Course is taught in a Spanish-speaking country. Not open for credit to students who have completed course 24.—I, II, III. (I, II, III)

28. Intermediate Spanish Conversation (2)  
Discussion—3 hours. Prerequisite: course 8 or 22. Continuation of course 8. Designed to develop oral communication skills at a more advanced level. Practice in more complex situations. (Former course 9) —I, II, III. (I, II, III)

31. Intermediate Spanish for Native Speakers I (5)  
Lecture/discussion—3 hours; tutorial—1 hour; frequent writing assignments. Prerequisite: course 3 or the equivalent of course 3. First course of a three-quarter series designed to provide bilingual students whose native language is Spanish with the linguistic and learning skills required for successfully completing upper division courses in Spanish. Introduction to grammar and composition. —I. (I)

32. Intermediate Spanish for Native Speakers II (5)  
Lecture/discussion—3 hours; tutorial—1 hour; frequent writing assignments. Prerequisite: course 3 or consent of instructor. Continuation of intensive review of grammar and composition. Development of all language skills through reading of modern texts, presentation/development of major ideas, vocabulary expansion, and writing essays on topics discussed. Designed for students whose native language is Spanish. (Former course 7B).—II. (II)

33. Intermediate Spanish for Native Speakers III (5)  
Lecture/discussion—3 hours; tutorial—1 hour; frequent writing assignments. Prerequisite: course 32 or consent of instructor. Development of writing skills, with emphasis on experimenting with various writing styles for analytical, argumentative, expository, and creative. Analytical review of literary genres. Written essays will be assigned. Students will develop a research paper. Designed for students whose native language is Spanish. (Former course 7C).—III.

98. Directed Group Study (1-5)  
Prerequisite: consent of instructor and Department Chairperson. Primarily for lower division students. (P/NP grading only)

99. Special Study for Undergraduates (1-5)  
Prerequisite: consent of instructor. (P/NP grading only)

Upper Division Courses

100. Principles of Hispanic Literature and Criticism (4)  
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 24 or 24S or 25. Principles of literary criticism applied to the study of fiction, drama, poetry, and essay of major literary writers of the Hispanic world. Not open for credit to students who have completed course 100S.—I, II, III. (I, II, III)

100S. Principles of Hispanic Literature and Criticism (4)  
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 24 or 24S. Principles of literary criticism applied to the study of fiction, drama, poetry and essay of major literary writers of the Hispanic world. Offered in a Spanish speaking country under the supervision of a UC Davis faculty/lecturer. Not open for credit to students who have completed course 100.—III.

110. Advanced Spanish Composition (4)  
Lecture—3 hours; frequent writing assignments. Prerequisite: course 24 or 24S. Practice in expository writing with emphasis on clarity and idiomatic expression. Practical application and review of selected grammar topics. (Part of former courses 110A and 110B)—I, II, III. (I, II, III)

111N. The Structure of Spanish: Sounds and Words (3)  
Lecture—3 hours. Prerequisite: Linguistics 1 and course 24 or 24S, or consent of instructor. A linguistic description of the sound patterns of Spanish and how those sounds can be learned as larger units, such as morphemes and words. Theoretical and practical comparisons with English and with other Romance languages. (Former course 132)—I, II, III. (I, II, III)

112N. The Structure of Spanish: Words and Phrases (3)  
Lecture—3 hours. Prerequisite: course 111N. A study of Spanish word and phrase structure, with special emphasis on the constituent structure of noun and verb phrases. Theoretical and practical comparisons with English and with other Romance languages. (Former course 131)—I, II, III. (I, II, III)

111S. Spanish Pronunciation (4)  
Lecture—3 hours; term paper. Prerequisite: Linguistics 1 and course 24 or 24S. The sound structure of modern Spanish; theoretical analysis of selected problems in pronunciation. Strongly recommended for prospective teachers of Spanish.—II, III. (II, III)

114N. Contrastive Analysis of English and Spanish (4)  
Lecture—3 hours; extensive writing. Prerequisite: Linguistics 1 and course 24 or 24S, or consent of instructor; courses 111N and 112N recommended. Contrastive analysis of English and Spanish, error analysis, introduction to structuralist and transformational linguistics. Individual and group conferences. (Former course 137)—I, II, III. (II, III)

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer. 2009-2010 offering in parentheses

115. History of the Spanish Language (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisites: course 24 or 245 or 33 and Linguistics 1 or consent of instructor. The Spanish language from its roots in spoken Latin to modernity. Emphasis on the close relationship between historical events and language change, and the role that literature plays in language standardization. Not open for credit to students who have completed course 113S. I, II, III. Blake

115S. History of the Spanish Language (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 24 or 33 and Linguistics 1 or consent of instructor. The Spanish language from its roots in spoken Latin to modernity. Emphasis on the close relationship between historical events and language change, and the role that literature plays in language standardization. Offered in a Spanish-speaking country under the supervision of a UC Davis faculty/lecturer. Not open for credit to students who have completed course 115—II, III. Blake, Alarcón

116. Applied Spanish Linguistics (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: Linguistics 1 and course 24 or 33, or consent of instructor. Exploration of the major theoretical and practical issues concerning learning Spanish as a second language. For students interested in teaching Spanish as a career. I, II, III. Blake, Alarcón

117. Teaching Spanish as a Native Tongue in the U.S.: Praxis and Theory (4)
Lecture—3 hours; extensive writing. Prerequisite: Linguistics 1 and course 24 or 33, or consent of instructor. Course 116 recommended. Designed for students interested in teaching Spanish to native speakers. Focus on cultural diversity of the main Spanish-speaking populations in the U.S.; applied language teaching methodologies in the context of teaching Spanish to native speakers at different levels. Conducted primarily in Spanish. I, II, III. Colomi, Alarcón

118. Topics in Spanish Linguistics (4)
Lecture—3 hours; term paper. Prerequisite: courses 111 and 112. A study of specialized topics in Spanish linguistics, for example: language and use; text and context; language and society; bilingualism; Spanish diachrony; syntax and semantics. May be repeated once for credit when topic differs. I, II, III. Alarcón

123. Creative Writing in Spanish (4)
Discussion—4 hours. Prerequisite: course 24 or 33, or consent of instructor. Intensive writing of poetry or fiction in Spanish (or in a Spanish-English format). Prerequisite: course 24 or 33. May be repeated once for credit when topic differs. I, II, III. Alarcón

130. Survey of Spanish Literature to 1700 (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Survey of Spanish literature (narrative, poetry and drama) to 1700. Emphasis on the multilevel birth of the Spanish novel, the formation and growth of the Spanish language and letters through its written records and the literature of the early period. I, II, III. Alarcón

131N. Survey of Spanish Literature: 1700 to Present (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100. Survey of modern Spanish literature, providing an overview of major literary movements (romanticism, realism, naturalism, modernism, avant-garde). Emphasis on the philosophical and historical background and on the European context for modern Spanish literature and culture. Prerequisites: courses 104A and 104B. I, II, III. Alarcón

132. Golden Age Drama and Performance (4)
Lecture—1.5 hours; performance instruction—1.5 hours. Prerequisite: course 100. Golden Age drama: text and performance. Study of Spanish Baroque drama as performance art. Close reading of plays and related aspects of seventeenth-century theater: theatrical spaces, staging, performance, actors, public language, costumes. Final project is performance of a play. May be repeated twice for credit. Limited enrollment. Offered in alternate years. I, II, III. Martín

133N. Golden Age Literature of Spain (4)
Lecture—3 hours; prerequisite: course 100. Introduction to the most prominent authors and literary movements of 16th- and 17th-century Spain and Spanish American colonial literature. May be repeated three times for credit. I, II, III. Martín

134A. Don Quijote I (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Critical interpretation of Don Quijote Part One by Cervantes. Focused study of key elements within the socio-cultural context of Golden Age Spain. Don Quijote as prototype for the modern novel. Offered in alternate years. I, II, III. Martín

134B. Don Quijote II (4)
Lecture—3 hours; term paper. Prerequisite: courses 100 and 134A. Critical interpretation of Don Quijote Part Two by Cervantes. Focused study of key elements within the socio-cultural context of Golden Age Spain. Don Quijote as prototype for the modern novel. Offered in alternate years. I, II, III. Martín

135N. Spanish Romanticism (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Romanticism as a literary movement in Spain, with emphasis on its distinctive, specific “Romantic” qualities and its literary expression in five leading authors of the early nineteenth century. Offered in alternate years. I, II, III. Alarcón

136N. The Spanish Novel of the 19th Century (4)
Lecture—3 hours; term paper. Prerequisite: course 100. 19th-century realism in Spain, focusing on Leopoldo de Alas (Clarín), Emilia Pardo Bazán, and Benito PérezGaldós. The unique characteristics of Spanish realism and its historical roots in Cervantes and the picaresque. Former course 119. I, II, III. Alarcón

137N. Twentieth-Century Spanish Fiction (4)
Lecture—3 hours; term paper. Prerequisite: course 100 or 131. Study of the major literary trends and authors of the modern Spanish novel and short story. Selected works by Unamuno, Valle-Inclán, Sender, Cela, Matute, Ayala and others. Former course 120A. I, II, III. Alarcón

138N. Modern and Contemporary Spanish Poetry (4)
Lecture—3 hours; term paper. Prerequisite: course 100 or 131. Study of the major literary trends and authors of modern and contemporary Spanish poetry. Selected works by Machado, Juan Ramón Jiménez, García Lorca, Álvaro de Sotomayor, Hernández Hierro and others. Offered in alternate years. Former course 120C. I, II, III. Alarcón

139. Modern Spanish Theater (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Study of the major dramatic trends and playwrights of modern Spanish theater. Selected works by Valle Inclán, García Lorca, Mihura, Buero Vallejo, Arribal and others. Offered in alternate years. Former course 120B. GE credit: ArtHum, Div. I, II, III. Alarcón

140N. Modern Spanish Essay (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Ortega, Unamuno and the modern Spanish essay. Their concept of Spain and their relations with other movements and thinkers. I, II, III. Alarcón

141. Introduction to Spanish Culture (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisites: course 24, 245, or 33. Introduction to the history, geography and culture of Spain. Art, history of ideas, and everyday cultural manifestations. Introduction to critical reading and critical analysis. Not open for credit to students who have completed course 151N. GE credit: ArtHum, Div. I, II, III. Alarcón

141N. Introduction to Spanish Culture (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 100. Spanish American literature from prehispanic texts and the Chronicles of the Conquest to Romanticism and Modernism. Reading selections include fiction, poetry, drama and essays. Former course 105A. GE credit: ArtHum, Div. I, II, III. Alarcón

142. Special Topics in Spanish Cultural and Literary Studies (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Special topics in the study of Spanish literature and culture. May be repeated twice for credit when topic differs. (Part of former course 151.) I, II, III. Armistead, Martín

143. Spanish Art (4)
Lecture—3 hours; term paper or discussion—1 hour. Spanish art and the different historical, sociological and political manifestations that frame it. History of art, including Paleolithic, Roman, Visigothic, Romanesque, Gothic, Renaissance, Baroque, Neo-classicism and Contemporary art. GE credit: ArtHum—IV. I, II, III. Martínez-Carazo

144. Topics in Spanish Cultural Studies (4)
Lecture—3 hours; project. Prerequisite: course 24, 245, or 33. Study of specific historical tendencies in Spanish culture(s) from historiographical and critical approaches. Sources studied may include literature, film, art, journalism, and performance. Approaches to material may address issues of aesthetics, politics, identity, globalization. May be repeated one time for credit. GE credit: ArtHum—II. GE credit: ArtHum—IV. I, II, III. Martínez-Carazo

Lecture—3 hours; film viewing—3 hours. Prerequisite: course 24 or 245 or 33. Analysis of the culture of the Spanish-speaking world through film in translation. Emphasis on the cultural information illustrated by the films; no prior knowledge of cinematography required. Films with subtitles. Not open for credit to students who have completed Spanish 148S. GE credit: ArtHum, Div. I, II, III. Martínez-Carazo

148S. Cinema in the Spanish-Speaking World in Translation (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 24 or 245 or 33. Analysis of the culture of the Spanish-speaking world through film in translation. Emphasis on the cultural information illustrated by the films; no prior knowledge of cinematography required. Films with subtitles. Offered in a Spanish-speaking country, in Spanish, under the supervision of UC Davis faculty. Not open for credit to students who have completed course 148S. GE credit: ArtHum, Div. I, II, III. Martínez-Carazo

149. Latin-American Literature in Translation (4)
Lecture/discussion—3 hours; term paper. Prerequisite: English 3 or the equivalent. Reading, lectures and discussions in English of works by Borges, Cortázar, Fuentes, García Márquez, Paz and others. May not be counted toward the major in Spanish. Offered in alternate years. GE credit: ArtHum, Div. Wrt. I, II, III. Egan

150N. Survey of Spanish-American Literature Before 1900 (4)
Lecture—3 hours; term paper. Prerequisite: course 100. Spanish American literature from prehispanic texts and the Chronicles of the Conquest to Romanticism and Modernism. Reading selections include fiction, poetry, drama and essays. Former course 105A. GE credit: ArtHum, Div. Wrt. I, II, III. Egan

151N. Survey of Spanish-American Literature 1900 to Present (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100. Spanish-American literature from Modernism to the present. Reading selections include fiction, poetry, drama and essays. Former course 105B. GE credit: ArtHum, Div. I, II, III. Egan, Bejel
**Spanish-American Short Story (4)**
Lecture—3 hours; term paper. Prerequisite: course 100. The evolution of the Spanish-American short story during the 19th and 20th centuries. Emphasis on the contemporary period. Offered in alternate years. (Former course 127—II.) Egan

**Spanish-American Novel (4)**
Lecture—3 hours; term paper. Prerequisite: course 100. The evolution of the Spanish-American novel during the 19th and 20th centuries. Emphasis on significant contemporary works. Offered in alternate years. (Part of former courses 108A and 108B.)—II. Egan

**Mexican Novel (4)**
Lecture—3 hours; term paper. Prerequisite: course 100. The evolution of the Mexican novel during the 19th and 20th centuries. Emphasis on the narrative of the Revolution and significant contemporary works. (Former course 129.)—II. (II.) Egan

**Dario, Modernism and Its Legacy (4)**
Lecture—3 hours; term paper. Prerequisite: course 100. Modernism as an authentic expression of Latin American literature and its influence on 20th-century poetry and prose. In depth analysis of the works of Dario and other major Modernist writers. Offered in alternate years. (Course 125—III.)—II. Egan

**20th Century Masters in Spanish-American Literature (4)**
Lecture—3 hours; term paper. Prerequisite: course 100. Study of major 20th-century Spanish-American writers and the cultural and literary milieu. Offered in alternate years. (Part of former courses 127 and 138.)—III. (III.) Egan, Bejel

**Spanish-American Poetry: From Vanguardism to Surrealism and Beyond (4)**
Lecture—3 hours; term paper. Prerequisite: course 100. Study of vanguardism, surrealism, and more recent movements of 20th-century poetry. An in depth analysis of the works of such major poets as Neruda, Vallejo, and Octavio Paz. Offered in alternate years. (II.)

**Special Topics in Spanish-American Literature and Culture (4)**
Lecture—3 hours; term paper. Prerequisite: course 100 or 100S. Special topics in the study of Spanish-American literature and culture. Course 159 and 159S combined may be repeated twice for credit when topic differs. —II. (II, III, IV, III.) Egan

**Special Topics in Spanish American Literature and Culture (4)**
Lecture—3 hours; term paper. Prerequisite: course 100 or 100S. Special topics in the study of Spanish-American literature and culture. Offered in a Spanish speaking country under the supervision of UC Davis faculty. Course 159S and 159 may be repeated twice for credit when topic differs. —III. (III.)

**Latin American Women Writers in Translation (4)**
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Latin American women writers from the 19th and 20th centuries. Recent theoretical approaches to literature by women in Latin America. Discussions in English of works by Matta de Turner, Avellaneda, Storni, Ocampo, Agustini, Mistral, Castellanos, and others. Offered in alternate years. GE credit: ArtHum, Div.—III. (III.) Peluffo

**Introduction to Spanish American Culture (4)**
Lecture—3 hours; term paper. Prerequisite: consent of instructor. Introduction to history, geography and culture of Spanish America. Multiple genres of cultural production and representation, with a focus on cultural diversity and regional difference. Introduction to critical reading and textual analysis. Not open for credit for students who have completed course 170S. GE credit: ArtHum, Div.—III. (III.)—II. Bejel, Irwin, Lazzara, Peluffo

**Introduction to Spanish American Culture (4)**
Lecture—3 hours; project. Prerequisite: consent of instructor. Introduction to history, geography and culture of Spanish America. Multiple genres of cultural production and representation, with a focus on cultural diversity and regional difference. Introduction to critical reading and textual analysis. Offered in a Spanish-speaking country. Not open for credit for students who have completed course 170. GE credit: ArtHum, Div.—III. (III.)—II. Bejel

**Music from Latin America (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor. Examination of music from Latin America. Characteristic music (i.e., tango, bossa nova, salsa, música meridiana, music and dance) as well as its implications in other musical genres. Taught in Spanish. Not open to students who have taken course 171S or Music 127. (Same course as Music 171.) Offered in alternate years. (II.)

**Music from Latin America (4)**
Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor. Examination of music from Latin America. Characteristic music (i.e., tango, bossa nova, salsa, música meridiana, music and dance) as well as its implications in other musical genres. Taught in Spanish and in a Spanish speaking country under the supervision of UC Davis faculty. Not open to students who have taken course 171 or Music 127.—II. (II.)

**Modernism as an Authentic Experience (4)**
Lecture—3 hours; term paper. Prerequisite: course 24 or 33. The development of Mexican culture from the Aztec-Mayan era to the present. Study includes important periods such as the Conquest and Colonialism, the Independence movement, and changes from the Revolution to contemporary Mexico. Reading, lectures and discussions in Spanish. (Former course 135.) GE credit: ArtHum, Div.—III. (III.) Egan

**Cinema and Latin American Culture (4)**
Lecture/discussion—3 hours, film viewing—3 hours. The development of Mexican culture from the Aztec-Mayan era to the present. Study includes important periods such as the Conquest and Colonialism, the Independence movement, and changes from the Revolution to contemporary Mexico. Reading, lectures and discussions in Spanish. (Former course 135.) GE credit: ArtHum, Div.—III. (III.) Egan

**CINEMA AND LATIN AMERICAN CULTURE (4)**
Lecture—3 hours; term paper/discussion—1 hour. Prerequisite: course 24 or 33. An interdisciplinary survey of Cinchana culture. Topics include literature, art, folklore, oral tradition, music, politics, as well as everyday cultural manifestations. Taught in Spanish. (Former course 124.) GE credit: ArtHum, Div.—II. (II.) Alarcon

**TOPICS IN SPANISH AMERICAN CULTURAL STUDIES (4)**
Lecture—3 hours; project—1 hour. Prerequisite: course 24, 245, or 33. Specific historical tendencies and issues in Spanish American culture(s) from pre-colonial times to present. Sources studied may include literature, art, music, journalism and performance. Approaches to material may address issues of aesthetics, politics, identity, and globalization. May be repeated one time for credit if content differs. GE credit: ArtHum, Div.—III. (III.) Bejel, Irwin, Lazzara, Peluffo

**LITERATURE IN SPANISH WRITTEN IN THE UNITED STATES (4)**
Lecture—3 hours; term paper. Prerequisite: course 24 or 33. Survey of the literary and cultural contributions of the main Spanish-speaking populations present in the U.S.: Chicanos, Puerto Ricans, Cuban-Americans, Central Americans, and other Latinos. GE credit: ArtHum, Div.—III. (III.) Alarcon

**Senior Seminar in Spanish Linguistics (4)**
Seminar—3 hours; term paper. Prerequisite: senior standing; a major in Spanish or consent of instructor. Group study of a special topic drawn from Spanish linguistics. Limited enrollment. May be repeated once for credit.—II. (II.) Bejel, Egan, Irwin, Lazzara, Peluffo

**Senior Seminar in Spanish Literature/Culture (4)**
Seminar—3 hours; term paper—1 hour. Prerequisite: senior standing; a major in Spanish or consent of instructor. Group study of a special topic drawn from Spanish literary or cultural studies. Independent research project. May be repeated one time for credit if content differs. Limited enrollment.—II. (II.) Alisid, Armistead, González, Martín, Martínez-Corazo

**Senior Seminar in Latin American Literature/Culture (4)**
Seminar—3 hours; term paper—1 hour. Prerequisite: senior standing; a major in Spanish or consent of instructor. Group study of a special topic drawn from Latin American literary or cultural studies. Independent research project. May be repeated one time for credit if content differs. Limited enrollment.—II. (II.) Bejel, Egan, Irwin, Lazzara, Peluffo

**Internship in Spanish (1-12)**
Independent study—336 hours. Prerequisite: course 23; junior standing; major in Spanish, Chicano Studies, or a related field. Internships where Spanish language skills can be used and perfected (teaching, counseling, translating-interpreting). May be repeated for credit for a total of 8 units. Units will not count toward the Spanish major. (P/NP grading only.)

**Special Study for Honors Students (1-5)**
Independent Study—3-15 hours. Prerequisite: Senior standing and qualification for the Spanish honors program. Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in Spanish literature, civilization, or language studies. May be repeated for up to 8 units of credit. (P/NP grading only.)

**Tutoring in Spanish (1-4)**
Tutorial—1-4 hours. Prerequisite: upper division standing and permission of the chair. Tutoring in undergraduate courses including leadership in small voluntary discussion groups affiliated with departmental courses. May be repeated for credit for a total of 6 units. (P/NP grading only.)

**Tutoring in the Community (2-4)**
Tutorial—2-4 hours. Prerequisite: upper division standing and permission of the chair. Tutoring in public schools under the guidance of a regular teacher and supervision by a departmental faculty member. May be repeated for credit for a total of 6 units. (P/NP grading only.)

**Directed Group Study (1-5)**
Prerequisite: consent of instructor and Department Chairperson. (P/NP grading only.)

**Special Study for Advanced Undergraduates (1-5)**
May be repeated for up to 6 units of credit (P/NP grading only.)

**Graduate Courses**

**Literary Theory I (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Basic theories and practical approaches to modern and contemporary Hispanic literature. Emphasis on formalism, poststructuralism, socio-cultural discourses, and ideologies.—II. (II.) Bejel

**Literary Theory II (4)**
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Major contemporary critical theories including recent, innovative approaches to Hispanic literature and culture. Readings from Semiotics and Deconstructionism to Psychological and Social-ideological approaches. Emphasis on Postmodern and Neo-colonial discourse.—III. (III.) Bejel

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General Education (GE) credit: ArtHum = Arts and Humanities; SciEng = Science and Engineering; SocSci = Social Sciences; Div = Social-Cultural Diversity; Wrt = Writing Experience
205. Spanish Phonology (4)
Seminar—3 hours; term paper. Prerequisite: some knowledge of phonetics is required and consent of instructor; Linguistics 109 and 139 highly recommended. Analyzes the sound patterns of Spanish from both linear and non-linear perspectives. Students will develop a clear understanding of what phonology is and the nature of Spanish phonology, as defined by modern linguistic analysis. —II. (II)

206. Spanish Syntax (4)
Seminar—3 hours; term paper. Prerequisite: Linguistics 140 and 145. An examination of Spanish word order within the framework of general linguistic theory. The student will investigate how to write a grammar of Spanish with particular attention to the structure of noun and verb clauses. —I. (I) Blake, Ojeda

207. History of the Spanish Language (4)
Seminar—3 hours; term paper. Prerequisite: course 220A. —I, III, III. Blake

208. Old Spanish Texts (4)
Seminar—3 hours; term paper. Prerequisite: course 207. An in-depth linguistic examination of Old Spanish texts from the 12th to the 15th centuries, with particular attention to the significance of orthographic changes. —II. Blake

211. Hispanic Dialectology (4)
Seminar—3 hours; term paper. Prerequisite: course 220 or consent of instructor. Descriptive and historical study of the distinctive features of Peninsular and American Spanish dialects. Former course 221. —III. (III)

212. Applied Linguistics (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor; courses 205 and 206 recommended. Specialized topics in Hispanic linguistics (e.g., pragmatics, sociolinguistics in specific contexts, and diachronic studies). May be repeated for credit when topic differs. —III. (III)

222. Critical Approaches to Spanish Literature I: Prose and Essay (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Critical approaches to Spanish prose and essay. May be repeated twice for credit when topic differs. Offered in alternate years. —II. Altisent, Armisted, Martin

223. Critical Approaches to Spanish Literature II: Poetry and Drama (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Critical approaches to Spanish poetry and drama. May be repeated twice for credit when topic differs. Offered in alternate years. —II. Altisent, Armisted, Martin

224. Studies of a Major Writer, Period, or Genre in Spanish Literature (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Critical study of the relevant linguistic aspects of the selected work. May be repeated for credit when topic differs. Offered in alternate years. —II. Altisent, Armisted, Martin

230. Topics in Latin American Cultural Studies (4)
Seminar—3 hours; term paper. Discussion of select contemporary theoretical debates in Latin American Cultural Studies. Application of critical questions to the analysis of cultural texts. May be repeated two times for credit when topic differs. Offered in alternate years. —II. McHale

231. Interamerican Studies (4)
Seminar—3 hours; term paper. Survey of methodologies of investigation for crosscultural or comparative projects in the geographical context of the Americas. Focus on particular problems of language, disci-pline, national definitions, and global hierarchies of knowledge that complicate such projects. Readings of interamerican cultural texts. Offered in alternate years. —II. McKee

252. Medieval Spanish Literature: Prose (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. An exploration of the major genres of Medieval Spanish prose from its origins to 1450. —I. (I) Armisted

253. Medieval Spanish Literature: Epic (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Medieval Spanish epic narrated. The relationship of the genre with the genesis, diffusion, and character of the Medieval epic. Relationship of epic to ballad literature. —II. (II) Armisted

254. Medieval Hispanic Lyric (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Analysis of the most representative lyric poetry in the various Peninsular languages and in proverbial, troubadour poetry, kharjas, villancicos, cantigas de amigo, and courtly lyric. —II. (II) Armisted

255. Spanish Literature of the Early Renaissance (4)
Seminar—3 hours; term paper. Spanish Literature, 1450-1550, with emphasis on La Celestina. Former course 229. —I. (I) Armisted, Martin

256. Spanish Literature of the Renaissance and Golden Age: Poetry (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Extensive critical study of the major works of Renaissance and Baroque Spanish poetry through its language structures, styles (“Culturismo-Conceptismo”), rhetorical devices, myths, and themes (love, death, time). —I. (I) Martin

257. Spanish Literature of the Renaissance and Golden Age: Drama (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. The origins and development of the Spanish novel during the Renaiss ance and the Spanish Golden Age. —I. (I) Martin

258. Spanish Literature of the Renaissance and Golden Age: Prose (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. An exploration of major 16th and 17th century literary and cultural developments through the study of selected dram atas. —I. (I) Martin

259. Cervantes and the Novel (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. The narrative works of Miguel de Cervantes with special emphasis on Don Quijote. —I. (I) Martin, Armisted

260. Modern Spanish Literature (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Topics of Spanish literature, from 1700-1920. —I. (I)

261. Contemporary Spanish Literature: Poetry (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Critical analysis of modern Spanish poetry from a wide spectrum of poetic currents. —II. Altisent

262. Contemporary Spanish Literature: Narrative (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the 20th-century narrative with emphasis on the avant-garde, existentialism, social realism, and postmodern trends. May be repeated twice for credit when topic differs and with consent of instructor. —III. Altisent

263. Contemporary Spanish Literature: Drama (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. The Spanish theatrical production of the last 70 years. —I. (I) Altisent

264. Contemporary Spanish Literature: Essay (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Major thinkers from Gaviria to Unamuno and Ortega y Gasset. Emphasis will be placed on the relationship between Spanish thought and European philosophical currents. Offered in alternate years. —III. (III)

265. Women Writers of Spain (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Introduction to the development of a feminist consciousness in the Spanish contemporary literary scene. Selected texts represent particularly innovative typologies of female discourse in the realm of the historical, psychoanalytical, and metatextual, erotic, and allegorical fiction. —I. (I) Altisent

272. Critical Approaches to Spanish American Literature: Narrative (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Development of Spanish-American literary periods and currents in novel, short story, and essay, from early Colonial times to the present. May be repeated twice for credit when topic differs. Offered in alternate years. —Egan, Bejel, Larsen

273. Critical Approaches to Spanish American Literature: Poetry and Drama (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Development of Spanish-American literary periods and currents in poetry and drama, from early Colonial times to the present. May be repeated twice for credit when topic differs. Offered in alternate years. —Egan

274. Studies of a Major Writer, Period, or Genre in Spanish-American Literature (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Artistic development of a major Spanish-American writer and his/her intellectual and literary milieu or study of a special topic, period, or genre. May be repeated for credit with consent of instructor. —I. (I)

275. Colonial Literature (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing and consent of instructor. A examination of pre-Hispanic and Colonial narrative, poetry and theatre. Emphasis on historical, anthropological, and ethnographic approaches to Colonial discourse. —I. (I) Egan

276. Twentieth-Century Spanish-American Drama (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Major dramatists from Florencio Sánchez to the present. Offered in alternate years. (Former course 240.) —III. (III)

277. Spanish-American Novel, 1900-1950 (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of major trends and key authors in Spanish America in the first half of the 20th century. Offered in alternate years. (Former course 241A.) —I. (I) Egan

Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Recent developments in Spanish-American narrative. Emphasis on innovative language and structure. Offered in alternate years. (Former course 241B.) —II. (II) Egan

279. Mexican Narrative (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the evolution of Mexican narrative. Emphasis on the narrative of the Revolution and significant contemporary writers. Offered in alternate years. —I. (I) Egan

280. Spanish-American Short Story (4)
Seminar—3 hours; term paper. Works by major writers with emphasis on 20th-century authors such as Quiroga, Borges, García Márquez, Cortazar, and Rulfo. (Former course 243.) —III. (III) Egan
Statistics

281. Spanish-American Women Writers (4) Seminar—3 hours, term paper. Prerequisite: graduate standing or consent of instructor. Study of feminist critical theories, gender construction, and self-representation within the history of socio-cultural changes in Latin America.—I. (I.) Egan

282. Dario and Modernism (4) Seminar—3 hours, term paper. Prerequisite: graduate standing or consent of instructor. Study of poetry and prose of Spanish-American Modernism (1880-1916). Offered in alternate years. (Former course 245.)—(I.) Egan

283. New Directions in Spanish-American Poetry (4) Seminar—3 hours, term paper. Offered in alternate years. (Former course 247.)—(III.) Egan

284. The Spanish-American Essay (4) Seminar—3 hours, term paper. Major Spanish-American essayists from Sarmiento to Octavio Paz. Offered in alternate years. (Former course 248.)—(II.) Egan

285. Multicultural Approaches to Cuban Literature and Culture (4) Seminar—3 hours, term paper. Prerequisite: graduate standing or consent of instructor. Study of main trends in Cuban literature. Emphasis on historical, geographical, and cultural context (including music and film). Course taught in English with some readings in Spanish.—III. (III.) Belje

291. Foreign Language Learning in the Classroom (4) Seminar—3 hours per project. Overview of approaches to university-level foreign language instruction and the theoretical notions underlying current trends in classroom practices across commonly taught foreign languages. (Same course as French 291 and German 291.)—I, II, III, (II) Anderson, Arnett, Blake, Iwasaki

298. Group Study (1-5) Prerequisite: graduate standing and consent of instructor. May be repeated for credit. (S/U grading only)

299. Research (1-12) (S/U grading only)

Professional Courses

390. The Teaching of Spanish in College (4) Lecture—2 hours; discussion—2 hours. Prerequisite: graduate standing. Theoretical instruction in modern teaching methods and demonstration of their practical application. Required of graduate teaching assistants. —I. (I.) López-Burton

396. Teaching Assistant Training Practicum (1-4) Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—I, II, III, (II, III)

Statistics

(College of Letters and Science)
Wolfgang Polonik, Ph.D., Chairperson of the Department


Faculty
Alexander Aue, Ph.D., Assistant Professor
Rudolph Beran, Ph.D., Professor
Prabir Burman, Ph.D., Professor
Christian Drake, Ph.D., Professor
Peter Hall, Ph.D., Professor
Fushing Hsieh, Ph.D., Professor
Jiming Jiang, Ph.D., Professor
Hans-Georg Muller, M.D., Ph.D., Professor
Debashis Paul, Ph.D., Assistant Professor
Jie Peng, Ph.D., Assistant Professor
Katherine Pollard, Ph.D., Assistant Professor
Wolfgang Polonik, Ph.D., Professor

George G. Roussas, Ph.D., Professor
Francisco J. Samaniego, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Rihrapha Sen, Ph.D., Assistant Professor
Duncan Temple Long, Ph.D., Associate Professor
Jessica M. Ulls, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Jane-Ling Wang, Ph.D., Professor

Emeriti Faculty
P.K. Bhattacharyya, Ph.D., Emeritus Professor
Alan P. Fenech, Ph.D., Emeritus Professor
Yue-Pok (Ed) Mack, Ph.D., Emeritus Professor
Robert H. Shumway, Ph.D., Emeritus Professor
Alvin D. Wiggins, Ph.D., Emeritus Professor

Affiliated Faculty
Rahman Azari, Ph.D., Lecturer

The Major Program
Statistics enables us to make inferences about entire populations, based on samples extracted from those populations. Statistical methods can be applied to problems from almost every discipline and they are vitally important to researchers in agricultural, biological, environmental, social, engineering, and medical sciences.

The Program. Statistics majors may receive either a Bachelor of Arts or a Bachelor of Science degree (please note, however, that the A.B. degree program is in the process of being discontinued). The B.S. degree program has four core courses. All three areas require theoretical and applied course work and underscore the strong interdependence of statistical theory and the applications of statistics.

General Option in Statistics emphasizes statistical theory and is especially recommended as preparation for graduate study in statistics.

Applied Statistics Option emphasizes statistical applications. This major is recommended for students who do not plan to pursue graduate study in statistics and includes an interest in combining the statistics study with a second major or minor program in the social and life sciences.

Computational Statistics Option emphasizes computing. This major is recommended for students interested in the computational and data management aspects of statistical analysis.

Career Alternatives. Probability models and statistical methods are used in a great many fields, including the biological and social sciences, business, and engineering. The wide applicability of statistics has created in both the public and private sectors a strong demand for graduates with statistical training. Current employment opportunities include state and federal government positions with a statistician designation, industrial positions (e.g., in the actuarial series within an insurance company, in the data management unit in a health science facility, or in the research units in pharmaceutical and biotechnology industries), and teaching positions.

A.B. Major Requirements: UNITS

Preparatory Subject Matter........................................... 25
Mathematics 21A, 21B, 21C ........................................... 12
Mathematics 22A, 22B .................................................... 6
Computer Science Engineering 30 or Computer Science Engineering 40 (or the equivalent) ........................................... 8
Statistics 32 .............................................................. 4

Depth Subject Matter .................................................. 41-44
Statistics 106, 108 or the equivalent) ........................................... 8
Statistics 131A, 131B, 131C ........................................... 12
Mathematics 104, 135, 137, 138, 141, 142, 144, 145 ........................................... 12
Related elective courses .................................................. 9-12

Total Units for the Major: 66-69

B.S. Major Requirements: UNITS

Preparatory Subject Matter........................................... 30-32
Mathematics 21A, 21B, 21C, 21D ........................................... 16
Mathematics 22A or 67 .................................................... 3-4
Mathematics 25 ......................................................... 4
Computer Science Engineering 30 or Computer Science Engineering 40 (or the equivalent) ........................................... 4
Any one introductory statistics course except Statistics 10 ........................................... 3-4

Depth Subject Matter .................................................. 51-52
Statistics 131A, 131B, 131C ........................................... 12
Three courses from Statistics 104, 135, 137, 141, 142, 144, 145 ........................................... 12
Mathematics 125A, 108 or 125B, and 167 ........................................... 12
Any one introductory statistics course except Statistics 10 ........................................... 3-4

Applied Statistics Option: UNITS

Preparatory Subject Matter........................................... 26-31
Mathematics 16A, 16B, 16C; or 17A, 17B, 17C, or 21A, 21B, 21C (21 series recommended) ........................................... 9-12
Mathematics 22A ......................................................... 3
Computer science Engineering 30 or Computer Science Engineering 40 (or the equivalent) ........................................... 4
Two introductory courses serving as the prerequisites to upper division courses in a chosen discipline to which statistics is applied ........................................... 7-8
Any one introductory statistics course except Statistics 10 ........................................... 3-4

Depth Subject Matter .................................................. 51-56
Statistics 130A, 130B .................................................... 8
Three courses selected from Statistics 104, 135, 137, 142, 144, 145, 158 ........................................... 12
Five upper division elective courses outside of Statistics ........................................... 15-20
The electives are chosen with and must be approved by the major advisor. The electives should follow a coherent sequence in one single discipline where statistical methods and models are applied: at least three of them should cover the quantitative aspects of the discipline.

Total Units for the Major: 77-87

Computational Statistics Option: UNITS

Preparatory Subject Matter........................................... 30-31
Mathematics 21A, 21B, 21C, 21D ........................................... 16
Mathematics 22A ......................................................... 3
Computer Science Engineering 30 or 40 ........................................... 8
Any one introductory statistics course except Statistics 10 ........................................... 3-4

Depth Subject Matter .................................................. 52
Statistics 106, 108, 141 .................................................... 12
Statistics 131A, 131B .................................................... 8
Two courses from Statistics 104, 135, 137, 138, 142, 144, 145, 148 ........................................... 12
Programming, Data Management & Data Technologies: Computer Science Engineering 110 or 145, and 165A or 166 ........................................... 8
Two courses on Scientific Computational Algorithm and Visualization from: Computer Science Engineering 122A, 129, 140A, 158, 163 ........................................... 8

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer, 2009-2010 offering in parentheses

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Social-Cultural Diversity; Wrt—Writing Experience
32. Basic Statistical Analysis Through Computers (3)
Lecture—2 hours. Prerequisite: Mathematics 16B or 218; ability to program in a high-level computer lan-
guage such as Pascal. Overview of probability mod-
eling and statistical inference. Problem solution
through mathematics and computer simula-
tion. Recommended as alternative to course 13 for
students who have some knowledge of calculus and

90X. Seminar (1-2)
Seminar—1-2 hours. Prerequisite: high school al-
gebra and consent of instructor. Examination of a spe-
tific topic in a small group setting.

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Applied Statistics for Biological Sciences (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite:
Mathematics 16B or the equivalent. Probability com-
putation/modeling, estimation, hypothesis testing,
contingency tables, ANOVA, regression; implemen-
tation of statistical analysis and computer pack-
package. Only two units credit allowed to students who
have taken course 13 or 32. Not open for credit to
students who have taken course 102. GE credit Sci-

102. Introduction to Probability Modeling and Statistical Inference (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
two years of high school algebra, and upper divi-
sion standing. Introductory probability and statistics
at a rigorous yet precise calculus level. Rigorous prob-
ability introduction to probability and parametric/
nonparametric statistical inference with computing;
binomial, Poisson, geometric, normal, and sampling
distributions; exploratory data analysis; regression
analysis; ANOVA. Only two units credit allowed to
students who have taken course 32. Not open for
credit to students who have taken course 100. GE credit:
SciEng — I, II , III. (I, III)

103. Applied Statistics for Business and Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 13, 32, or 102; and Mathematics 16A, 16B. D
escriptive statistics; probability; random variables;
expectation; binomial, normal, Poisson, other univar-
iate distributions; joint distributions; sampling distri-
butions; central limit theorem; properties of esti-
mators, linear combinations of random variables;
test and estimation; Microtub computer package.

104. Applied Statistical Methods: Nonparametric Statistics (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite:
course 13, 32, or 102. Sign and Wilcoxon tests;
Wahl averages. Two-sample procedures. Inferences
concerning scale. Kruskal-Wallis test. Measures of
association. Chi square and Kalmogorov-Smirnov
tests. Offered in alternate years. GE credit: Sci-
Eng — I, II, III, (I, II, III)

13V. Elementary Statistics (4)
Lecture—1.5 hours; laboratory—lecture—5 hours.
Prerequisite: two years of high school algebra or the
equivalent in college. Descriptive statistics; basic prob-
bility concepts; binomial, normal, Student’s t, and
chi-square distributions. Hypothesis testing and con-
fidence interval estimation; regression. Regression.
Not open for credit to students who have completed
course 13 or 19. GE credit: SciEng — I, II

130A. Mathematical Statistics: Brief Course (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
Mathematics 16B. Probability, expectations, and dis-
bributions, mean, variance, covariance, Cheby-
chev’s inequality, some special distributions, sam-
ping distributions, central limit theorem. Not open
for credit to students who have completed course 131A. I— I.

130B. Mathematical Statistics: Brief Course (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 130A. Transformations, random variables,
large sample properties of estimates. Basic ideas of
hypotheses testing, likelihood ratio tests, goodness-
of-fit tests. General linear model, least squares esti-
mates, Gauss-Markov theorem. Analysis of variance,
F-test. Regression and correlation, multiple regres-
sion. Selected topics. — II. (II)

131A. Introduction to Probability Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
Mathematics 21A, B, C, and D. Fundamental con-
cepts of probability theory, discrete and continuous
random variables, standard distributions, moments
and moment-generating functions, laws of large
numbers and the central limit theorem. Not open
for credit to students who have completed Mathematics

131B. Introduction to Mathematical Statistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 1318. Sampling, methods of estimation,
sampling distributions, confidence intervals, testing
hypotheses, linear regression, analysis of variance,
elements of large sample theory and nonparametric
inference. — II. (III) Mueller

133. Mathematical Statistics for Economists (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 130 and Mathematics 139A, or the equiva-

135. Multivariate Data Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 103, and Mathematics 16B, or the equiva-

General Education (GE) credit: ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Social-Cultural Diversity; Wr--Writing Experience.
Graduate Courses

205. Statistical Methods for Research (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 106 or the equivalent. Topics in design of experiments in industrial and management science, balanced and unbalanced experiments, random and mixed effects models, response surface methodology, nested design, repeated measures, cross-over design, analysis of covariance. Applications in engineering, biological sciences, medicine and environmental research. Offered in alternate years. — III. (III.)

222. Biostatistics: Survival Analysis (4)
Lecture—3 hours; discussion—laboratory—1 hour. Prerequisite: course 131C. Likelihood and linear regression; generalized linear model; Binomial regression; case-control studies; dose-response and bioassay; Poisson regression; Gamma regression; quasi-likelihood models; estimating equations; multivariate GLMs. (Same course as Biostatistics 223.) — II. (II.)

224. Analysis of Longitudinal Data (4)
Lecture—3 hours; discussion—laboratory—1 hour. Prerequisite: course/Biostatistics 222, 223 and course 225B. Standardized advanced methodology, theory, algorithms, and applications relevant for analysis of repeated measurements and longitudinal data in biostatistical and statistical settings. (Same course as Biostatistics 224.) — II. (II.)

225. Clinical Trials (4)
Lecture—3 hours; discussion—laboratory—1 hour. Prerequisite: course/Biostatistics 222 or consent of instructor. Basic principles of clinical designs, including bias, randomization, blocking, and masking. Practical applications of widely-used designs, including dose-finding, comparative and cluster randomization designs. Advanced statistical procedures for analysis of data collected in clinical trials. (Same course as Biostatistics 225.) Offered in alternate years. — III.

226. Statistical Methods for Bioinformatics (4)
Lecture—3 hours; discussion—laboratory—1 hour. Prerequisite: course 131C or consent of instructor; data analysis experience recommended. Standard and advanced statistical methodology, theory, algorithms, and applications relevant to the analysis of omics data. (Same course as Biostatistics 226.) Offered in alternate years. — III.

231A. Mathematical Statistics I (4)
Lecture—3 hours; discussion—laboratory—1 hour. Prerequisite: course 131A, 131B, 131C, Mathematics 127A, 127B or the equivalent. First part of three-quarter sequence on mathematical statistics. Emphasizes foundations topics. Includes basic concepts in asymptotic theory, decision theory (e.g. risk function, Bayes and minimax optimality, Bayes estimation), and an overview of methods of point estimation. — I. (I.)

231B. Mathematical Statistics II (4)
Lecture—3 hours; discussion—laboratory—1 hour. Prerequisite: course 231A. Second part of a three-quarter sequence on mathematical statistics. Emphasizes large sample theory, e.g. asymptotics of MLE, likelihood-ratio test, chi-squared test, CIE with applications in generalized linear models. Classical hypothesis testing, e.g. Neyman-Pearson theory, UMP (unbiased)-tests. — II. (II.)

231C. Mathematical Statistics III (4)
Lecture—3 hours; discussion—laboratory—1 hour. Prerequisite: course 231A, 231B. Third part of three-quarter sequence on mathematical statistics. Emphasizes large sample theory and their applications. Topics include statistical decision functions (applications to L- and Estimation); resampling methods (jackknife, bootstrap, curve estimation [density, regression, failure rate], rank tests, and one-instructor-selected topic. — III. (III.)

232A. Applied Statistics I (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 106, 108, 131A, 131B, 131C, Mathematics 165. Estimation and testing for the general linear model, ANOVA design, model validation, optimal selection, and analyzing data with the linear model. — I. (I.)

232B. Applied Statistics II (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 232A. Estimation and testing for the general linear mixed model, Bayesian hierarchical modeling, parametric modeling, analyzing data and designing experiments with respect to these models. — II. (II.)

232C. Applied Statistics III (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 232B. Multivariate analysis: multivariate distributions, multivariate linear models, data analytic methods including principal component, factor, discriminant, cluster, and canonical correlation analyses, nonparametric methods, regression trees, and Bayesian methods. — III. (III.)

233. Design of Experiments (3)
Lecture—3 hours. Prerequisite: course 131C. Topics from balanced and partially balanced incomplete block designs, fractional factorials, and response surfaces. Offered in alternate years. — III.

235A-235B-235C. Probability Theory (4-4-4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: 235A—Mathematics 125B and 135A or course 131A or consent of instructor; 235B—Mathematics 235A/course 235B or consent of instructor; 235C—Mathematics 235B/course 235B or consent of instructor. Measure-theoretic foundations, abstract integration, independence, laws of large numbers, characteristic functions, central limit theorems. Weak convergence in metric spaces, Brownian motion, invariance principle. Conditional expectation. Topics selected from martingales, Markov chains, ergodic theory. (Same course as Mathematics 235A-235B-235C.)—III. (III.)

237A-237B. Time Series Analysis (4-4)
Lecture—3 hours; term paper. Prerequisite: course 131B or the equivalent; course 237A is a prerequisite for course 237B. Advanced topics in time series analysis and applications. Models for experimental data, measures of dependence, large-sample theory, statistical estimation and inference. Univariate and multivariate spectral analysis, ARIMA models, state-space models, Kalman filtering. Offered in alternate years. — III.

238. Theory of Multivariate Analysis (4)
Lecture—3 hours; term paper. Prerequisite: courses 131B and 135. Multivariate normal and Wishart distributions, Hotelling’s T-Squared, simultaneous inference, likelihood ratio and union intersection tests, Bayesian methods, discriminant analysis, principal component and factor analysis, multivariate clustering, nonlinear regression and analysis of variance, application to data. Offered in alternate years. — III.

240A-240B. Nonparametric Inference (4-4)
Lecture—3 hours; term paper. Prerequisite: course 231C; courses 235A-235B-235C recommended. Comprehensive treatment of nonparametric statistical inference, including the most basic materials from classical nonparametrics, nonparametric estimation of a distribution function from incomplete data, curve estimation and theory, and resampling methodology. Offered in alternate years. — III. (III.)

241. Asymptotic Theory of Statistics (4)
Lecture—3 hours; term paper. Prerequisite: course 231C; courses 235A-235B-235C desirable. Topics in asymptotic theory of statistics chosen from weak convergence, contiguity, large sample theory, Edgeworth expansion, and semiparametric inference. Offered in alternate years. — III.
Statistics (A Graduate Program)

Professional Course

401. Methods in Statistical Consulting (3) Lecture—3 hours; discussion—1 hour. Introduction to consulting, in-class consulting as a group, statistical consulting with clients, and in-class discussion of consulting problems. Clients are drawn from a pool of University clients. Students must be enrolled in the graduate program in Statistics or Biostatistics. May be repeated for credit with consent of graduate advisor. Not offered every year. (S/U grading only.)—I, II, III, II, II, III.

Wolfgang Polonik, Ph.D., Chairperson of the Program
Program Office, 4118 Mathematical Sciences Building
(530) 752-2362; http://www.stat.ucdavis.edu

Faculty

Alexander Aue, Assistant Professor (Statistics)
Laurel Beckett, Ph.D., Professor (Public Health Sciences)
Rudolph Beran, Ph.D., Professor (Statistics)
Prabir Burman, Ph.D., Professor (Statistics)
Calin Cameron, Ph.D., Professor (Economics)
Christiana Drake, Ph.D., Professor (Statistics)
Thomas B. Farver, Ph.D., Professor (Population Health and Reproduction)
Peter Hall, Ph.D., Professor (Statistics)
Fushing Hsieh, Ph.D., Professor (Statistics)
Jiming Jiang, Ph.D., Professor (Statistics)
Oscar Jorda, Ph.D., Associate Professor (Economics)
Hans-Georg Müller, M.D., Ph.D., Professor (Statistics)
Debashis Paul, Ph.D., Assistant Professor (Statistics)
Jie Peng, Ph.D., Assistant Professor (Statistics)
Katherine Pollard, Ph.D., Professor (Statistics)
Wolfgang Polonik, Ph.D., Associate Professor (Statistics)
David Rocke, Ph.D., Professor (Graduate School of Management)
George G. Roussas, Ph.D., Professor (Statistics)
Naoki Saito, Ph.D., Professor (Mathematics)
Francisco J. Samaniego, Ph.D., Professor (Statistics)
Rituparna Sen, Ph.D., Assistant Professor (Statistics)
Duncan Temple Lang, Ph.D., Associate Professor (Statistics)
Chih-Ling Tsai, Ph.D., Professor (Statistics)
Graduate School of Management)
Jessica M. Utts, Ph.D., Professor (Statistics)
Jane-Ling Wang, Ph.D., Professor (Statistics)

Emeriti Faculty

P.K. Bhattacharya, Ph.D., Professor Emeritus
Alan P. Fenech, Ph.D., Professor Emeritus
Yue-Pok (Ed) Mack, Ph.D., Professor Emeritus
Robert H. Shumway, Ph.D., Professor Emeritus
Alvin D. Wiggins, Ph.D., Professor Emeritus

Affiliated Faculty

Rahman Azari, Ph.D., Lecturer (Statistics)

Graduate Study. The Graduate Program in Statistics offers programs of study and research leading to the M.S. and Ph.D. degrees. The M.S. gives students a strong foundation in the theory of statistics as well as substantial familiarity with the most widely used statistical methods. Facility in computer programming is essential for some of the course work. The supervised statistical consulting required of all M.S. students has proven to be a valuable educational experience. The Ph.D. program combines advanced course work in statistics and probability with the opportunity for in-depth concurrent study in an applied field. For detailed information contact the Chairperson of the Program or the Graduate Adviser.

Preparation. For admission to the Ph.D. program, course work requirements for the master’s degree, and at least one semester/two quarters of advanced calculus must be completed.

Graduate Adviser. P. Burman

Subject A

See University Requirements, on page 90.

Surgery

See Surgery (SUR), on page 397; and Surgical and Radiological Sciences (VSR), on page 511.

Technocultural Studies

[College of Letters and Science]

Jesse Drew, Ph.D., Program Director
Program Office. Art Building, Room 316
(530) 752-2103; http://technoculture.ucdavis.edu

Committee in Charge

Elizabeth Constable, Ph.D. (Film Studies)
Jesse Drew, Ph.D. (Technocultural Studies)
Frances Dyson, Ph.D. (Technocultural Studies)
Andy Janes, Ph.D. (English)
Douglas Kahn, Ph.D. (Technocultural Studies)
Darin Martin, M.F.A. (Art)
Bob Ostertag, Ph.D. (Teachncultural Studies)
Simon Sadler, Ph.D. (Art History)
Laurie San Martin, M.F.A. (Music)
Oliver Stadlb, Ph.D. (Computer Science)
Kathryn Sylva, M.F.A. (Design)
Carl Whithaus, Ph.D. (Writing Program)

Faculty

Jesse Drew, Ph.D., Associate Professor
Frances Dyson, Ph.D., Associate Professor
Douglas Kahn, Ph.D., Professor
Michael Neff, Ph.D., Assistant Professor
Bob Ostertag, Ph.D., Professor
Julie Wyman, MFA, Assistant Professor

Emeriti Faculty

Lynn Hershman, M.A., Professor Emerita

The Major Program

The major is an interdisciplinary integration of current research in cultural history and theory with innovative hands-on production in digital media and “low-tech.” It focuses on the fine and performing arts, media arts, community media, literature and cultural studies as they relate to technology and science. Backed by critical perspectives and the latest forms of research and production skills, students enjoy the mobility to explore individual research and expression, project-based collaboration and community engagement.
The Program
Preparatory course work involves a solid introduction to the history, ideas and current activities of technocultural studies along with technical skills courses enabling individuals to get up to speed on digital imaging, sound, digital video and Web production, among other skills. For depth subject matter, students in the major concentrate on either critical studies or creative production emphases, and work toward a final project. All majors are required to take at least one course from another department or program area of study, upon approval from TCS, and may take more courses with approval. The final project for the critical studies emphasis consists of a substantial research paper. The final project for the creative production emphasis will be a major individual or collaborative work. Plans for final projects must be approved in advance.

Career Paths. Technocultural Studies is designed to prepare graduates to be the highly skilled, collaborative, multi-skilled and current with the latest developments. Perhaps most importantly self-motivation: students do best when fueled by their own passions and plot their own directions, while held to very high standards. We feel this is the best education for living and working in a complex, rapidly changing world. Final research papers and creative production portfolios graduate school admissions committees, employers or clients with tangible evidence of TCS graduates’ track records and talents.

A.B. Major Requirements:

UNITs
Preparatory Subject Matter.................. 28
Technocultural Studies 1, 2, 4, 5, 6, 7A-E .......................... 24
American Studies 1A or 5 ....... 4
Depth Subject Matter .................. 44
Technocultural Studies 190, 191 .................. 8
Production emphasis......................... 32
Choose five from production based Technocultural Studies 100, 101, 103, 104, 110, 111, 112, 121, 122, 123, 192, plus two from Technocultural Studies 120, 150, 151, 152, 153, 154, 155, 158, 159, plus a four-unit class from another department or program relevant to the student’s area of concentration, as approved by Technocultural Studies.
Studies emphasis......................... 32
Choose two from production based Technocultural Studies 100, 101, 103, 104, 110, 111, 112, 121, 122, 123, 192, plus five from Technocultural Studies 120, 150, 151, 152, 153, 154, 155, 158, 159, plus a four-unit class from another department or program relevant to the student’s area of concentration, as approved by Technocultural Studies.
Technocultural Studies 198 .................. 4
Total Units for the Major .............. 72
Major Adviser. See Program office.

Courses in Technocultural Studies (TCS)

Lower Division Courses
1. Introduction to Technocultural Studies (4)
Lecture—3 hours; extensive writing. Contemporary developments in the fine and performing arts, media arts, digital arts, and literature as they relate to technological and scientific practices. GE credit: ArtHum.

2. Critiques of Media (4)
Lecture/discussion—3 hours; term paper. Introduction to different forms of critical analysis of media, with focus on creative responses to the media within visual arts, media arts, and net culture. Response of artists to the power of mass media, from early forms of photomontage through contemporary “culture-jamming” and alternative media networks. GE credit: ArtHum.

4. Parallels in Art and Science (4)
Lecture—3 hours; term paper. Issues arising from historical and contemporary encounters between the arts and sciences, with emphasis on comparative notions of research, experimentation, and progress. GE credit: ArtHum.

5. Media Archaeology (4)
Lecture/discussion—3 hours; term paper. Evolution of media technologies and practices beginning in the 19th Century as they relate to contemporary digital arts practices. Special focus on the reconstructions of the social and artistic possibilities of lost and obsolete media technologies. GE credit: ArtHum.

6. Technoculture and the Popular Imagination (4)
Lecture—3 hours; extensive writing. Issues of technological and scientific developments as conveyed through mass media and popular culture with special attention to public spectacle, exhibitions, broadcasts, performances, demonstrations and literary fictions and journalistic accounts. GE credit: ArtHum.

7A-E. Technocultural Workshop (1)
Seminar—1 hour. Workshops in technocultural digital skills: (A) Digital Imaging; (B) Digital Video; (C) Digital Sound; (D) Web Design; (E) Topics in Digital Production.

Upper Division Courses
100. Experimental Digital Cinema I (4)
Lecture/discussion—3 hours; laboratory—3 hours. Experimental approaches to the making of film and video in the age of digital technologies. Opportunities for independent producers arising from new media. Instruction in technical, conceptual and imaginative skills for taking a project from idea to fruition. —Wymann

101. Experimental Digital Cinema II (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 100. Continuation of course 100 with further exploration of digital cinema creation. Additional topics include new modes of distribution, streaming, installation and exhibition. —Wymann

103. Interactivity and Animation (4)
Lecture/discussion—3 hours; laboratory—3 hours. Fundamentals of creating interactive screen-based work. Theories of interactivity, linear versus non-linear structures, audience involvement and participation. Use of digital production tools to produce class projects. —Drew

104. Documentary Production (4)
Lecture/discussion—3 hours; project. Prerequisite: course 78 or the equivalent; course 155. Traditional and new forms of documentary, with focus on technocultural issues. Skills and strategies for producing work in various media. Progression through all stages of production, from conception through post-production to critique. —Drew, Wymann

110. Object-Oriented Programming for Artists (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 1. Introduction to object-oriented programming for artists. Focus on understanding the metaphors and potential of object-oriented programming for sound, video, performance, and interactive installations. —Ostertag

111. Community Media Production (4)
Lecture/discussion—3 hours; laboratory—3 hours. Use of video and new media tools to address social issues among neighborhood and community groups. Students will use local production and lighting techniques as they work with local groups in a group video project. —Ill. (III.)

112. New Radio Features and Documentary (4)
Lecture/discussion—3 hours; laboratory—3 hours. New feature and documentary production for radio and other audio media, including audio streaming Websites and installation. Emphasis on new and experimental approaches to audio production for broadcast on community radio and in international arts programming.

113. Community Networks (4)
Lecture/discussion—3 hours; laboratory—3 hours. Improving and innovating community radio stations, community access centers, community radio networks in community, civic, and social life. Subjects may include community access computer sites, neighborhood wireless networks, the digital divide, open-source software, and citizen action.

120. History of Sound in the Arts (4)
Lecture—3 hours; term paper. Prerequisite: course 1. A survey of the use of sound, voice, noise, and modes of listening in the modernist avant-garde, and experimental arts for the late 20th Century to the present. Focus on audio/visual and audiovisual technologies. —Kahn

121. Introduction to Sonic Arts (4)
Lecture/discussion—3 hours; lecture/laboratory—3 hours. Prerequisite: courses 7C, 170C. Techniques of recording, editing, mixing, and synthesis to combine voice, field recordings, and electronic signals. Incorporating live, recorded, and found sounds to create multidimensional stories. Presentation of live performances, audio recordings, and sound installations. —Ostertag

123. Sight and Soundtrack (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: courses 7C, 170C. The use of sound to articulate, lend mood or subconsciously underscore visual, environmental or performative situations, combining music, voice, sound effects and other noises to create sounds that enhance, alter or support action and movement. —Ostertag

150. Introduction to Theories of the Technoculture (4)
Lecture/discussion—3 hours; extensive writing. Major cultural theories of technology with emphasis on media, communications, and the arts. Changing relationships between technologies, humans, and culture. Focus on the evolution of modern technologies and their reception within popular and applied contexts. GE credit: ArtHum —Dyson

151. Topics in Virtual Reality (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1. Social, political, economic, and aesthetic factors in virtual reality. Artificial environments, telepresence, and simulated experience. Focus on contemporary artists’ work and writing. —Dyson

152. New Trends in Technocultural Arts (4)
Lecture/discussion—3 hours; term paper. Current work at the intersection of the arts, culture, science, and technology including biological and medical sciences, computer science and communications, and artificial intelligence and media. —Dyson

153. Concepts of Innovative Soundtracks (4)
Lecture/discussion—3 hours; term paper. Innovative and unconventional soundtrack styles in cinema, media arts, and fine arts. Introduction to basic analytical skills for understanding sound-image relationships. —Kahn

154. Outsider Machines (4)
Lecture/discussion—3 hours; term paper. Invention, adaptation and use of technologies outside the mainstream, constructed by and for the marginal. Topics include machines as metaphor and embodied thought, eccentric customizing and fictional technologies.
155. Introduction to Documentary Studies (4)
Lecture/discussion—3 hours; term paper. Recent evolution of the documentary. The personal essay film, found-footage/appropriation work; non-linear, multimedia forms; spoken word; storytelling, oral history recordings; and other examples of documentary expression.—I. (I.) Drew

158. Technology and the Modern American Body (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 and either American Studies 1 or 5. The history and analysis of the relationships between human bodies and technologies in modern society. Dominant and eccentric examples of how human bodies and technologies influence one another and reveal underlying cultural assumptions. (Same course as American Studies 158.) GE credit: ArtHum.—de la Pena

159. Media Subcultures (4)
Lecture/discussion—3 hours; term paper. Relationships between subcultural groups and media technologies. Media as the cohesive and persuasive force of subcultural activities. List-servs, Web sites, free radio, fan ‘zines, and hip-hop culture. GE credit: Div. II. (II.) Drew

170A-E. Advanced Technocultural Workshop (1)

190. Research Methods in Technocultural Studies (4A)
Lecture/discussion—3 hours; project. Introduction to basic research methods for Technocultural Studies: electronic and archived images, sounds and data, satellite downlinking, radiowave scanning, and oral histories.—Drew

191. Writing Across Media (4)
Lecture/discussion—3 hours; extensive writing. Introduction to experimental approaches to writing for different media and artistic practices. How written texts relate to the images, sounds, and performances in digital and media production.—Jones

192. Internship (1-4)
Internship—3-12 hours. Supervised internship on or off campus in an area related to Technocultural Studies. May be repeated twice for credit. (P/NP grading only.)

197T. Tutoring in Technocultural Studies (1-5)
Tutorial—3-15 hours. Prerequisite: consent of instructor. Undergraduates assist the instructor by tutoring students in one of the department’s regularly scheduled courses. May be repeated for credit up to eight units. (P/NP grading only.)—I, II, III, I, II, III

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. Guided study with faculty member in independent scholarly activity. May be repeated for credit up to eight units. (P/NP grading only)

Textile Science
See Fiber and Polymer Science, on page 292.

Textiles (A Graduate Group)
Gang Sun, Ph.D., Chairperson of the Group
Group Office, 129 Everson Hall
Paciﬁc Material Science and Engineering Center
Faculty
Colin A. Carter, Ph.D., Professor
(Agricultural and Resource Economics)
You-Lo Hsieh, Ph.D., Professor
(Textiles and Clothing)
Susan B. Kaiser, Ph.D., Professor (Textiles and Clothing, Women and Gender Studies)
Zuhair A. Munir, Ph.D., Professor
(Chemical Engineering and Materials Science)
Ning Pan, Ph.D., Professor (Textiles and Clothing, Biological and Agricultural Engineering)
Victoria Z. Rivers, M.A., Professor (Design)
Margaret H. Rucker, Ph.D., Professor (Textiles and Clothing)
James F. Schackelford, Ph.D., Professor (Chemical Engineering and Materials Science)
Charles F. Shoemaker, Ph.D., Professor
(Food Science and Technology)
Gang Sun, Ph.D., Professor
(Textiles and Clothing)
Emeriti Faculty
Gyongy Laky, M.A., Professor Emeritus
(Textiles and Clothing)
Dean MacCannell, Ph.D., Professor Emeritus
(Landscape Architecture)
Howard G. Schultz, Ph.D., Professor Emeritus
(Consumer Science)
Jo Ann C. Stabb, M.A., Senior Lecturer Emeritus
(Design)
S. Haig Zeronian, Ph.D., Professor Emeritus
(Textiles and Clothing)
Graduate Study, The Graduate Group in Textiles offers a program of study and research leading to the M.S. degree. Students in the program use an interdisciplinary approach emphasizing the physical and behavioral properties of textiles. Research areas include chemical, physical, biochemical, and mechanical properties of fibers and polymers as well as fibrous assemblies, including composites, paper, and nonwovens; and psychological and sociological factors relating to perception and consumption of textiles and apparel. Extensive specialized fiber, polymer, and textiles research facilities and a behavioral research laboratory are available. For detailed information regarding the program, address the Chairperson of the Group:
Graduate Adviser, Gang Sun (Textiles and Clothing)

Textiles and Clothing
(College of Agricultural and Environmental Sciences)
You-Lo Hsieh, Ph.D., Chairperson of the Division
Division Office, 129 Everson Hall
Paciﬁc Material Science and Engineering Center
Faculty
You-Lo Hsieh, Ph.D., Professor
Susan B. Kaiser, Ph.D., Professor
Ning Pan, Ph.D., Professor
Margaret H. Rucker, Ph.D., Professor
Gang Sun, Ph.D., Professor

Textile Arts and Costume Design
See Design, on page 200.
Restricted Electives ........................................... 12
Courses selected from the following:
Agricultural and Resource Economics 18, 112, 142, 155, 157, 171A, 171B, Anthropology 122A, 126A, Consumer Science 100, Design 77, 107, 143, Economics 101, 121A, 121B, 134, 162, and other relevant course work. Foreign language units may be used to satisfy any or all of the required 12 units. Mathematics 16C, Psychology 151, Sociology 123, 126, 140, 141, 145, Textiles and Clothing 180A, 180B, 230, 293, with consent of instructor, and a maximum of 5 units in either Textiles and Clothing 192 or 199.

Unrestricted Electives ................................... 15-44

Textile Science Option
Additional Preparatory Subject Matter for the option........................................... 19
Chemistry 2A, 2B, 8A, 8B ........................................... 16
Mathematics 16A ...................................................... 3

Depth Subject Matter ....................................... 52-53
Agricultural and Resource Economics 112, 113 ........................................... 8
Design 143 .......................................................... 4
Psychology 151 or Consumer Science 100 .................................................. 3-4
Fiber and Polymer Science 100, 161, 161L, Textiles and Clothing 107, 162, 162L, 163, 163L, 164, 165, 171, 173, 174 ........................................... 16

Restricted Electives ........................................... 16
Courses selected from the following:

Unrestricted Electives ........................................... 17-46

Total Units for the Degree .................................. 180

Major Adviser. S. Kaiser
Advising Center for the major is located in 129B Everson Hall (530) 752-4417.

Minor Program Requirements:
The Division of Textiles and Clothing offers a minor program for non-majors interested in satisfying secondary career objectives. For acceptance into the program see the staff adviser in 129B Everson Hall.

Textiles and Clothing ........................................... 18
Textiles and Clothing 6, 7, or 8 ........................................... 4
Courses selected from Fiber and Polymer Science 100, 110, 161, 161L, Textiles and Clothing 163R, 163L, 163M, 164, 165, 171, 173, 174 ........................................... 14

Minor Adviser. G. Sun

Courses in Textiles and Clothing (TXC)
Questions pertaining to the following courses should be directed to the instructor or to the Division of Textiles and Clothing. See also courses in Fiber and Polymer Science, on page 292.

Lower Division Courses

6. Introduction to Textiles (4)
Lecture—3 hours; laboratory—3 hours. Introduction to the structure and properties of textiles. Consumer use and fabric characteristics are emphasized. GE credit: SciEng.—I (II) Sun

7. Style and Cultural Studies (4)
Lecture/discussion—3 hours; discussion/laboratory—1 hour. The multiple and overlapping influences of gender, sexuality, ethnicity, and class as constructions of identity and community are explored through the study of style in popular culture and everyday life. Continuity and change in clothing and appearance styles are interpreted. GE credit: SocSci, Div, Wrt.—III. (III.) Kaiser

8. The Textile and Apparel Industries (4)
Lecture—4 hours. Textile and apparel industries including fashion theory, production, distribution, and consumption of textile goods. GE credit: SocSci, Div.—I (II) Rucker

92. Internship in Textiles and Clothing (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Work experience off campus in a textiles or clothing-related area. Supervision by a member of the Textiles and Clothing faculty. (P/NP grading only)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

99. Special Study for Lower Division Students (1-5)
(P/NP grading only)

Upper Division Courses

107. Social and Psychological Aspects of Clothing (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Sociology 2. Social and cognitive factors influencing management and perception of personal appearance in everyday life. Concepts and methods appropriate to the study of meaning of clothing in social and cultural contexts. GE credit: SocSci, Div, Wrt.—I. (II) Kaiser, Chandler

162. Textile Fabrics (3)
Lecture—3 hours. Prerequisite: course 6. Properties of fabrics as related to serviceability, comfort, and appearance. GE credit: SciEng.—III. (III.) Pan

162L Textile Fabrics Laboratory (1)
Laboratory—3 hours. Prerequisite: course 162 (may be taken concurrently). Laboratory methods and procedures employed in studying properties of textile fabrics as related to serviceability, comfort, and appearance.—III. (III.) Pan

163. Textile Coloration and Finishing (3)
Lecture—3 hours. Prerequisite: course 6, Fiber and Polymer Science 110, or Chemistry 88. Basic principles of textile dyeing, printing, and finishing; color theory; structure, properties, and application of dyes and finishes; factors affecting application and fastness; maintenance of dyed and finished textiles.—III. (III.) Sun

163L Textile Coloration and Finishing Laboratory (1)
Laboratory—3 hours. Prerequisite: course 163 (may be taken concurrently). Demonstrates various aspects of dyeing, printing, and finishing of textile substrates including the effect of fiber and finish type, and physical and chemical variables on dyeing and finishing processes and on the properties of the resultant textile.—III. (III.) Sun

164. Principles of Apparel Production (3)
Lecture—3 hours. Prerequisite: course 6 or 8. Overview of characteristics, technology, processes, and research in apparel manufacturing industries including study of government statistics, material utilization and fabrication, mechanization, management, and production engineering.—II. (II) Chandler

165. Textile Processes (3)
Lecture/discussion—3 hours. Prerequisite: course 6. Physical processes involved in the production of textiles from the individual fiber to the finished fabric. Includes spinning, texturing, yarn formation, weaving, preparation, weaving and knitting, tufting and finishing.

171. Clothing Materials Science (4)
Lecture—3 hours; laboratory/discussion—3 hours. Prerequisite: course 6, 8, and senior standing. The properties, characterization, and performance evaluation of clothing materials. Corequisites for specific functional applications. Principles and methods related to wetting and transport properties, fabric and hand aesthetics, clothing comfort, and material and assembly technology.—II. (II) Hueh

173. Principles of Fashion Marketing (3)
Lecture—3 hours. Prerequisite: course 8, Economics 1A, Agricultural and Resource Economics 113 or 136. Study of basic elements of fashion marketing including marketing and sales objectives, organization, merchandising, pricing, promotion and personnel. Offered in alternate years.—III. Rucker

174. Introduction to World Trade in Textiles and Clothing (3)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 8. Structure of the global fiber/textile/apparel complex and its distribution patterns with an overview of political, economic and technological factors that are changing these industries and their markets. GE credit: SocSci, Div.—II. (II) Rucker

180A-180B. Introduction to Research in Textiles (2-2)
Laboratory—6 hours. Prerequisite: senior standing with textiles-related major and consent of instructor. Senior thesis on independent problems. Research begun in course 180A will be continued and completed in course 180B. (Deferred grading only, pending completion of research.)—I, II, III. (II, III)

192. Internship in Textiles and Clothing (1-12)
laboratory—3-36 hours. Prerequisite: consent of instructor. Work-experience off campus in a textiles or clothing-related area. Supervised by a member of the Textiles and Clothing faculty. (P/NP grading only)

197L. Tutoring in Textiles and Clothing (1-5)
Discussion/laboratory—3-15 hours. Prerequisite: upper division textiles-related major and consent of instructor. Tutoring of students in Textiles and Clothing courses. Assistance with discussion groups and laboratory sections under supervision of instructor. May be repeated for credit in tutoring another textiles course. (P/NP grading only)

199. Directed Group Study (1-5)
(P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)

Graduate Courses

230. Behavioral Science Concepts in Textiles (3)
Lecture—3 hours. Prerequisite: course 107, upper division or graduate course in statistics (e.g., Agricultural Management and Rangeland Resources 120) and one in a behavioral science (e.g., Psychology 145). Examination of the role of research concerning relationships between clothing and human behavior with emphasis on research techniques, including methods of measuring clothing variables. Offered in alternate years.—I. Kaiser

290. Seminar (1)
Seminar—1 hour. Critical review of selected topics of current interest in textiles. (S/U grading only)—I, II, III

290C. Research Conference (1)
Discussion—1 hour. Prerequisite: graduate standing; consent of instructor. Individual faculty members meet with their graduate students. Critical presentations of original research are made by graduate students.
293. Recent Advances in Textiles (3)
Lecture—3 hours. Prerequisite: two upper division courses in Textiles and Clothing or consent of instructor. Critical reading and evaluation on selected topics of current interest in textiles. Multidisciplinary aspects of the topics selected will be stressed. May be repeated for credit.—(III)

298. Group Study (1-5)
299. Research (1-12)
(S/U grading only)

Professional Course
396. Teaching Assistant Practice (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—I, II, III. (I, II, III)

Theatre and Dance

[College of Letters and Science]
Peter Lichtenfels, Chairperson of the Department
Department Office, 222 Wright Hall
S(30) 752-0888; F(30) 752-8818
http://theatredance.ucdavis.edu

Faculty
Sarah Pia Anderson, Professor
Larry Bogad, Ph.D., Associate Professor
Della Davidson, M.A., Professor
David Grenke, Professor
Lynette Hunter, Ph.D., Professor
John Iacovelli, M.F.A., Professor
Peter Lichtenfels, Professor
Jade McCutcheon, Ph.D., Assistant Professor
Maggie Morgan, M.F.A., Associate Professor
Thomas Munn, Professor
Jon Rossini, Ph.D., Assistant Professor
Barbara Sellers-Young, Ph.D., Professor
Peggy Shannon, Professor
Darrell F. Winn, M.A., Lecturer

Emeriti Faculty
Bobbie J. Bolden, M.A., Senior Lecturer Emerita
Ruby Cohn, Ph.D., Professor Emerita
Harry C. Johnson, M.A., Professor Emeritus
William E. Kleb, D.F.A., Professor Emeritus
Robert K. Sarlós, Ph.D., Professor Emeritus
Alan A. Stambusky, Ph.D., Professor Emeritus

The Dramatic Art Major Program
The A.B. degree in Dramatic Art provides students with an appreciation for and understanding of performance and its role in culture and society. The program offers a strong foundation in all aspects of drama, theatre, dance, performance, and production. Students build significant skills in specific areas as well as achieving a broad knowledge of theatre, dance and film.

Productions and Facilities. Each year’s schedule includes undergraduate festivals in theatre, dance, and film; opportunities to work with professional directors and choreographers in three main stage productions, and performance projects and established scripts developed by M.F.A. students. These productions take place on our prosenium (Main), thrust (Wyatt), black box (Arena), performance studio (Studio City), stages as well as in the Mondavi Center’s Studio Theatre and Jackson Hall. These productions are part of the academic program and provide a diverse and active learning environment and serve an important purpose in the study of theatre and dance. Participation is open to all students.

A.B. Major Requirements:

Theatre Emphasis

Preparatory Subject Matter ……………… 33

UNITS
Dramatic Art 20, 24, 25, 26.............. 14
Dramatic Art 21A or 21B, 24........... 14
Choose 4 units from Dramatic Art 218, 40A, 40B, 41A, 41B, 98, 99, African American and African Studies 51 or courses in other departments with departmental approval......................... 4
Dramatic Art 30........................................... Participation in at least two of the following areas: acting/dance, directing, choreography/playwriting; stage management/dramaturgy; design/studio/technical production; and crew assignments for a minimum of one production which may include stage management, fly crew, stage running crew, props, running crew, lighting board operator, follow spot operator, sound board operator, costume running crew, dresser, makeup.

Depth Subject Matter ……………………… 45-47
Dramatic Art 156A, 156B, 156C.................. 12
One course from Dramatic Art 124A, 124B, 124C, 124D, 125.............. 4
One course from Dramatic Art 150, 154, 155, 155A, 159.............. 4
One course from Dramatic Art 121A, 121B, 122A, 122B, 141, 143, 143P.............. 4
One course from Dramatic Art 126, 127A, 127B, 140A, 160A.............. 4
Dramatic Art 180........................................... Participation in University Theatre in at least two of the following areas: acting/dance, directing/choreography/playwriting; stage management/dramaturgy; design/studio/technical production; and crew assignments for a minimum of two productions which may include stage management, fly crew, stage running crew, props, running crew, lighting board operator, follow spot operator, sound board operator, costume running crew, dresser, makeup.

Total Units for the Major …………………78

Dance Emphasis

Preparatory Subject Matter ……………… 28
Dramatic Art 14, 24, 26.............. 11
Dramatic Art 30; crew.............. 4
Dramatic Art 30; performance.............. 3

Depth Subject Matter ……………………… 45
Dramatic Art 140A, 140B, 140C, 141, 145, 154, 155, 155C, 159, Music 107A, Native American Studies 125.............. 19
Dramatic Art 124C, 126.............. 7
Total Units for the Major …………………73

Major Adviser:

Minor Program Requirements:

Theatre Emphasis

Preparatory Subject Matter ……………… 33

UNITS
Dramatic Art 20, 24, 25, 26.............. 14
Dramatic Art 21A or 21B, 24........... 14
Choose 4 units from Dramatic Art 218, 40A, 40B, 41A, 41B, 98, 99, African American and African Studies 51 or courses in other departments with departmental approval......................... 4
Dramatic Art 30........................................... Participation in University Theatre in at least two of the following areas: acting/dance, directing/choreography/playwriting; stage management/dramaturgy; design/studio/technical production; and crew assignments for a minimum of one production which may include stage management, fly crew, stage running crew, props, running crew, lighting board operator, follow spot operator, sound board operator, costume running crew, dresser, makeup.

Transfer Students. As described above, all students completing a major in Dramatic Art must participate in dramatic productions, including work in at least three of the following four areas: acting/dance, design, stage, costume, lighting, painting, props, sound, directing/playwriting/stage management. Such experience gained prior to transfer to UC Davis may count toward partial satisfaction of this requirement; transfer students should see the major adviser for evaluation of your previous experience. While in residence at UC Davis, transfer students are required to participate in a minimum of five dramatic productions and that participation must include work in at least three of the four areas specified above, as well as running crew.

Guest Artists. The Granada Visiting Artists Program brings distinguished professional artists to the campus each year, to be in residence for a quarter. These visiting professional artists interact closely with students in the classroom and rehearsal halls and provide them excellent pre-professional experience of theater practice.

Graduate Study. The Department of Dramatic Art offers programs of study and research leading to the M.F.A. (acting, directing, design, choreography) and Ph.D. (performance and culture) degrees. Detailed information may be obtained by contacting the Graduate Adviser.

Graduate Advisers, Ph.D. Program: L. Hunter, M.F.A. Program: Della Davidson

Courses in Dramatic Art (DRA)

Lower Division Courses

1. Theatre, Performance and Culture (4)
Lecture—3 hours; discussion—1 hour. Introductory investigation of the nature of performance, moving from performance theory to consideration of various manifestations of performance including theatre, film and media, performance art, dance, sports, rituals, political and religious events, and other “occasions.” Not open to students who have completed course 15. GE credit: Art/Hum, Div. Wrt.—Bogad, Hunter, Rossini

15. Theatre, Performance and Culture (4)
Lecture—3 hours; discussion—1 hour. Introductory investigation of the nature of performance, moving from performance theory to consideration of various manifestations of performance including theatre, film and media, performance art, dance, sports, rituals, political and religious events, and other “occasions.” For Short Term Programs Abroad. Not open to students who have completed course 1. Not offered every year. GE credit: Art/Hum, Div. Wrt.—McCutch

5. Understanding Performance: Appreciation of Modern Theatre, Dance, Film and Performance Art (4)
Lecture/discussion—2 hours; laboratory/discussion—5 hours; tutorial—1 hour. Relevance of theatre and performance to modern culture and society. Approaches to theatre/dance/media/performance art, integrated into Mondavi Center and the Arts and Theatre and Dance Department programs. GE Credit: Art/Hum, Div.—I, II, III, III, III, III, III

10. Introduction to Acting (3)
Laboratory/discussion—4 hours; term paper. Fundamentals of movement, speech, theatre games, and improvisation. Selected reading and viewing of theatrical productions. Intended for students not specializing in Dramatic Art.—I, II, III

Quarter Offered: I=Fall; II=Winter; III=Spring; IV=Summer; 2009-2010 offering in parentheses

14. Introduction to Contemporary Dance (4) Lecture—3 hours; laboratory—3 hours. Introduction to basic contemporary dance techniques. Focus on preparing the student for dancing and dance-making through basic techniques of improvisation and composition. Consideration of dance as a cultural practice.—I, II, III, IV.

20. Introduction to Dramatic Art (4) Lecture—3 hours; discussion—1 hour. Understanding and appreciating both of the distinctive and collaborative contributions of playwright, actor, director, and the total work of dramatic art. Study of plays from the major periods of dramatic art in their cultural contexts. GE credit: ArtHum.

21A. Fundamentals of Acting (4) Lecture—2 hours; laboratory—4 hours. Prerequisite: course 20. Basic acting principles and techniques applicable to all performing arts. Development of acting skills in the classroom, outside of class, and in large studio situations. GE credit: SciEng.

21B. Fundamentals of Acting (4) Lecture—2 hours; laboratory—4 hours. Prerequisite: course 20. Basic acting principles and techniques applicable to all performing arts. Development of acting skills in the classroom, outside of class, and in large studio situations. GE credit: SciEng.

25. Technical Aspects of Dramatic Production (3) Lecture—3 hours. Technical principles of dramatic production emphasizing the three areas of scenic, costume and lighting studios. Subjects covered include basic tools, materials and equipment, production techniques, and the interdisciplinary and collaborative nature of production management.

26. Performing Arts Production Management (3) Lecture—3 hours. Theoretical study of performing arts administration and backstage operations from a technical and management perspective. Techniques of scheduling, production management, stage management, technical direction, audience control, box office, promotion, safety, accommodations for persons with disabilities, and production procedures.—Winn.

30. Theatre Laboratory (1-5) Prerequisite: course 25 or consent of instructor. Projects in acting, production, scene design, costume design, lighting, direction, and playwriting. Participation in departmental productions. May be repeated for credit up to 11 units.—I, II, III, IV.

40A. Beginning Modern Dance (2) Laboratory/discussion—4 hours. Prerequisite: course 14 or consent of instructor. Fundamentals of modern dance focusing primarily on the development of techniques and creative problem solving. Basic anatomy, dance terminology, and a general overview of modern dance history. May be repeated once for credit with consent of instructor.

40B. Intermediate Modern Dance (2) Laboratory/discussion—4 hours. Prerequisite: course 40A. More advanced modern dance techniques. Basic anatomy, dance terminology, and a general overview of modern dance history. May be repeated once for credit with consent of instructor.

41A. Beginning Jazz Dance (2) Laboratory/discussion—4 hours. Prerequisite: course 14 or consent of instructor. Fundamentals of jazz dance techniques. Warm-up, dance techniques and combinations. Basic anatomy, dance terminology and general overview of jazz dance history. May be repeated once for credit with consent of instructor.

41B. Intermediate Jazz Dance (2) Laboratory/discussion—4 hours. Prerequisite: course 41A. Warm-up, dance techniques and combinations at the intermediate level. Basic anatomy, dance terminology and a general overview of jazz styles of historically significant jazz choreographers and leading contemporary jazz choreographers. May be repeated once for credit with consent of instructor.

42A. Beginning Ballet (2) Laboratory/discussion—4 hours. Prerequisite: course 14 or consent of instructor. Fundamentals of ballet, focusing on the development of technique through proper alignment, quality, and rhythm. Basic anatomy, ballet terminology, and dance history. May be repeated once for credit with consent of instructor.

42B. Intermediate Ballet (2) Laboratory/discussion—4 hours. Prerequisite: course 42A or consent of instructor. Barre and center work at the intermediate level. Development and refinement of technique through proper alignment, rhythm, and qualitative understanding. Anatomy, ballet terminology, and dance history. May be repeated once for credit with consent of instructor.

43A. Contact Improvisation Dance (2) Lecture/laboratory—4 hours. Fundamentals of contact improvisation and its applications to all forms of dance, performance, sports, physical safety and health. Safety practices, coordination, communication, alignment, basic lifting and weight-sharing, intuition, developing relaxed readiness and personal expression. May be repeated twice for credit. Not offered: Spring 2008.

43B. Intermediate Contact Improvisation (2) Lecture/laboratory—4 hours. Prerequisite: course 43A. Building on the fundamentals. Reviewing basics, extended improvising, skillfully working with partners of different sizes and abilities, advanced lifting, advanced safety practices, embracing risk and disorientation, subtle nuances of communication. May be repeated twice for credit.

44A. Beginning Hip Hop Dance (2) Laboratory/discussion—4 hours. Fundamentals of Hip Hop dance focusing on developing a fluid movement vocabulary, facility in body isolations, intricate rhythmic patterning, quick shifts of weight and mastering dance combinations. Discussions on Hip Hop dance history, styles and terminology. May be repeated once for credit.

44B. Intermediate Hip Hop Dance (2) Laboratory/discussion—4 hours. Prerequisite: course 44A or consent of instructor. Expansion of Hip Hop dance vocabulary by focusing on master- ing body isolations and intricate rhythmic techniques, complex dance combinations, advanced across the floor sequences. May be repeated once for credit.

92. Internship in Dramatic Art (1-12) Prerequisite: consent of instructor and department chairperson; lower division students (less than 84 units completed). Internship outside the Department of Theatre and Dance enabling students to practice their skills. May be repeated for credit up to 12 units. (P/NP grading only.)—I, II, III, IV.

98. Directed Group Study (1-5) Primarily for lower division students. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses

1115. Representation and Identity in Culture and Cinema (4) Lecture/discussion—2 hours; film viewing—4 hours. Issues of personal and collective identity via study of film narratives and contemporary cultures. Reflection of dominant cultural identities in film. Taught in Australia. GE credit: ArtHum, Div, Writ.—McCutchon

114. Theatre on Film (4) Lecture/discussion—3 hours; film viewing—2 hours; term paper. Prerequisite: consent of instructor; graduate standing; course 1, 14, 15. Study of six/eight films on film, using mixed casts and raising issues of diversity. Focus: sociohistorical context for production and reception, intertextuality and analysis of topics (gender, ethnicity, age, politics, philosophy), and filming, screenwriting, design, and acting/ directing for film. GE Credit: ArtHum, Div, SocSci, Writ.

115. Advanced Study of Major Film Makers (4) Lecture/discussion—3 hours; film viewing—2 hours. Prerequisite: course 15. Analysis of the contribution of some outstanding film makers. Study of diverse aesthetic theories of the cinema and their application to selected films. May be repeated for credit when different film creator studied.

121A. Advanced Acting: Mask, Myth, and Tragedy (4) Lecture/laboratory—6 hours. Prerequisite: course 218 and consent of instructor. Theory and practice of acting focused on the performance skills necessary to enact verse plays. Specific concentration on language as vocal and physical metaphor. Offered in alternate years.

121B. Advanced Acting: Comedy from Force to Manners (4) Lecture/laboratory—6 hours. Prerequisite: courses 218, 121A and consent of instructor. Theory and practice of acting in comic plays. Specific issues addressed will be comic characterization, physical mask, and timing. Offered in alternate years.

122A. Advanced Acting: Realism (4) Lecture/laboratory—6 hours. Prerequisite: course 218 and consent of instructor. The issues of Stanislavsky realism are explored through selected plays. Script analysis using improvisation and emotional scoring. Offered in alternate years.

122B. Advanced Acting: Non-Realism (4) Lecture/laboratory—6 hours. Prerequisite: courses 218, 122A and consent of instructor. Exploration of the acting techniques needed to perform a non-realistic script. Different avant-garde movements will be examined through performance of the scripts. Offered in alternate years.

124A. Principles of Theatrical Design: Scenery (4) Lecture/seminar—4 hours. Prerequisite: course 24 or consent of instructor. Scene design processes, working drawings, sketching techniques, scale models, materials and scenic construction. Offered in alternate years.

124B. Principles of Theatrical Design: Scenery (4) Lecture/seminar—4 hours. Prerequisite: course 24 or consent of instructor. Analysis of plays in terms of scenic design, elements of design, execution of designs for modern and period plays.

124C. Principles of Theatrical Design: Lighting (4) Lecture/seminar—4 hours. Prerequisite: course 24 or consent of instructor. Theories of lighting the stage, equipment and control systems, execution of lighting plots.—Munn

124D. Principles of Theatrical Design: Costume (4) Lecture/seminar—4 hours. Prerequisite: course 24 or consent of instructor. Source materials for theatrical costume, selecting fabrics, elements of design, analysis of plays in terms of costume design, execution of designs for modern and period plays.—Morgan

124E. Costume Design for Film (4) Lecture/discussion—4 hours. Prerequisite: course 24 or 124D or consent of instructor. Theories of lighting the stage, equipment and control systems, execution of designs for period and contemporary films. Viewing of current films.—Morgan
125. Scenic Painting: Studio (4) Lecture—2 hours; studio—3 hours; laboratory—3 hours.
Prerequisite: upper division standing in Dramatic Art, Art Studio, or Design; or course 24 or 25, or consent of instructor. Scene painting techniques, practices and materials. Course satisfies production requirement in studio category. May be repeated once with consent of instructor. Offered in alternate years.

126. Principles of Performing Arts Stage Management (3) Lecture/discussion—2 hours; laboratory—3 hours. Prerequisite: course 20, 24, 25, 26 or the equivalent or consent of instructor. Stage management principles for theatre, dance, musical theatre, music, and concerts. The dynamical role of the stage manager in the performing arts, upper-management team. — Winn

127A. Principles of Directing (4) Lecture—2 hours; laboratory—4 hours. Prerequisite: courses 21A, 26, two of 135A, 156B, 156C, or consent of instructor. The director’s creative approach to the play and to its staging.

127B. Principles of Directing (4) Lecture—2 hours; laboratory—4 hours; rehearsal. Prerequisite: and consent of instructor for non-majors. The director’s creative approach to the actor.

128. Principles of Theatre Sound (3) Lecture/discussion—2 hours; laboratory—3 hours. Fundamentals of sound and equipment, and sound design as used in modern theatre and other performance venues. Assembly, setup, and operation of basic theatre sound reinforcement system, recording system, and theatrical playback system. — Jacobson

130. Approaches to Theatrical Design: Practice and Theory (4) Seminar—2 hours; studio—4 hours. Prerequisite: upper division standing in Dramatic Art, Art Studio, or Design. Advanced scenic design study in specific areas including but not limited to: research, design styles and concepts, new materials and techniques, photography, projections, computer technology, spectacle and special effects, and alternative theatre forms and genres. Course satisfies Dramatic Art production requirement in Design. Offered in alternate years.

140A. Dance Composition (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 40A, 41A, and 42A, or consent of instructor. Introduction to the craft of choreography. Students will compose and present movement studies based on the elements of choreography: motivation, space, time, force/energy. — Davidson

140B. Dance Composition (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: course 140A. Continuation of the study of choreography, focusing on the development of group choreography: duets, trios, quartets and group work, form, and accompanying. — Grenke

140C. Dance Composition (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 140A, 140B. Continuation of study of choreography focusing on sequenced movements for groups. The relation between dance and allied mediums of music, set, costumes and lighting. Students conceptualize a choreographic issue and explore it through creation of short dance studies. — Davidson

141. Introduction to the Fundamentals of Movement (3) Lecture/discussion—3 hours. Introduction to fundamentals of movement that combines intellectual and kinesthetic understanding of the body’s skeletal and muscular systems. Explorations based on theories of body and mind specialists Feldenkrais, Bartenieff and Swegard as well as the eastern discipline of Yoga.

142. History of Modern Dance (5) Lecture—3 hours; laboratory—3 hours; extensive writing. The Modern Dance tradition in the U.S., focusing on its theorizations of individual and social identity. Students will write and choreograph analyses of personal dance forms in this tradition. Offered in alternate years.

143. Dance and Movement Studio (1-4) Laboratory/discussion—2-8 hours. Prerequisite: course 14 or consent of instructor. Special studies in dance and movement as such as African, Balinese, Baroque, Chinese and stage combat. Offered as needed for stage productions. May be repeated for credit for a total of 8 units.

144. Introduction to Traditional Chinese Physical Culture (4) Lecture/discussion—4 hours. Traditional Chinese Wushu practices, explored through practical work in dance laboratory conditions. Integration of practice with conceptual analysis; contemporary social, educational and artistic applications. GE Credit: ArtHum, SocSci.—II. (II.) Hunter

145. Directed Choreography Projects (4) Lecture/laboratory—6 hours. Prerequisite: courses 140A, 140B, 140C or consent of instructor. Conceptualization, creation, casting, rehearsing, and concert presentation of complete dances, with students integrating elements of stagecraft and directing the on-stage rehearsals. — Grenke

146A. Professional Track Modern Dance I (3) Laboratory/discussion—6 hours. Prerequisite: course 40B; consent of instructor. Professionally oriented performance training. Rigorous, consistent training regimen based on traditional modern dance technique. Breath and voice, skeletal and muscular placement, moving from the spine, contraction technique, movement intention. May be repeated two times for credit. — Grenke

146B. Professional Track Modern Dance II (3) Laboratory/discussion—6 hours. Prerequisite: courses 40B and 146A; consent of instructor. Continuation of course 146B. Time as a theatrical device, sustaining movement and non-movement, phrasing, musicality. May be repeated twice for credit. — Grenke

146C. Professional Track Modern Dance III (3) Lecture/discussion—6 hours. Prerequisite: courses 40B, 146A, and 146B; consent of instructor. Continuation of course 146B. Time as a theatrical device, sustaining movement and non-movement, phrasing, musicality. May be repeated twice for credit. — Grenke

150. American Theatre and Drama (4) Lecture—4 hours. The history of the theatre from Colonial times to the present. Readings of selected plays. Offered in alternate years. GE credit: ArtHum, Div, Wrt.


154. Asian Theatre and Drama: Contexts and Forms (4) Lecture/discussion—4 hours. Prerequisite: upper division standing. Selected Asian plays and performance forms in their cultural and artistic contexts, myth, ritual and the theatre; performance training, visual presentation of the text; political theatre; inter-cultural performance—the fusion of Asian and Western traditions. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—Sellers-Young

155. Representing Race in Performance (4) Lecture—4 hours. Examination of how “race” is represented and performed in American culture. Course will feature different works such as “All-Black American Theatre” or “Asian-Americans on Stage.” May be repeated once for credit when topic differs. Offered in alternate years. GE credit: ArtHum, Div, Wrt.

155A. African American Dance and Culture in the United States, Brazil and the Caribbean (4) Lecture/discussion—4 hours. A comparative study of the African American dance forms in the U.S., Brazil, Haiti, Coba, Jamaica, Barbados, and Trinidad. Examination of ritual, folk, and popular dance forms and the socio/historical factors that have influenced these forms. [Same course as African American and African Studies 155A.] Offered in alternate years.

155B. Ancient and Contemporary Greek Theatre and Dance (6) Discussion/laboratory—10 hours; performance instruction—10 hours; seminar—13 hours. Offered in alternate years. GE credit: ArtHum, Div, Wrt.—Bogad

156D. Theatre History through Shakespeare (15) Lecture—4 hours; writing. Shakespeare’s plays, the theatre history, and theatre today. European contexts from 1590-2004 and international theatre from 20th century. Stagecraft, different media (print, stage, film), social/political environments, design, and cultural change (gender, sexuality and ethnicity). May be repeated one time for four units of credit. GE Credit: ArtHum, Div, Wri.—Bogad

156AN. Performance Analysis (4) Laboratory/discussion—3 hours; discussion—1 hour. Prerequisite: course 1, course 20 or consent of instructor. Analysis of performance on the stage, in the street, in everyday life, ritual, and in politics. Satire, irony, creative protest and performance. Social movements, the state, and performance as tactical intervention. GE Credit: ArtHum, Div, Wri.—Hunter

156BN. Theatre in History and Place: Local, National and Global Conditions for Production (4) Laboratory/discussion—3 hours; discussion—1 hour. Prerequisite: course 1, course 20 or consent of instructor. Study of important movements in performance, especially theatre and dance from realism to the present. Primary emphasis on Western traditions though others may be studied. GE Credit: ArtHum, Div, Wri.—Rossini

158. Performance Studies Undergraduate Seminar (4) Seminar—4 hours. Prerequisite: course 156A, B, or C, or consent of instructor. Focused inquiry into a particular genre, period, movement, artist, or theme in performance. Philosophical and aesthetic issues as well as historical and cultural performance contexts. In-depth research projects in relationship to the subject of inquiry. May be repeated for credit. GE Credit: Wri.

159. Contemporary Experimental Performance, Theatre and Drama (4) Lecture/discussion—4 hours. Evaluation and examination of the “New Theatre”—its experimental and innovative nature since the 1950s. Contemporary stage, performance art and public acts of a performative nature. Not open for credit to students who have completed course 159S. GE credit: ArtHum, Div, Wrt.—McCulloch

159S. Contemporary Experimental Performance, Theatre and Drama (4) Lecture/discussion—4 hours. Evaluation and examination of the “New Theatre”—its experimental and innovative nature since the 1950s. Contemporary stage, performance art and public acts of a performative nature. This course is offered in Sydney, Australia. Not open for credit to students who have completed course 159S. Not offered every year.—McCulloch
160A-160B. Principles of Playwriting (4-4) Lecture/seminar—4 hours. Prerequisite: two courses in Drama or theatre or other departments; course 160A prerequisite for 160B or consent of instructor. Analysis of dramatic structure; preparation of scenarios; the composition of plays.

170. Musical Theatre (3) Lecture—1 hour; rehearsal—2 hours; performance—1 hour. Prerequisite: upper division standing in Dramatic Art, Music, Art Studio, Design, Computer Science, or Engineering: Computer Science, or consent of instructor. New media and application of theatre design and performance. Emphasis on collaborative process in relationship to integration of emerging technologies and formation of new theatrical works. Development of collaborative performance through lecture, demonstration, improvisation and experiment. May be repeated once for credit.

180. Theatre Laboratory (1-5) Prerequisite: upper division standing and course 25, or consent of instructor. Projects in acting, production, scenic design, costuming, lighting, directing, and playwriting. Participation in departmental productions. May be repeated for credit. —I, II, III. (I, II, III.)

192. Internships in Theatre and Dance (1-12) Internship—3-36 hours. Theatre production experience in creative, technical or management areas. Experience in galleries, performance sites, or the-atre/dance/physical theatre companies. May be repeated for credit for a total of 12 units. Not open to students who have completed course 192S. (P/NP grading only.)—McCUTCHEON

194A-194HB. Special Study for Honors Students (3-3) Independent study—9 hours. Prerequisite: qualification for Letters and Science Honors Program and admission to Dramatic Art Senior Honors Program. Preparation and presentation of a culminating project, under the supervision of an instructor, in one of the creative or scholarly areas of Dramatic Art. (Deferred grading only, pending completion of sequence.)

197T. Tutoring in Dramatic Art (1-5) Tutoring—1-5 hours. Prerequisite: upper division or graduate standing in one major in dramatic art; consent of department chairperson. Leading of small voluntary groups affiliated with one of the department’s regular courses. May be repeated for credit. (P/NP grading only.)

198. Directed Group Study (1-5) Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

200. Methods and Materials in Theatre Research (4) Seminar—3 hours, term paper. Essential research tools in theatre and related fields; bibliographies, printed sources, methods of evaluating and presenting evidence; delineating research areas in the field.

211. Advanced Voice and Speech (2) Laboratory—4 hours. Open to advanced undergraduates with consent of instructor. Voice production and speech related to specific acting problems in classical plays, particularly in verse. May be repeated for credit.

212. Advanced Stage Movement (3) Laboratory—6 hours. Prerequisite: graduate standing in the MFA Program; an exploration of modern style and technique, and the use of imagery as well as Laban’s effort/shape system as a method of analysis in classic and modern plays. Open to advanced undergraduates by consent of instructor. May be repeated for credit.

221. Special Problems in Advanced Acting (4) Seminar—2 hours; laboratory—4 hours. Prerequisites: consent of instructor and course 222A. Projects in acting in scenes selected from plays from ancient Greece to the present. May be repeated for credit.

224A. Seminar in Theatrical Design: Ancient Worlds—Early 17th Century (4) Seminar—2 hours; project—2 hours. Prerequisite: graduate standing. Group study while focusing primarily on one discipline: scenic, costume or lighting design. Periods covered: Ancient Greek—Greek, Medieval, 16th century. Design projects include script analysis, research of period style, fashion, character development, developing design concepts and presentation skills.—I. Iacovelli, Morgan, Munn

224B. Seminar in Theatrical Design: Mid 17th Century to 1900 (4) Seminar—2 hours; project—2 hours. Prerequisite: graduate standing. Group study focusing primarily on one discipline—scenic, costume or lighting design. Periods covered: Cavalier, Restoration 18th century opera and ballet, 19th century. Design projects include script analysis, research of period style, fashion, character development, developing design concepts and presentation skills.—II. Iacovelli, Morgan, Munn

224C. Seminar in Theatrical Design: the 20th Century (4) Seminar—2 hours; project—2 hours. Prerequisite: graduate standing; courses 224A and 224B or consent of instructor. Group study focusing primarily on one discipline—scenic, costume or lighting design. Periods covered: 19th century. Design projects include script analysis, research of period style, fashion, character development, developing design concepts and presentation skills.—III. Iacovelli, Morgan, Munn

224D. Seminar in Theatrical Design: Contemporary Concepts (4) Seminar—2 hours; project—2 hours. Prerequisite: graduate standing; courses 224A, 224B, 224C, and 224D or consent of instructor. Group study focusing primarily on one discipline—scenic, costume or lighting design. Emphasis on contemporary design concepts for new works and classics: Shakespeare, modern dance, concept plays and musicals. Script and character analysis for design in performance, research, design projects.—I. Iacovelli, Morgan, Munn

224E. Seminar in Theatrical Design: Advanced Concepts (4) Seminar—2 hours; project—2 hours. Prerequisite: graduate standing; courses 224A, 224B, 224C, and 224D or consent of instructor. Group study focusing primarily on one discipline—scenic, costume or lighting design. Emphasis on specific issues in contemporary design concepts for new works and classics. Script and character analysis for design in performance, research, design projects. —II. III. (III.) Iacovelli, Morgan, Munn

235. Performance Design Studio: Techniques in Media (2) Studio—2 hours. Prerequisite: graduate standing; must be taken concurrently with course 224 series. Exploration and development of technologies and skills in the performance design process. Drafting, model building, drawing, painting and rendering, costume drawing, color theory, lighting techniques, design portfolio preparation and presentation. May be repeated for credit. —I, II, III. (I, II, III.) Iacovelli, Morgan, Munn

228. Seminar in Directing Theory: Non-Realism (4) Seminar—2 hours; term paper. Modern directing theory as it applies to non-realistic theatre; development of directorial concepts for production of selected non-realistic plays—Greek to the present; emphasis on textual analysis. Offered in alternate years.

229. Special Problems in Directing (5) Seminar—2 hours; laboratory—2 hours, rehearsal—4 hours. Prerequisite: consent of instructor. Projects in directing/scene selection from plays from ancient Greece to the present. May be repeated for credit.

244. Critical Approaches to Traditional Systems of Body Movement (4) Discussion/labouratory—6 hours; project, term paper. Introduction to traditional systems of body movement, development of critical approaches to them, and experiments in how they inform training and practice in theatre, dance, and performance. May be repeated five times for credit. Not offered every year.

250. Modern Theatre (4) Seminar—3 hours; term paper. The theatre of Europe and America, 1860-1940, with emphasis on the relationship of the director to the physical circumstances under which they were produced. Offered in alternate years.

251. Scoring and Scripting in Performance (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. The process of weaving together various performance elements brought into play by the artists in their respective disciplines. The “script” is the thread from which the artists “scent” and transform the “story” into performance for specific time, place, spectators.

252. Performance: Concepts of Space, Place, and Time (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. Innovative theories of creating performance spaces, establishing a sense of place, and communicating the concept of time explored through collaborative interaction. Research includes traditional principles, site-specific spaces and consideration of various tempi from music and movement.

253. Approaches to Collaboration (4) Lecture—4 hours; laboratory—3 hours. Prerequisite: graduate standing. Exploration of different approaches to collaboration among artists in different media and their influence on the creative process. —I.

254. Performing Identities/Personae (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. Historical and contemporary theories of constructing stage identities. Discussion and project collaborations based on theories. Questions of identity related to ethnicity, gender or sexual orientation.

255. Composition in the Arts (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. Examination of work in which specific elements utilized by actors, dancers, directors, choreographers, and designers are combined or related to form a whole in space and time, as well as methods of sequencing used by each discipline to produce artistic products. May be repeated once for credit.

257. Interdisciplinary Seminar in Theatre, Dance and Performance (4) Seminar—3 hours; project. Prerequisite: consent of instructor. Interdisciplinary seminar for first and second year MFA students in Dramatic Art. Topics will range from current practice in dance, theatre, film and performance, to lectures by outstanding practitioners in the field. Students must be enrolled on the MFA in Dramatic Art. Students taking the Ph.D. in Performance Studies or the DE in Studies in Performance and Practice may apply to the chair. May be repeated twice for credit.
259. Topics in Contemporary Theatre and Performance (4) Seminar—3 hours; term paper. Special topics designed to study in depth aspects of contemporary performance including performance analysis, cultural and historical context, modes of production, theoretical and political entailments, and issues of spectatorship e.g., “Brecht and After,” “British Theater,” “Race and Gender in Performance.” May be repeated five times for credit.

259A, 259B, 259C, 259D, 259E Seminar—3 hours; term paper; project. Introduces students to the literature of performance production in a variety of media: theatre, dance, film, video, computer-based, looking at cultural, aesthetic, rhetorical and political theory. Offered in alternate years. May be repeated three times for credit when topics differ.

265A, 265B Seminar—3 hours; term paper; project. Introduces students to analysis of the body in performance, drawing on theoretical models from several fields. Offered in alternate years. May be repeated three times for credit when topics differ.

265C Seminar—3 hours; term paper; project. Introduces students to the role of performance (broadly defined) in everyday life, sociopolitical negotiation, identity, social movements, the media, and the state. Offered in alternate years. May be repeated three times for credit when topics differ.

265D Seminar—3 hours; term paper; project. Introduction to the theory, history and criticism, informing performance studies. Offered in alternate years. May be repeated three times for credit when topics differ.

2651 Seminar—12 hours. A professional level seminar. May be repeated for credit. May be offered with consent of instructor. Prerequisite: consent of instructor.

396. Teaching Assistant Training Practicum (1-4) Prerequisite: graduate standing. May be repeated for credit [S/U grading only].—I, II, III. [I, II, III, IV, V]

Professional Courses 413. Stage Makeup (1) Lecture—2 hours. Prerequisite: consent of instructor. Approf for advanced grade credit. Lectures, demonstrations, and practical work in aspects of theatrical make-up.

459. Approaches to Theatre and Dance (4) Seminar—3 hours; term paper; project. Prerequisite: a consent of instructor; advanced graduate students. Work on approaches to theatre, dance, film/video, design and performance, with a focus on methodology and professional development. May be repeated five times for credit. Not offered every year.

Transportation Technology and Policy (A Graduate Group)

Patricia L. Mokhtarian, Ph.D., Chairperson of the Group


Faculty

Ralph C. Aldredge, III, Ph.D., Professor (Mechanical and Aeronautical Engineering)
Alison Berry, Ph.D., Professor (Environmental Health, Policy)
Hemant Bhargava, Ph.D., Professor (Graduate School of Management)
David Bunch, Ph.D., Professor (Graduate School of Management)
Harry Dwyer, Ph.D., Professor (Mechanical and Aeronautical Engineering)
Paul Erickson, Ph.D., Assistant Professor (Mechanical Engineering)
Yueye Fan, Ph.D., Assistant Professor (Civil and Environmental Engineering)
Y. Hossein Farzin, Ph.D., Professor (Agricultural and Resources Economics)
Robert Feenstra, Ph.D., Professor (Economics)
Mark Francis, M.L.A., Professor (Landscape Architecture)
Andrew A. Frank, Ph.D., Assistant Professor (Mechanical and Aeronautical Engineering)
Joanna R. Groza, Ph.D., Professor (Chemical Engineering and Materials Science)
Susan Harutyunyan, Ph.D., Professor (Environmental Science and Policy)
John T. Harvey, Ph.D., Associate Professor (Civil and Environmental Engineering)
Bryan Jenkins, Ph.D., Professor (Biological and Agricultural Engineering)
Alissa Kendall, Ph.D., Assistant Professor (Civil and Environmental Engineering)
Ian Kennedy, Ph.D., Professor (Mechanical and Aeronautical Engineering)
Michael Kleeman, Ph.D., Associate Professor (Civil and Environmental Engineering)
Chris Knittel, Ph.D., Associate Professor (Economics)
Cynthia Lin, Ph.D., Assistant Professor (Agricultural and Resources Economics)
Mark Lubell, Ph.D., Associate Professor (Environmental Science and Policy)
Patricia L. Mokhtarian, Ph.D., Professor (Civil and Environmental Engineering)
Debbie A. Niemeier, Ph.D., Professor (Civil and Environmental Engineering)
Joan Ogden, Ph.D., Professor (Environmental Science and Policy)
Almela Palazoglu, Ph.D., Professor (Chemical and Materials Science Engineering)
Bahram Ravanian, Ph.D., Professor (Mechanical and Aeronautical Engineering)
David M. Rocke, Ph.D., Professor (Graduate School of Management)
Paul Sabatier, Ph.D., Professor (Environmental Science and Policy)
Nesrin Sarigul-Klijn, Ph.D., Professor (Mechanical and Aeronautical Engineering)
Seymour Schwartz, Ph.D., Professor (Environmental Science and Policy)
Daniel Sperling, Ph.D., Professor (Civil and Environmental Engineering, Environmental Science and Policy)
Pieter Stroeve, S.C., Professor (Chemical Engineering and Materials Science)
Steven Velinsky, Ph.D., Professor (Mechanical and Aeronautical Engineering)
Anthony Wexler, Ph.D., Professor (Mechanical and Aeronautical Engineering)
James Wilen, Ph.D., Professor (Agricultural and Resources Economics) Distinguished Graduate Mentoring Award
Michael Zhang, Ph.D., Professor (Civil and Environmental Engineering)

Emeriti Faculty

Thomas Cahill, Ph.D., Professor Emeritus (Atmospheric Science and Physics)
Don Chang, Ph.D., Professor Emeritus (Civil and Environmental Engineering)
Myron “Mike” Hoffman, Professor Emeritus (Mechanical and Aeronautical Engineering)
Robert Johnston, Ph.D., Professor Emeritus (Environmental Science and Policy)

Affiliated Faculty

Lowell Ashbaugh, Ph.D., Research Ecologist (Crocker Nuclear Laboratory)
Rahman Azari, Ph.D., Lecturer (Statistics)
Andrew B. Burke, Ph.D., Research Engineer (Institute of Transportation Studies)
Mark A. Delucchi, Ph.D., Research Ecologist (Institute of Transportation Studies)
Ryuichi Kitaumu, Ph.D., Research Engineer (Institute of Transportation Studies)
Kenneth S. Kurani, Ph.D., Research Engineer (Institute of Transportation Studies)
Alan Meier, Ph.D., Professional Researcher (Institute of Transportation Studies)

Graduate Study. The Graduate Group in Transportation Technology and Policy offers the M.S. [Plan I—thesis; and Plan II—exam], and Ph.D. degrees in two areas of specialization: Transportation Technology (also Transportation Planning and Policy). The technology track is for students trained in engineering and the physical sciences and interested in systems-level planning, analysis, management and design of advanced technologies (emphasizing vehicular propulsion and “intelligent transportation system” technologies) focusing on energy and environmental issues. The planning and policy track is aimed at students from a wider range of disciplines interested in the broader public policy issues concerning transportation systems. The curriculum for both tracks includes courses in civil, mechanical, and environmental engineering, economics, policy sciences, statistics, travel behavior, management, technology assessment and environmental studies.

Preparation. Applicants will normally be expected to have completed two courses in calculus, one course in linear algebra, and one course each in calculus level statistics and microeconomics. Additionally, students entering the technology track will need either to have an appropriate technical background or make up a relatively large number of prerequisite courses in order to be able to take the approved courses in that track.

Program of Study. Students will have the option of following either a technology or policy/management track. M.S. students complete 6 core courses, plus electives. Ph.D. students take 7 courses from the same core, 3 additional courses from their chosen track, one more in the alternate track, plus electives. Master's degrees require a minimum of 36 quarter units and doctoral degrees require a minimum of 54 units. M.S. Plan 1 students may replace up to 6 units of regular course work with research [course 299] units. At least two thirds of all credits must be at the graduate level.

Graduate Adviser. P. Mokhtarian

Curriculum

Core Courses. Students in each track are required to take courses in a common set of core competencies, as well as for Ph.D. students some courses in the other track.

Knowledge areas core courses: M.S. and Ph.D. students take Transportation Technology (TTP 210), Transportation Policy [ECI 252 or TTP 220], and Transportation Systems [ECI 251].

Skill areas core courses: M.S. and Ph.D. students take one in the area of Research Design from the following: Transportation Survey Methods (TTP 201), Research Methods in Environmental Policy [EBS 278], Survey Design, and Questionnaire Research Methods (PSY 207), Design and Analysis of Engineering Experiments (EBS 265), Experimental Design...
283. Professionalism, Leadership, and Ethics (1) Seminar—2 hours. Speakers from industry, government, academia, and NGOs will lead discussions about succeeding and performing in the professional world. They will address leadership, ethics, and other workplace issues. May be repeated for credit. (S/U grading only)—III. (III.) Sperling

289A. Selected Topics in Transportation Technology and Policy (1-5) Lecture and/or laboratory. Prerequisite: consent of instructor. Directed group study of special topics with instruction carried out through lecture or laboratory, or a combination of both. May be repeated for credit. —I, II, III. (I, II, III.)

289B. Selected Topics in Transportation Technology and Policy (1-5) Lecture and/or laboratory. Prerequisite: consent of instructor. Directed group study of special topics with instruction carried out through lecture or laboratory, or a combination of both. May be repeated for credit. (S/U grading only)—I, II, III. (I, II, III.)

290C. Graduate Research Group Conference (1) Discussion—1 hour. Prerequisite: consent of instructor. Research problems, group discussions, and techniques in transportation. May be repeated for credit. (S/U grading only)—I, II, III. (I, II, III.)

292. Internship in Transportation Technology and Policy (1-5) Prerequisite: second year standing; approval of project prior to period of internship. Supervised work experience in transportation studies. May be repeated for credit if topic differs. (S/U grading only)—I, II, III. (I, II, III.)

298. Group Study (1-5) Discussion—1 hour. Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12) Hours. Prerequisite: consent of instructor. (S/U grading only.)

Professional Course

396. Teaching Assistant Training Practicum (1-4) Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—I, II, III. (I, II, III.)

University of California, Davis
Washington Program

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The UC Davis Washington Program provides students and faculty new and expanded opportunities in the nation’s capital to enrich their education and research. Its principal activities are an undergraduate-academic internship program, fellowships and internships for graduate students, professional school students, fellowships and research grants for faculty, and conferences and workshops organized by UC Davis faculty. The University of California Washington Center resides in an 11-story, state of the art facility in downtown D.C. The center houses the academic and residential programs for undergraduate, faculty, and graduate students participating in the
University Writing Program

[College of Letters & Science]
Christopher J. Thaisi, Program Director

Program Office, 176 Voorhies Hall
(530) 752-0431; http://program.ucdavis.edu

Committee in Charge
John Boe, Ph.D. (University Writing Program)
Marlene Clarke, Ph.D. (University Writing Program)
Margaret Ferguson, Ph.D. (English)
Julia E. Menard-Warwick, Ph.D. (Linguistics)
Sandra M. Murphy, Ph.D. (Education)
Brenda D. Schildgen, Ph.D. (Comparative Literature)
Christopher J. Thaisi, Ph.D.

[University Writing Program]
Carl W. Whithaus, Ph.D.
[University Writing Program]

Aram A. Yengoyan, Ph.D. (Anthropology)

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Affiliated Faculty
Cynthia J. Bates, M.A., Lecturer
Mary E. Bly, M.A., Lecturer
John Boe, Ph.D., Lecturer
Academic Federation Excellence in Teaching Award

Amy Clarke, Ph.D., Lecturer
Marlene B. Clarke, Ph.D., Lecturer
Mardena E. Creek-Michelson, Ph.D., Lecturer
Pamela Demory, Ph.D., Lecturer
Aliki Dragana, Ph.D., Lecturer
Academic Federation Excellence in Teaching Award
Dale B. Flynn, Ph.D., Lecturer
Laurie Glover, Ph.D., Lecturer
Gary S. Goodman, Ph.D., Lecturer
Jared Haynes, M.A., Lecturer
Academic Federation Excellence in Teaching Award

Brad J. Henderson, Ph.D., Lecturer
David B. Johns, Ph.D., Lecturer
Academic Federation Excellence in Teaching Award

Andy Jones, Ph.D., Lecturer
Pamela J. Major, Ph.D., Lecturer
James McElroy, Ph.D., Lecturer
Don Meisenheimer, Ph.D., Lecturer
Janet L. Papalo, M.A., Lecturer
Academic Federation Excellence in Teaching Award

Raquel Scher, Ph.D., Lecturer
Academic Federation Excellence in Teaching Award

Eric J. Schroeder, Ph.D., Lecturer
Academic Federation Excellence in Teaching Award

Victor Squiri, Ph.D., Lecturer
Academic Federation Excellence in Teaching Award

John Stenzel, Ph.D., Lecturer
Academic Federation Excellence in Teaching Award

The Program

The University Writing Program (UWP) offers writing courses and seeks to improve writing instruction across campus through a variety of programs. The UWP coordinates first year, intermediate, and advanced writing courses that satisfy college composition requirements and offers courses in writing across the curriculum, writing in specific disciplines,
and writing in the professions. The Program offers graduate courses in the teaching of writing and in composition theory. The UWP also administers the English Composition Examination, an alternative way to satisfy the advanced writing requirement. The UWP publishes an annual anthology of exemplary student writing, Prized Writing, and a journal for writing instructors, Writing on the Edge. The Writing in the Disciplines Workshop Program presents workshops on teaching writing for faculty and TAs and workshops on writing for students. The Writing Ambassadors Program trains advanced undergraduates and places them as interns in K-12 classrooms to improve writing instruction.

Courses in University Writing Program (UWP)

Lower Division Courses

1. Expository Writing (4)
   Lecture/discussion—4 hours. Prerequisite: completion of Entry-Level Writing requirement. Composition, the essay, paragraph structure, diction, and related topics. Frequent writing assignments. Not open for credit to students who have completed English 1. GE credit: Wrt.—I, II, III, IV; (I, II, III, IV)

2. Style in the Essay (4)
   Lecture/discussion—4 hours. Prerequisite: course 1 or English 3 or the equivalent. Style, language, and structure in the essay. Analyzing style, developing a voice in writing, revising sentences, developing effective paragraphs, revised arguments, and writing with force and clarity. Not open for credit to students who have completed English 18. GE credit: Wrt.—I, II, III; (I, II, III)

3. Writing Research Papers (4)
   Lecture/discussion—4 hours. Prerequisite: course 1 or English 3 or the equivalent. Critical reading, analysis, documentation, and writing research-based assignments. Formulation of research topics and development of effective arguments. Reading and writing assignments may focus on a single theme. Not open for credit to students who have completed English 19. GE Credit: Wrt.—I, II, III; (I, II, III)

4. Interning (1-12)
   Internship—3.36 hours. Prerequisite: course 1 or English 3. Internships in fields where students can practice their skills. May be repeated for credit for a total of 12 units. (P/NP grading only)

5. Directed Group Study (1-5)
   Prerequisite: completion of English 3 or the equivalent; consent of instructor. (P/NP grading only)

6. Special Study for Undergraduates (1-5)
   Prerequisite: course 1 or English 3 or the equivalent; consent of instructor. (P/NP grading only)

Upper Division Courses

101. Advanced Composition (4)
   Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Instruction in advanced principles of expository writing. Writing tasks within and beyond the University. Different writing modes, including narrative, analysis, explanation, argument, critique. Not open for credit to students who have completed English 101. GE Credit: Wrt.—I, II, III, IV; (I, II, III, IV)

102A. Writing in the Disciplines: Biology (4)
   Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing; open to majors in a biological science or to students concurrently enrolled in an upper division biological science course. Advanced instruction in writing in biology. Not open for credit to students who have completed English 102B. GE credit: Wrt.—I, II, III; (I, II, III)

102B. Writing in the Disciplines: Biology (4)
   Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing; open to majors in a biological science or to students concurrently enrolled in an upper division biological science course. Advanced instruction in writing in biology. Not open for credit to students who have completed English 102B. GE credit: Wrt.—I, II, III; (I, II, III)

102C. Writing in the Disciplines: History (4)
   Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent; upper division standing; open to majors in history or to students concurrently enrolled in an upper division course accepted for the major history. Advanced instruction in writing in international relations. Not open for credit to students who have completed English 102D. GE credit: Wrt.—I, II, III; (I, II, III)

102D. Writing in the Disciplines: International Relations (4)
   Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent; upper division standing. Open to majors in international relations or to students concurrently enrolled in an upper division course accepted for the major. Advanced instruction in writing in international relations. Not open for credit to students who have completed English 102D. GE credit: Wrt.—I, II, III; (I, II, III)

102E. Writing in the Disciplines: Engineering (4)
   Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent; upper division standing. Open to upper division students in the College of Engineering and to students enrolled in an upper division engineering or computer science course for the major. Advanced instruction in writing in the discipline of engineering. Not open for credit to students who have completed English 102E. GE credit: Wrt.—I, II, III; (I, II, III)

102F. Writing in the Disciplines: Food Science and Technology (4)
   Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent; upper division standing. Open to majors in food science and technology and to students concurrently enrolled in an upper division course in food science and technology. Advanced instruction in writing in food science and technology. Not open for credit to students who have completed English 102F. GE credit: Wrt.—I, II, III; (I, II, III)

102G. Writing in the Disciplines: Environment (4)
   Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent; upper division standing; restricted to students with upper division standing. Students work with an environmental focus. Advanced instruction in writing and practice in effective styles of communication in the fields of environmental study, policy, or advocacy. Not open for credit to students who have completed English 102A or course 102A in the same academic field. Not offered every year. GE credit: Wrt.—I, II, III; (I, II, III)

102H. Writing in the Disciplines: Human Development and Psychology (4)
   Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent; upper division standing; restricted to majors and minors or to students concurrently enrolled in an upper division course in the fields of Human Development and Psychology. Not open for credit to students who have completed English 102A or course 102A in the same academic field. GE credit: Wrt.—I, II, III; (I, II, III)

102I. Writing in the Disciplines: Ethnic Studies (4)
   Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing; restricted to majors and minors in ethnic studies, or students with upper division coursework focusing on race and ethnicity. Advanced instruction in cross-disciplinary writing about race and ethnicity and practice in effective styles of communication. Not open for credit to students who have completed English 102A or course 102A in the same academic field. GE credit: Wrt.—I, II, III; (I, II, III)

102J. Writing in the Disciplines: Sociology (4)
   Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing; restricted to majors and minors or to students concurrently enrolled in an upper division course in Sociology. Advanced instruction in writing and practice in effective styles of communication in Sociology and related academic and professional fields. Not open for credit to students who have completed English 102A or course 102A in the same academic field. GE credit: Wrt.—I, II, III; (I, II, III)

104A. Writing in the Professions: Business Reports and Technical Communication (4)
   Lecture/discussion—3 hours. Prerequisite: course 1 or English 3 or the equivalent; upper division standing. Designing, writing, and documenting business and technical reports. Problem solving and data gathering. Suitable for students planning careers in science, government, business, engineering, or industry. Not open for credit to students who have completed English 104B. GE credit: Wrt.—I, II, III; (I, II, III)

104B. Writing in the Professions: Law (4)
   Lecture/discussion—3 hours. Prerequisite: course 1 or English 3 or the equivalent; upper division standing. Advanced principles of critical thinking, argumentation, and style, with special emphasis on their application in the legal profession. Suitable for students planning careers in law, business, administration, or management. Not open for credit to students who have completed English 104B. GE credit: Wrt.—I, II, III; (I, II, III)

104C. Writing in the Professions: Journalism (4)
   Lecture/discussion—3 hours. Prerequisite: course 1 or English 3 or the equivalent; upper division standing. Non-fiction for magazines and newspapers, with attention to style and language. Emphasis on research, interviewing, market analysis, and query letters. Not open for credit to students who have completed English 104C. GE credit: Wrt.—I, II, III; (I, II, III)

104D. Writing in the Professions: Elementary and Secondary Education (4)
   Lecture/discussion—3 hours. Prerequisite: course 1 or English 3 or the equivalent; upper division standing. Advanced expository writing in the contemporary American classroom. Strongly recommended for teaching credential candidates. Not open for credit to students who have completed English 104D. GE credit: Wrt.—I, II, III; (I, II, III)

104E. Writing in the Professions: Science (4)
   Lecture/discussion—3 hours. Prerequisite: course 1 or English 3 or the equivalent; upper division standing or enrollment in a graduate science curriculum. Writing abstracts, research proposals, scientific papers, other forms of scientific communication. Presenting data graphically. Students engaged in or planning careers in basic or applied research. Not open for credit to students who have completed English 104E. GE credit: Wrt.—I, II, III; (I, II, III)
104F. Writing in the Professional: Health (4)
Lecture/discussion—3 hours; extensive writing.
Prerequisite: course 1 or English 3 or the equivalent; upper division standing. Advanced expository writing common in the health professions, emphasizing effective communication between the writer and different audiences. Topics relate to health, disability, and disease. Suitable for students planning careers in professions such as medicine, dentistry, physical therapy, optometry. Not open for credit to students who have completed English 102A or course 102A. GE credit: Wrt.--I, II, III. (I, II, III.)

104L. Writing in the Professions: Internships (4)
Lecture/discussion—3 hours. Prerequisite: course 1 or English 3 or the equivalent and upper division standing; restricted to students concurrently enrolled in an internship and to Contemporary Leadership minors. Advanced instruction in writing in the work-place, including public and private sectors, government agencies, profit and non-profit organizations. Collaborative work and practice in effective styles of communication. Not open for credit to students who have completed English 102A or course 102A. GE credit: Wrt.—I, II, III. (I, II, III.)

192. Internship in Writing (1-12)
Internship—3-36 hours. Prerequisite: course 1 or English 3 or the equivalent. Internships in fields where students can practice their skills. May be repeated up to 12 units for credit. (P/NP grading only.)

197L. Tutoring in Writing (1-5)
Tutoring—1-5 hours. Prerequisite: upper division standing; consent of instructor. Tutoring one-on-one or leading small voluntary discussion groups affiliated with a writing course. May be repeated up to 10 units for credit. (P/NP grading only.)

197C. Community Tutoring in Writing (1-4)
Tutoring—1-4 hours. Prerequisite: upper division standing; consent of instructor. Field experience, with individuals or in K-12 classroom instruction, focusing on reading- and writing-to-learn strategies in any subject area. May be repeated up to 10 units for credit. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: course 1 or English 3 or the equivalent; consent of instructor. May be repeated up to 10 units for credit. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

298. Directed Group Study (1-5)
Prerequisite: graduate standing; consent of instructor. (S/U grading only.)

299. Individual Study (1-12)
Prerequisite: consent of instructor; graduate standing. (S/U grading only.)

Professional Courses

390. Theory and Practice of University-Level Composition Instruction (4)
Seminar—3 hours, term paper. Prerequisite: graduate standing. Teaching Assistant in the Composition Program. Examination of current theories about the teaching of writing and their practical application to undergraduate writing courses at UC Davis. Not open for credit to students who have completed English 390. (S/U grading only.)—I. (II, III.)

392. Teaching Expository Writing (2)
Discussion—2 hours. Prerequisite: graduate standing, appointment as Teaching Assistant in the Composition Program; completion of course 390 or the equivalent. Discussion of problems related to teaching expository writing at the university level, with special emphasis on teaching reading and writing skills and responding to student papers. (S/U grading only.)—I. (I.)

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing; consent of instructor. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)

Urban Planning

See Environmental Science and Policy, on page 281.

Urology

See Medicine, School of, on page 367.

Vegetable Crops

See Plant Sciences, on page 448.

Veterinary Medicine, School of

Bennie I. Osburn, D.V.M., Ph.D., Dean of the School
Bruno B. Chomel, D.V.M., Ph.D., Interim Dean
James S. Cullor, D.V.M., Ph.D., Director, Veterinary Medicine Teaching and Research Center, Tulare
Jan E. Illik, B.V.S.C., Ph.D., Associate Dean-Academic Programs
Donald J. Klingborg, D.V.M., Assistant Dean-Public Programs; Director, Veterinary Extension
Raeve B. LeFevre, Ph.D., Associate Dean-Student Programs
K. C. Kent Lloyd, D.V.M., Ph.D., Associate Dean-Research and Graduate Education Programs
John R. Pascoe, B.V.Sc., Ph.D., Executive Associate Dean
W. David Wilson, B.V.M.S., Interim Associate Dean-Clinical Programs; Director, Veterinary Medical Teaching Hospital

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J. Charles Hart, D.V.M., Ph.D., Associate Professor (Pathology, Microbiology, and Immunology)
Lynette A. Hart, M.A., Ph.D., Professor (Pathology, Microbiology, and Immunology)
on hands-on learning through participation. (Deferred grading only, pending completion of sequence. S/U grading only.—I, II, III, IV, V, VI, VII, VIII.) Klingborg

400C. Junior Doctoring (1.8)

Lecture—2 sessions; laboratory—2 sessions; lecture/discussion—2 sessions; project—2 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine, consent of instructor. Introduction to the "art" of veterinary medicine, focusing on essential skills (communication, team-building, leadership, conflict resolution, stress management, financial management). Emphasis on practical application of these skills to function efficiently and effectively in practice, academia, industry, government or other career. (Deferred grading only, pending completion of sequence. S/U grading only)—I, II, III, IV, V, VI, VII, VIII.) Klingborg

401A. The Normal Anatomy of the Canine Locomotor System (3.4)

Lecture—16 sessions; laboratory—18 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Normal canine anatomy of bones, joints, muscles, ligaments, tendons, nerves and vessels of the vertebral column and limbs; musculoskeletal physiology and biomechanics.—I. (I.) Meyers

401B. The Normal Anatomy of the Canine Head (1.7)

Lecture—7 sessions; laboratory—8 sessions; discussion—2 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Normal canine anatomy with comparison to other species of bones, joints, muscles, ligaments, tendons, nerves and vessels of the head including the eye and ear.—II. (II.) Kasper

402. Structure and Function of the Cardiovascular and Respiratory Systems (4.5)

Lecture—32 sessions; laboratory—13 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Integrated view of cardiovascular and respiratory anatomy and physiology. (Deferred grading only, pending completion of sequence.—I, II, III, IV, V, VI, VII, VIII.) Klingborg

402D. Structure and Function of the Urinary System and Body Fluids (2.3)

Lecture—17 sessions; laboratory—6 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine; consent of instructor. Basic understanding of the structure and function of the urinary system plus physiology of body fluids and acid-base balance. (Deferred grading only, pending completion of sequence.—I, II, III, IV, V, VI, VII, VIII.) Klingborg

403. Physiological Chemistry (5.9)

Lecture—52 sessions; discussion—7 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Biochemical principles used to analyze problems and to evaluate metabolic relationships important in animal health and pathophysiology. Integrative approach, emphasizing controls of major metabolic pathways, molecular basis of gene expression, tumor genesis and signal transduction.—I. (I.) Cortiassio

405. Veterinary Parasitology (3.6)

Lecture—26 sessions; laboratory—10 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Biological and clinical aspects of parasites and the diseases they cause in animals. —III. (III.) Conrad, Boyce

406. Principles of Behavior (0.7)

Lecture—7 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Overview of animal behavior with relevance to veterinary medicine.—I. (I.) Bain

407. Principles and Techniques of Operative Surgery and Anesthesia (2.4)

Lecture—24 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine; course 426. Introduction to operative and anesthetic skills and foundation in the principles of regional anatomy in the planning and conduct of surgical practice.—I. (I.) J. Pascoe, Ilkiv

407L. Principles and Techniques of Surgery and Anesthesia Laboratory (1.4)

Laboratory—14 sessions; laboratory—3 sessions; third-year standing in the School of Veterinary Medicine. Introduction to surgical anatomy, operative and anesthetic skills. (Deferred grading only, pending completion of sequence. S/U grading only)—I, II, III, IV, V, VI, VII, VIII.) Klingborg

408. Nutrition and Nutritional Diseases in Animals (2.9)

Lecture—27 sessions; laboratory—2 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Principles of nutrition and their application to the solution of nutritional disorders of animals.—II. (II.) Ramsey

409. Epidemiology and Biostatistics (2.7)

Lecture—11 sessions; discussion—6 sessions. Prerequisite: first-year standing in School of Veterinary Medicine. Introduction to epidemiologic effect measures, causal inference, experimental and non-experimental study design, and clinical epidemiology, with applications in veterinary medicine.—I. (I.) Kass

412. Fundamentals of Zoonoses (1.1)

Lecture—11 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Major zoonotic infections transmitted mainly by domestic animals, especially pets and particularly in North America. A short review of symptoms in animals and humans, epidemiology, diagnostic tests, treatment and prevention with regard to each animal species and each infection or infestation. Some zoonotic diseases, subject to USDA rules and regulations, will be studied in more detail (i.e., rabies, brucellosis, tuberculosis, avian chlamydiosis).—III. (III.) Chomel

413. Veterinary Food Safety (1.3)

Lecture—13 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. The food system and diseases transmitted by food. Topics include sources of contaminants, the function of processing in food safety, and the role of veterinarians in pre-harvest food safety and in food protection in general.—III. (III.) Chomel

414A. Principles of Veterinary Pharmacology and Toxicology (2.5)

Lecture—20 sessions; discussion—4 sessions; laboratory—1 session. Prerequisite: second-year standing in the School of Veterinary Medicine. Introduction to the principles of pharmacology and toxicology. Pharmacodynamics, pharmaco-toxicodynamics and chemotherapeutic of bacterial, neoplastic, fungal and viral diseases.—I. (I.) Bucki

414B. Veterinary Pharmacology (2.5)

Lecture—23 sessions; discussion—2 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Basic principles for the use of drugs affecting the autonomic and central nervous systems as well as compounds affecting the cardiovascular system.—II. (II.) Vulliet

414C. Veterinary Toxicology (1.9)

Lecture—16 sessions; discussion—2 sessions; laboratory—1 session. Prerequisite: second-year standing in the School of Veterinary Medicine. Toxins of major importance in veterinary medicine. Basic principles and mechanism of action of toxins, therapeutic and diagnostic approach.—III. (III.) Puschner

415A. Freshman Clinical Skills (1.1)

Lecture—1 session; lab—10 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Development of clinical skills by learning procedures that are important to the practice of veterinary medicine in a variety of species in both a laboratory and clinical environment. (Deferred grading only, pending completion of sequence. S/U grading only)—I, II, III, IV, V, VI, VII, VIII.) Klingborg

415B. Sophomore Clinical Skills (1.2)

Lecture—1 session; lab—11 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Development of clinical skills by learning procedures that are important to the practice of veterinary medicine in a variety of species in both a
laboratory and clinical environment. (Deferred grading only, pending completion of sequence. S/U grading only.)—I, II, III. (I) Kivw

415C. Junior Clinical Skills (1.9) Lecture—1 session; laboratory—18 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine and completion of junior clinical skills. Development of clinical skills by learning procedures to the practice of veterinary medicine in a variety of species in both a laboratory and clinical environment. (Deferred grading only, pending completion of sequence. S/U grading only.)—I, II, III. (I) Kivw

419. Virology (2.7) Lecture—27 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Introduction to the classification, morphology, and life cycle of major viral families, covering the molecular pathology of animal viruses at the cellular level with emphasis on agents of infectious diseases of domestic animals. —I. (I) Yilma

420. Immunology (3) Lecture—21 sessions; laboratory—9 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Approved for graduate degree credit. Concepts of immunology. Emphasis is on the immune response to vaccination, responses to pathogenic agents, and the development of hypersensitivity and autoimmune reactions. —II, III. (II) Gershwin

421. Principles of Neurosciences (2.7) Lecture—22 sessions; laboratory—5 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. An integrated study of normal neurobiology, neuroanatomy and neurophysiology, to enable students to engage in studies of neurological disorders and clinical neurology. —II. (II) LeCourte

422. Veterinary Ophthalmology (1.9) Lecture—17 sessions; laboratory—2 sessions. Prerequisite: third-year standing in School of Veterinary Medicine. The eye and related structures. Basic anatomy and physiology with clinically relevant aspects emphasized. Presentation of clinical appearance of common pathological changes. Specific diseases frequently encountered in general practice, including signs, causes, diagnostic approach, and treatment philosophy. —II. (II) Hollingsworth

425. Veterinary Genetics (1.8) Lecture—16 sessions; discussion—2 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Basic principles of veterinary anatomy, including techniques of monitoring and management of animals under anesthesia. —III. (III) P. Pascoe

427. Cell and Tissue Structure and Function (3.3) Lecture—24 sessions; laboratory—9 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Relationship between structure and function of animal tissues, emphasizing the molecular and cellular mechanisms which integrate normal physiological activity. Mechanisms of cell division, differentiation and locomotion. Microscopic anatomy and organization of cells and extracellular molecules to form specialized differentiated tissues. —I. (I) Tablin


431. Endocrinology (1.8) Lecture—17 sessions; laboratory—1 session. Prerequisite: first-year standing in the School of Veterinary Medicine. The structure and function of endocrine glands and how hormones and cytokines influence physiological processes. —III. (III) Raybould

432. Structure and Function of the Gastrointestinal and Mammary Systems (3.2) Lecture—22 sessions; laboratory—10 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Introduction to the regulation of structure and function of the gastrointestinal and mammary systems. Multiple species’ differences examined. —II. (II) Lloyd

433. Veterinary Otolaryngology (1.2) Lecture—12 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Relationships between pathology, hematology, cytology, immunology, and the clinical manifestations of neoplastic diseases in animals. —I. (I) Kent

434. Introduction to Veterinary Hematology (1.4) Lecture—10 sessions; laboratory—4 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Introduction to blood cells and the activities of hemostasis.—III. (III) W. Versaci

435. Veterinary Clinical Pathology (3.9) Lecture—13 sessions; laboratory/discussion—2 sessions. Prerequisite: second-year standing in School of Veterinary Medicine. The principles, selection, use, interpretation of laboratory tests used for the diagnosis and monitoring of diseases in animals. (Deferred grading only, pending completion of sequence.) —I, II, III, (III) Borjeson

436. Veterinary Ethics and Law (1.2) Discussion—12 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Ethical and legal issues critical to successful and ethical veterinary practice. Processes through which ethical and legal questions are approached and resolved. Background reading materials and discussions are supplemented with problem-based learning. —I. (I) Tannenbaum

437. Veterinary Ethics and Law (2) Lecture—16 sessions; discussion—4 sessions. Prerequisite: consent of instructor; third-year standing in the School of Veterinary Medicine. Ethical and legal issues critical to successful and ethical veterinary practice. Processes through which ethical and legal questions are approached and resolved. Reading and discussions supplemented with problem-based learning. —III. (III) Tannenbaum

440. Veterinary Neurology (2.7) Lecture—21 sessions; laboratory—6 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Integrated study of the relationship between microanatomy, neurophysiology, neuropathology, and the clinical manifestations and diagnosis of neurological diseases, and the use of the various neurodiagnostic aids. —I. (I) Dickinson

444. Clinical Endocrinology (1.5) Lecture—12 sessions; discussion—3 sessions. Prerequisite: third-year standing in School of Veterinary Medicine. A correlated review of common endocrinology disorders affecting the dog and cat. —II. (II) Feldman

446. Veterinary Reproduction (4) Lecture—30 sessions; laboratory—10 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Structural, functional, pathological, and clinical aspects of reproduction in animals. —I. (I) Dickinson

447. Introduction to Public Veterinary Practice and Foreign Animal Diseases (1) Lecture—10 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Overview of the importance of foreign animal diseases and the veterinary responsibilities associated with the prevention, detection and reporting of these diseases in the United States. —I. (I) Metola, Wetherill

451. Veterinary Bacteriology and Mycology (4.9) Lecture—34 sessions; laboratory—15 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Introduction to the clinical and subclinical aspects of bacterial and fungal agents of animal diseases. Specifically, each microorganism will be discussed with respect to overall significance to animal disease, structural and functional aspects including morphology, cellular composition, and products of medical interest. —I. (I) Lefebvre

452. General Pathology (3.1) Lecture—18 sessions; laboratory—13 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Basic principles of disease and in particular the fundamental mechanisms responsible for creating a disease situation. Illustrations of how the application of general pathological principles is used to determine disease pathogenesis and prognosis. —I. (I) Mahr

459. Systemic Pathology (5.8) Lecture—44 sessions; laboratory—14 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Basic understanding of the pathobiology of major organ systems relevant to a variety of animal species. Emphasis on mechanisms of injury, patterns of response to injury and on balance between damage and repair.—II. (II) Moore

460. Fundamentals of Clinical Orthopedics (1) Lecture—10 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine and consent of instructor. Fundamental concepts of veterinary orthopedics, including differentials of bone disease, diagnostics for bone disease, bone biomechanics, principles of fracture repair, applied joint anatomy, principles of joint disease, applied tendon and ligament anatomy, and principles of tendon and ligament disease.—I. (I) MacDonald

480. Senior Clinic (1.5) Clinical activity—60 hours. Prerequisite: fourth-year standing in School of Veterinary Medicine. Integration of knowledge and development of critical judgement and skills in the diagnosis, treatment, and prevention of animal disease. (Deferred grading only, pending completion of sequence. S/U grading only.)—I, II, III, IV. (I, II, III, IV) W.D. Wilson

Departmental Courses

Anatomy, Physiology and Cell Biology (APC)

Lower Division Courses

92. Internship (1-12) Internship—3-36 hours. Prerequisite: lower division standing; consent of instructor. Internship experience off and on campus in all subject areas offered in the Department of Anatomy, Physiology & Cell Biology. Internships are supervised by a member of the faculty. (P/NP grading only.)

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division Courses

100. Comparative Vertebrate Organology (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Science 1A and 1B or 2A and 2B. Functional anatomy of major organ systems in vertebrates. Each system examined from cellular to gross level in fish, birds, and mammals. Emphasis on how differentiated cell types are integrated into tissues and organs to perform diverse physiological functions. (Same course as Neurobiology, Physiology, and Behavior 123.) —II. (II) Werner

192. Internship (1-15) Internship—3-45 hours. Prerequisite: upper division standing. Approval of internship. Internship experience off and on campus in all subject areas offered
in the Department of Anatomy, Physiology and Cell Biology. Internships are supervised by a member of the faculty. May be repeated for credit if topic differs. (P/NP grading only.)

198. Directed Group Study (1-5) Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only.)

Graduate Courses

284. Ruminant Nutrition and Physiology (3) Lecture—27 sessions; laboratory—3 sessions. Prerequisite: graduate or first-year standing in School of Veterinary Medicine. Basic and applied aspects of ruminant nutrition and physiology, nutritional and metabolic disorders of ruminants. —III. (Ill.)

285. Morphometry of Cells, Tissues and Organs (2) Lecture—1 hour; laboratory—3 hours. Prerequisite: course 100 or the equivalent; Statistics 13. Stereological estimation of volumes, surfaces and lengths of organs/components; estimation of number of cells in an organ or tissue; their volumes, products and gene expression. Practical application of stereology and avoidance of most common biases of histological measurements. Offered in alternate years. —II. Hyde

286. Basics of Microscopy and Cellular Imaging (2) Lecture—1 hour; laboratory—2 hours. Prerequisite: graduate standing; consent of instructor. Practical applications of basic microscope techniques used to image cells and tissues with the goal of using these techniques to generate publication quality images. Principles of light, epifluorescent, confocal and electron microscopy, their applications and limitations. Restricted enrollment. Offered in alternate years. —III. Van Winkle

290. Seminar (1) Seminar—1 hour. Discussion and critical evaluation of advanced topics and current trends in research. (P/NP grading only)—I, II, III. (II, III)

291. Topics in Biology of Respiratory System (1) Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Topics concerning function and structure of respiratory system. Possible topics include: lung growth, pulmonary reaction to toxicants, pulmonary inflammation, lung metabolism, biology of lung cells, tracheobronchial epithelium, nasal cavity structure and function. May be repeated for credit. (S/U grading only)—I, II, III. (II, III, III) Hyde, Wu, Pinkerton

292. Topics in Neuroscience Research (1) Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Students will examine current topics in neuroscience research literature, as well as evaluate rationale, methods, results, interpretation of data, and relevance of possible topics. Possible topics include pain, autonomic nervous system, neuroendocrinology, neurotransmitter regulation of gene expression, neuroendocrine-immune interactions, stress. (S/U grading only)

298. Group Study (1-5) Laboratory—6-15 hours. Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12) Laboratory—6-36 hours. Prerequisite: consent of instructor. (S/U grading only.)

Professional Course

410. Equine Locomotor Anatomy (1.8) Lecture—9 sessions; laboratory—9 sessions. Prerequisite: concurrent attendance in the School of Veterinary Medicine. Normal anatomy of the equine fore and hind limb bones, joints, muscles, ligaments, tendons, nerves and vessels with emphasis on clinically applicable structures. —III. (Ill.) Stover

Medicine and Epidemiology (VME) Upper Division Courses

158. Infectious Disease in Ecology and Conservation (3) Lecture—3 hours. Prerequisite: Evolution and Ecology 101 or Environmental Science and Policy 100 or Veterinary Medicine 409 or equivalent. Introduction to the dynamics and control of infectious disease in wildlife, including zoonotic diseases and those threatening endangered species. Basic epidemiological models and application to field data. Scientific role in developing disease control policies. Offered in alternate years. —(II.) Foley

198. Directed Group Study (1-5) Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5) (P/NP grading only.)

Graduate Courses

217. Evaluation and Application of Diagnostic Tests (2) Lecture/discussion—17 sessions; laboratory—3 sessions. Prerequisite: consent of instructor; introductory courses in probability [e.g., Preventive Veterinary Medicine 402 or Statistics 102] and epidemiology [e.g., Preventive Veterinary Medicine 405 or Epidemiology 205]. A study of epidemiological principles beneficial but not essential to understanding technical material associated with diagnostic tests. Topics include sensitivity, specificity, predictive values, Bayes’ Theorem, ROC analysis, measuring agreement between tests, series and parallel testing strategies. Emphasis on rational evaluation, interpretation and presentation of test results for individuals and aggregates. Offered in alternate years. —III. Gardner

219. Clinical Experimental Design (3) Lecture—15 sessions. Prerequisite: biostatistics, ecology, epidemiology, experience in clinical medicine or microbiology recommended. Design and construction of experiments, hypothesis testing, exploratory data analysis, controls, influencing causation, and the performance of scientific research. Offered in alternate years. —II. Foley

258. Infectious Disease in Ecology and Conservation (1) Discussion—2 hours. Prerequisite: course 158 (must be taken concurrently). Presentation, analysis and discussion of principles of ecology on the dynamics and control of infectious disease in wildlife, including zoonotic diseases and those threatening endangered species. Multidisciplinary approach combines perspectives of ecology and veterinary medicine. Offered in alternate years. (S/U grading only)—II. Foley

290C. Research Group Conference (1) Conference—10 sessions. Prerequisite: consent of instructor; first, second- or third-year standing in the School of Veterinary Medicine. Current research topics relevant to veterinary clinical pharmacology. May be repeated two times for credit. (S/U grading only)—I, II, III. (II, III) Tell

294B. Conservation Biology and Veterinary Medicine (1) Seminar—10 sessions. Prerequisite: first, second- or third-year standing in the School of Veterinary Medicine or graduate or continuing standing. Current topics in conservation biology as they relate to veterinary medicine, wildlife population management and ecosystem health. May be repeated two times for credit if topic differs. (S/U grading only)—II. (II) Mazzet

298. Group Study (1-5) Prerequisite: student in School of Veterinary Medicine or consent of instructor. Group study in selected areas of the clinical sciences. (S/U grading only.)

299. Research (1-12) (S/U grading only.)

Professional Courses

401. Introduction to Ecosystem Health (1.0) Lecture—10 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Core principles and approaches for understanding ecosystem health with emphasis on relationships between environmental, animal and human health. Topics include ecosystem change and human/animal impacts, emerging infectious disease, wildlife zoonoses, ecotoxicology, and indicators of ecosystem health. —(I.) Johnson

410. Husbandry, Feeding and Management of Captive Animals (2) Lecture—20 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine. Introduction of husbandry and husbandry dynamics as a prerequisite for preventive health programs in zoos, aquaria, vivaria, and other environments for exotic pets and wild animals. —III. (Ill.) Tell

412. Laboratory Animal Medicine (2) Lecture—10 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. The role of an institutional laboratory animal veterinarian. Emphasis on the role of the attending veterinarian, mouse genetics, vivarium management, health monitoring programs, experimental design and animal models. —II. (II)

413. Medical Primatology (2) Lecture—20 sessions. Prerequisite: second- and third-year standing in School of Veterinary Medicine; consent of instructor. Major diseases, medical management and husbandry of non-human primates. Offered in alternate years. (S/U grading only)—III. (III) Lerche

415. Management and Diseases of Captive Wildlife (2) Lecture—20 sessions. Prerequisite: second- or third-year standing in the School of Veterinary Medicine. Introduction to the roles of a zoological veterinarian and the most common topics encountered. Emphasis on taxonomy, husbandry, preventive medicine and the most common diseases seen in common captive wildlife species. —I. (I) Wack

416. Diseases of Fish (2.1) Lecture—18 sessions; laboratory—3 sessions. Prerequisite: second- or third-year standing in the School of Veterinary Medicine. Etiology, pathology, diagnosis, treatment and prevention of diseases of fish. Preventive management of diseases in aquaculture and aquaria. Offered in alternate years. —III. Hedrick

417. Companion Avian Medicine (2) Lecture—20 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Diseases, diagnostic, medical management, surgery, avian husbandry and the most common avian diseases. —II. (II) Tell

419. Companion Exotic Small Animal Medicine and Surgery (3.4) Lecture—34 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. The etiology, clinical presentation, diagnostic evaluation, treatment, prevention, and control of medical diseases of companion small exotic mammals, amphibians and reptiles. —I. (I) Hawkins

424. Shelter Medicine (1) Seminar—10 sessions. Prerequisite: first, second- or third-year standing in the School of Veterinary Medicine. Shelter medicine is a newly emerging specialty in veterinary medicine building on the clever solutions and experience of hundreds of shelter veterinarians, managers, technicians, rescue and foster homes, and others, who have honed their skills in the trenches. (S/U grading only)—III. (III) Hurley

427. Introduction to Food Animal Herd Health (1.9) Lecture—17 sessions; laboratory—2 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine, core 463A and 463B (concurrently) or consent of instructor. Introduction to current problem solving concepts, approaches, and issues addressed in subsequent food animal medi-
481. Clinical Rounds (1) Discussion—10 sessions. Prerequisite: first- or second-year standing in the School of Veterinary Medicine or consent of instructor. Discussion of selected small and large animal cases from the Veterinary Medical Teaching Hospital. May be repeated once for credit. (S/U grading only).—I, II, (ill, II) W.D. Wilson

486. Equine Clinical Neonatology (1) Discussion—10 sessions. Prerequisite: first-, second- and third-year standing in the School of Veterinary Medicine. Discussion of methods of equine neonatal intensive care and disease pathophysiology in a case format. (S/U grading only).—Ill, (III, III) Madigan, Magdesian

487. Comparative Anatomy and Physiology of Non-Domestic Animals (2) Lecture—20 sessions. Prerequisite: first-, second- or third-year standing in the School of Veterinary Medicine. Comparative anatomy and physiology of non-domestic species, including native and free-ranging wildlife, exotic pets, laboratory animals, and species in apiculture, aquaculture, and viticulture. Basis for understanding husbandry, diseases, and other veterinary concerns of multiple taxa. (S/U grading only).—II. (ll) Larsen

493. Seminar in Veterinary Medicine (1) Seminar—2 hours. Prerequisite: professional standing; resident in Veterinary Medical Teaching Hospital. Seminars given by the faculty of the School of Veterinary Medicine in topics relating directly to the practice of clinical medicine and surgery. Residents will assist in the presentation of seminar material. May be repeated for credit. (S/U grading only).—I, II, III, (II, III, III)

494. International Programs Seminar (1) Seminar—10 sessions. Prerequisite: first, second, or third-year standing or MPVM standing in the School of Veterinary Medicine. Discussion by veterinarians around the world of aspects of veterinary medicine in their countries and regions, ranging from livestock to wildlife medicine to companion animal practice. May be repeated twice for credit. (S/U grading only).—II. (II) Tell

Molecular Biosciences (VMB) Lower Division Courses

92. Internship (1-12) Internship—3-36 hours. Prerequisite: lower division standing in consent of instructor. Work experience off and on campus in all subject areas offered in the Department of Molecular Biosciences. Internships supervised by a member of the faculty. (P/NP grading only)

Upper Division Courses

192. Internship (1-12) Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in all subject areas offered in the Department of Molecular Biosciences. Internships supervised by a member of the faculty. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5) (P/NP grading only)

Graduate Courses

247. Natural Toxics (2) Lecture—2 hours. Prerequisite: organic chemistry, Biological Sciences 102 and 103, or consent of instructor. Toxicity and metabolism of natural toxins with emphasis on the toxic plants present in the western United States. General pathways of metabo- lism plus discussion of the biochemical properties and biologic activity of natural toxins are discussed. Offered in alternate years. —III.

253. Metabolism of Toxics and Drugs (2) Lecture—2 hours. Prerequisite: Pharmacology and Toxicology 201, 202, or general biochemistry or consent of instructor. Significance/chemical pathways of toxics and drug metabolism, enzymology and molecular aspects of P450 and flavin monooxy- genases, hydrolases and phase 2 transferases and experimental approaches for metabolic studies. Offered in alternate years. —II. Buckpitt

254. Toxicology of the Respiratory System (3) Lecture—3 hours; discussion. Prerequisite: Pharmacology and Toxicology 201, 202, 203, or consent of instructor. Survey of structure and function of the respiratory system, the pathophysiology of major lung diseases, the interactions of toxics with the lung and response of the host to injury. Offered in alternate years. —II. Buckpitt

266. Mass Spectrometry in Biological Sciences: Basics, Applications and Computer Use (3) Lecture—22 sessions; discussion—7 sessions; laboratory—1 sessions. Prerequisite: Math 16C or equivalent, one year college chemistry or equivalent, one year college physics or equivalent; consent of instructor. Deliver working knowledge and communica- tion tools of mass spectrometry focusing on samples with biological origin: instrumentation, ionization technique selection, scanning techniques, signal detection, quantification and structure elucidation. Way of generating and understanding mass spectral information.—III. Lango

290. Seminar (1) Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Topics in nutrition, pharmacology/toxicology, and biochemistry. May be repeated for credit. (S/U grading only).—I, II, III, (I, II, III)

297. Tutoring in Graduate Molecular Biosciences (1-5) Prerequisite: graduate or professional student standing and consent of instructor. Assist in preparation and teaching of courses in Nutrition, Pharmacology and Toxicology, or other courses offered by the department under direct supervision of the instructor. Designed for graduate or professional students who desire teaching experience in graduate courses. May be repeated up to 5 units of credit. (S/U grading only).—I, II, III, (II, III)

298. Group Study (1-5) (S/U grading only).—I, II, III, IV, (I, II, III, IV)

299. Research (1-12) (S/U grading only)

Professional Courses

397. Tutoring in Molecular Biosciences (1-5) Discussion—1.5 hours. Prerequisite: graduate or professional standing and consent of instructor. Experience in professional curriculum for graduate or professional students, not teaching assistant, under direct supervision of instructor. May be repeated up to 5 units of credit (S/U grading only).—I, II, III, (II, III, III)

475. Case Studies in Large Animal Clinical Toxicology (1.5) Discussion—15 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Clinical systematic approach to poisoning problems in horses, cattle, sheep, goats, lamoids and other live- stock emphasizing their diagnosis and treatment.—I. (I) Puschner

480. Case Studies in Small and Exotic Animal Clinical Toxicology (1.5) Discussion—15 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Clinical systematic approach to poisoning problems in small and exotic animals emphasizing diagnosis and treatment. —II. (II) Jandrey, Poppenga

485. Advanced Clinical Nutrition (2) Lecture—14 sessions; laboratory—1 session; discussion—4 sessions; project. Prerequisite: third-year standing in the School of Veterinary Medicine or consent of instructor. Advanced training in the princi- ples and application of small animal clinical nutrition. (S/U grading only).—I. (I) Facelli

Pathology, Microbiology, and Immunology (PMI)

Lower Division Course

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only)

Upper Division Courses

101. Comparative Hematology (2) Lecture—2 hours. Prerequisite: Biological Sciences 1A, 1B, Neurobiology, Physiology, and Behavior 101, Biological Sciences 102; or consent of instruc- tor. An overview of the production, function and mor- phology of vertebrate blood cells, their alteration in health and disease, and the basic principles of labo- ratory testing in hematology. For students interested in medical technology or animal health. Offered in alternate years.

126. Fundamentals of Immunology (3) Lecture—3 hours. Prerequisite: Biological Sciences 102 or the equivalent or consent of instructor. Over- view of immunology including components of the immune system, initiation and regulation of the immune response, infection and immunity, hypersen- sitivity and immune dysfunction. Clinical immuno- logic techniques, immunodeficiency and vaccinology.—II. (II) Stott

126L. Immunology Laboratory (2) Laboratory—6 hours. Prerequisite: course 126 or the equivalent (may be taken concurrently). Laboratory procedures in clinical immunology. Laboratory ani- mal immunization/bleeding. Quantitative and quali- tative characterization of the immune response. Cells of the immune system.—II. (II) Stott

127. Medical Bacteria and Fungi (5) Lecture—3 hours; laboratory—5 hours. Prerequisite: general microbiology (Microbiology 102 and 102L), basic immunology (course 126 or Medical Microbiology 188). An introduction to the bacterial and mycotic pathogens of man and animals, with emphasis on pathogenic mechanisms and ecologic aspects of infectious disease.—III. LeFevre

128. Biology of Animal Viruses (3) Lecture—3 hours. Prerequisite: Biological Sciences 102. Fundamental physical and chemical properties of animal viruses, methods of propagation, purification and assay. Mechanisms of viral replication and pathogenesis of viral infections in man and animals. Immunity to virus diseases and oncogenic properties of animal viruses. Two units of credit to students who have completed Microbiology 162. —I. (I) Miller

198. Directed Group Study (1-5) Prerequisite: consent of instructor. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5) (P/NP grading only)

Graduate Courses

250. Philosophy and Ethics of Biomedical Science (1) Seminar—1 hour. Prerequisite: graduate-level stand- ing. Presentations by faculty and guest speakers fol- lowed by discussions of relevant current events by graduate students. (S/U grading only).—II, (III, III) Gallow-

270. Advanced Immunology (3) Lecture—3 hours. Prerequisite: introductory course in immunology. Current concepts in lymphocyte biol- ogy, antigenity, cooperation, functional attributes and protective immune response(s), mechanisms of immunologic disease, immunologic unresponsiveness and host evasion mechanisms of viral, bacte- rial, and parasitic pathogens. Strategies in immunomodulation and immunotherapy. Advanced methodologies in immunologic research. Offered in alternate years. —II. (II) Stott

Quarter Offered: I=Fall, II=Winter, III=Spring, IV=Summer; 2009-2010 offering in parentheses

General Education (GE) credit ArtHum—Arts and Humanities, SciEng—Science and Engineering, SocSci—Social Sciences, Div—Social-Cultural Diversity, Wrt—Writing Experience
275. Comparative Pathology of Organ Systems (4)
Lecture—3 hours; laboratory/discussion—2 hours. Prerequisite: graduate level standing and consent of instructor. Correlative alterations in structure and function of organ response to injury presented in context of normal and disease states. Emphasis on general responses to disease in both humans and animals. Introductory material on the mechanisms of virial, bacterial and parasite pathogenesis.—I. (I) Alffaldt

280A. The Mouse as an Experimental Model for Human and Animal Diseases I (3)
Lecture—3 hours. Prerequisite: undergraduate level standing in the biological sciences, first, second, or third-year standing in the School of Veterinary Medicine, or prior experimental modeling experience. Offered in graduate standing and consent of instructor. Ten lectures: broad exposure to animal modeling in veterinary medicine and the importance of non-human animal models. Current technologies in establishment and evaluation of mouse models.—III. (III) Wasson

280B. The Mouse as an Experimental Model for Human and Animal Diseases II (3)
Lecture—3 hours. Prerequisite: course 280A. Mice as models in biomedical research. Emphasis on mouse genetics, experimental pathology, immunology, physiology and other uses of experimental mouse models. Current technologies in establishment and evaluation of mouse models.—III. (III) Wasson

283. Comparative Avian Anatomy and Pathobiology (1-3)
Lecture—3 hours. Prerequisite: Anatomy section [1 unit]: upper division undergraduate standing, veterinary students, or graduate standing, and consent of instructor. Pathology section: third- or fourth-year standing in the School of Veterinary Medicine or graduate standing and consent of instructor. Ten lectures: overview of avian anatomy and disease manifestations for students interested in avian biology. The remaining 20 lectures encompass comparative aspects of avian pathobiology and disease manifestations for students interested in avian diseases.—I. (I) Lowestine

285. Cellular Basis of Disease (3)
Lecture—3 hours. Prerequisite: Biological Sciences 104, Veterinary Medicine 452, course 275, or Medical Pathology 210. Application of cell biology, biochemistry and molecular biology to the understanding of the basic nature of disease. Cellular injury and mechanisms of adaptation, host-defense and vascular responses, and cellular transformation. Offered in alternate years.—II. (II) Wu

287. Comparative Pathology of Laboratory Animals (3)
Lecture—3 hours. Prerequisite: general and systemic pathology; second-, third-, or fourth-year standing in the School of Veterinary Medicine or graduate student standing, or consent of instructor. Recognition of lesions and understanding of pathogenesis of diseases of animals commonly kept in laboratory settings. Species covered include rodents, lagomorphs, amphibians, nonhuman primates, genetically manipulated animals and novel animal models. Offered in alternate years.—III. (III) Lowestine

290. Seminar (1)
Seminar—1 hour. Prerequisite: graduate level standing. Topics in pathology, microbiology or immunology. May be repeated for credit. (S/U grading only.) I, II, IV. (I, II, IV)

291A. Seminar in Immunology (1)
Seminar—1 hour. Prerequisite: course 126 or the equivalent. Students choose topic for each quarter. Individual or pairs of students choose a paper for all to read and present a seminar based on the subject of the paper. All students participate in discussion. May be repeated for credit. (S/U grading only.) I, III, (I, III) Gerwin

292A. Seminar in Animal Virology (1)
Seminar—1 hour. Prerequisite: graduate-level standing or consent of instructor. Discussion of the current topics in animal virology. (Same course as Microbiology 290.) I, III. (I, II, III) Munsen

292B. Surgical Pathology Conference (1)
Discussion—1 hour. Prerequisite: graduate student standing or consent of instructor. Diagnosis and discussion of current surgical pathology cases based on clinical records and microscopic study. May be repeated for credit. (S/U grading only.) I, II, III, IV. (I, II, III, IV) Munsen

293A. Seminar in Infectious Diseases (1)
Seminar—1 hour. Prerequisite: current enrollment in health science professional school or graduate standing in biological sciences. Discussion of current topics and cases of infectious diseases. May be repeated one time for credit if topic differs. (S/U grading only.) I, II, III, IV. (I, II, III, IV) Byrne

293b. Necropsy and Surgical Pathology (2-4)
Laboratory—6-12 hours. Prerequisite: graduate student standing and consent of instructor. Responsible diagnostic casework. Performance of necropsies, slide reading, and case reporting. May be repeated for credit. (S/U grading only.) I, II, III, IV. (I, II, III, IV) Munson

296. Microbiological Diagnosis (2-5)
Laboratory—5-14 hours; discussion—1 hour. Prerequisite: laboratory course in veterinary medical microbiology or equivalent or consent of Chief of Microbiology, VM Teaching Hospital. Laboratory diagnosis of infectious diseases involving case work at the VM Teaching Hospital. (S/U grading only.) I, II, III, IV. (I, II, III, IV) Byrne

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)

Professional Courses

418. Health and Disease in Terrestrial Wildlife (2)
Lecture—20 sessions. Prerequisite: first-, second-, or third-year standing in the School of Veterinary Medicine or consent of instructor. Ecology and epidemiology of disease in free-ranging terrestrial wildlife. Offered in alternate years. (S/U grading only.) I, II, III, IV. (I, II, III, IV) Ziccardi

419. Field Techniques for Assessment of Wildlife and Ecosystem Health (2)
Fieldwork—7 sessions. Prerequisite: first-, second-, third-year or MPMV standing in the School of Veterinary Medicine or consent of instructor. Introduction to the concepts and technical skills necessary to conduct field studies pertaining to wildlife/ecosystem health. Emphasis will be on Southern California ecosystem. Limited enrollment. (S/U grading only.)—I, II, III, IV. (I, II, III, IV) Ziccardi

476. Comparative Pathology of Non-Mammalian Vertebrates (2)
Lecture—20 sessions. Prerequisite: second- or third-year standing in the School of Veterinary Medicine or consent of instructor; Medicine and Epidemiology 410, 487. Mechanisms of disease in non-mammalian vertebrates (fish, amphibians, reptiles, and birds) that differ from mammalian species including tissue response to injury, repair and neoplasia. Gross lesions and microanatomic reflecting non-mammalian vertebrates. (S/U grading only.)

Population Health and Reproduction (PHR)

Lower Division Course

92. Internship in Veterinary Science (1-4)
Discussion/laboratory—1-4 hours; clinic—3-36 hours; final report. Prerequisite: approval of project prior to period of internship by faculty sponsor. Supervised work experience in reproduction. (P/NP grading only.)

Upper Division Courses

106. Human-Animal Interactions: Benefits and Issues (2)
Lecture—9 sessions; discussion—9 sessions; laboratory—1 session. Prerequisite: upper division standing or consent of instructor. The contributions of animals to human society, including historic, anthropologic, developmental, human health and therapeutic perspectives, as well as effects of humans on animals. One field trip required.—II. (II) Hart

111. Food Animals and the Public’s Health (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1 or consent of instructor. Causes, prevention, and control of animal diseases and zoonoses in domestic agriculture and in public health, with emphasis upon animal management factors in disease.—II. (II) Moore

192. Internship in Veterinary Science (1-12)
Discussion/laboratory—1-12 hours; clinic—3-36 hours; final report. Prerequisite: upper division standing; approval of project prior to period of internship. Supervised work experience in Reproduction. May be repeated for credit. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate Courses

202. Sampling in Health-Related Research (3)
Lecture—3 hours. Prerequisite: Preventive Veterinary Medicine 403 or the equivalent; consent of instructor. A very thorough coverage of simple random sampling, stratified sampling, cluster sampling, systematic sampling and other sampling methods applied extensively in epidemiology and other health-related disciplines. Emphasis on application of the sampling methods. Offered in alternate years.—II. (II) Farver

203. Multivariate Biostatistics (3)
Lecture—3 hours. Prerequisite: Preventive Veterinary Medicine 403 and the equivalent; consent of instructor. Multivariate procedures covered are principal component analysis, factor analysis, Two-group and k-group multivariate analysis, discriminant analysis, regression, Two-group and k-group discriminant analysis and repeated measures analysis, cluster analysis, and canonical analysis. Emphasis is on application of procedures. Offered in alternate years.—II. (II) Farver

212. Epidemiology of the Zoonoses (4)
Lecture—35 sessions; discussion—5 sessions. Prerequisite: graduate standing or third-year standing in the School of Veterinary Medicine. ANOVA, multivariate analysis of variance, multiple regression. Epidemiological, biological and ecological features of some major infections shared by humans and other animals. Wildlife and domestic animals, zoones of major health and economic significance are presented to illustrate how knowledge of zoonoses epidemiology is essential for implementing control measures.—II. (II) Chomel

213. Food Safety (1)
Lecture—10 sessions. Prerequisite: graduate standing or consent of instructor. Food-borne disease hazards from producer to consumer; types and causes of food-borne illness; measures for prevention of food-borne disease and enhancement of food safety.
214. Vector-Borne Infectious Diseases: Changing Patterns (2)
Lecture—2 hours. Prerequisite: Open to graduate students, MPVM and MPH students, DVM and medical students with second- or third-year standing. Open to upper division undergraduate students with consent of instructor. Vector-borne infectious diseases especially as they relate to changing patterns associated with climatic changes, trade and population movement. [Same course as Entomology 214.].—I. (I.) Chomel

220. Avian Medicine (3)
Lecture—3 hours. Prerequisite: second-year standing or MPVM standing in the School of Veterinary Medicine. Prevalence and immunology 127 or second or third-year standing in graduate students, MPVM and MPH students, DVM and medical students with second- or third-year standing. Ongoing development of avian disease processes. Normal structure of the avian immune system, a quick review of basic immunology, comparison between mammalian and avian immune systems and genetics of immune responses, immunodiagnosis and vaccination.

225. Preventive Avian Medical Practice (3)
Lecture—3 hours. Prerequisite: first-, second-, third-year, or MPVM standing in the School of Veterinary Medicine or consent of instructor. Economic structure of breeder, commercial egg and turkey industries, delivery of preventive veterinary medical services within these industries. Specific prevention, eradication programs pertaining to diseases of economic importance are covered. Environmental, OSHA, regulatory and agrotobusiness.

232. Advanced Reproductive Biology (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Genetics 210A, 210C or equivalents, with consent of instructor. In-depth study of topics in canine genetics and genomics. Topics will vary, but may include mental health, whole genome association, complex traits and linkage disequilibrium. Students will lead discussions on assigned readings. May be repeated for credit when topic differs. Limited enrollment.—II. (II.) Bannasch

Lecture—2 hours; discussion—0.5 hours; laboratory—0.5 hours. Prerequisite: undergraduate genetics and ecology/conservation biology courses recommended. Introduction to the field of applied ecological genetics, physiological and behavior 121 and 123; graduate standing or consent of instructor. Examination of or challenge to established and emerging concepts at the molecular, cellular and organismal levels. Reproductive development, the male, the non-pregnant female and the pregnant or senescent female. Offered in alternate years.—III. (III.) Conley

241. Advances Topics in Canine Genetics and Genomics (2)
Discussion—2 hours. Prerequisite: Genetics 201A, 201C or equivalents, with consent of instructor. In-depth study of topics in canine genomics. Topics will vary, but may include positional cloning, whole genome association, complex traits and linkage disequilibrium. Students will lead discussions on assigned readings. May be repeated for credit when topic differs. Limited enrollment.—I. (I.) Bannasch

266. Applied Analytic Epidemiology (3)
Lecture—2 hours; laboratory—2 hours. Prerequisite: Preventive Veterinary Medicine 404 or consent of instructor. Principles and applications in analysis of epidemiologic data. Methods of analyzing stratified and matched data, logistic regression for cohort and case-control data, survival-time methods. [Same course as Master of Public Health 266.].—III. (III.) Kass

290A. Seminar (1)
Seminar—1 hour. Discussion of current topics in animal reproduction and medicine, as well as preparation for presentation of research findings by graduate students and faculty. May be repeated for credit. (S/U grading only).—II, III, (I, II, III) Ball

290C. Current Topics in Avian Medicine (1)
Seminar—1 hour. Prerequisite: consent of instructor. Topics from the current literature in avian medicine will be assigned to students for discussion and interpretation. May be repeated for credit.—I, III, (I, II, III, III) Ball

292. Current Topics in Reproduction (1)
Seminar—1 hour. Prerequisite: consent of instructor. Discussion of current scientific literature in reproduction, as well as presentation of research findings by graduate students and faculty. (S/U grading only).—II, III, (I, II, III, III) Ball

298. Group Study (1-5)
Prerequisite: consent of instructor.

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only)

Professional Courses

406. Human-Animal Interactions in Veterinary Science (1)
Lecture—9 sessions; laboratory—1 session. Prerequisite: first-, second-, or third-year standing in the School of Veterinary Medicine. Human relationships with companion animals, and, secondarily, food, laboratory, and wild animals. Emphasis on the perspective of veterinarians and their clients’ needs. Emphasis on the benefits of companion animals for human mental and physical wellbeing, the role of animals in the human life cycle, societal traditions in keeping animals, and types of specialized and more typical relationships with animals.—II. (II.) Hart

408. Behavior and Biology of Mice as Domestic Animals (1)
Lecture—10 sessions. Prerequisite: first, second, or third-year standing in the School of Veterinary Medicine. Animal behavior observed under laboratory, and behavioral and scientific studies. Laboratory mouse biology and welfare, including the development and purposes of specialized strains of mice, constraints for their care and environmental enrichment, legislation and regulation, and the human benefits of their use.—II. (II.) Hart

409. Animal Health Policy (1)
Lecture—8.5 hours; laboratory—7 hours; discussion—3 hours. Prerequisite: consent of instructor; MPVM standing in the School of Veterinary Medicine. Focus on the interactions between science, opinion, legislation, and regulation that result in our current animal health policy. Involves cases from the animal health industry and regulatory agencies. [S/U grading only].—II. (II.) Klingborg

420. Zoones of Non-Human Primates (2)
Lecture—20 sessions. Prerequisite: second- or third-year standing in the School of Veterinary Medicine. Epidemiological, clinical, and biological features of zoonoses of non-human primates. Emphasis given to major zoonoses which are threatening to human health and their transmission. Focus also on management of non-human primates in research, zoological gardens and in the wild. Offered in alternate years.—II. (II.) Chomel

429D. Dairy Herd Health Management (4)
Lecture—40 sessions. Prerequisite: Medicine and Epidemiology 427, 463A, 463B, 463C, third-year standing in School of Veterinary Medicine, or consent of instructor. Practical systems for delivering veterinary services to dairy farms with emphasis on disease prevention and improved herd performance. Offered in alternate years.—III. (III.) Cullor

429D. Dairy Herd Health Management Laboratory (0.6)
Laboratory—6 sessions. Prerequisite: third-year standing in School of Veterinary Medicine, course 429D concurrently or consent. Review of systems for delivering veterinary services to dairy farms with emphasis on disease prevention and improved herd performance. Field trips and computer laboratories to practice skills in animal observation, facilities observation and use of the computer for nutrition services and dairy records analysis. (S/U grading only).—III. (III.) Cullor

429D. Dairy Goat Health Management Laboratory (0.6)
Laboratory—10 sessions. Prerequisite: Medicine and Epidemiology 427, 463A, 463B, 463C, third-year standing in School of Veterinary Medicine, or consent of instructor. The application of problem-solving and epidemiologic methods to dairy goat diseases and their control.—III. (III.) Rowe

432. Reproductive Technology in Mammals and Birds (0.8)
Lecture—5 sessions; discussion—2 sessions. Prerequisite: first-year standing in the School of Veterinary Medicine or consent of instructor. Introduction to the application of technology to the reproductive process in mammals and birds. Emphasis on domestic animals, but birds and farm animals also discussed. Exposure of students to some of the “sexier” aspects of population/ reproduction management. (S/U grading only) —III. (III.) Chebel

432L. Reproductive Technology in Mammals and Birds, Laboratory (0.2)
Laboratory—2 sessions. Prerequisite: course 432 concurrently, first-year standing in the School of Veterinary Medicine or consent of instructor. Laboratory demonstrations and exercises in gamete freezing, thawing, and handling, artificial insemination of cattle, artificial insemination and other applications of reproductive technology in small ruminants. (S/U grading only) —III. (III.) Chebel

440. Ruminant Clinical Nutrition (1.9)
Lecture—19 sessions. Prerequisite: Veterinary Medicine 408, second- or third-year standing in the School of Veterinary Medicine or consent of instructor. Nutritional related disorders in ruminants with a herd basis approach. Nutritional related disorders that affect modern cattle production. Emphasis on understanding the problem and preventing it through nutritional management. —I. (I.) Bebel

442. Equine Theriogenology (2)
Lecture—20 sessions. Prerequisite: third-year standing in School of Veterinary Medicine; consent of instructor. Discussions of abnormal conditions and physiologic function in equine reproduction with emphasis on methods of diagnosis and interpretation of clinical and laboratory findings associated with the abnormalities.—I. (I.) Ball

444. Animal Food Theriogenology and Reproductive Pathology Laboratory (1)
Laboratory—10 sessions. Prerequisite: third-year standing in School of Veterinary Medicine. Hands-on diagnosis and implementation of techniques related to reproductive examination in small ruminants, swine and goats. Assessment of, and interventions for nutrition services and dairy records analysis. (S/U grading only) —III. (III.) Chomel

445. Food Animal Theriogenology and Reproductive Pathology (4)
Lecture—20 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine or consent of instructor. Physiological, pathophysiological, and management factors affecting the reproductive health and performance of food animals, with emphasis on dairy, beef cattle, and sheep. Minor emphasis on swine and goats. Assessment of, and intervention strategies for, herd reproductive performance.—II. (II.)
445L. Food Animal Theriogenology Laboratory (1) Lecture—10 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine, course 445 concurrently or consent of instructor. Obstetrical and gynecological diagnosis and treatment for food animals; breeding soundness examination of males; analysis and on-farm use of computerized reproductive records; embryo technology. (S/U grading only)—II. (II.)

446A. Food Animal Reproduction (1) Lecture—6 sessions; laboratory—4 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Approved for graduate degree credit. Conditions affecting the reproductive system in the cow, sow, ewe, and goat, with emphasis on symptomatology, pathophysiology, treatment, control, prevention, and herd health applications. —III. (III.) Rowe

446B. Equine Reproduction (1) Lecture—2 sessions; laboratory—4 sessions. Prerequisite: consent of instructor; second-year standing in the School of Veterinary Medicine. Introduction to clinical and laboratory reproduction with emphasis on methods of diagnosis and the interpretation of clinical and laboratory findings. —III. (III.) Bon-Durant

446C. Non-Domestic Reproduction (1) Lecture—10 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Follows course 446A. Study relating to reproduction in nondomestic mammals, birds, and reptile species. Concepts relating to the evaluation of reproductive status, diagnosis of infertility, assisted reproduction and contraception will be presented. —II. (III.) Bon-Durant

450. HACCP & Risk Assessment in Pre and Postharvest Food Safety (3) Lecture/discussion—3 hours. Prerequisite: first, second, or third-year standing in the School of Veterinary Medicine; Master of Public Health students, advanced undergraduate and graduate students from Food Science and Animal Science or consent of instructor. Application of the Hazard Analysis-Critical Control Point (HACCP) system in the food industry, for regulatory agencies; and in the preharvest area of food production. Development of HACCP plans. (S/U grading only)—II. (II.) Clever, Hajmeier

452. On-Farm Food Safety/Veterinary Public Health (2) Lecture—20 sessions. Prerequisite: Master of Preventive Veterinary Medicine (MPVM) students or consent of instructor. The organizations and regulations responsible for ensuring food safety, pathogens that may be on the farm and cause public health concerns, management issues that affect animal health, and key topics regarding environmental health relating to animal agriculture. —III. (III.) Chomel, Collar

457. Veterinary Practice Management (2) Lecture—6 sessions. Prerequisite: first, second, and third-year standing in the School of Veterinary Medicine or consent of instructor. Information essential to the successful management of a veterinary practice. Topics include business management, medical recordkeeping, money management, business and personal insurance, client relations and tax law. (S/U grading only)—III. (III.) Klingborg

483. Pet Loss Support Hotline and End of Life Issues (2) [A] Discussion/laboratory—3-6 hours. Prerequisite: first, second, or third-year standing the School of Veterinary Medicine. Training and experience in addressing end-of-life issues for companion animals, including hospice, decision-making and pet loss support. Responding to pet loss hotline callers who are anticipating or experiencing the end of a relationship with a beloved companion animal. Communication skills, especially supportive listening, and referral to community resources. (S/U grading only)—I, II, III. (I, II, III) Hart

Preventive Veterinary Medicine (MPM)

Professional Courses

402. Medical Statistics I (4) Lecture—3 hours; laboratory—2 hours. Prerequisite: MPVM standing in the School of Veterinary Medicine or consent of instructor. In clinical, laboratory and population medicine: graphical and tabular presentation of data; probability, binomial, Poisson, normal, t-, F-, and Chi-square distributions; elementary parametric methods; simple linear regression and correlation; life tables. Microcomputer applications of statistical procedures in population medicine.—IV. (IV.) Farver

403. Medical Statistics II (4) Lecture—3 hours; laboratory—2 hours. Prerequisite: MPVM standing in the School of Veterinary Medicine and/or successful completion of course 402 (or equivalent) or consent of instructor. Continuation of course 402. Analysis of variance in biomedical sciences; nonparametric methods; multiple regression; biomedical applications of statistical methods. Microcomputer applications to reinforce principles that are taught in class. —II. (II.) Farver

404. Medical Statistics III (4) Lecture—3 hours; laboratory—2 hours. Prerequisite: MPVM standing in the School of Veterinary Medicine and/or successful completion of course 403 (or equivalent) or consent of instructor. Continuation of course 403. Analysis of time dependent variation and trends, analysis of multiway frequency tables; logistic regression; survival analysis selecting the best regression equation; biomedical applications. —II. (II.) Farver

405. Principles of Epidemiology (4) Lecture—4 hours. Prerequisite: course 402 or consent of instructor. Basic epidemiologic concepts and approaches to epidemiologic research with emphasis on the role of epidemiology and medical and public health. Emphasis on data quality and design of data applications. Specific topics include library fundamentals and managing human resources for project management, data collection, organization, storage, analysis and communication. Limited enrollment.—IV. (IV.)

426. Applied Epidemiologic Problem Solving (1.5) Laboratory—10 sessions. Prerequisite: MPVM standing in the School of Veterinary Medicine or consent of instructor. Integration of epidemiologic and statistical methodology in a problem-solving approach to contemporary animal population health issues. Data validation and manipulation, descriptive statistical analysis using spreadsheets, database management, and Epi Info software. Builds on skills learned in courses 403L and 406.—II. (II.) Gardner

Surgical and Radiological Sciences (VSR)

Lower Division Course

99. Special Study for Undergraduates (1-5) (P/NP grading only)

Upper Division Course

199. Special Study for Advanced Undergraduates (1-5) (P/NP grading only)

Graduate Courses

298. Group Study (1-5) Prerequisite: consent of instructor. (S/U grading only)

299. Research (1-12) Prerequisite: consent of instructor. (S/U grading only)

Professional Courses

400. Equine Radiographic Anatomy (1) Autotutorial—1 hour. Prerequisite: first, second, or third-year standing in the School of Veterinary Medicine. Self-study of the radiographic anatomy displayed on the standard radiographic projections of the musculoskeletal system of the horse. (S/U grading only)—I, II, III. (I, II, III) Wisner

401. Small Animal Radiology Case Discussions (1) Discussion—10 sessions. Prerequisite: first, second, or third-year standing in the School of Veterinary Medicine. The role of diagnostic radiology in the clinical setting and student interpretation of radiographs. May be repeated one time for credit. (S/U grading only)—I, II, III. (I, II, III) Spriet

402. Large Animal Radiology Case Discussions (1) Discussion—10 sessions. Prerequisite: first, second, or third-year standing in the School of Veterinary Medicine. The role of diagnostic radiology in the clinical setting and student interpretation of radiographs. May be repeated one time for credit. (S/U grading only)—I, II, III. (I, II, III) Spriet

404A. Small Animal Radiology (2.9) Lecture—17 sessions; discussion—12 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine and consent of instructor. Registration in course 404A is required at the begin-
512 Veterinary Medicine, School of

rning of both winter and spring quarters for this two quarter course. Students may audit the course, but retroactive adds after the examination has been administered at the end of each quarter are not allowed. Course 404A is required for students who intend to rotate with Small Animal Radiology Service during their senior year. Introduction to radiographic interpretation as it relates to musculoskeletal, thoracic, and abdominal disorders of small animals. Also examination of the examination as practiced in interpreting radiographic patterns described in lecture. (Deferred grading only, pending completion of sequence.)—II, III, IV, (II, III, IV) Zwingenberger

404B. Large Animal Radiology (1.6) Lecture—12 sessions; discussion—4 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Radiographic manifestations of common equine orthopedic, upper airway and thoracic diseases. Common radiographic abnormalities in non-equine large animal patients. Equine and other large animal radiographic pattern recognition and differential diagnosis generation based on the identification of patterns. (II) Fucalski

405. Advanced Small Animal Abdominal Ultrason (2.1) Lecture—7 sessions; discussion—1 session; laboratory—2 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Ultrasound imaging principles.—I (II) Pollard

406. Small Animal Diagnostic Ultrasound (1) Lecture—7 sessions; discussion—1 session; laboratory—2 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine. Ultrasound imaging principles.—I (II) Pollard

407R. Comparative Dentistry and Oral Surgery (2) Discussion—2 hours. Prerequisite: residents in the Veterinary Medical Teaching Hospital; graduate students, veterinarians enrolled in training programs leading to board certification in veterinary dentistry, AVDC Diplomates and dentists with consent of instructor. Review of current literature pertaining to comparative oral biology, surgery and medicine and related basic sciences; half of sessions based on topics assigned to resident while other half consist of critical reviews of recent papers chosen by the participants. May be repeated once for credit. (S/U grading only)—I, II, III, IV, (II, III, IV) Verstraete

409R. Known Case Conference—Imaging (1.5) Discussion—15 sessions. Prerequisite: resident status in the Veterinary Medical Teaching Hospital; consent of instructor. Film review of current and past Veterinary Medical Teaching Hospital proven cases. Intended for radiology residents and others with background in diagnostic imaging. May be repeated three times for credit. (S/U grading only)—I, II, III, IV, (II, III, IV) Wisner

411R. Small Animal Orthopedics Conference (0.9) Discussion—9 sessions. Prerequisite: resident status in the Veterinary Medical Teaching Hospital; consent of instructor. Film review of current and past veterinary medicine, School of veterinary medicine. Introduction to the principles of oral examination, pathophysiology and treatment of periodontitis, exodontics, basic oral soft tissue surgical procedures, orthodontics, developmental and regressive dental conditions, endodontics, prosthodontics, advanced periodontal therapy, oral medicine and advanced oral surgery. (Deferred grading only, pending completion of sequence. S/U grading only)—II, III, (II, III) Verstraete

413L. Small Animal Dentistry Lab (0.3) Lab—3 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine; concurrent enrollment in course 413L; consent of instructor. Principles of oral examination, goals of examination, routine peri- odontal treatment and dental extraction techniques. (Deferred grading only, pending completion of sequence. S/U grading only)—II, III, IV, (II, III) Verstraete

415. Small Animal Orthopedics (1.5) Lecture—13 sessions; laboratory—2 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Common conditions of small animal lameness and basic principles of small animal traumatology.—III. (II) Kapatin

416. Equine Ultrasound (1) Lecture—8 sessions; discussion—2 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine and consent of instructor. Familiarize students with ultrasonographic diagnostic methodology and with ultrasonic features of common diseases of the major equine organ systems.—III. (II) Whitcomb

416L. Equine Ultrasound Lab (0.4) Laboratory—4 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine, concurrent enrollment in course 416L. Familiarize students with ultrasonographic diagnostic methodology and with ultrasonic features of common diseases of the major equine organ systems.—III. (II) Whitcomb

418R. Topics in Surgery/Oncology (0.4) Discussion—4 sessions. Prerequisite: resident status at the Veterinary Medical Teaching Hospital; consent of instructor. Discussion of topics relevant to surgery and oncology with special focus on new treatments, recommendations, and modalities. May be repeated up to 16 times for credit. (S/U grading only)—II, III, IV, (II, III, IV) Kent, MacLeod

423. Diagnostic Ophthalmology (1.5) Lecture—15 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine or consent of instructor; successful completion of Veterinary Medicine 422. The pathogenesis and diagnosis of commonly encountered eye diseases of common domestic animals.—II, III, (II, III, IV) Kent, MacLeod

424. Clinical Veterinary Oncology (1) Lecture—10 sessions. Prerequisite: second-year standing in the School of Veterinary Medicine; consent of instructor. The internal medicine subspecialty of oncology. Clinically pertinent considerations and basic tenants of tumor biology. (S/U grading only)—I, II, (II, III, IV) Kent

425R. Veterinary Cancer Biology: Clinical Applications (1) Discussion—10 sessions. Prerequisite: resident status in the Veterinary Medical Teaching Hospital; consent of instructor. Survey of contemporary literature regarding the clinical management of important tumors in domestic animals and focus on diagnosis and treatment. (S/U grading only)—I, II, III, IV, (II, III, IV) Kent

426. Veterinary Cancer Biology: Mechanisms of Disease (1) Discussion—10 sessions. Prerequisite: resident status in the Veterinary Medical Teaching Hospital; consent of instructor. Survey of contemporary literature regarding the biology of cancer with particular reference to mechanisms underlying tumorigenesis in domestic animals. (S/U grading only)—I, II, III, IV, (II, III, IV) Kent

432M. Advanced Veterinary Neurosurgery Conference (1) Seminar—4 hours. Prerequisite: resident status in the Veterinary Medical Teaching Hospital or consent of instructor. Lectures/discussions/literature reviews of diagnostic and treatment modalities of neurologic diseases of animals to include relevant neurologic and neurosurgical topics from human medicine. May be repeated for credit up to 12 times for 24 units of credit. (S/U grading only)—I, II, III, IV, (II, III, IV) Sturgeon, Vernau

432R. Advanced Veterinary Neurosurgery Seminar (1.5) Lecture/laboratory—15 sessions. Prerequisite: resident status in Small Animal Surgery or Neurology/Neurosurgery in the Veterinary Medical Teaching Hospital or consent of instructor. Overview of the diagnosis and treatment of neurological disease in small animals with an emphasis on neurosurgery. Laboratory sessions allow residents to develop familiarity with anatomical landmarks and the neurosurgical skills. May be repeated six times for credit. (S/U grading only)—I, II, III, IV, (II, III, IV) Maggs, Hollingsworth

435. Clinical Neuroradiology (1) Seminar—1 hour. Prerequisite: resident status at the Veterinary Medical Teaching Hospital or consent of instructor. Case discussions and review of neuroradiology and neuromuscular diseases. May be repeated twelve times for credit. (S/U grading only)—I, II, III, IV, (II, III, IV) Gandara

442L. Advanced Small Animal Emergency/Critical Care Physiology Rounds (3) Seminar—3 hours. Prerequisite: resident status at the Veterinary Medical Teaching Hospital; consent of instructor. Review of physiology and topics pertinent to small animal emergency and critical care. May be repeated twelve times for credit. (S/U grading only)—I, II, III, IV, (II, III, IV, IV) Burkitt

450R. Veterinary Ophthalmology Slide Review (1) Discussion—1 hour. Prerequisite: resident in Veterinary Medical Teaching Hospital Ophthalmology program or consent of instructor. Review and critical evaluation of 35 mm projection slides involving clinical and microscopic depictions of normal and abnormal conditions seen in the field of veterinary ophthalmology. Discussion of current treatment modalities, diagnostic capabilities and other related and relevant issues. (S/U grading only)—I, II, III, IV, (II, III, IV) Maggs, Hollingsworth

451R. Veterinary Ophthalmology Literature Review (1) Discussion—1 hour. Prerequisite: resident in Veterinary Medical Teaching Hospital Ophthalmology program or consent of instructor. Review and critical evaluation of contemporary literature in or related to the field of veterinary ophthalmology. (S/U grading only)—I, II, III, IV, (II, III, IV) Maggs, Hollingsworth

459R. Renal Transplantation (0.5) Lecture/discussion—5 sessions. Prerequisite: resident status in the Veterinary Medical Teaching Hospital and consent of instructor required. Topics related to renal transplant cases. May be repeated up to 12 times for credit. (S/U grading only)—I, II, III, IV, (II, III, IV) Mehdi

460. Emergency and Critical Patient Care (2) Lecture—20 sessions. Prerequisite: third-year standing in School of Veterinary Medicine. Introduction to the essential and practical concepts of care for emergency and critically ill patients.—II, (II, III, IV) Hopper, Bunn

462. Radiographic Diagnosis: Small Animal (1) Lecture—1 session; discussion—9 sessions. Prerequisite: course 404A, third-year standing in the School of Veterinary Medicine. Small animal radiographic case studies. Presentation of solution of assigned cases before knowing the actual diagnosis. (S/U grading only)—I, II, III, IV, (II, III, IV) Wisner
463. Soft Tissue Surgery (1.8)
Lecture—18 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Pathological and surgical treatment of selected soft tissue diseases. —III. (III.) MacLeod

464R. Principles of Veterinary Radiation Oncology (2)
Lecture—2 hours. Prerequisite: house officers in the Veterinary Medical Teaching Hospital. Graduate students or veterinary students with consent of instructor. Principles and practice of veterinary radiation therapy. Topics include physical methods of radiation therapy, biologic effects of therapeutic radiation and applications in veterinary patients. (S/U grading only.) Offered in alternate years. —II. Thoen

465R. Biology and Practice of Veterinary Radiation Oncology (2)
Lecture—2 hours. Prerequisite: house officers in the Veterinary Medical Teaching Hospital. Graduate students or veterinary students with consent of instructor. Principles and practice of veterinary radiation therapy. Topics include physical methods of radiation therapy, biologic effects of therapeutic radiation and applications in veterinary patients. (S/U grading only.) Offered in alternate years. —II. Thoen

466. Large Animal Applied Anesthesiology (1.5)
Lecture—15 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine or consent of instructor. Applied clinical anesthesiology. Special techniques and consideration for anesthetizing a variety of species including horses, swine, ruminants, camels, and large non-domiciled species. —II. (II.) Boulton

467. Small Animal Anesthesiology (2)
Lecture—20 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. The safe clinical administration of anesthetic drugs to small animals. Clinical applications, indications and contraindications, methods of use of common anesthetic drugs and techniques will be discussed. —II. (II.) Ilkow

468. Equine Lameness and Radiology (4)
Lecture—40 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Principles for the clinical evaluation and radiographic interpretation of lameness disorders of the fore- and hindlimbs of horses. Methods used in large animal radiography and the latest techniques for managing and treating equine lameness. Anatomy and pathology of some areas of the musculoskeletal system. —III. (III.) MacDonald

468L. Equine Lameness and Radiology Laboratory—11 sessions. Prerequisite: course 468 concurrently, third-year standing in School of Veterinary Medicine. Focus on clinical gait evaluation, and various diagnostic strategies for localizing lameness disorders in the fore- and hindlimbs of horses. Radiographs from clinical cases. Clinical evaluation and treatment of various disorders of the foot. Equine chiropractic and acupuncture therapy. —III. (III.) Galloppo

469. Equine Surgery (3)
Lecture—30 sessions. Prerequisite: third-year standing in the School of Veterinary Medicine. Appropriate methods for surgical diseases, provide an understanding of different treatment options, and develop a framework for establishing a prognosis for the disease considering particular uses of horses. —II. (II.) Snyder

469L. Equine Surgery Laboratory (1.4)
Laboratory—8 sessions; discussion—6 sessions. Prerequisite: course 469 concurrently, third-year standing in School of Veterinary Medicine. Common equine surgical procedures and other techniques useful in equine practice. (S/U grading only.) —II. (II.) Snyder

470R. Equine Surgery Journal Discussion (1)
Discussion—1 hour. Prerequisite: course 471R concurrently, resident in Veterinary Medical Teaching Hospital or consent of instructor. Current veterinary literature and other related topics in preparation for board certification in the American College of Veterinary Surgeons. Critical evaluation of journal articles for content, methodology and statistical methods. (S/U grading only.) —II, III, IV. (II, III, IV) Galloppo

471R. Equine Surgery Case Management Conference (1)
Discussion—1.5 hours. Prerequisite: course 470R concurrently, resident in Veterinary Medical Teaching Hospital or consent of instructor. Discussion of soft tissue, orthopedic and lameness clinical disorders that focus on pathophysiology of disease, appropriate treatment options, and evaluation of prognosis. Simulation of mock oral examination for the American College of Veterinary Surgeons board examination. (S/U grading only.) —II, III, IV. (II, III, IV) Galloppo

471L. Equine Surgery Conference (1)
Discussion—1 hour. Prerequisite: open to students with D.V.M. or equivalent degree who are residents in specialty training. Graduate students in a related discipline with consent of instructor. Review current medical and veterinary literature and discuss presentation, diagnosis and treatment of small animal surgical conditions. Review the morbidity and mortality of clinical cases and provide mock examinations for ACVS specialty boards. May be repeated three times for credit. (S/U grading only.) —II, III. (II, III) Pyeneydop

491R. Anesthesia/Critical Care Basic Science Management Conference (1.2)
Discussion—12 sessions. Prerequisite: residents in the Veterinary Medical Teaching Hospital or students with consent of instructor. Physiology of WMTH case material to illustrate specific medical problems and their preventive and corrective management as it pertains to anesthesia and critical care. May be repeated three times for credit. (S/U grading only.) —II, III. (II, III) Pyeneydop

493R. Anesthesia/Critical Care Case Management Conference (1.2)
Discussion—12 sessions. Prerequisite: residents in the Veterinary Medical Teaching Hospital or students with consent of instructor. Physiology of WMTH case material to illustrate specific medical problems and their preventive and corrective management as it pertains to anesthesia and critical care. May be repeated three times for credit. (S/U grading only.) —II, III. (II, III) Pyeneydop

494R. Anesthesia/Critical Patient Care Journal Discussion (1)
Discussion—1 hour. Prerequisite: resident status at the Veterinary Medical Teaching Hospital. Review of current medical and veterinary anesthesia literature. Discussion will focus on scientific methodology, content and relevance to clinical practice. May be repeated 16 times for credit. (S/U grading only.) —II, III, (II, III) Pyeneydop

Viticulture and Enology

[College of Agricultural and Environmental Sciences]
Andrew L. Waterhouse, Ph.D., Professor; Interim Chairperson of the Department

Department Office: 1162 RMI North Building (530) 752-0380; http://wineserver.ucdavis.edu

Faculty
Douglas O. Adams, Ph.D., Professor
Linda F. Bisson, Ph.D., Professor
David E. Block, Ph.D., Professor
(Viticulture and Enology, Chemical Engineering)
Roger B. Bouilliez, Ph.D., Professor
(Viticulture and Enology, Chemical Engineering)
Susan E. Ebeler, Ph.D., Professor
Hildegard Heymann, Ph.D., Professor
Mark A. Mattos, Ph.D., Professor
David A. Mills, Ph.D., Professor
David R. Smart, Ph.D., Associate Professor
Andrew L. Waterhouse, Ph.D., Professor
Larry E. Williams, Ph.D., Professor

Emeriti Faculty
L. Peter Christensen, Cooperative Extension Specialist, Emeritus
W. Mark Kleier, Ph.D., Professor Emeritus
Ralph E. Kunkee, Ph.D., Professor Emeritus
Lloyd A. Lider, Ph.D., Professor Emeritus
Carole P. Meredith, Ph.D., Professor Emeritus
Ann C. Noble, Ph.D., Professor Emerita
Cornelius S. Ough, D.Sc., Professor Emeritus
Vernon L. Singleton, Ph.D., Professor Emeritus

Academic Senate Distinguished Teaching Award

Affiliated Faculty
Matthew W. Fidelibus, Ph.D., Associate Specialist in Cooperative Extension
James T. Lapsley, Ph.D., Associate Adjunct Professor
Andrew J. McElrune, Ph.D., Assistant Adjunct Professor
Kerri L. Steenwehr, Ph.D., Assistant Adjunct Professor
James A. Wopel, Ph.D., Specialist in Cooperative Extension

The Major Program
The Viticulture and Enology major provides an interdisciplinary education in the biological and physical principles underlying grape and wine production as well as practical knowledge of grape growing (viticulture) and wine making (enology). This program provides the knowledge base for problem-solving and decision-making in commercial grape and wine production.

Preparatory Requirements. Before transferring into the Viticulture and Enology major, students must complete the following courses with a grade of C- or better and with a combined grade point average of at least 2.50 at the University of California (at least 3.00 for similar courses taken at community college) for these and all other preparatory courses. In addition, students’ overall GPA must be 2.250 or higher. All courses must be taken for a letter grade.

Biological Sciences 1A or 2A = 4.5 units
Chemistry 2A, 2B, 2C, 8A = 17 units
Mathematics 16A = 3 units
Physics 1A, 1B or 7A = 4.6 units

Recomendations. Completion of UC Davis equivalents of the following preparatory courses for the major are not required for entry but are highly recommended. Failure to complete these will delay entry into required upper division courses and may thus delay graduation. Students desiring to enroll at UC Davis during Summer Session.

Chemistry 8B = 4 units
Mathematics 16B = 3 units
Biological Sciences 1C or Plant Sciences 2 = 4.5 units
Biological Sciences 102 = 3 units

The Program. The curriculum builds upon a foundation of biology, chemistry, biochemistry and mathematics with specialized courses related to grape and wine production. To complete the program, students may choose to place particular emphasis on viticulture, enology or economics. Credit may also be earned for foreign language study and internships.

Career Alternatives. Graduates are qualified for a variety of vineyard and winery positions, including production management, quality control and research. Additionally they may work in related fields such as pest management, nursery production and analytical services.

B.S. Major Requirements:

UNITS
English Composition Requirement 0-8
See College requirement

Breadth/General Education Requirement 24
See General Education requirement.
Preparatory Subject Matter .......... 44-51
Biological Sciences 1A or 2A and 1C or Plant Sciences 2 or 3 ............. 8-10
Chemistry 2A-2B-2C ............. 15
Chemistry 8A, 8B ..................... 6
Plant Sciences 21 or equivalent and adviser approval ...................... 0-3
Mathematics 16A-16B .......... 6
Physics 1A, 1B or 7A .......... 4-6
Viticulture and Enology 2, 3 .......... 5

Depth Subject Matter .......... 53-54
Biological Sciences 102, 103 .......... 6
Microbiology 102, 104, 105 .......... 7
Plant Sciences 120 or Statistics 100 or 106 ..................... 4
Viticulture and Enology 101A, 101B, 101C, 110, 118, 120, 126, 128, 135 and in consultation with the adviser, choose 6 courses from the following courses: 123L, 124L, 125L, 126L, 128L. If more than 3 are taken, the extra courses will count as restricted electives in Area B 21-22

Restricted Electives ................. 28
In consultation with adviser, choose 28 units from three of the following five areas. At least 12 units must be from one of the following areas: (A) Plant Science, (B) Food Science and Microbiology, or (C) Economics and Business Science.


(B) Food Science and Microbiology area: Biological Sciences 101, Food Science and Technology 102A, 102B, 104, 104L, 108, 119, 110A, 110B, 127, Microbiology 140, 150, 155L, Viticulture and Enology 140.


(D) Language area: Maximum 12 units, not counting any of the following languages: French, German, Italian, Portuguese or Spanish. At least one course must be Intermediate or Conversational, qualifying Intermediate or Conversational courses are listed below: French 8, 21, 22, 23, 38, German 6, 11, 20, 21, 22, Italian 5, Spanish 8, 21, 22, 23, 32, 33.

Courses taught in English will not count as restricted electives in this major.

(E) Internship area: A maximum of 8 units of Viticulture and Enology 190X, 192, 198, 199, 290 or 298 may be counted as restricted electives by prior arrangement with adviser. May be increased to 12 units in exceptional circumstances.

Unrestricted Electives .......... 15-23
Total units for the Degree ........... 180

Major Adviser, M. Matthews

Related Major Programs, Food Science and Technology, and Plant Sciences.

Graduate Study, Several graduate groups offer programs of study leading to advanced degrees in the fields of viticulture and enology. For the M.S. or Ph.D. degree, see Agricultural and Environmental Chemistry [A Graduate Group], on page 130, Engineering: Chemical Engineering and Materials Science, on page 235, Ecology [A Graduate Group], on page 209, Food Science [A Graduate Group], on page 295, Genetics [A Graduate Group], on page 302, Horticulture and Agronomy [A Graduate Group], on page 322, Microbiology [A Graduate Group], on page 401, Plant Biology [A Graduate Group], on page 445, Plant Pathology, on page 446, Soils and Water [A Graduate Group], on page 481, and Viticulture and Enology [A Graduate Group], on page 516.

Courses in Viticulture and Enology (VEN)

Lower Division Courses

2. Introduction to Viticulture (VEN)

Lecture—2 hours. Fundamental principles of biology and culture of the grapevine including taxonomy, morphology, physiology, distribution, domestication, utilization, propagation, production systems, harvesting, and storage and processing of grapes. Successful completion of the course should prepare students for upper division courses in viticulture.—I. (I.) Williams

3. Introduction to Winemaking (VEN)


90X. Lower Division Seminar (2)

Seminar—1 hour; term paper (required)/discussion. Prerequisite: lower division standing and consent of instructor. A critical analysis of issues surrounding viticulture and enology. GE credit: Wrt. 99.

Special Study for Undergraduates (1-5) (P/NP grading only.)

Upper Division Courses

101A. Viticultural Practices (3)

Lecture—1.5 hours; discussion/laboratory—3.5 hours. Prerequisite: course 2. Identification, cultivation, and use of the major wine, table, raisin, and rootstock cultivars. Includes practices specific to the fall such as fruit contracts, maturity sampling, harvesting, cover crops, and soil-pests. One field trip required.—I. (I.) Walker

101B. Viticultural Practices (3)

Lecture—1.5 hours; discussion/laboratory—3.5 hours. Prerequisite: course 2. Theory, principles, and practices of pruning and grapevine propagation. Plant materials and the certification process, weed control and weed identification, wood diseases and frost protection. One field trip required.—II. (II.) Walker

101C. Viticultural Practices (3)

Lecture—1.5 hours; discussion/laboratory—3.5 hours. Prerequisite: course 2. Field oriented experience in the principles and practices of grapevine production, including vineyard establishment, vine training, trellising, canopy management practices, irrigation and water management, and methods of crop adjustment for improvement of fruit quality. One field trip required. —III. (III.) Smart

110. Grapewine Growth and Physiology (3)

Lecture—3 hours. Prerequisite: course 2. Botanical aspects including growth, photosynthesis, and temperature. Current research and the impact of these factors on grapevine growth and its spread throughout the world will be covered, along with discussions of current viticultural practices in different parts of the world, including California.

111L. Critical Evaluation of Wines of the World (1)

Lecture—2 hours. Prerequisite: course 111 (must be taken concurrently), course 125 with a grade of C or better. Critical analysis of wines produced in different parts of the world with emphasis on the relationship between sensory properties of the wines and factors associated with their place of origin. (P/NP grading only.)

115. Raisin and Table Grape Production (2)

Lecture—2 hours. Prerequisite: course 2. Overview of the raisin and table grape industries in California and other production areas of the world. Cultural practices associated with raisin and table grape production will also be discussed.—I. (I.) Williams

116. Grapevine Pests, Diseases and Disorders (3)

Lecture—3 hours. Prerequisite: course 2. Various pests and diseases of vineyards throughout California. Pest/disease identification and control methods (to include chemical, physical and biochemical methods). May not be repeated for credit. GE credit: Wrt.

123L. Analysis of Musts and Wines (3)

Lecture—2 hours. Prerequisite: Chemistry 2C and 88 or equivalent, Agricultural Management and RangeLand Resources 21 or equivalent. Students enrolled in the course must meet the following requirements: a) the course will be required to enroll in 1 unit of course 199/299; b) fundamental principles of analytical chemistry as they relate to specific methods used in winemaking. GE credit: Wrt. —I. (I.) Ebeler

123L. Analysis of Musts & Wines Laboratory (2)

Lab—3 hours; independent study—3 hours. Prerequisite: Chemistry 2C and 88, or equivalent, Agricultural Management and RangeLand Resources 21, and course 123 (course 123 may be taken concurrently). Fundamental principles of analytical chemistry as they relate to specific methods used in winemaking. Laboratory exercises demonstrating various chemical, physical and biochemical methods. Data will be analyzed and results interpreted in weekly lab reports; includes student-designed independent project and written report. Enrollment restricted to upper division and graduate students in Viticulture & Enology; others by approval of instructor. GE Credit: Wrt. —I. (I. Ebeler

124. Wine Production (2)

Lecture—2 hours. Prerequisite: course 3, 123 (may be taken concurrently), Biochemistry 101. Principles and practices of making standard types of wines, with special reference to grape varieties used and methods of vinification.—I. (I.) Bisson

124L. Wine Production Laboratory (3)

Laboratory—3 hours; independent study—3 hours; term paper. Prerequisite: course 124 (may be taken concurrently). Restricted to undergraduate students in fermentation science, viticulture and enology, biochemistry, microbiology, food science, and plant biology or graduate students in food science, agricultural and environmental chemistry and horticulture. Current technologies used in production of California table wines; techniques of monitoring, analysis and interpretation of data from sensory analysis of model solutions.—III. (III) Heymann

125. Wine Types and Sensory Evaluation (2)

Lecture—2 hours. Prerequisite: course 124; Agricultural and Rangeland Management 120 or Statistics 100 or 106. Principles of sensory evaluation and application to wines. Factors, flavor, and aroma data from sensory analysis of model solutions.—III. (III.) Heymann

125L. Sensory Evaluation of Wine Laboratory (2)

Laboratory—3 hours; term paper. Prerequisite: course 125 (may be taken concurrently). Restricted to upper division majors in fermentation science or viticulture and enology or graduate students in food science. Sensory evaluation of wines and model sys
items using discrimination tests, ranking, descriptive analysis and time-intensity analysis. Data analyzed by open- and closed-form statistical and results interpreted in extensive weekly lab reports. — III. (III.) Heymann

126. Wine Stability (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 124. Restricted to students in viticulture and enology, food science, microbiology, applied plant biology majors, or graduate students in food science, microbiology, horticulture, and horticulture and agronomy. Principles of equilibria and rates of physical and chemical reactions in wines; treatment of unstable components in wines by absorption, ion exchange, refrigeration, filtration, and membrane processes; and protein, polysaccharide, tartrate, oxidative, and color stabilites. — II. (III.) Boulton

126L. Wine Stability Laboratory (2)
Laboratory—3 hours; independent study—3 hours. Prerequisite: course 126 [may be taken concurrently]. Restricted to upper division fermentation science majors and graduate students in food science, agricultural and environmental chemistry, microbiology or by consent of instructor. Practical application of principles of equilibria and rates of physical and chemical reactions to wine stability. — II. (III.) Mills

128. Wine Microbiology (2)
Lecture—2 hours. Prerequisite: courses 123 and 124, Microbiology 102 and 102L, or Food Science and Technology 104 and 104L. Courses 125 and 126 recommended. Nature, development, physiology, biochemistry, and control of yeasts and bacteria involved in the making, aging and spoilage of wine. — II. (III.) Mills

128L. Wine Microbiology Laboratory (2)
Laboratory—6 hours. Prerequisite: course 123, 124, and 128 [may be taken concurrently]. Microbiology 102L or Food Science and Technology 104 and 104L. Course 126 recommended. Restricted to upper division students in fermentation science, viticulture and enology or graduate students in food science. Nature, development, physiology, biochemistry and control of yeasts and bacteria involved in the making, aging and spoilage of wine. — II. (III.) Mills

130. Management, Marketing, and Economics of the California Wine Industry (9)
Lecture—24 hours; lecture/discussion—4 hours; fieldwork—8 hours. Prerequisite: course 124. Introduction to management, marketing and economics of wine industry. Emphasis on wines of particular emphasis on California. Reviews market segmentation and explores alternative strategies for grape acquisition, production, brand development, distribution, and social policy formation. GE credit: Wrt. 135. Wine Technology and Winery Systems (5)
Lecture—3 hours; discussion/laboratory—2 hours. Prerequisite: course 124. Process technologies and process systems that are used in modern commercial wineries. Lectures, demonstrations, problem solving sessions, and possible field trips. Includes grape preparation and fermentation equipment; postfermentation processes; wine storage; utility systems, cleaning systems, and waste treatment. — III. (III.) Block

140. Distilled Beverage Technology (3)
Lecture—3 hours. Prerequisite: Chemistry 88; Food Science and Technology 110A. Distillation principles and practices; production technology of brandy, whiskey, rum, vodka, gin, and other distilled beverages; characteristics of raw materials, fermentation, distillation, and aging. Offered in alternate years. — III. (III.) Boulton

181. Readings in Enology (1)
Discussion—1 hour. Prerequisite: course 3. Critical evaluation of selected monographs in enology. Discussion among the students. May be repeated three times for credit. (P/NP grading only.) — III. (III.) Matthews

186. Fermentation Science (3)
Lecture—3 hours. Prerequisite: Microbiology 102, Biologsical Sciences 101. Basic principles of fermentation science and biotechnology with emphasis on industrial fermentation processes that generate useful products including fermented food and beverages, pharmaceuticals, fine chemicals, and other gene products.

190X. Winemaking Seminar (1)
Seminar—1 hour; discussion—1 hour. Prerequisite: course 3. Open to Viticulture and Enology majors and graduate students on a specific winemaking topic chosen for the quarter. Discussion with the speaker hosted by the faculty member(s) in charge. May be repeated for credit up to 3 times. (P/NP grading only.)—III. (III.)

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units. Work experience related to Fermentation Science (Enology) or Plant Science (Viticulture) majors. Internships must be approved and supervised by a member of the department or major facility, but are arranged by the student. (P/NP grading only.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)

Graduate Courses

200. Introduction to Scientific Methods (2)
Lecture/discussion—1 hour; term paper. Prerequisite: graduate standing or instructor. Processes involved in conducting scientific research. Topics include conducting literature review, formulating hypotheses, and analyzing and reporting results. Annotated bibliography and written and oral research proposals. — II. Boulton

210. Grape Development and Composition (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 102, 103. The anatomy, physiology and biochemistry of grape berry development, with emphasis on the development of grape composition relevant to winemaking. Offered in alternate years. —III. Adams, Polito

215. Sensometrics (3)
Lecture—3 hours. Prerequisite: Food Science and Technology 117 or the equivalent, courses 125 and 125L. Food Science and Technology 107A or 107B. Experimental design and statistical analysis including multivariate analyses, for both sensory and instrumental data in enology and food-related studies. — I. (II.) Heymann

216. Vineyard Establishment and Development (4)
Lecture/discussion—3 hours; fieldwork—3 hours; term paper. Prerequisite: courses 101A, 101B, 101C, and one of courses 115 or 116, and course 118 as consent of instructor; course 110, Soil Science 100, Atmospheric Science 133 and Agricultural and Resource Economics 140 recommended. Application of plant, meteorological, soil, water, and economic sciences to vineyard establishment and development. Preparation of a comprehensive study to determine the viticultural and economic feasibility of a given site for raisin, table, or wine grape production. — I. (II.) Swartz

219. Natural Products of Wine (3)
Lecture—3 hours. Prerequisite: courses 123 and 124, or natural products background and consent of instructor. Structure, occurrence, and changes due to wine production of the natural products found in wine. Chemicals with a sensory impact will be emphasized, including flavonoids and other pheno- lics, terpenes and norisoprenoids, pyrazines, oak volatiles and other wine constituents. — I. (II.) Waterhouse

220. Secondary Nutrients, Chemistry (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Chemistry 88, Biological Sciences 102. Introduction to phytochemicals with possible health or nutritional effects, with a focus on chemical structure, reactivity and occurrence in foods, including phenolics, glucosinolates, carotenoids and fiber. Students will give oral reports.

223. Instrumental Analysis of Must and Wine (4)
Lecture—2 hours, laboratory—3 hours, discussion—1 hour. Prerequisite: course 123 or Food Science and Technology 103; Biological Sciences 102, Chemistry 107B or 115 recommended. Open to upper division students in Fermentation Science, Viticulture and Enology, or graduate students in Food Science, Agricultural and Environmental Chemistry or Viticulture and Enology. Theory and practice of instrumental analysis of wines and musts. Emphasis on the principles of analytical techniques (e.g., CE, GC, HPLC, Mass Spectrometry) and factors determining correct choice of instrumental method. —III. (III.) Ebeler

224. Advances in the Science of Winemaking (3)
Lecture—3 hours. Prerequisite: course 125, 126 and graduate standing or consent of instructor. Selected topics in the science and technology of winemaking. Topics drawn from current research of the participating faculty. Critical analysis of the technical content of published material. —III. (III.)

225. Advanced Sensory Analysis of Wines (3)
Lecture/discussion—2 hours, laboratory—4 hours. Prerequisite: courses 124 and 125 (or Food Science and Technology 107) and Agricultural Management and Rangeland Resources 120 or the equivalent. Sensory descriptive analysis experiments will be designed and conducted using standard sensory science methods. Data will be analyzed by analyses of variance, principal component analyses and gen- eralized Procrustes analysis to evaluate the judge’s performance and interpret the significance of the results. —III. (III.) Heymann

235. Winery Design (4)
Lecture—2 hours, discussion—1 hour; independent study. Prerequisite: course 124, 135 or consent of instructor. Design of wineries. Includes process calculations, equipment selection, process layout and building choice and siting. Project scheduling, capital costs, and ten-year cash flows analysis for the winery. One field trip required. Offered in alternate years. —II. Boulton

270. Critical Evaluation of Scientific Literature (2)
Discussion—2 hours. Prerequisite: consent of instructor. Contemporary research topics in biological sciences. Discussion of recent research articles in a special topic area. Intended to develop skills in criti- cal evaluation and the ability to evaluate research being conducted by the group. Discussion led by individual research instructors for research group. May be repeated for credit. (S/U grading only.)—II, III, (III.) Bisson

290C. Advanced Research Conference (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Planning and results of research programs, proposals, and experiments. Discussion and critical evaluation of interest that relate viticulture to fruit or wine sensory attributes or quality. May be repeated once for credit. Offered in alternate years. —III. (III.) Matthews
Viticulture and Enology (A Graduate Group)

Douglas O. Adams, Ph.D., Chairperson of the Group

Group Office. 1162 RMI North Building (530) 752-8035; Fax (530) 752-0382; http://wineserver.ucdavis.edu

Faculty

Douglas O. Adams, Ph.D., Professor (Viticulture and Enology)

Charles W. Bamforth, Ph.D., Professor (Food Science and Technology)

Linda F. Bisson, Ph.D., Professor (Viticulture and Enology)

David E. Black, Ph.D., Professor (Viticulture and Enology, Chemical Engineering)

Roger B. Boulton, Ph.D., Professor (Viticulture and Enology, Chemical Engineering)

Douglas R. Cook, Ph.D., Professor (Plant Pathology)

Susan E. Ebeler, Ph.D., Professor (Viticulture and Enology)

Jean-Xavier Guinard, Ph.D., Professor (Food Science and Technology)

Hildegarde Heymann, Ph.D., Professor (Viticulture and Enology)

Mark A. Matthews, Ph.D., Professor (Viticulture and Enology)

David A. Mills, Ph.D., Professor (Viticulture and Enology)

David R. Smart, Ph.D., Associate Professor (Viticulture and Enology)

Jean S. VanderGheynst, Ph.D., Associate Professor (Biological and Agricultural Engineering)

M. Andrew Walker, Ph.D., Professor (Viticulture and Enology)

Andrew L. Waterhouse, Ph.D., Professor (Viticulture and Enology)

Larry E. Williams, Ph.D., Professor (Viticulture and Enology)

Affiliated Faculty

Matthew W. Fidelibus, Ph.D., Associate Specialist in Cooperative Extension (Viticulture and Enology)

W. Douglas, Gubler, Ph.D., Cooperative Extension Plant Pathologist (Plant Pathology)

Kenli L. Strojny, Ph.D., Assistant Adjunct Professor (Viticulture and Enology)

Graduate Study. The M.S. program offers advanced studies in viticulture and enology, ranging from the genetics, physiology and biochemistry of grapevines to the chemistry, microbiology and sensory science of wines and the chemical engineering of winemaking. Graduate students will usually work on a project that requires at least two of these fields of science and may involve grapevines, grapes, and wine or wine distillates. Topics can vary; examples include the molecular biology of grapevines, bacte-

ria or yeast, the grape and wine chemistry associated with fermentation and aging and the correlation of analytical and sensory analyses. All application material must be received in the Group office by January 15.

Ph.D. studies are offered through one of the following Graduate Groups: Agricultural and Environmental Chemistry, Chemical Engineering, Food Science, Horticulture and Agronomy, Genetics, Microbiology, and Plant Biology.

Preparation. Applicants to the program are required to have a level of competence equivalent to that of a strong science undergraduate program. This includes coursework in biology, general chemistry, organic chemistry, calculus, statistics (analysis of variance), biochemistry, and microbiology. Specific requirements are outlined in detail and may be obtained from the Group office or see http://wineserver.ucdavis.edu.

Graduate Advisers. H. Heymann, D.A. Mills

War–Peace Studies

The interdisciplinary minor in War–Peace Studies examines the causes and dynamics of intro- and international wars and efforts to prevent and settle such conflicts.

Students in the minor are encouraged to participate in the educational activities of the Davis Program of the UC Institute on Global Conflict and Cooperation (IICC).

The minor is sponsored by the International Relations Program.

Minor Program Requirements:

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<th>Course Units</th>
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<td>War–Peace Studies</td>
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One or two courses from each of the following areas:

Approaches: Anthropology 123AN, 126B, Comparative Literature 157, Philosophy 115, 118, Political Science 121, 123, 124, 132, 176, Sociology 157, Women’s Studies 102


Southeastern and Eastern Regions: Anthropology 142, 143A, 143B, 144, History 165, 191F, 194C, Native American Studies 120, Political Science 142A

Restriction. No more than two courses from a single department may be offered in satisfaction of the minor requirements.

Advising. International Relations Program (530) 752-3063

Water Science

See Hydrologic Sciences (A Graduate Group), on page 327; Hydrology, on page 329; and Soil and Water Science, on page 481.

Wildlife, Fish, and Conservation Biology

[College of Agricultural and Environmental Sciences]

Douglas A. Kelt, Ph.D., Chairperson of the Department

Department Office. 1088 Academic Surge (530) 752-6586; http://wfcb.ucdavis.edu

Faculty

Daniel W. Anderson, Ph.D., Professor (Viticulture and Enology)

Louis W. Botsford, Ph.D., Professor (Plant Ecology)

Tim Cara, Ph.D., Professor (Aquatic Ecology)

John M. Eadie, Ph.D., Professor (Aquatic Ecology)

Deborah L. Elliott-Fisk, Ph.D., Professor (Aquatic Ecology)

Douglas A. Kelt, Ph.D., Professor (Aquatic Ecology)

A. Peter Klimley, Ph.D., Associate Adjunct Professor (Aquatic Ecology)

Peter B. Mayle, Ph.D., Professor (Aquatic Ecology)

Dirk H. Van Vuren, Ph.D., Professor (Aquatic Ecology)

Emeriti Faculty

Joseph J. Cech, Jr., Ph.D., Professor Emeritus (Aquatic Ecology)

Ronald E. Cole, B.S., Lecturer Emeritus (Aquatic Ecology)

Christopher M. Dewees, Ph.D., Specialist in Cooperative Extension, Lecturer Emeritus (Aquatic Ecology)

Don C. Erman, Ph.D., Professor Emeritus (Aquatic Ecology)

Nancy A. Erman, M.S., Lecturer Emerita (Aquatic Ecology)

E. Lee Fitchugh, Ph.D., Specialist in Cooperative Extension, Emeritus (Aquatic Ecology)

Walter E. Howard, Ph.D., Professor Emeritus (Aquatic Ecology)

Nadine K. Jacobsen, Ph.D., Professor Emerita (Aquatic Ecology)

Rex E. Marsh, A.B., Lecturer Emeritus (Aquatic Ecology)

Affiliated Faculty

Terrell P. Salmon, Ph.D., Specialist in Cooperative Extension (Aquatic Ecology)

Lisa C. Thompson, Ph.D., Assistant Specialist in Cooperative Extension (Aquatic Ecology)

The Major Program

The Wildlife, Fish, and Conservation Biology major deals with the relationships between the require-
ments of wildlife and the needs of people. Understanding these relationships is vital for the
maintenance of ecological diversity, recreational resources, and food supplies. Students completing the
major possess a broad knowledge of ecology and natural history, but with the quantitative skills to use this knowledge in critical thinking and decision-
making.

The Program. The major emphasizes broad training in biological and physical sciences, with special-
ization in one of nine areas. The major is primarily for students interested in becoming professionals in the diverse and cutting edge fields of wildlife, fish,
and conservation biology. The breadth of course requirements, when combined with electives, make this an excellent preparatory major for such areas as veterinary medicine and secondary school teaching. Certification by professional societies such as The
Wildlife Society, American Fisheries Society, or the Ecological Society of America, or preparation for specialized resource-related graduate studies may also be achieved by careful planning of electives with a faculty adviser.

Career Alternatives. The major prepares stu-
dents to excel in the dynamic fields of environmental and conservation biology emphasizing vertebrate animals in their natural environments, as well as res-
olution of conflicts between humans and wild ani-
mals. Positions now held by graduates in this major include wildlife biology, fisheries biology, wildlife
management, and resource biologists and managers with local, state, and federal agencies. Some
graders are biologists or consultants with
private industries such as environmental consulting firms, commercial fishing businesses, electrical utili-
ties, sporting clubs or businesses, and aquaculture operations, while others are veterinarians, medical physicians, and professors/researchers who teach and/or conduct research in academic institutions.
### B.S. Major Requirements:

**Written/Oral Expression**
- University Writing Program 1 .......................... 4
- Communication 129 ..................................... 4

**Preparatory Subject Matter**
- Biological Sciences 1A, 1B, 1C or 2A, 2B, 2C ...... 14.5
- Chemistry 2A, 2B, 8A, 8B ............................... 16
- Mathematics 16A, 16B ................................. 6
- Physics 1A, 1B ........................................ 6
- Statistics 100, 102, or Plant Sciences 120 ......... 12

**Breadth/General Education**
- Satisfaction of General Education requirement. .... 6-24

**Depth Subject Matter**
- Students graduating with this major are required to attain at least a C average (2.00) in all courses taken at the university in depth subject matter.

**Minor Program Requirements:**

- The minor in Wildlife, Fish, and Conservation Biology is for students interested in basic training and understanding of the ecology and conservation of wild terrestrial and aquatic vertebrates, emphasizing birds, mammals, and fish, but with relevance and application to all life forms.

### Restricted Electives: 12-36

Choose one of the following courses:
- Environmental Toxicology 101, 112A (112B recommended), 112C, 112E, 112F
- Pathology, Microbiology, and Immunology 101, Medical Microbiology 115 or 116
- Fisheries Biology: Complete Wildlife, Fish, and Conservation Biology 120, 120L, 121, and either Wildlife, Fish, and Conservation Biology 102, 102L, or Geology 136
- Complete one from the following options:
  - Option 1: Environmental Science and Policy 116 or Evolution and Ecology 115; complete the Bodega Marine Lab Spring Quarter Internship (1)
  - Option 2: Biological Sciences 102, 103, or Animal Biology 102, 103; complete one course from (a) and one course from (b):
    - (a) Entomology 116, Evolution and Ecology 112-112L, or Environmental Science and Policy 151L;
- Complete Wildlife, Fish, and Conservation Biology 120 and 130 and either Biological Sciences 102, 103 or Animal Biology 102, 103. Choose two courses from Neurobiology, Physiology, and Behavior 126, 127, 128, 140, or 141.
- Complete Wildlife Damage Management: Complete Wildlife, Fish, and Conservation Biology 152, Plant Science 103, Evolution and Ecology 104, and choose one course from Nature and Culture 140 or Veterinary Medicine 170.
- Complete Wildlife Biology: Complete Wildlife, Fish, and Conservation Biology 100 or 101-101L, Wildlife, Fish, and Conservation Biology 151, and two courses from Evolution and Ecology 134, 134A, 134L, and Conservation Biology 110L or 111L and (a) Choose one course from Plant Biology 102, 108, 117, 144, 147, or 178, or Evolution and Ecology 117, and (b) Choose one course from Agricultural Management and Rangeland Resources 130, Environmental Science and Policy 155, Environmental Horticulture 160, Wildlife, Fish, and Conservation Biology 155, 156, or 157; and (c) Choose two courses from Environmental Science and Policy 121, Wildlife, Fish, and Conservation Biology 136, 152, 153, 154, or 158
- Population Dynamics: Mathematics 16C (17A-17B-17C or 21A-21B-21C recommended), Statistics 108, Environmental Science and Policy 121, Engineering 6, and one additional upper division science course beyond the Depth Subject Matter requirement (e.g. Statistics 104, 106; note that Statistics 100, 102 do not fulfill this requirement).
- Individualized: Students may, with prior approval of the Graduate Committee, design their own individualized specialization within the major. The specialization will consist of four to six courses with a common theme.

### Courses in Wildlife, Fish, and Conservation Biology (WFC)

**Lower Division Courses**


11. **Introduction to Conservation Biology (3)**
- Lecture—3 hours. Introduction to conservation biology and background to the biological issues and controversies surrounding loss of species and habitats for students with no background in biological sciences. GE credit: SciEng, Div.—III. (III.) Caro

92. **Internship (1-6)**
- Internship—3-18 hours. Prerequisite: lower division standing and consent of instructor. Work experience off and on campus in all subject areas offered in the department. Internships supervised by a member of the faculty. P/NP grading only.

**Upper Division Courses**

100. **Field Methods in Wildlife, Fish, and Conservation Biology (4)**
- Lecture—2 hours; laboratory—3 hours; fieldwork—3 hours. Prerequisite: Environmental Science and Policy 100 and consent of instructor. Introduction to field methods for monitoring and studying wild vertebrates and their habitats, with an emphasis on hypothesis testing. Required weekend field trips. —III. (III.) Anderson, Eadie, Kelt, Van Vuren

101. **Field Research in Wildlife Ecology (2)**
- Lecture/discussion—2 hours. Prerequisite: Consent of instructor and one upper division course in either ecology, statistics, and ornithology, mammalogy, or herpetology. Field research in ecology of wild vertebrates in terrestrial environments; formulation of testable hypotheses, study design, following up on results. Limited enrollment. Offered in alternate years. GE credit: Wrt.—I. Anderson, Eadie, Kelt, Van Vuren
101L. Field Research in Wildlife Ecology: Laboratory (4) Lecture/discussion—2 hours; field work—15 hours. Prerequisite: consent of instructor, course 101 [may be taken concurrently], and one upper division course in each of ecology, statistics, and ornithology, mammalogy, or herpetology. Field research in ecology of wild vertebrates in terrestrial environments, testing ecological hypotheses through field research, application of research methodology, supervised independent research projects. Held between Labor Day and fall quarter. Limited enrollment. Offered in alternate years.—I. Anderson, Eadie, Kelt, Van Vuren

102. Field Studies in Fish Biology (1) Lecture/discussion—1 hour. Prerequisite: upper division course in each of ecology, aquatic biology, fish biology, and statistics, and consent of instructor. Emphasis on theory of quantitative fish capture methods and design of individual research projects on ecology, behavior, physiology or population biology of fishes. Offered in alternate years.—III. Mayle

102L. Field Studies in Fish Biology: Laboratory (6) Fieldwork—15 hours; laboratory—12 hours; discussion/lab—3 hours. Prerequisite: course 102, upper division course in each of ecology, aquatic biology, fish biology, and statistics, and consent of instructor. Laboratory and field exercises in Fish Biology emphasized including quantitative capture methods and individual research projects on ecology, behavior, physiology or population biology of fishes at the field site related to their habitats. Offered in alternate years. [Deferred grading only, pending completion of projects.] GE credit: SciEng, Wrt.—III. Mayle

110. Biology and Conservation of Wild Mammals (2) Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or Biological Sciences 2A, 2B, 2C, Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course.Origins, evolution, diversification, and geographical and ecological distributions of mammals. Morphological, physiological, reproductive, and behavioral adaptations of mammals to their environment.—III. I. Kelt

110L. Laboratory in Biology and Conservation of Wild Mammals (2) Laboratory—6 hours. Prerequisite: course 110 [may be taken concurrently] and consent of instructor. Laboratory exercises in the morphology, systematics, species identification, anatomy, and adaptations of wild mammals to different habitats. Limited enrollment.—III. I. Kelt

111. Biology and Conservation of Wild Birds (3) Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or Biological Sciences 2A, 2B, 2C, Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course. Phylogeny, distribution, evolution, population dynamics, behavior and physiological ecology of wild birds. Emphasis on adaptations to environments, species interactions, management, and conservation.—I. I. Anderson, Eadie

111L. Laboratory in Biology and Conservation of Wild Birds (3) Laboratory—6 hours; fieldwork—3 hours. Prerequisite: course 111 [may be taken concurrently]; consent of instructor. Laboratory exercises in bird species identification, anatomy, molt, age and sex, specialized adaptations, behavior, research, with emphasis on conservation of wild birds. Several weekend field trips, after class bird walks, and independent bird study are required. Limited enrollment.—I. I. Anderson, Eadie

120. Biology and Conservation of Freshwater Fishes (2) Lecture—3 hours. Prerequisite: Biological Sciences 1B. Evolution, ecology, and conservation of marine and freshwater fishes.—I. I. Mayle

120L. Laboratory in Biology and Conservation of Fishes (1) Laboratory—2 hours. Prerequisite: course 120 [may be taken concurrently]. Morphology, taxonomy, conservation, and identification of marine and freshwater fishes with emphasis on California species. Limited enrollment.—I. I. Mayle

121. Physiology of Fishes (4) Lecture—3 hours, laboratory—3 hours. Prerequisite: upper division courses in nutrition and physiology or consent of instructor. Comparative physiology, growth, reproduction, behavior, and energy relations of fishes. GE credit: SciEng, Wrt.—II. (II.)

122. Population Dynamics and Estimation (4) Lecture—3 hours, laboratory—3 hours. Prerequisite: Mathematics 16A; 16B; Statistics 13 or the equivalent, an upper division course in ecology. Description of bird, mammal and fish population dynamics, modeling philosophy, techniques for estimation of animal abundance (e.g., mark-recapture, change-in-ratio, etc.), mathematical models of populations (e.g., Leslie matrix, logistic, dynamic pool, stock-recruitment, case histories).—III. (III.) Botzler

130. Physiological Ecology of Wildlife (4) Lecture—4 hours. Prerequisites: courses 110, 111, or 120; Neurobiology, Physiology, and Behavior 101; and Evolution and Ecology 101. Animal functions, adaptations, and ecological energetics of wildlife. Nutrition, metabolism, and behavior are emphasized as a pattern of relationships for understanding the distribution and abundance of wild ecotones and endemics in time and space. Not offered every year.—II. (II.)

136. Ecology of Waterfowl and Game Birds (3) Lecture—2 hours; laboratory—3 hours; field trip. Prerequisite: courses 111 and 111L or the equivalent. Detailed examination of distribution, behavior, population dynamics, and management of waterfowl and upland game birds. Offered in alternate years.—II. (II.)

141. Behavior and Ecology (4) Lecture—3 hours, film viewing—1 hour. Prerequisite: Evolution and Ecology 101. Basic theories underlying the functional and evolutionary significance of behavior, and the role of ecological constraints. Supporting empirical evidence taken mainly from studies of wild vertebrates. Offered in alternate years.—II. (II.) Caro

151. Wildlife Ecology (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1A, 1B, 1C or Biological Sciences 2A, 2B, 2C or the equivalent; course 110L or 111L recommended. Ecology of wild vertebrates, including habitat selection, spatial organization, demography, population growth and regulation, competition, predation, and community dynamics. Set in the context of human-caused degradation of environments in North America.—I. I. Van Vuren

152. Ecological Management of Problem Wildlife (3) Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B, and 1C, or Biological Sciences 2A, 2B, 2C, or the equivalent. Ecological approaches to managing wild vertebrates that cause problems for agriculture, public health, or conservation of biodiversity. Offered in alternate years.—II. Van Vuren

153. Wildlife Ecotoxicology (4) Lecture—3 hours, discussion—1 hour. Prerequisite: introductory courses in organic chemistry, ecology, and physiology, or consent of instructor. Environmental Toxicology 101 recommended. Various forms of environmental pollution in relation to fish and wildlife, the effects and mechanisms of pollutants, effects on individuals and systems, laboratory and field ecotoxicity, examples/case histories, philosophical/management considerations. Offered in alternate years. GE credit: SciEng, Wrt.—I. I. Anderson

154. Conservation Biology (4) Lecture—3 hours, term paper [will be one or more biweekly]. Prerequisites: Evolution and Ecology 101 or Environmental Science and Policy 100 or the equivalent. An introduction to conservation biology and background to the biological issues and controversy surrounding loss of species and habitats.—I. (I.) Woodroffe

155. Habitat Conservation and Restoration (4) Lecture—3 hours, laboratory—3 hours. Prerequisite: introductory ecology course; course 154 and Environmental Horticulture 160 recommended. Analysis of the characteristics of wildlife and fish habitats, the conservation of habitats, and restoration. GE credit: SciEng, Wrt.—II. (II.) Elliott/Fisk

156. Plant Geography (4) Lecture—3 hours, laboratory—3 hours, term paper. Field trips will be substituted for some in-lab activities. Prerequisites: Environmental Science and Policy 100 or Evolution and Ecology 101, Plant Biology 102 or 108 strongly recommended. Survey of the geographical distribution of vegetation types and habitats, with consideration of the environmental and historical factors that determine these patterns. Conservation and management approaches. Analytical field and lab techniques introduced. Offered in alternate years. GE credit: SciEng, Wrt.—II. Elliott-Fisk

157. Coastal Ecosystems (4) Lecture—3 hours, laboratory/workshop—3 hours. Prerequisites: Environmental Studies 100 or Evolution and Ecology 101; course work in organismal biology, physical geography, and conservation recommended. Overview of coastal ecosystems, physical and biological elements and processes, and coastal zone dynamics, including sandy, rocky and muddy shorelines, estuaries, dunes and coastal wetlands. Discussion of the role of historical factors and conservation, restoration, and management approaches. Not offered every year.—II. (II.) Elliott/Fisk

158. Infectious Disease in Ecology and Conservation (3) Lecture—3 hours. Prerequisites: Evolution and Ecology 101 or Environmental Science and Policy 100 or Veterinary Medicine 409 or the equivalent. Introduction to the dynamics and control of infectious disease in wildlife, including zoonotic diseases and those threatening endangered species. Basic epidemiological models and their applications. Role of scientists in developing disease control policies. Offered in alternate years.—III.

190. Departmental Research Seminar (1) Seminar—1 hour. Prerequisite: upper division standing in the biological sciences. Reports and discussions of recent advances in the fields of wildlife and fisheries biology. May be repeated for credit up to 3 times. (P/NP grading only.)—I, II, III.

191. Museum Science (2) Lecture—1 hour; laboratory—3 hours. Prerequisite: upper division standing in the biological sciences. Report and discussion of recent advances in the fields of wildlife and fisheries biology. May be repeated for credit up to 3 times. (P/NP grading only.)—I, II.

192. Internship (1-12) Internship—3.36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus in all subject areas offered in the department. Internships supervised by a member of the faculty. (P/NP grading only.)

195. Field and Laboratory Research (3) Laboratory—6 hours; discussion—1 hour. Prerequisites: courses 110, 111L, or 120L, 121 or 130; Evolution and Ecology 101 or the equivalent; and consent of instructor. Critique and practice of research methods applied to field and/or laboratory environments of wild vertebrates. Students work independently or in small groups to design experimental protocol, analyze data, and report their findings. May be repeated twice for credit.—I, II, III, (I), III.
222. Advanced Population Dynamics (3)
Lecture—3 hours. Prerequisite: graduate standing; advanced course in ecology [e.g., Evolution and Ecology 101], population dynamics [e.g., course 122], and one year of calculus; familiarity with matrix algebra and partial differential equations recommended. Logical basis for population models, evaluation of single ecological models, current population models with age, size, and stage structure, theoretical basis for management and exemplary case histories. Emphasis on development and use of realistic population models in ecological research. Not offered every year. —II. (II.) Botelho

223. Conservation Biology and Animal Behavior (3)
Lecture—1.5 hours; discussion—1.5 hours. Prerequisite: Zoology 208 or Animal Behavior 221. Influences of concepts of animal behavior (functional, evolutionary, developmental, mechanistic, and methodological issues) on conservation biology theory and practice. Offered, alternate years. (III.)—Caro

290. Seminar (1-3)
Seminar—1-3 hours. Prerequisite: consent of instructor. Seminar devoted to a highly specific research topic in any area of wildlife or fisheries biology. Special topic selected for a quarter will vary depending on interests of instructor and students. (S/U grading only.)—I, II, III. (I, II, III)

290C. Research Group Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. Weekly conference on research problems, progress and techniques in wildlife and fishery sciences. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III)

291. Seminar in Aquatic Ecology (2)
Seminar—2 hours. Prerequisite: graduate standing in biology. Presentation and analysis of assigned topics in aquatic ecology emphasizing fish, fisheries and aquatic conservation. Offered in alternate years. (S/U grading only.)—III. (III.)—Moyle

292. Physiology of Fishes Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing and at least two courses in physiology; consent of instructor. Seminar devoted to current topics concerning the physiological functioning of fishes. May be repeated twice for credit. (S/U grading only.)—I. (I)

294. Behavioral Ecology of Predators and Prey (3)
Seminar—2 hours. Prerequisite: graduate standing. Presentation and analysis of research papers on social and foraging behavior of predatory animals, antipredator strategies of prey species, co-evolution of predators and prey, and ecology of predator-prey interactions. May be repeated twice for credit. (Same course as Animal Behavior 294.) Offered in alternate years. —II. (II)

295. Seminar in Wildlife Ecotoxicology (3)
Seminar—2 hours, term paper. Prerequisite: graduate standing in biology. Presentation and analysis of assigned and selected research papers on transport, exposure, and effects of environmental contaminants on wildlife-associated ecosystem components, especially at individual/population levels. Specific subjects vary each offering. Offered in alternate years. (S/U grading only.)—II. Anderson

297T. Supervised Teaching in Wildlife and Fisheries Biology (1-3)
Tutorial—3 to 9 hours. Prerequisite: meet qualifications for teaching assistant; graduate standing; and consent of instructor. Tutoring and teaching students in undergraduate courses in Wildlife, Fish, and Conservation Biology. Weekly conferences with instructor; evaluations of teaching; preparing for and conducting demonstrations, laboratories, and discussions; preparing and grading examinations. May be repeated for a total of 6 units when a different course is tutored. (S/U grading only.)

298. Group Study (1-5)

299. Research (1-12)
(S/U grading only.)

Students transferring to UC Davis from another institution or new students declaring the major of Wildlife, Fish, and Conservation Biology must consult the Master Adviser so that their program can be evaluated and a faculty adviser assigned. See the Staff Adviser in 1089 Academic Surge Building or telephone (530) 752-9796.

Wine Production

Food Science and Technology, on page 293; Microbiology, on page 399; and Viticulture and Enology, on page 519.

Women and Gender Studies

Women and Gender Studies

(Asian American Studies, Women and Gender Studies)

Botsford, Loredana, Ph.D., Professor

Gayatri Gopinath, Ph.D.

(Arabic, Women's Studies)

Luz Mena, Ph.D.

(Asian American Studies, Women and Gender Studies)

Caren Klein, Ph.D.

(Jewish Studies, Women and Gender Studies)

Caren Kaplow, Ph.D.

(African American Studies, Women and Gender Studies)

Anna K. Kuhn, Ph.D.

(African American Studies, Women and Gender Studies)

Luz Mena, Ph.D.

(African American Studies, Women and Gender Studies)

Kimberly D. Netles, Ph.D.

(African American Studies, Women and Gender Studies)

Margaret Swain, Ph.D.

(African American Studies, Women and Gender Studies)

Gayatri Gopinath, Ph.D., Associate Professor

Wendy Ho, Ph.D.

(Asian American Studies, Women and Gender Studies)

Suad Joseph, Ph.D.

(Antropology, Women and Gender Studies)

Susan Kaiser, Ph.D. (Textiles and Clothing, Women and Gender Studies)

Caren Klein, Ph.D.

(Women and Gender Studies, Cultural Studies)

Anna K. Kuhn, Ph.D.

(Women and Gender Studies)

Kimberly D. Netles, Ph.D.

(Women and Gender Studies)

Margaret Swain, Ph.D. (Center for Gender and Global Issues, Women and Gender Studies)

Gayatri Gopinath, Ph.D., Associate Professor

Wendy Ho, Ph.D., Associate Professor (Asian American Studies, Women and Gender Studies)

Susan Kaiser, Ph.D. (Textiles and Clothing, Women and Gender Studies)

Anna K. Kuhn, Ph.D.

Luz Mena, Ph.D., Assistant Professor

Kimberly D. Netles, Ph.D., Assistant Professor

Kimberly D. Netles, Ph.D., Associate Professor

Margaret Swain, Ph.D., Adjunct Associate Professor

Emeriti Faculty

Judith Newton, Ph.D., Professor Emerita

Leslie Rabine, Ph.D., Professor Emerita

The Major Program

Women’s Studies is an interdisciplinary major founded on the premise that gender is a historically variable construction that centrally shapes the historical experience and everyday lives of women as well as men. Women’s Studies also assumes that gender, race, class, sexual and national identities are constructed in relation to one another. The intersections of these categories of experience as well as the history of debate over what these categories mean is an important strand of the Women’s Studies curricula. Women’s Studies at UC Davis is particularly rich in faculty doing comparative, cross-cultural work on women and gender. Among the faculty offering courses for the major are scholars working on women and gender in Africa, the Caribbean, the Americas, China, Europe, Japan, India, various countries of the Middle East, Southeast Asia, and the United States.

The Program. Perhaps the most exciting, albeit challenging, aspect of the major is the flexibility offered to students. Women Studies Program is that students can pursue their particular academic interests and design their course of study accordingly. In devising their program of study, students will draw on courses in African American and African Studies, Anthropology, Asian American Studies, Chicana/o Studies, Comparative Literature, English, French, German, History, Italian, Linguistics, Native American Studies, Political Science, Psychology, Sociology, Spanish, Textiles and Clothing, and other related disciplines. In addition to offering a broad array of courses that deal with gender, race, class, ethnicity, and sexuality, the Women and Gender Studies Program affords interested students the opportunity to earn internship credit and conduct independent research as well as take advantage of the Honors Thesis option.

Students design a program of study in consultation with an adviser that is in accordance with their individual career goals. Many Women and Gender Studies majors find it advantageous to pursue a double major, or to minor in another discipline such as Political Science, History, English, Sociology, Comparative Literature or Ethnic Studies.

Career Alternatives. A degree in Women’s opens possibilities for future employment. The WGS Program introduces students to relevant social issues, fosters critical thinking, and encourages social advocacy; it also hones their verbal and writing skills. It prepares students for entrance into graduate programs in the Humanities and Social Sciences. Pre-professional students will discover that a major in Women’s Studies offers useful preparatory training for medical or law school. It is particularly suitable for those interested in specializing in social or family-related issues. Students who plan to do practical work in counseling, clinical psychology, social services, or political science will also find Women’s Studies to be a helpful undergraduate major. Those who wish to do graduate level research in such fields as history, literature, ethnic studies, philosophy, sociology, anthropology, economics, political science, French, German, Italian, comparative literature, dramatic art, education, English. Spanish will also benefit from a strong undergraduate background in women’s history, feminist social theory, and a feminist understanding of narrative and cultural representation.

Increasingly, corporations, colleges and universities, insurance companies, and personnel firms are hiring specialists in women and gender studies as consultants. Current state and federal agencies need people who have special understanding for the problems that women face in society, industry, and the professions. Educational institutions need specialists to develop and administer women’s studies programs, women’s centers, and other organizations designed specifically to study and assist women.
Women's Studies

A.B. Major Requirements:

Preparatory Subject Matter ................................. 20
Two courses from Women's Studies 20, 50, 60, 70 ................. 8
Three courses selected from the following:
African American and African Studies 10, 15, American Studies 1E, 1F, Anthropology 2, 20, 21, Art History 15, Asian American Studies 1, 2, Chicano/a Studies 10, 50, Classics 15, Comparative Literature 12, Dramatic Art 1, English 30A or 308, 45, 46A or 46B, History 72A, 72B, Humanities 10, Nationalities 1, 10, Nature and Culture 1, Political Science 7, Psychology 1, Science and Society 1, 15, Sociology 1, 2, 3, Textiles and Clothing 7, Women's Studies 1, 12

Depth Subject Matter ........................................ 44
Women's Studies 103, 104, 190 and one additional upper division Women's Studies course .................. 16
Cross-Cultural Requirement ................................... 16
Courses used to meet this requirement may not duplicate those used to meet other Women's Studies major requirements. The table that follows represents a partial list of options; other courses may be included with the consent of the Women's Studies adviser.


Gender-based courses ........................................ 12
Choice of one of two tracks: Disciplinary or Thematic. Courses used to meet this requirement may not duplicate those used to meet other Women's Studies major requirements.

Disciplinary track

Choose two courses from one of the following focus groups:
Anthropology focus: Anthropology 129, 130, 131, 134, 139, 148B, 158, Women's Studies 102, 182, 184.


Literature and Language focus:

Sociology and Psychology focus:

Thematic track

In consultation with a Women's Studies adviser, choose three courses that form a thematic cluster (for example, Gender and Race in the United States; The Cultural Representations of Gender; Gender and Public Policy; Gender and Global Issues; Gender and Autobiography; The Body; Theory and Representation, Sexualities; Gender and Science). Other clusters may be developed in consultation with a Women's Studies adviser.

Total units for the major .................................... 64

Major Adviser. All Women's Studies majors and minors must consult with a faculty adviser, individually, at least once each academic year.

Minor Program Requirements:

Preparatory Subject Matter .................................... 24
Women's Studies 20, 50, 60, 70 or 80 ......... 4
Choose one course from American Studies 123, 133, Anthropology 139, Asian American Studies 112, Chicano/a Studies 111, 112, 122, 131, Native American Studies 134, 180, Sociology 134, 172, Women's Studies 160, 180 .............. 4

Additional Electives from approved list of upper division cross-listed Women's Studies courses ....................................... 12
Note: When no Women's Studies adviser, other upper division courses may be accepted toward the minor program. Under no circumstances may more than one lower division course be offered in satisfaction of requirements for the minor.

Minor Adviser. All Women's Studies majors and minors must consult with a faculty adviser, individually, at least once each academic year.

Graduate Study. The Women's Studies Program offers a designated emphasis in Feminist Epistemology and Research for students enrolled in the Ph.D. programs of twelve other affiliated departments.

Courses in Women's Studies (WMS)

Lower Division Courses

20. Cultural Representations of Gender (4)

Lecture/discussion—4 hours. Prerequisite: one course specified for the Women's Studies major. Interdisciplinary investigation of how specific cultures represent gender difference. Examine a variety of cultural forms and phenomena including film, television, literature, music, popular movements, and institutions. GE credit: ArtHum, Div. Wrt.—II. (III.)

25. Gender and Global Cinema (4)

Lecture—3 hours; film viewing—3 hours. The role gender plays in film history/culture in various geographical contexts and in aspects of contemporary globalization. Films from nations such as China, Colombia, Cuba, Ethiopia, India, Iran, Korea, New Zealand, and the U.S. GE credit: ArtHum, Div. Wrt.—II. (III.)

50. Introduction to Women and Gender Studies (4)

Lecture—3 hours; discussion—1 hour. Interdisciplinary introduction to the field which integrates anthropological, artistic, cultural studies, historical, legal, literary, philosophical, psychological, and scientific, and sociological perspectives on the study of gender and its relationship to race, sexuality, class, and other aspects of social experience. GE credit: ArtHum or SocSci, Div. Wrt.—II. III, II. III. Gopinath, Ho, Kuhn, Mena, Nettes

60. Introduction to Feminist Interpretations of Western Thought (4)

Lecture/discussion—4 hours. A critical introduction to major traditions of social thinking in the West from a feminist perspective. Not offered every year. GE credit: ArtHum or SocSci, Div. Wrt.

70. Theory and History of Sexualities (4)

Lecture/discussion—4 hours. Key issues in the social construction, organization, and reproduction of sexualities such as the intersection of sexual identity with gender, race, ethnicity, and class, and the relation between movements for sexual liberation and the regulation of the body. GE credit: ArtHum or SocSci, Div.—II.

80. Special Topics in Women's Studies (4)

Lecture/discussion—4 hours. In-depth examination of a women's studies topic related to the research interest of the instructor. May be repeated for credit when topic varies. Limited enrollment. —Gopinath, Ho, Joseph, Kaisl, Kuhn, Mena, Nettes, Swain

90X. Lower Division Seminar (2)

Seminar—2 hours. Examination of a special topic in Women's Studies through shared readings, discussions, and written assignments. Offered in alternate years. —Gopinath, Ho, Joseph, Kaisl, Kulp, Kuhn, Mena, Nettes, Swain

11. Research Seminar in the Transnational Production and Consumption of Fashion (1-2)

Seminar—1-2 hours. Preparation for a research conference. May be repeated for credit when topic varies. —III (II) Kaiser

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)—Gopinath, Ho, Joseph, Kaisl, Kulp, Kuhn, Mena, Nettes, Swain

199. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)—Gopinath, Ho, Joseph, Kaisl, Kulp, Kuhn, Mena, Nettes, Swain

Upper Division Courses

102. Colonialism, Nationalism, and Women (4)

Lecture/discussion—4 hours. Prerequisite: one course specified for Women's Studies major. Explores key dimensions of women's relationship to colonialism and nationalism in one or more societies. GE credit: SocSci, Div.—II. Mena, Swain

103. Introduction to Feminist Theory (4)

Lecture/discussion—4 hours. Prerequisite: one course specified for the Women's Studies major. Introduction to the emergence of feminist theory and to key concepts in feminist theorizing. Examination of past and current debates over sexuality, race, identity politics, and the social construction of women's experience. —I (I) Gopinath, Kuhn, Mena, Nettes

104. Feminist Approaches to Inquiry (4)

Lecture/discussion—4 hours. Prerequisite: one course specified for the Women's Studies major. Feminist applications and transformations of traditional disciplinary practices; current issues and methodologies in feminist interdisciplinary work. —II. (II) Mena, Nettles

130. Feminism and the Politics of Family Change (4)

Lecture/discussion—4 hours. Prerequisite: any Women's Studies course or Sociology 131 or 132. An examination of contemporary conflicts over family values and the changing family from a feminist perspective. Offered in alternate years. GE credit: ArtHum or SocSci, Div.—II.

136. Topics in Gender, Production, Consumption, and Meaning (4)

Lecture/discussion—3 hours; term paper Construction of gender through production and consumption of goods and services. Transnational movement of peoples and products. Topics may include fashion, film, food, and technology. May be repeated for credit. GE Credit: ArtHum, Div, SocSci, Writ.—Gopinath, Ho, Kaisl, Kuhn, Nettes

137. Feminist Interpretations of Contemporary Western Thought (4)

Lecture/discussion—4 hours. Prerequisite: one course in Women's Studies, or consent of instructor. Introduction to decolonizing, deessentializing, and interrogating poststructuralist, postmodern, and postcolo
138. Transnational Studies of Dress, Fashion, and Gender (4)

139. Feminist Cultural Studies (4)
Lecture/discussion—4 hours. Prerequisite: one course in Women's Studies or American Studies. The histories, theories, and practices of feminist traditions within Cultural Studies. (Same as course American Studies 139) GE credit: SocSci, Div, Wrt.—(II.) West

158. Contemporary Masculinities (4)
Lecture/discussion—4 hours. Prerequisite: one course specified for the Women’s Studies major. A multidisciplinary study of contemporary trends in masculinity and the economic, social and political forces that have shaped them. Topics may include men’s movements, ethnic nationalist masculinities, and images of masculinity in popular culture. GE credit: ArtHum or SocSci, Div.—Ill. Newton, Ho

160. Representations of Women in Color in Cinema (4)
Lecture/discussion—2 hours; film viewing—3 hours. Prerequisite: course 20 or another film course. The representations of women of color in commercial and independent films from a feminist perspective. GE credit: ArtHum, Div.—(III.)

162. Feminist Film Theory and Criticism (4)
Lecture/discussion—3 hours; film-viewing—3 hours. Prerequisite: one course from the Women’s Studies major and Humanities 10 or consent of instructor. Historical overview of and contemporary issues in feminist film theory, including representation, spectatorship, and cultural production. Film stars, women filmmakers, and the intersections of gender, race, sexuality, and class in films and their audiences. Offered in alternate years. GE credit: ArtHum, Div.—III. Constable

164. Topics in Gender and Cinematic Representation (4)
Lecture/discussion—3 hours; film-viewing—3 hours. Prerequisite: one course from the Women’s Studies major and Humanities 10 or consent of instructor. Examination of a specific topic within the broad rubric of gender and cinema. Possible topics include gender in Hollywood, genre, nation, cinema; and gender and film genre. Topics vary. May be repeated twice for credit when topic differs. Offered in alternate years. GE credit: ArtHum, Div.—Gopinath, Kuhn

165. Feminist Media Production (6)
Lecture/discussion—3 hours; laboratory—3 hours; fieldwork—6 hours. Prerequisite: one course in Women and Gender Studies or consent of instructor. Basics of video production and community service. Video, audio and photography instruction; feminist community documentary; video ethnography; video journals, alternative representations of fashion and women’s bodies. Fundamentals of camera and microphone operation, interviewing techniques, and editing. May be repeated two times for credit if topic differs. Not offered every year. GE credit: ArtHum, Div. SocSci, Wrt.—Kuhn, Nettles

170. Queer Studies (4)
Lecture/discussion—4 hours. Prerequisite: course 20, or 50, or 70, or consent of instructor. Study of queer sexualities, identities, theories, practices. Alternative sexualities as historical, social, and cultural constructions in intersections with race, gender, class, nationality. Interdisciplinary exploration of sexual liberation and the regulation of sexuality through history, theory, and expressive cultural forms. GE credit: ArtHum or SocSci, Div, Wrt. Not offered every year.—Gopinath, Rodriguez

178A-F. Transnationalism and Writing by Women of Color (4)
Lecture/discussion—4 hours. Prerequisite: one course in Women’s Studies, or consent of instructor. Writings by women of color in a transnational framework, understood in their cultural, socio-economic, and historical contexts. The intersection among gender, writing, nationalism, and transnationalism, with focus on women’s writing in specific geographic/national locations and their responses: (A) The Arab World; (B) Asia; (C) The Caribbean; (D) Africa; (E) Diasporic Women Writers in Europe; (F) Topics on Women Writers of Color. Not offered every year. GE credit: ArtHum, Div. Wrt.—Gopinath, Ho, Joseph, Kuhn, Mena, Nettles

179. Gender and Literature (4)
Lecture/discussion—4 hours. Prerequisite: one course in Women’s Studies, or consent of instructor. Role of literature, especially novels, in constructing, challenging, and transforming normative genders in society. Transnational and transnational focus on gender in its intersections with race, class, sexuality, and politics. Not offered every year. GE credit: ArtHum, Div. Wrt.—Gopinath, Ho, Joseph, Kuhn, Mena, Nettles

180. Women of Color Writing in the United States (4)
Lecture/discussion—4 hours. Prerequisite: course 20 or 50. Literature, especially novels, written by contemporary women of color in the United States, understood in their socioeconomic, cultural and historical contexts. GE credit: ArtHum, Div.—II. Ho, Nettles

182. Globalization, Gender and Identity (4)
Lecture/discussion—4 hours. Prerequisite: course 50. Feminist theories of gender on self and identity and cross cultural study as it intersects gender with race, class, ethnicity. Impact of globalization processes on identity. Offered in alternate years. GE credit: SocSci, Div.—III. Mena, Swain

184. Gender in the Arab World (4)
Lecture/discussion—4 hours. Prerequisite: course 50. Examination of the history, culture, and social/political/economic dynamics of gender relations and gendering in the Arab world. GE credit: SocSci, Div. Wrt.—II. Joseph

187. Gender and Social Policy (4)
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing and a course in Women’s Studies. The role of gender in the creation of social policies, especially with respect to issues brought into the policy areas by contemporary feminism. Offered in alternate years. GE credit: SocSci, Div.—(III) Nettles

189. Special Topics in Women and Gender Studies (4)
Lecture/discussion—4 hours. Prerequisite: one course from the Women’s Studies major. In-depth examination of a women’s studies topic related to the research interests of the instructor. May be repeated once for credit if topic differs. Not offered every year.—I. Gopinath, Ho, Joseph, Kaiser, Kuhn, Mena, Nettles, Swain

190. Senior Seminar (4)
Seminar—4 hours. Prerequisite: senior standing in Women’s Studies. Course studies and analysis of women’s Studies majors, which focuses on current issues on feminism as they impact theory, public policy, and practice.—II. (III) Gopinath, Ho, Joseph, Kaiser, Kuhn, Mena, Nettles, Swain

191. Capstone Seminar (4)
Seminar—4 hours. Prerequisite: course 104 or Textiles and clothing 107, and course 194HA, course 199, or Textiles and Clothing 199, or consent of instructor. Revision, completion, and presentation of senior research or creative project. Creating a multimedia Web site for publishing research and creative projects. GE credit: Wrt.—II. (III) Kaiser

192. Internship in Women’s Studies (1-12)
Internship—3.36 hours; written report. Prerequisite: completion of a minimum of 84 units and consent of instructor; enrollment dependent on availability of internship positions with priority to Women’s Studies majors. Supervised internship in positions/institutional settings dealing with gender-related problems or issues, as for example, a women’s center, affirmative action office, advertising agency, or social welfare agency. Written report on internship experience. (P/NP grading only)—Gopinath, Ho, Joseph, Kaiser, Kaplan, Kuhn, Mena, Nettles, Swain

193. Gender and Global Issues Internship Seminar (2)
Seminar—2 hours. Prerequisite: course 192 concurrently. The ethics of working in communities and community projects, encompassing feminist understandings of activism, communities, globalization, multiculturalism, and the politics of institutions, agencies, and organizations. May be repeated for credit. (P/NP grading only)—I, II, III, II, III, Swain

194A-194B. Senior Honors Project in Women’s Studies (4-6)
Independent study—12 hours. Prerequisite: senior standing, Women’s Studies major, and adviser’s approval. In consultation with an adviser, students complete a substantial research paper or significant creative project on a Women’s Studies topic. (Deferred grading only, pending completion of sequence)—Gopinath, Ho, Joseph, Kaiser, Kaplan, Kuhn, Mena, Nettles, Swain

195. Thematic Seminar in Women’s Studies (4)
Seminar—4 hours. Prerequisite: two courses specified for women’s studies major. Group study of a topic, issue or area in feminist theory and research involving intensive reading and writing. May be repeated for credit when topic differs. Limited enrollment. GE credit: ArtHum or SocSci, Div.—III. Gopinath, Ho, Joseph, Kaiser, Kuhn, Mena, Nettles, Swain

197T. Tutoring in Women’s Studies (1-4)
Tutoring—3-12 hours. Prerequisite: upper division standing and consent of director. Leading small, voluntary discussion groups associated with a Women’s Studies course. May be repeated for credit for a total of 8 units. (P/NP grading only)

198. Directed Group Study (1-5)
Prerequisite: upper division standing, consent of instructor. (P/NP grading only)—Gopinath, Joseph, Kaiser, Kaplan, Kuhn, Mena Nettles, Swain

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: upper division standing, consent of instructor. (P/NP grading only)—Gopinath, Ho, Joseph, Kaiser, Kaplan, Kuhn, Mena, Nettles, Swain

Graduate Courses

200A. Current Issues in Feminist Theory (4)
Seminar—4 hours. Current issues in feminist theory; techniques employed to build feminist theory in various fields.—I. (I) Gopinath, Ho, Joseph, Kaiser, Kuhn, Mena, Nettles, Swain

200B. Problems in Feminist Research (4)
Seminar—4 hours. Prerequisite: course 200A with a grade of B+ or better. Application of feminist theoretical perspectives to the interdisciplinary investigation of a problem or question chosen by the instructor(s). May be repeated for credit when subject area differs.—II. (II) Gopinath, Mena, Nettles
201. Special Topics in Feminist Theory and Research (4)
Lecture/discussion—4 hours. Explores in depth a topic in feminist theory and research related to the research interests of the instructor. May be repeated for credit when topic differs. Limited enrollment.—(II.) Gopinath, Ho, Joseph, Kaiser, Kuhn, Nettles, Swain

250. Cultural Study of Masculinities (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Interdisciplinary approaches to understanding the social and cultural construction of masculinities; attention to the effects of biology, gender, race, class, sexual and national identities; criticism of oral, printed, visual, and mass mediated texts, and of social relations and structures. (Same course as American Studies 250.)—Ho

Professional Course

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—I, II, III. (I, II, III.)
Gopinath, Ho, Joseph, Kaiser, Kuhn, Mena, Nettles, Swain

See Evolution and Ecology, on page 288.
1991 UC Davis has the highest graduation rate of the University of California campuses.
### ARTS & HUMANITIES

#### Majors
- African American and African Studies
- American Studies
- Art History
- Art Studio
- Asian American Studies (Humanities emphasis)
- Chicana/Chicano Studies (Cultural emphasis)
- Chinese
- Classical Civilization
- Comparative Literature
- Design
- Dramatic Art
- English
- Film Studies
- French
- German
- History
- Italian
- Japanese
- Landscape Architecture
- Medieval and Early Modern Studies
- Music
- Native American Studies
- Philosophy
- Religious Studies
- Russian
- Spanish
- Technocultural Studies
- Women's Studies

#### Minors
- African American and African Studies
- American Studies
- Art History
- Art Studio
- Asian American Studies
- Chicana/Chicano Studies
- Chinese
- Classical Civilization
- Comparative Literature
- Dramatic Art
- English
- Film Studies
- French
- German
- Global and International Studies (Arts and Humanities Emphasis)
- Greek
- History
- Italian
- Japanese
- Jewish Studies
- Landscape Restoration
- Latin
- Medieval and Early Modern Studies
- Music
- Native American Studies
- Philosophy
- Religious Studies
- Russian
- Sexuality Studies
- Social and Ethnic Relations
- Spanish
- Women's Studies

### SCIENCE & ENGINEERING

#### Majors
- Agri Mgmt & Rangeland Resource; see Ecological Management and Restoration
- Animal Biology
- Animal Science
- Animal Science & Management
- Anthropology (B.S. degree only)
- Applied Mathematics
- Applied Physics
- Atmospheric Science
- Avian Sciences
- Biochemistry and Molecular Biology
- Biological Sciences
- Biotechnology
- Cell Biology
- Chemistry
- Clinical Nutrition
- Computer Science
- Crop Science and Management; see Plant Sciences
- Ecological Management and Restoration
- Engineering (all majors)
- Entomology
- Environ Biology & Mangt; see Environmental Science and Management
- Environ Hort & Urban Forestry
- Environmental & Resource Sci; see Environmental Hort & Urban Forestry
- Environmental Biology & Mangt; see Environmental Science and Management
- Environmental Toxicology
- Evolution, Ecology & Biodiversity
- Exercise Biology
- Fiber and Polymer Science
- Food Science
- Genetics
- Geology
- Hydrology
- Mathematical and Scientific Computation
- Mathematics
- Microbiology
- Natural Sciences
- Nature and Culture
- Neurobiology, Physiology, and Behavior
- Nutrition Science
- Physics
- Plant Biology
- Plant Sciences
- Psychology (B.S. degree)
- Soil & Water Science; see Environmental Science and Management
- Statistics
- Viticulture & Enology
- Wildlife, Fish & Conservation Bio
- Agri Computing & Info Systems
- Agri Entomology & Bee Biology
- Agricultural Entomology
- Agricultural Systems & Envir
- Animal Science
- Anthropology (Evolutionary emphasis)
- Apiculture
- Applied Computing & Info Systems
- Atmospheric Science
- Avian Sciences
- Biological Sciences
- Chemistry
- Community Nutrition
- Computational Applied Science
- Computer Science
- Construction Engineering and Management Engineering (all majors)
- Entomology
- Environmental Geology
- Environmental Horticulture
- Environmental Toxicology
- Exercise Biology
- Fiber and Polymer Science
- Fungal Biology & Ecology
- Geographic Information Systems
- Geographic Studies
- Geology
- Geophysics
- Hydrologic Science
- Hydrology
- Insect Ecology
- Insect Ecology & Evolution
- Mathematics
- Medical-Veterinary Entomology
- Nature and Culture
- Nematology
- Nutrition Science
- Nutrition and Food
- Oceanography
- Physics
- Plant Biology
- Precision Agriculture
- Quantitative Biology and Bioinformatics
- Science and Society
- Soil Science
- Statistics

#### SOCIAL SCIENCES

#### Majors
- Anthropology (A.B. degree)
- Asian American Studies (Social Science emphasis)
- Chicana/Chicano Studies (Social/Policy Studies emphasis)
- Communication
- Community and Regional Development
- Economics
- Environ Policy Analy & Plan
- Human Development
- Intern'l Agri Devlopmt
- International Relations
- Linguistics
- Managerial Economics
- Middle East/South Asia Studies
- Political Science
- Political Science-Public Service
- Psychology (A.B. degree)
- Science & Tech Studies
- Sociology
- Sociology-Organizational Studies
- Textiles & Clothing
- Aging and Adult Development
- Agri & Managerial Econ
- Anthropology (General emphasis)
- Anthropology (Sociocultural emphasis)
- Communication
- Community Development
- Contemporary Leadership
- East Asian Studies
- Economics
- Education
- Energy Policy
- Environ Policy Analy & Plan
- Environmental Policy Analysis
- Global and International Studies (Social Science emphasis)
- History & Philosophy of Science
- Human Development
- Intern'l Agri Devlopmt
- Latin American and Hemispheric Studies
- Linguistics
- Linguistics for Language Teachers
- Managerial Economics
- Middle East/South Asia Studies
- Political Science
- Psychology
- Science and Society
- Sociology
- Technology Management
- Textiles & Clothing
- War-Peace Studies
### GENERAL EDUCATION COURSES

**TOPICAL BREADTH**

These courses provide GE credit for topical breadth. Many of these courses also satisfy the GE requirement for social-cultural diversity (indicated by D) and/or provide GE credit for writing experience (indicated by W). Complete lists of the courses that satisfy the social-cultural diversity requirements and the courses that provide writing experience credit follow this list.

#### Arts & Humanities

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* This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously.

† Also assigned to another area of topical breadth.

# Credit for writing experience allowed if course taken concurrently (see writing experience list).
General Education Courses/Options
Science & Tech Studies 131 † .........
Science & Tech Studies 173 ............
Science and Society 40 † .................. D
Science and Society 42 †
Spanish 139 ..................................... D
Spanish 141 ..................................... D
Spanish 141S ................................... D
Spanish 143
Spanish 144
Spanish 148 ..................................... D
Spanish 148S ................................... D
Spanish 149 ..................................... D
Spanish 160 ..................................... D
Spanish 170 ..................................... D
Spanish 170S ................................... D
Spanish 172 ..................................... D
Spanish 173 ..................................... D
Spanish 174 ..................................... D
Spanish 175 ..................................... D
Spanish 176 ..................................... D
Technocultural Studies 1
Technocultural Studies 2
Technocultural Studies 4
Technocultural Studies 5
Technocultural Studies 6
Technocultural Studies 150
Technocultural Studies 158
Women's Studies 20 ........................ D
Women's Studies 25 ........................ D
Women's Studies 50 † ...................... D
Women's Studies 60 † ...................... D
Women's Studies 70 † ...................... D
Women's Studies 130 † .................... D
Women's Studies 136 † .................... D
Women's Studies 137 † .................... D
Women's Studies 138 † .................... D
Women's Studies 158 † .................... D
Women's Studies 160 ...................... D
Women's Studies 162 ...................... D
Women's Studies 164 ...................... D
Women's Studies 165 † .................... D
Women's Studies 170 † .................... D
Women's Studies 178A .................... D
Women's Studies 178B .................... D
Women's Studies 178C .................... D
Women's Studies 178D .................... D
Women's Studies 178E .................... D
Women's Studies 178F .................... D
Women's Studies 179 ...................... D
Women's Studies 180 ...................... D
Women's Studies 195 † .................... D

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Science & Engineering
Animal Science 1 .............................
Animal Science 2 .............................
Animal Science 18
Animal Science 42 ...........................
Animal Science 104
Animal Science 105
Animal Science 106 .........................
Animal Science 115
Animal Science 120
Animal Science 123
Animal Science 124 .........................
Animal Science 136 .........................
Animal Science 146 .........................
Anthropology 1 ............................... D
Anthropology 5 ...............................
Anthropology 15 ............................. D
Anthropology 15V ........................... D
Anthropology 34 ............................. D
Anthropology 151 ...........................
Anthropology 152 ...........................
Anthropology 153 ...........................
Anthropology 154A .........................
Anthropology 155 ...........................
Anthropology 156
Anthropology 157 ...........................
Anthropology 158 ........................... D
Anthropology 181
Anthropology 183 ...........................
Astronomy 10G
Astronomy 10L
Astronomy 10S
Atmospheric Science 5
Atmospheric Science 6
Atmospheric Science 10 ..................
Avian Sciences 11 ............................
Avian Sciences 13 ............................
Biological Sciences 1C .....................
Biological Sciences 10

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Biological Sciences 10V ...................
Biotechnology 1
Chemistry 2A
Chemistry 2B
Chemistry 2C
Chemistry 10 ...................................
Chemistry 150 .................................
Chicano Studies 40 .......................... D
Chicano Studies 40S ........................ D
Chicano Studies 140A
Design 137B †
Engineering 7
Engineering 10 ................................
Engineering 160 †
Engr: Biological Systems 75
Engineering Biomedical 161L
Engr: Civil & Environ 123 † ........... D
Engr: Computer Science 15 .............
Entomology 1 †
Entomology 2 ..................................
Entomology 10
Entomology 100 ..............................
Entomology 101
Entomology 102
Entomology 103 ..............................
Entomology 104
Entomology 107 ..............................
Entomology 109 ..............................
Entomology 110 ..............................
Entomology 116
Entomology 117 ..............................
Entomology 119 ..............................
Entomology 140S ............................
Entomology 153 ..............................
Entomology 156 ..............................
Entomology 158 † ...........................
Environmental Horticulture 1 .........
Environ & Resource Science 8 † .....
Environ & Resource Science 30
Environ & Resource Science 100 ....
Environ & Resource Science 121 ....
Environ & Resource Science 131 ....
Environ Science & Policy 10 ...........
Environ Science & Policy 30 ...........
Environ Science & Policy 116 .........
Environ Science & Policy 121 .........
Environmental Toxicology 10
Environmental Toxicology 20 .........
Environmental Toxicology 30
Environmental Toxicology 101
Environmental Toxicology 127
Environmental Toxicology 128
Environmental Toxicology 135
Environmental Toxicology 146
Evolution and Ecology 2 .................
Evolution and Ecology 11
Evolution and Ecology 12 ...............
Evolution and Ecology 108
Evolution and Ecology 138 .............
Evolution and Ecology 141 .............
Exercise Biology 10 ......................... D
Exercise Biology 113
Exercise Biology 115
Exercise Biology 117
Exercise Biology 126
Fiber And Polymer Science 110 † ...
Food Science & Technology 3
Food Science & Technology 10 †
Food Science & Technology 120
Food Science & Technology 128
Geology 1
Geology 2 ........................................
Geology 3 ........................................
Geology 4
Geology 10
Geology 16
Geology 16G ....................................
Geology 30
Geology 32
Geology 35
Geology 36 ......................................
Geology 100 ....................................
Geology 101 ....................................
Geology 105 ....................................
Geology 106 ....................................
Geology 108 ....................................
Geology 109 (course 109L required
concurrently) ..................................
Geology 110 ....................................
Geology 115 † .................................
Geology 134 ....................................
Geology 138

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Geology 143 ....................................
Geology 145 ....................................
Human Development 117 ...............
Hydrologic Science 10 † ..................
Integrated Studies 8A ......................
International Agricultural Dev 162 . D
Landscape Architecture 50
Linguistics 175
Math & Physical Sci 1
Mathematics 16A
Mathematics 16B
Mathematics 16C
Mathematics 17A
Mathematics 17B
Mathematics 17C
Mathematics 21A
Mathematics 21AH
Mathematics 21B
Mathematics 21BH
Mathematics 21C
Mathematics 21CH
Mathematics 21M
Mathematics 36
Med: Cell Bio & Human Anat 101 ..
Microbiology 10
Microbiology 100 †
Molecular and Cellular Biology 10
Nature and Culture 1 † ....................
Nature and Culture 100 † ................
Neuro, Physio & Behavior 10
Neuro, Physio & Behavior 12 .........
Neuro, Physio & Behavior 14
Neuro, Physio & Behavior 15
Neuro, Physio & Behavior 68
Neuro, Physio & Behavior 132
Nutrition 10
Nutrition 114 ...................................
Nutrition 115 ...................................
Nutrition 120AN † .......................... D
Nutrition 120BN † ........................... D
Nutrition 127
Philosophy 13 † ...............................
Philosophy 30 † ...............................
Philosophy 31 †
Philosophy 32 † ...............................
Philosophy 107 † .............................
Philosophy 108 † .............................
Physics 10 ........................................
Physics 30
Physics 160 †
Plant Biology 108
Plant Biology 112
Plant Biology 116
Plant Biology 143 ............................
Plant Biology 147 ............................
Plant Pathology 140 ........................
Plant Science 8
Plant Science 12 † ............................ D
Plant Science 14 ..............................
Plant Science 120
Plant Science 121 ............................
Plant Science 130 ............................
Plant Science 141 † ..........................
Plant Science 142
Plant Science 151 ............................
Science & Tech Studies 1 †
Science & Tech Studies 20 † ...........
Science & Tech Studies 130A † .......
Science & Tech Studies 130B ..........
Science & Tech Studies 131 † .........
Science & Tech Studies 161 ............
Science and Society 1 † .................... D
Science and Society 2 † ....................
Science and Society 3 † ....................
Science and Society 4 † ....................
Science and Society 5 † ....................
Science and Society 7 † .................... D
Science and Society 8 † ....................
Science and Society 9 † ....................
Science and Society 10 † ..................
Science and Society 11 † ..................
Science and Society 12 † .................. D
Science and Society 15 † .................. D
Science and Society 18 † ..................
Science and Society 20 † ..................
Science and Society 25 † .................. D
Science and Society 30 † ..................
Science and Society 40 † .................. D
Science and Society 42 †
Science and Society 105 ..................
Science and Society 120 † ...............
Science and Society 135S † .............. D

527

Soil Science 10
Statistics 10 † ...................................
Statistics 12
Statistics 13
Statistics 13V
Statistics 32
Statistics 100
Statistics 102
Statistics 103
Statistics 104
Statistics 106
Statistics 108
Statistics 120
Statistics 138
Statistics 144
Textiles & Clothing 6
Textiles & Clothing 162
Viticulture & Enology 3 † ...............
Wild, Fish & Conserv Biol 10 ......... D
Wild, Fish & Conserv Biol 11 .........
Wild, Fish & Conserv Biol 102L .....
Wild, Fish & Conserv Biol 121 .......
Wild, Fish & Conserv Biol 153 .......
Wild, Fish & Conserv Biol 155 .......
Wild, Fish & Conserv Biol 156 .......

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* This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously.
† Also assigned to another area of topical breadth.
# Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

Afr Am & Afr Std 80 ....................... D
Afr Am & Afr Std 110 ..................... D
Afr Am & Afr Std 133 ..................... D
Afr Am & Afr Std 145A ................... D
Afr Am & Afr Std 145B ................... D
Afr Am & Afr Std 165 ..................... D
Afr Am & Afr Std 180 † .................. D
Agricult & Res Econ 1
Agricult & Res Econ 15 ................... D
Agricult & Res Econ 115A .............. D
Agricult & Res Econ 115B
Agricult & Res Econ 120
Agricult & Res Econ 146
Agricult & Res Econ 147
Agricult & Res Econ 150 ................. D
Agricult & Res Econ 175
Agricult & Res Econ 176
Agricultural Education 100 .............
Agricultural Education 160 .............
Agricultural Education 172 .............
American Studies 1B † ..................... D
American Studies 1C † .................... D
American Studies 1E † .................... D
American Studies 5 † .......................
American Studies 10 † ..................... D
American Studies 25 † ..................... D
American Studies 30 † ..................... D
American Studies 55 † ..................... D
American Studies 59 † ..................... D
American Studies 110 † ................... D
American Studies 120 † ................... D
American Studies 130 † ................... D
American Studies 132 † ................... D
American Studies 133 ...................... D
American Studies 139 ...................... D
American Studies 151 † ................... D
American Studies 152 † ................... D
American Studies 153 † ................... D
American Studies 154 † ................... D
American Studies 155 † ................... D
American Studies 156 † ................... D
American Studies 157 † ................... D
Animal Science 141 .........................
Animal Science 148 .........................
Animal Science 170 .........................
Anthropology 2 ............................... D
Anthropology 3 ............................... D
Anthropology 4 ............................... D
Anthropology 13 .............................
Anthropology 131 ........................... D
Anthropology 20 ............................. D
Anthropology 23 ............................. D
Anthropology 24 ............................. D
Anthropology 50 ............................. D
Anthropology 100
Anthropology 101 ........................... D
Anthropology 102 ........................... D
Anthropology 104N ......................... D
Anthropology 105 ...........................
Anthropology 109 ...........................
Anthropology 110 ........................... D
Anthropology 117 ........................... D
Anthropology 119
Anthropology 120 ........................... D

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General Education Courses/Options

Anthropology 122A .........................D
Anthropology 122B ..........................D
Anthropology 124 ............................D
Anthropology 125A .........................D
Anthropology 125B ..........................D
Anthropology 126A .........................D
Anthropology 126B ..........................D
Anthropology 127 ............................D
Anthropology 128A .........................D
Anthropology 128B ..........................D
Anthropology 130A .........................
Anthropology 130BN .......................
Anthropology 130C .........................
Anthropology 131 ............................D
Anthropology 134 ............................D
Anthropology 135 ............................D
Anthropology 136 ............................
Anthropology 138
Anthropology 139AN .......................D
Anthropology 139BN .......................D
Anthropology 140A .........................D
Anthropology 140B ..........................D
Anthropology 141A .........................D
Anthropology 141B ..........................D
Anthropology 142 ............................D
Anthropology 143A .........................D
Anthropology 143B ..........................D
Anthropology 144 ............................D
Anthropology 145 † .........................D
Anthropology 146 ............................D
Anthropology 147 ............................D
Anthropology 148A .........................D
Anthropology 148AS ........................D
Anthropology 148B ..........................D
Anthropology 148C .........................D
Anthropology 149A .........................D
Anthropology 149B ..........................D
Anthropology 170 ............................D
Anthropology 171 ............................
Anthropology 172 ............................D
Anthropology 173 ............................D
Anthropology 176 ............................D
Anthropology 178 ............................D
Anthropology 184
Asian American Studies 1 ................D
Asian American Studies 2 ................D
Asian American Studies 3 ................D
Asian American Studies 100 ............D
Asian American Studies 110 ............D
Asian American Studies 111 ............D
Asian American Studies 112 † .........D
Asian American Studies 114 ............
Asian American Studies 140 † .........D
Asian American Studies 150B ..........D
Asian American Studies 150C ..........D
Asian American Studies 150D ..........D
Asian American Studies 150E ..........D
Chicano Studies 23
Chicano Studies 110 ........................D
Chicano Studies 112 ........................D
Chicano Studies 120 ........................D
Chicano Studies 121 ........................D
Chicano Studies 123 ........................D
Chicano Studies 131 ........................D
Chicano Studies 131S ......................D
Chicano Studies 182 † .....................D
Communication 101
Communication 103
Communication 105
Communication 134
Communication 135 ........................D
Communication 136
Communication 138
Communication 140
Communication 141
Communication 142
Communication 143 ........................
Communication 146
Communication 152
Communication 165
Communication 170
Communication 189A ......................
Communication 189B ......................
Communication 189C .....................
Communication 189D .....................
Comm & Reg Develpmnt 1 .............D
Comm & Reg Develpmnt 2 .............D
Comm & Reg Develpmnt 17 ...........D
Comm & Reg Develpmnt 118 .........

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Comm & Reg Develpmnt 140 .........
Comm & Reg Develpmnt 151 .........D
Comm & Reg Develpmnt 152 .........
Comm & Reg Develpmnt 153A .......D
Comm & Reg Develpmnt 153B .......D
Comm & Reg Develpmnt 154 .........D
Comm & Reg Develpmnt 157 .........D
Comm & Reg Develpmnt 176 .........D
Comm & Reg Develpmnt 180
Consumer Sciences 100 ...................D
Dramatic Art 114 † ..........................D
Dramatic Art 144 † ..........................D
Economics 1A
Economics 1B
Economics 110A
Economics 110B
Economics 111A
Economics 111B
Economics 115A ..............................D
Economics 115B
Economics 121A
Economics 162
Education 110 ..................................
Education 120 ..................................
Education 122 ..................................D
Education 245
Engineering 160 †
Engr: Civil & Environ 123 † ............D
Engr: Civil & Environ 165 ...............
Entomology 158 † ............................
Environ & Resource Science 8 † ......
Environ Science & Policy 101 .........D
Environ Science & Policy 102 .........D
Environ Science & Policy 105 .........
Environ Science & Policy 161 .........
Environ Science & Policy 169 †
Environ Science & Policy 172
Environ Science & Policy 175
Exercise Biology 102
Exercise Biology 120 ........................D
Fiber And Polymer Science 110 † ....
Food Science & Technology 10 †
French 53 .........................................D
Geology 115 † ..................................
History 6 † .......................................D
History 7A † .....................................D
History 7B † .....................................D
History 7C † .....................................D
History 10A † ...................................D
History 115D ....................................D
History 115F † .................................D
History 132 ......................................D
History 139A † .................................
History 139B † .................................
History 140
History 147A † .................................
History 147B † .................................
History 147C † .................................D
History 149 † ...................................D
History 190A † .................................D
History 190B † .................................D
History 190C † .................................D
History 193A † .................................D
History 193B † .................................D
History 196B ....................................D
Human Development 102 ................
Humanities 3 ....................................
Humanities 5 † .................................
Humanities 6 † .................................
Humanities 8 † .................................D
Humanities 12 † ...............................
Humanities 18 † ...............................D
Humanities 60 † ...............................D
Hydrologic Science 10 † ...................
Integrated Studies 8C .......................
International Agricultural Dev 10 ....D
International Agricultural Dev 103 ..D
Jewish Studies 10 .............................D
Jewish Studies 121 ...........................
Landscape Architecture 1 † ..............
Landscape Architecture 2 .................
Landscape Architecture 3 .................
Landscape Architecture 168 † ..........
Linguistics 1 † ..................................
Linguistics 6 .....................................D
Linguistics 150 † ..............................
Linguistics 160 .................................D
Linguistics 163 .................................D
Linguistics 171

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Linguistics 177
Linguistics 182 † ..............................D
Med: Epid & Prev Med 175W .........
Microbiology 100 †
Native American Studies 1 ...............D
Native American Studies 10 † ..........D
Native American Studies 46 .............D
Native American Studies 55 .............D
Native American Studies 115 ...........D
Native American Studies 116 ...........D
Native American Studies 117 ...........D
Native American Studies 118 ...........D
Native American Studies 120 ...........D
Native American Studies 122 ...........D
Native American Studies 130A ........D
Native American Studies 130B .........D
Native American Studies 130C ........D
Native American Studies 133 ...........D
Native American Studies 134 ...........D
Native American Studies 180 ...........D
Nutrition 120AN † ...........................D
Nutrition 120BN † ...........................D
Philosophy 13 † ...............................
Philosophy 17 ..................................
Philosophy 104
Philosophy 109 † .............................
Philosophy 118 ................................D
Philosophy 119 ................................D
Physical Education 120 ....................D
Physics 160 †
Plant Science 12 † ............................D
Plant Science 141 † ..........................
Political Science 1 ............................
Political Science 2 ............................
Political Science 3 ............................
Political Science 4 ............................
Political Science 5 ............................
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Political Science 51
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Political Science 105 ........................
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Political Science 143A ......................D
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Political Science 144A ......................
Political Science 144B ......................
Political Science 146A ......................D
Political Science 146B ......................D
Political Science 147A ......................
Political Science 147B ......................
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* This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously.
† Also assigned to another area of topical breadth.
# Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

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Science & Tech Studies 1 †
Science & Tech Studies 20 † ............
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Science & Tech Studies 150 .............D
Science & Tech Studies 163
Science & Tech Studies 165 .............
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Science and Society 2 † ....................
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Textiles & Clothing 107 ..................D
Textiles & Clothing 174 ..................D
Viticulture & Enology 3 † ................
Washington Center 175 ...................
Women's Studies 50 † ......................D
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Women's Studies 195 † ....................D

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SOCIAL-CULTURAL DIVERSITY

These courses satisfy the GE requirement for social-cultural diversity. Many of these courses also provide GE credit for topical breadth or writing experience. Refer to the topical breadth and writing experience course lists to determine if any additional GE credit applies.

† Also assigned to another area of topical breadth and writing experience list.
‡ Credit for writing experience allowed if co-course taken concurrently (see writing experience list).

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**WRITING EXPERIENCE**

These courses satisfy the GE requirement for writing experience. Many of these courses also provide GE credit for topical breadth or social-cultural diversity. Refer to the topical breadth and social-cultural diversity course lists to determine if any additional GE credit applies.

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* This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously.

† Also assigned to another area of topical breadth.

# Credit for writing experience allowed if co-course taken concurrently [see writing experience list].
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| Anthropology 130A | Anthropology 130BN | Chemistry 113 |
| Anthropology 130C | Anthropology 134 | Chemistry 125 |
| Anthropology 134 | Anthropology 135 | Chemistry 150 |
| Anthropology 136 | Chicago Studies 10 | Chicago Studies 215 |
| Anthropology 136 | Chicago Studies 40 | Comparative Literature 144 |
| Anthropology 139AN | Chicago Studies 40S | Comparative Literature 145 |
| Anthropology 139BN | Chicago Studies 110 | Comparative Literature 146 |
| Anthropology 140A | Chicago Studies 112 | Comparative Literature 147 |
| Anthropology 140B | Chicago Studies 121 | Comparative Literature 151 |
| Anthropology 141A | Chicago Studies 121 | Comparative Literature 152 |
| Anthropology 141B | Chicago Studies 150 | Comparative Literature 153 |
| Anthropology 142 | Chicago Studies 181 | Comparative Literature 154 |
| Anthropology 142A | Chicago Studies 182 | Comparative Literature 155 |
| Anthropology 143A | Chinese 10 | Comparative Literature 157 |
| Anthropology 143B | Chinese 11 | Comparative Literature 158 |
| Anthropology 144 | Chinese 50 | Comparative Literature 159 |
| Anthropology 146 | Chinese 103A | Comparative Literature 160A |
| Anthropology 146 | Chinese 102 | Comparative Literature 160B |
| Anthropology 147 | Chinese 103 | Comparative Literature 161A |
| Anthropology 148A | Chinese 104 | Comparative Literature 161B |
| Anthropology 148B | Chinese 105 | Comparative Literature 162 |
| Anthropology 148C | Chinese 106 | Comparative Literature 164A |
| Anthropology 149A | Chinese 107 | Comparative Literature 164B |
| Anthropology 149B | Chinese 108 | Comparative Literature 164C |
| Anthropology 151 | Chinese 109A | Comparative Literature 164D |
| Anthropology 152 | Chinese 109B | Comparative Literature 165 |
| Anthropology 153 | Chinese 109C | Comparative Literature 165A |
| Anthropology 154A | Chinese 109D | Comparative Literature 165B |
| Anthropology 154 | Chinese 109E | Comparative Literature 166 |
| Anthropology 154L | Chinese 109F | Comparative Literature 166A |
| Anthropology 156 | Chinese 109G | Comparative Literature 166B |
| Anthropology 157 | Chinese 109H | Comparative Literature 167 |
| Anthropology 157L (course 157 required concurrently) | Chinese 109I | Comparative Literature 168 |
| Anthropology 158 | Chinese 110 | Comparative Literature 168A |
| Anthropology 170 | Classics 1 | Comparative Literature 168B |
| Anthropology 171 | Classics 2 | Comparative Literature 169 |
| Anthropology 172 | Classics 3 | Comparative Literature 169A |
| Anthropology 173 | Classics 5 | Comparative Literature 169B |
| Anthropology 176 | Classics 8 | Comparative Literature 169C |
| Anthropology 178 | Classics 10 | Comparative Literature 169D |
| Anthropology 183 | Classics 12 | Comparative Literature 170 |
| Art History 5 | Classics 10 | Comparative Literature 170A |
| Art History 110 | Classics 11 | Comparative Literature 170B |
| Art History 133 | Classics 14 | Dramatic Art 1 |
| Art History 135 | Classics 16 | Dramatic Art 15 |
| Art History 163A | Classics 17 | Dramatic Art 115 |
| Art History 163B | Classics 20 | Dramatic Art 116 |
| Art History 164 | Classics 50 | Dramatic Art 117 |
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| Art History 175 | Classics 112 | Dramatic Art 122 |
| Art History 176A | Classics 113 | Dramatic Art 123 |
| Art History 176B | Classics 114 | Dramatic Art 124 |
| Art History 177A | Classics 115 | Dramatic Art 125 |
| Art History 177B | Classics 116 | Dramatic Art 126 |
| Art History 178A | Classics 117 | Dramatic Art 127 |
| Art History 178B | Classics 119 | Dramatic Art 128 |
| Art History 178C | Communication 1 | East Asian Studies 113 |
| Art History 178D | Communication 14 | Education 110 |
| Art History 178E | Communication 143 | Education 119 |
| Art History 178F | Communication 189A | Education 120 |
| Art History 182 | Communication 189B | Education 122 |
| Art History 182A | Communication 189C | Engineering 10 |
| Art History 183B | Communication 190D | Engineering 45 |
| Art History 183C | Comm & Reg Development 1 | Engineering Biomedical 116 |
| Art History 184 | Comm & Reg Development 2 | Engr. Chemical 153A |
| Art History 185 | Comm & Reg Development 17 | Engr. Chemical 153B |
| Art History 185 | Comm & Reg Development 18 | Engr. Chemical 161L |
| Art History 186 | Comm & Reg Development 140 | Engr. Civil & Envir. 123 |
| Art History 188A | Comm & Reg Development 154 | Engr. Civil & Envir. 146 |
| Art History 188B | Comm & Reg Development 157 | Engr. Civil & Envir. 163 |
| Art History 188D | Comm & Reg Development 176 | Engr. Civil & Envir. 165 |
| Art History 188E | Comparative Literature 1 | Engr. Computer Science 15 |
| Art History 189 | Comparative Literature 2 | Engr. Materials Science 102L |
| Art Studio 26 | Comparative Literature 3 | Engr. Materials Science 172L |
| Art Studio 30 | Comparative Literature 4 | Engr. Materials Science 174 |
| Art Studio 147 | Comparative Literature 5 | Engr. Materials Science 174L |
| Art Studio 148 | Comparative Literature 6 | Engr. Materials Science 180 |
| Art Studio 149 | Comparative Literature 7 | Engr. Materials Science 181 |
| Art Studio 150 | Comparative Literature 8 | Engr. Materials Science 182 |

* This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously.

† Also assigned to another area of topical breadth.

# Credit for writing experience allowed if co-course taken concurrently (see writing experience list).
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<td>Political Science 1</td>
<td>Science &amp; Tech Studies 229</td>
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</table>

* This course may not be used to satisfy a college or university composition requirement and GE writing experience simultaneously.
† Also assigned to another area of topical breadth.
# Credit for writing experience allowed if co-course taken concurrently (see writing experience list).
GENERAL EDUCATION THEME OPTIONS

General Education theme options are sets of GE courses sharing a common intellectual theme. These GE theme options are not a separate element of the GE requirement, but a way of selecting your GE courses so that you may benefit from a coherent focus of study while completing the GE requirement. Completion of a theme satisfies the GE requirement for students with majors assigned to the GE topical breadth area of Arts and Humanities. Students with majors assigned to the topical breadth area of either Science and Engineering or Social Science will need to complete additional GE courses in Arts and Humanities to satisfy the campus GE requirement.

Global Population and Environmental Issues

For centuries, there have been concerns and predictions about population growth and its potential effects on the environment and the quality of life. Perspectives on population and environmental issues often vary based on such factors as gender, social class, culture, nation, race/ethnicity, and religion. In this group of courses, students will learn about the complex interplay among environmental, economic, and ethical issues through the study of global population patterns. They will then learn how science addresses the use of natural resources by humans, along with the fundamentals of environmental impacts such as global warming. This option group of courses explores diverse perspectives on global population and environmental issues by examining biological, physical, and social processes that influence the everyday lives of people around the world.

Topics might include the social, economic, and environmental challenges of population growth; and the ethics and dilemmas of natural resource use.

<table>
<thead>
<tr>
<th>Theme</th>
<th>Course Code</th>
<th>Requirement</th>
<th>Ge Gen Credit</th>
<th>Science or Social Category</th>
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<tbody>
<tr>
<td>Global Population</td>
<td>Atmospheric Science 5 [or 10]</td>
<td>SciEng, Wrt</td>
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<td></td>
<td>Environmental and Resource Sciences 60</td>
<td>SciEng, Wrt</td>
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<td>Human Development 117</td>
<td>SciEng, Wrt</td>
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<td></td>
<td>Agricultural and Resource Economics 15</td>
<td>SocSci, Div, Wrt</td>
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<td>Science and Society 1</td>
<td>SciEng or SocSci, Div, Wrt</td>
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<td></td>
<td>[or Fiber and Polymer Science 110</td>
<td>SciEng or SocSci, Wrt</td>
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<td>International Agricultural Development 10, SocSci, Div, Wrt</td>
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<td>[or Community &amp; Regional Development 1 SocSci, Div, Wrt</td>
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Biodiversity and Cultural Diversity

The nations with the greatest biodiversity often have tremendous ethnic and cultural diversity. This option examines diversity in many interrelated contexts: biological diversity and the impact of contemporary humans; values and cultural practices in regard to production and consumption; the clothes people wear; creation and use of social spaces; and the preservation of genetic resources for food, fiber, and pharmaceuticals.

Topics might include conservation biology; integration of human and natural systems; cultural expression through clothing and appearance; and discussion of what are cultural and social rights.

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<tr>
<th>Theme</th>
<th>Course Code</th>
<th>Requirement</th>
<th>Ge Gen Credit</th>
<th>Science or Social Category</th>
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<tbody>
<tr>
<td>Biodiversity and Cultural Diversity</td>
<td>Wildlife, Fish and Conservation Biology 10</td>
<td>SciEng, Div, Wrt</td>
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<td>Plant Biology 11</td>
<td>SciEng, Wrt</td>
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<td>Science and Society 105</td>
<td>SciEng, Wrt</td>
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<td>Textiles and Clothing 7</td>
<td>SocSci, Div, Wrt</td>
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<td></td>
<td>Community and Regional Development 2</td>
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<td></td>
<td>Landscape Architecture 2</td>
<td>SocSci, Wrt</td>
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Food and Fiber

This option focuses on food and fiber systems, from their plant, animal, or synthetic sources to their ultimate use by humans for health, safety, communication, and pleasure. Understanding these systems enables students to see the connections between the food and clothes that are part of our everyday lives and the scientific, social, and cultural issues that make them so significant to society as a whole.

Topics might include food and clothing safety, quality, and availability; media and consumer perceptions; and cultural histories, values, and meanings.

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<tr>
<th>Theme</th>
<th>Course Code</th>
<th>Requirement</th>
<th>Ge Gen Credit</th>
<th>Science or Social Category</th>
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<td>[or Plant Biology 12</td>
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<td>Nutrition 10 and Nutrition 11</td>
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<td>[or Food Science and Technology 10</td>
<td>SciEng or SocSci</td>
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<td>Textiles and Clothing 6</td>
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<td>Viticulture and Enology 3—3W cancelled</td>
<td>SciEng or SocSci</td>
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Changing Agriculture

Changing demographics, environmental issues, and social-political trends in California all play a role in public perceptions and policies related to our food and fiber systems, natural resources, and community values. These perceptions, policies, and values need to be critically examined in the context of larger global economic trends and environmental health and safety. In this option group of courses, students can explore a range of challenging issues related to the complex interplay between rural and urban needs and values.

Topics might include holistic approaches to agriculture; international migration and agricultural development; and how plants and animals influence the course of history.

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<th>Theme</th>
<th>Course Code</th>
<th>Requirement</th>
<th>Ge Gen Credit</th>
<th>Science or Social Category</th>
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<td>Entomology 110</td>
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<td>Plant Biology 12</td>
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<td>Agricultural and Resource Economics 15</td>
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<td>Environmental &amp; Resource Sciences 121*</td>
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<td>Science and Society 2</td>
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The UC-Blackwelder tomato harvester, developed at UC Davis in the '50s, is designated a historic landmark.

The Davis campus acquires the only university-owned airport in the state, then and now.
RESIDENCE FOR TUITION INFORMATION

Tuition Fee for Nonresident Students

If you have not been living in California with intent to make it your permanent home for more than one year immediately before the residence determination date for each term in which you propose to attend the University, you must pay a nonresident tuition fee in addition to all other fees. The residence determination date is the day instruction begins at the last of the University of California campuses to open for the quarter, and for schools on the semester system, the day instruction begins for the semester.

Law Governing Residence

The rules regarding residence for tuition purposes at the University of California are governed by the California Education Code and implemented by Standing Orders of the Regents of the University of California. Under these rules, adult citizens and certain classes of aliens can establish residence for tuition purposes. There are particular rules that apply to the residence classification of minors; see Who is a Resident?, below.

Who is a Resident?

If you are an adult student (18 years of age or older) you may establish residence for tuition purposes in California if: (1) you are a U.S. citizen; (2) you are a permanent resident or other immigrant; or (3) you are a nonimmigrant who is not precluded from establishing a domicile in the U.S. Nonimmigrants who are not precluded from establishing a domicile in the U.S. include those who hold visas of the following types: A, E, G, H-1, H-4, I, K, L, N, NATO, O-1, O-3, R, or V. To establish residence you must be physically present in California for more than one year and you must have come here with the intent to make California your home as opposed to coming to this state to go to school. Physical presence within the state solely for educational purposes does not constitute the establishment of California residence, regardless of the length of your stay. You must demonstrate your intention to make California your home by severing your residential ties with your former state of residence and establishing those ties with California. Evidence of intent must be dated one year before the term for which you seek resident classification. If these steps are delayed, the one-year duration will be extended until you have demonstrated both presence and intent for one full year. If your parents do not meet the University’s requirements for residence for tuition purposes, you are required to be financially independent in order to be a resident for tuition purposes; see Requirement for Financial Independence, below.

Your residence cannot be derived from your spouse, registered domestic partner, or your parents.

Requirement for Financial Independence

You will be considered “financially independent” if one or more of the following applies: (1) you are at least 24 years of age by December 31 of the calendar year for which you are requesting resident classification; (2) you are a veteran of the U.S. Armed Forces; (3) you are a ward of the court or both parents are deceased; (4) you have children or other legal dependents other than a spouse or registered domestic partner; (5) you are married or in a registered domestic partnership, or a graduate student or a professional student, and you were not claimed as an income tax deduction by your parents or any other individual for the tax year immediately preceding the term for which you are requesting resident classification; or (6) you are a single undergraduate student and you were not claimed as an income tax deduction by your parents or any other individual for the two tax years immediately preceding the term for which you are requesting resident classification, and you can demonstrate self-sufficiency for those years and the current year. Note: Graduate or professional school students who are employed at UC Davis 49% or more (or awarded the equivalent in University-administered funds; e.g., fellowships, grants, stipends) during the term for which classification as a resident is requested are exempt from the financial independence requirement.

Establishing Intent to Become a California Resident

Indications of your intent to make California your permanent residence can include the following: registering to vote and voting in California elections; designating California as your permanent address on all school and employment records, including military records if you are in the military service; obtaining a California driver’s license or, if you do not drive, a California Identification Card; obtaining California vehicle registration; paying California income taxes as a resident, including taxes on income earned outside California from the date you establish residence; establishing a California residence in which you keep your personal belongings; and licensing for professional practice in California. The absence of these indicia in other states during any period for which you claim residence can also serve as an indication of your intent. Documentary evidence is required and all relevant indications will be considered in determining your classification. Your intent will be questioned if you return to your prior state of residence when the University is not in session.

General Rules Applying to Minors

If you are an unmarried minor (under age 18), the residence of the parent with whom you live is considered to be your residence. If you have a parent living, you cannot change your residence by your own act, by the appointment of a legal guardian, or by the relinquishment of your parent’s right of control. If you lived with neither parent, your residence is that of the parent with whom you last lived. Unless you are a minor alien present in the U.S. under the terms of a nonimmigrant visa which precludes you from establishing domicile in the U.S., you may establish your own residence when both your parents are deceased and a legal guardian has not been appointed. If you derive California residence from a parent, that parent must satisfy the one-year durational residence requirement.

Specific Rules Applying to Minors

1. Deceased Parents. You may establish your own residence if both of your parents are deceased and a legal guardian has not been appointed for you.

2. Divorced/Separated Parents. You may be able to derive California resident status from a California resident parent if you move to California to live with that parent on or before your 18th birthday. If you begin residing with your California parent after your 18th birthday, you will be treated like any other adult student coming to California to establish residence.
3. Parent of Minor Moves From California. You may be entitled to resident status if you are a minor U.S. citizen or eligible alien whose parent(s) was a resident of California who left that state within one year of the residence determination date if: (1) you remained in California after your parent(s) departed; (2) you enroll in a California university postsecondary institution within one year of the time your parent(s) depart and establish residence elsewhere; and (3) once enrolled, you maintain continuous attendance in that institution. Financial independence will not be required in this case.

4. Self-Support. You may be entitled to resident status if you are a U.S. citizen or eligible alien, a minor, and can prove the following: (1) you lived in California for the entire year immediately preceding the residence determination date; (2) you are self-supporting and were self supporting the entire year preceding the residence determination date; and (3) you intend to make California your permanent home.

5. Two-Year Care and Control. You may be entitled to resident status if you are a U.S. citizen or eligible alien and you have lived continuously with an adult who is not your parent for at least two years prior to the residence determination date. The adult with whom you are living must have been responsible for your care and control for the entire two-year period and must have been residing in California during the one year immediately preceding the residence determination date.

Exemptions from Nonresident Tuition

1. Member of the Military. If you are a member of the U.S. military stationed in California on active duty, unless you are assigned for educational purposes to a state-supported institution of higher education, you may be exempt from the nonresident tuition fee. You must provide the residence deputy on campus with a statement from your commanding officer or personnel officer stating that your assignment to active duty in California is not for educational purposes. The letter must include the dates of your assignment to the state.

2. Spouse, Registered Domestic Partner, or Other Dependents of Military Personnel. You are exempt from payment of the nonresident tuition fee if you are a spouse, a registered domestic partner, a natural or adopted child or stepchild who is a dependent of a member of the U.S. military stationed in California on active duty. If you are enrolled in an educational institution and the member of the military is transferred on military orders to a place outside California where he or she continues to serve in the armed forces, or the member of the military retires from active duty immediately after having served in California on active duty, you may retain this exemption.

3. Child, Spouse, or Registered Domestic Partner of Faculty Member. To the extent funds are available, if you are an unmarried dependent child under age 21 the spouse, or the registered domestic partner of a member of the University faculty who is a member of the Academic Senate, you may be eligible for a waiver of the nonresident tuition fee. Confirmation of the faculty member's membership on the Academic Senate must be secured each term this waiver is granted.

4. University Employment Outside of California. You may be entitled to resident classification if you are a full-time University employee, or the unmarried dependent child, the spouse, or the registered domestic partner of a full-time University employee who is assigned to work outside of the state of California (e.g., Los Alamos National Laboratory and the University of California Washington D.C. Center). The University employee's employment status must be ascertained each term.

5. Child, Stepchild, Spouse, or Registered Domestic Partner of Deceased Public Law Enforcement or Fire Suppression Employee. You may be entitled to a waiver of the nonresident tuition fee if you are the child, the stepchild, the spouse, or the registered domestic partner of a deceased public law enforcement or fire suppression employee who was a California resident at the time of his or her death and who was killed in the course of fire suppression or law enforcement duties.

6. Dependent Child of a California Resident. A student who has not been an adult resident of California for more than one year and who is the dependent child of a California resident who has been a resident for more than one year immediately prior to the residence determination date may be entitled to resident classification until the student has resided in California for the minimum time necessary to become a resident so long as continuous attendance is maintained at an institution.

7. Native American Graduate of BIA School. You are eligible for an exemption from the nonresident fee if you are a graduate of a California school operated by the Federal Bureau of Indian Affairs and you enroll at one of the University of California campuses. Currently, Sherman Indian High School in Riverside is the only California high school operated by the BIA.

8. Employee of a California Public School District. A student holding a valid credential authorizing service in California public schools and employed by a school district in a full-time certificate position may be exempt from nonresident tuition.

9. Student Athlete in Training at U.S. Olympic Training Center, Chula Vista. An amateur athlete in training at the U.S. Olympic Training Center in Chula Vista may be exempt from nonresident tuition until s/he has resided in California for the minimum time necessary to become a resident.

10. Graduate of California High School. A student who attended high school in California for three or more years (9th grade included) and graduated from a California high school (or attained the equivalent) may be exempt from nonresident tuition.

11. Surviving Spouse, Registered Domestic Partner, or Dependent Child of a California Resident Killed in the September 11, 2001 Terrorist Attacks. An undergraduate student who is the surviving spouse, registered domestic partner, or dependent child of a California resident killed in the September 11, 2001 terrorist attacks on the World Trade Center, the Pentagon Building or the crash of United Airlines Flight 93, may be exempt from nonresident tuition and mandatory system-wide fees. Eligible students must meet the financial need requirements for the Cal Grant A program.

12. Recipient of a Congressional Medal of Honor or the Child of a Recipient of the Congressional Medal of Honor. An undergraduate student who is a recipient of a Congressional Medal of Honor or who is the child of a recipient of the Congressional Medal of Honor may be exempt from nonresident tuition and mandatory system-wide fees. The recipient of the Medal of Honor must be a California resident or must have been a California resident at the time of his or her death. The student may not be older than 27 and the student's annual income may not exceed the national poverty level.
**Temporary Absence**

If you are a nonresident student who is in the process of establishing a residence for tuition purposes and you return to your former home during non-instructional periods, your presence in the state will be presumed to be solely for educational purposes and only convincing evidence to the contrary will rebut this presumption; a student who is in the state solely for educational purposes will NOT be classified as a resident for tuition purposes regardless of the length of his or her stay. If you are a student who has been classified as a resident for tuition purposes and you leave the state temporarily, your absence could result in the loss of your California residence. The burden will be on you (or your parents if you are a minor) to verify that you did nothing inconsistent with your claim of a continuing California residence during your absence. Steps that you (or your parents) should take to retain a California residence include:

1. Continue to use a California permanent address on all records; educational, employment, military, etc.
2. Satisfy California resident income tax obligations. Note: If you are claiming California residence, you are liable for payment of income taxes on your total income from the date you establish California residence. This includes income earned in another state or country.
3. Retain your California voter’s registration and vote by absentee ballot.
4. Maintain a California driver’s license and vehicle registration. If it is necessary to change your driver’s license and/or vehicle registration while you are temporarily residing in another state, you must change them back to California within the time prescribed by law.
5. Maintain active bank accounts.

**Classification to Resident Status**

If you are classified as a non-resident student and you wish to be classified as a resident, you should file your petition at least three weeks before the first day of instruction for the quarter for which you seek resident status. Late petitions will not be accepted.

**Incorrect Classification**

If you were incorrectly classified as a resident, you are subject to reclassification and to payment of all nonresident tuition fees not paid. If you concealed information or furnished false information and were classified incorrectly as a result, you are also subject to University discipline. Resident students who become nonresidents must immediately notify the campus residence deputy.

**Time Limitation Providing Documentation**

If additional documentation is required for either an initial residence classification or reclassification but is not readily accessible, you will be allowed until the end of the applicable term to provide it. Please remember that you are liable for payment of fees when they are due. Petitioning for a change of status does not alter the fee payment deadline.

**Inquiries and Appeals**

Inquiries regarding residence requirements, determination and/or recognized exceptions should be directed to the Residence Deputy, Office of the University Registrar, One Shields Avenue, Davis, California 95616 or to residencedeputy@ucdavis.edu. NO OTHER UNIVERSITY PERSONNEL ARE AUTHORIZED TO SUPPLY INFORMATION RELATIVE TO RESIDENCE REQUIREMENTS FOR TUITION PURPOSES. You are cautioned that this summary is not a complete explanation of the law regarding residence. Please note that changes may be made in the residence requirement between the publication of this statement and the relevant residence determination date. Any student, following a final decision on residence classification by the residence deputy, may appeal in writing to the legal analyst at Legal Analyst—Residence Matters, 1111 Franklin St., 8th Floor, Oakland, CA 94607-5200 within 30 days of notification of the residence deputy’s final decision.

Remember, applicants and students are responsible for submitting ALL RELEVANT DOCUMENTATION AND INFORMATION to the campus Residence Deputy in support of their in-state residency request. Information or documents requested but not made available to the Residence Deputy will generally NOT be considered or reviewed on appeal.

**UNIVERSITY POLICY ON NONDISCRIMINATION, SEXUAL HARASSMENT, STUDENT RECORDS AND PRIVACY**

**Nondiscrimination.** The University of California, in accordance with applicable Federal and State law and University policy, does not discriminate on the basis of race, color, national origin, religion, sex, gender identity, pregnancy (including pregnancy, childbirth, and medical conditions related to pregnancy or childbirth), disability, age, medical condition (cancer-related), ancestry, marital status, citizenship, sexual orientation, or status as a Vietnam-era veteran or special disabled veteran. The University also prohibits sexual harassment. This nondiscrimination policy covers admission, access, and treatment in University programs and activities.

Inquiries regarding the University’s student-related nondiscrimination policies may be directed to: Matilda Aidam, Director, Mediation Services and Interim Title IX and Disability Compliance Officer, (530) 757-4480, and to Director, Student Judicial Affairs, (530) 752-1128.

**Sexual Harassment.** Sexual harassment is prohibited by law and by university policy and is not condoned by UC Davis (Policy 380-12 at http://manuals.ucdavis.edu/ppm/380/380-12.htm). The Sexual Harassment Education Program (530) 752-2255 provides information and assists in resolving complaints of sexual harassment informally. Students may also use formal and informal grievance procedures to resolve complaints of alleged sexual harassment or other illegal discrimination (Policy 280-05 at http://manuals.ucdavis.edu/ppm/280/280-05.htm). Students should seek assistance as soon as possible (time limits may apply to filing formal complaints) and may receive informal counseling and/or referrals by contacting the Sexual Harassment Education Program, the Office of Student Judicial Affairs, Counseling & Psychological Services, or the Women’s Resources and Research Center. Formal complaints may be filed with the vice chancellor or dean of the school or college in which the alleged discrimination or harassment occurred.
Disclosures from Student Records. Students have the right to review records that relate to themselves in their capacity as students and to request corrections of records that are inaccurate. Most disclosures from student records to outside parties require prior consent from the student.

Under the Family Educational Rights and Privacy Act of 1974 and University and campus policies, UC Davis students have the following rights:

- To review their own student records within 45 days after the student submits a written request for access to the Registrar or other department having possession of the records to be reviewed. That office will make arrangements for access and notify the student when and where the records may be reviewed. If the records are maintained by a different office, the request will be redirected and the student notified. The campus maintains several types of student records in various locations. Questions about how to obtain records should be referred to Student Judicial Affairs at (530) 752-1128.

- To request amendment of their own student records if they believe the records are inaccurate or misleading. Students should submit a written request to the office that maintains the records specifying the portion of the record the student wants changed and why it is believed to be inaccurate or misleading. That office has 45 days to determine whether the record should be changed and notify the student of the decision, including of the right to a hearing and hearing procedures.

- To restrict the disclosure of personally identifiable information contained in student records, except when law and policy permit disclosure without consent. Examples of circumstances in which the student's consent is not required for disclosure of student records include the following:

  1. Disclosure of “directory” or “public” information including the student’s name; local and/or permanent address(es); e-mail addresses and telephone number(s); dates of attendance; major; grade level; enrollment status (undergraduate/graduate); full or part time; number of enrolled course units; degrees and honors received; most recent previous educational institution attended; participation in officially recognized activities, including intercollegiate athletics, and the name, weight and height of participants on ICA teams. Such information may be published in a student directory.

     a. To prevent disclosures of telephone numbers and/or addresses, students must submit a written request to the Registrar by the tenth day of instruction. To prevent disclosure of their e-mail address, students must follow instructions at [https://computingaccounts.ucdavis.edu/](https://computingaccounts.ucdavis.edu/), and then select “Change your directory information.”

     b. Students may designate as confidential and withhold all information about themselves by filing a request with the Registrar. If all information is designated confidential, no information about a student can be disclosed without the student's written consent (except as otherwise permitted by law and policy) including verifying student status, awards, or any degrees earned.

  2. Disclosure to campus officials (for example faculty, staff, student employees, or those under contract with the University) having a legitimate educational interest in the records. Legitimate educational interest means the information is relevant and necessary to a task or determination that is (a) an employment responsibility or an assigned subject matter for the inquirer and/or related to (b) the inquirer’s participation in the student’s education; (c) the discipline of a student; or (d) providing a service or benefit related to a student or student’s family (such as health care, counseling, job placement, or financial aid).

  Parental/guardian information is confidential. It is used by UC Davis only for notification of events, ceremonies, awards and development or in case of an emergency involving the student.

  For more information, see University of California Policies Applying to Disclosure of Information from Student records and UC Davis Policy and Procedure Manual Section 320-21.

  Questions about these rights and requirements should be referred to Student Judicial Affairs, (330) 752-1128. Students can file complaints regarding alleged violations of privacy rights with the Office of Student Judicial Affairs.


Social Security Numbers. A student’s Social Security number is used to verify personal identity in the UC Davis Student Records System. Disclosure of social security number is mandatory. In compliance with state law, Social security numbers are confidential and are not used as student identifiers.

CAMPUS SECURITY, CRIME AWARENESS, AND ALCOHOL AND DRUG ABUSE PREVENTION

In accordance with federal law, UC Davis annually provides students and employees with information regarding campus security, crime statistics, and alcohol and drug abuse prevention, pursuant to the Student Right to Know and Campus Security Act of 1990 and the Drug Free Schools Act of 1989. The UC Davis Police and Campus Administration make continual efforts to reduce crime on campus. A well-informed community is better served and safer.

For a copy of the complete UC Davis security and crime prevention report, including crime statistics, campus security measures and crime reporting procedures, applicants for admission or prospective employees may contact the UC Davis Campus Violence Prevention Office, located in the UC Davis Police Department, contact (530) 752-3299, or jnbeeman@ucdavis.edu.

ACCREDITATION

The University of California, Davis is accredited by the Accrediting Commission for Senior Colleges and Universities of the Western Association of Schools and Colleges, 985 Atlantic Avenue, Suite 100, Alameda, CA 94501, (510) 748-9001, an institutional accrediting body recognized by the Council for Higher Education and the U.S. Department of Education. UC Davis is also accredited by the Accreditation Board for Engineering and Technology, Accreditation Council for Graduate Medical Education, American Assembly of Collegiate Schools of Business, American Association for Accreditation of Laboratory Animal Care, American Bar Association, American Chemical Society, American Dietetic Association, American Society of Landscape Architects, Association of American Law Schools, Association of
American Medical Colleges, Commission of Teacher Credentialing, Computer Science Accreditation Commission, Council on Education and Public Health, the Council on Education of the American Veterinary Medical Association, and the Liaison Committee on Medical Education.

Students interested in reviewing the accreditation documents may do so by scheduling an appointment with the Office of the Provost in Mrak Hall.

THE BOARD OF REGENTS

Governance of the University is entrusted to a corporation called The Board of Regents. Of the individuals composing the board, 18 are California citizens appointed by the governor; and seven, including the president of the University and the governor of California, serve ex officio. A Student Regent is selected each year from a list of names submitted to the board by the Student Body Presidents’ Council.

The Regents have delegated authority in academic matters to the Academic Senate of the faculty, which determines academic policy and supervises the instructional activities of the entire University. All of the permanent faculty, as well as key administrators, are members of the Senate.

The Regents have delegated authority for the organization of the University to the president. Mark G. Yudof is President and head of the Universitywide administration. Authority for the administration of each campus has been delegated to a chancellor.

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

Regents Ex Officio

Arnold Schwarzenegger
Governor of California and President of the Regents

Cruz M. Bustamante
Lieutenant Governor of California

Fabian Núñez
Speaker of the Assembly

Jack O’Connell
State Superintendent of Public Instruction

Richard Rominger
President of the Alumni Associations of the University of California

Eric G. Juline
Vice President of the Alumni Associations of the University of California

Mark G. Yudof
President of the University

Appointed Regents

Current term expires on March 1 of year indicated.

Richard C. Blum, 2014
William De La Pena, 2018
Russell Gould, 2017
Judith L. Hopkinson, 2009
Eddie Island, 2017
Odessa P. Johnson, 2012
Joanne C. Koziarz, 2010
Sherry L. Lansing, 2010
Monica Lozano, 2013
George M. Marcus, 2012
Gerald L. Parshley, 2008
Norman J. Pattie, 2014
Peter Preuss, 2008
Frederick Ruiz, 2016
Leslie Tang Schilling, 2013
Bruce D. Varner, 2018

Paul Watcher, 2016
Ben Allen, June 30, 2008
Student Regent

Michael T. Brown, August 31, 2008
Faculty Representative

Mary Coughran, August 31, 2009
Faculty Representative

Principal Officers of the Regents

Charles F. Robinson
General Counsel

Marie N. Berggren
Acting Treasurer

Diane Griffiths
Secretary

ADMINISTRATIVE OFFICERS OF THE UNIVERSITY

Mark G. Yudof
President of the University

Wyatt R. (Rory) Hume
Provost and Executive Vice President—Academic and Health Affairs

Katherine Lapp
Senior Vice President—Business Operations

Bruce B. Darling
Executive Vice President—University Affairs

Daniel M. Dooley
Vice President—Agriculture and Natural Resources

Patrick J. Lenz
Vice President—Budget

William H. Gurtner
Vice President—Clinical Services Development

Judy Sakaki
Vice President—Student Affairs

Anne C. Broome
Vice President—Financial Management

Wyatt R. (Rory) Hume
Vice President—Health Affairs

Admiral S. Robert Foley; Retired, U.S. Navy
Vice President—Laboratory Management

Lawrence B. Coleman
Vice Provost—Research

UNIVERSITY CHANCELLORS

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Chancellor at Berkeley

Larry N. Vanderhoef
Chancellor at Davis

Michael V. Drake
Chancellor at Irvine

Gene D. Block
Chancellor at Los Angeles

Sung-Mo “Steve” Kang
Chancellor at Merced

Robert D. Grey
Acting Chancellor at Riverside

Marye Anne Fox
Acting Chancellor at San Diego

J. Michael Bishop
Chancellor at San Francisco

Henry T. Yang
Chancellor at Santa Barbara

George W. Blumenthal
Chancellor at Santa Cruz
ADMINISTRATIVE OFFICERS—UC DAVIS

Chancellor
Larry N. Vanderhoef, Ph.D.

Chancellor Emeritus
Theodore L. Hullar, Ph.D.

Vice Chancellors
Barbara A. Horwitz, Ph.D.
Interim Provost and Executive Vice Chancellor
Stan Nosek, M.S.
Vice Chancellor—Administration
Barry M. Klein, Ph.D.
Vice Chancellor—Research
John Meyer, M.P.A.
Vice Chancellor—Resource Management and Planning
Fred E. Wood, Ph.D.
Vice Chancellor—Student Affairs
Beverly “Babs” Sandeen, Ph.D.
Vice Chancellor—University Relations

Vice Provosts
Bruce R. White, Ph.D.
Interim Vice Provost—Academic Personnel
Peter Siegel, M.A.
Vice Provost—Information and Educational Technology
Patricia A. Turner, Ph.D.
Vice Provost—Undergraduate Studies
William B. Lacy, Ph.D.
Vice Provost—University Outreach and International Programs

Associate Chancellor
Maril R. Stratton, M.A.

Associate/Assistant Vice Chancellors/Provost
Rahim Reed, M.P.A., J.D.
Associate Executive Vice Chancellor—Campus Community Relations
Karen Slakey Hull
Interim Associate Vice Chancellor—Human Resources and Risk Management
Maurice Hollman
Associate Vice Chancellor—Facilities Operations and Maintenance
J. Michael Allred, M.B.A.
Associate Vice Chancellor—Finance
Andy Lamb
Interim Associate Vice Chancellor—Business Services
Lynne Chronister, M.P.A.
Associate Vice Chancellor—Research Administration
Bernd Hamann, Ph.D.
Associate Vice Chancellor—Research
Alan B. Bennett, Ph.D.
Associate Vice Chancellor—Research
Deb Niemeier, Ph.D.
Associate Vice Chancellor—Research
Jill M. Blackwelder, B.S.
Associate Vice Chancellor—Safety Services
Janet C. Gong, Ed.D.
Senior Associate Vice Chancellor—Student Affairs
Cheryl Brown Lohse, M.S.
Associate Vice Chancellor—Development
Jean-Xavier Guinard, Ph.D.
Associate Vice Provost—International Programs
Peggy Shannon, M.F.A.
Associate Vice Provost—University Outreach and Engagement
Robert Kerr, Ph.D.
Assistant Vice Provost—International Alumni and Development
Robert I. Loesberg-Zahl, M.P.P.
Assistant Executive Vice Chancellor

Janice Corbett, M.B.A.
Acting Assistant Vice Chancellor—Alumni Relations/Executive Director—CAAA
Kelly Rathiff, M.B.A.
Associate Vice Chancellor—Budget Resource Management and Institutional Planning and Analysis
Robert Segar, M.L.A.
Assistant Vice Chancellor—Campus Planning
Karl Mohr, M.A.
Interim Vice Chancellor—Capital and Environmental Resource Management
Marjorie M. Dickinson, B.A.
Assistant Vice Chancellor—Government and Community Relations
Lisa Lapin, B.A.
Assistant Vice Chancellor—University Communications
Griselda Castro, M.A.
Assistant Vice Chancellor—University Outreach and Engagement
Lora Jo Bossio, M.A.
Interim Assistant Vice Chancellor—Student Affairs; Enrollment and Academic Support

University Librarian
Marilyn J. Sharrow, M.A.L.S.

Registrar
Frank Wada, M.A.

Directors
Greg Warzecka, M.S.
Director, Athletics
Michelle Famula, M.D.
Director, Cowell Student Health Center
Katy Maloney, B.S.
Interim Director, Financial Aid
Emily Galindo, M.B.A.
Interim Director, Student Housing
Pamela L. Burnett
Director, Undergraduate Admissions and Outreach Services
Don Roth, Ph.D.
Executive Director, Mondavi Center/University Cultural Programs

College of Agricultural and Environmental Sciences
Neal K. Van Allen, Ph.D., Dean
James MacDonald, Ph.D., Executive Associate Dean
Lovell Jarvis, Ph.D., Associate Dean—Human Sciences
Michael Parrella, Ph.D., Associate Dean—Agricultural Sciences
Randal J. Southard, Ph.D., Associate Dean—Environmental Sciences
Diane Ullman, Ph.D., Associate Dean—Undergraduate Academic Programs

College of Biological Sciences
Kenneth C. Burtis, Ph.D., Dean
Carol Erickson, Ph.D., Executive Associate Dean—Graduate Studies and Research
Steven M. Theg, Ph.D., Associate Dean—Undergraduate Academic Programs

College of Engineering
Enrique J. Lavernia, Ph.D, Dean
Bruce White, Ph.D., Associate Dean—Academic Personnel and Planning
Karen McDonald, Ph.D., Associate Dean—Research and Graduate Studies
Vacant, Associate Dean—Undergraduate Studies

College of Letters and Science
Jessie Ann Owens, Ph.D., Dean—Division of Humanities, Arts, and Cultural Studies
Winston Ko, Ph.D., Dean—Division of Mathematical and Physical Sciences
Vacant, Dean—Division of Social Sciences
James S. McClain, Ph.D., Associate Dean—Undergraduate Education

School of Education
Harold Levine, Ph.D., Dean
Paul E. Heckman, Ph.D., Associate Dean

Graduate School of Management
Nicole Woolsey Biggart, Ph.D., Dean
Donald A. Palmer Ph.D., Associate Dean—Academic Personnel
David L. Woodruff, Ph.D., Associate Dean—Academic Affairs
Appendix

Graduate Studies
Jelfery Gibeling, Ph.D., Dean
Edward Caswell-Chen, Ph.D., Associate Dean for Graduate Programs
Lenora Timm, Ph.D., Associate Dean for Graduate Students
Annik Hirshen, J.D., Assistant Dean

School of Law
Kevin Johnson, J.D., Dean
Hollis L. Kulwin, J.D., Assistant Dean—Student Affairs
Adam Talley, Assistant Dean Administration

School of Medicine
Claire Pomeroy, MD, MBA, Vice Chancellor for Human Health Sciences and Dean, School of Medicine
Ann Bonham, PhD, Executive Associate Dean of Academic Affairs
Thomas Nesbitt, MD, MPH, Executive Associate Dean of Clinical and Administrative Affairs
Edward Callahan, PhD, Associate Dean for Academic Personnel
Tim Albertson, MD, PhD, Associate Dean for Academic Clinical Programs
Fitz-Roy E. Curry, PhD, Associate Dean for Basic and Translational Research
James Nuovo, MD, Associate Dean for Student Affairs and Career Advising
Jesse Joad, MD, Associate Dean for Diversity and Faculty Life
Mark Henderson, MD, Associate Dean for Admissions
Ralph de Vere White, MD, Associate Dean for Cancer Center
Faith Fitzgerald, MD, Associate Dean for Ethics and Humanities
Lars Bergh, MD, PhD, Associate Dean for Clinical and Translational Research

School of Veterinary Medicine
Bennie I. Osburn, D.V.M., Ph.D., Dean
John R. Pascoe, B.V.Sc., Ph.D., Executive Associate Dean
Jan E. Ilkiw, B.V.Sc., Ph.D., Associate Dean—Academic Programs
James S. Cullor, D.V.M., Ph.D., Associate Dean and Director—Veterinary Medicine Teaching and Research Center, Tulare
Rance LeFebvre, Ph.D., Associate Dean—Student Programs
Kent K. C. Lloyd, D.V.M., Ph.D., Associate Dean—Research and Graduate Education
W. David Wilson, BVMS, MRCVS, Interim Associate Dean—Clinical Programs and Director—Veterinary Medical Teaching Hospital
Donald J. Klingborg, D.V.M., Associate Dean—Veterinary Extension and Public Programs Director—Center for Continuing Professional Education
Bruno Chomel, D.V.M., M.S., M.S., Ph.D., Interim Director, Masters of Preventive Veterinary Medicine Program

UC Davis Extension
Dennis Pendleton, Ph.D., Dean
PROPORTION OF UC DAVIS GRADUATES FINDING WORK IN THEIR FIELDS OF CHOICE

The percent of alumni whose full-time job is in the field of their choice is shown by field of study. Figures do not include the 15 percent of graduates who had not decided on a career field at the time of the survey.

Field of Study\(^1\), Percentage finding work in field of choice

<table>
<thead>
<tr>
<th>Field of Study</th>
<th>Average Yearly Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Sciences, 85%</td>
<td>$50,750</td>
</tr>
<tr>
<td>Biological Sciences, 68%</td>
<td>$40,167</td>
</tr>
<tr>
<td>Engineering, 81%</td>
<td>$62,103</td>
</tr>
<tr>
<td>Environmental Sciences, 84%</td>
<td>$44,000</td>
</tr>
<tr>
<td>Humanities, Arts and Cultural Studies, 71%</td>
<td>$58,300</td>
</tr>
<tr>
<td>Human Sciences, 71%</td>
<td>$66,548</td>
</tr>
<tr>
<td>Mathematical and Physical Sciences, 80%</td>
<td>$73,500</td>
</tr>
<tr>
<td>Social Sciences, 63%</td>
<td>$73,500</td>
</tr>
</tbody>
</table>

Total, 71%\(^1\)

\(^1\)Source: A 2006 survey of June 2004-05 graduates conducted by Student Affairs Research and Information.

\(^2\)Fields of Study are groups of related undergraduate majors as organized into UC Davis colleges or divisions.

RETENTION DATA AND GRADUATION RATES AT UC DAVIS

Freshmen\(^*\)

(Retention and graduation rates through Summer 2006 for all undergraduates entering UC Davis as freshmen.)

<table>
<thead>
<tr>
<th>Fall Quarter of Initial Enrollment:</th>
<th>Number of Students**</th>
<th>Percent Enrolled One Year</th>
<th>Percent Graduating in Four Years</th>
<th>Percent Graduating in Five Years</th>
<th>Percent Graduating in Six Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>3,114</td>
<td>90.6%</td>
<td>29.8%</td>
<td>67.9%</td>
<td>76.6%</td>
</tr>
<tr>
<td>1994</td>
<td>3,182</td>
<td>89.2%</td>
<td>30.5%</td>
<td>65.6%</td>
<td>73.4%</td>
</tr>
<tr>
<td>1995</td>
<td>3,245</td>
<td>88.8%</td>
<td>31.7%</td>
<td>68.4%</td>
<td>75.3%</td>
</tr>
<tr>
<td>1996</td>
<td>3,685</td>
<td>91.1%</td>
<td>37.6%</td>
<td>72.6%</td>
<td>79.2%</td>
</tr>
<tr>
<td>1997</td>
<td>3,526</td>
<td>89.7%</td>
<td>37.6%</td>
<td>71.0%</td>
<td>77.8%</td>
</tr>
<tr>
<td>1998</td>
<td>3,616</td>
<td>89.6%</td>
<td>38.7%</td>
<td>72.2%</td>
<td>78.4%</td>
</tr>
<tr>
<td>1999</td>
<td>3,817</td>
<td>90.1%</td>
<td>42.0%</td>
<td>74.7%</td>
<td>79.9%</td>
</tr>
<tr>
<td>2000</td>
<td>4,319</td>
<td>90.3%</td>
<td>42.7%</td>
<td>75.9%</td>
<td>80.9%</td>
</tr>
</tbody>
</table>

Transfer Students

(Retention and graduation rates through Spring 2006 for all undergraduates transferring to UC Davis as juniors.)

<table>
<thead>
<tr>
<th>Fall Quarter of Initial Enrollment:</th>
<th>Number of Students**</th>
<th>Percent Enrolled One Year</th>
<th>Percent Graduating in Two Years</th>
<th>Percent Graduating in Three Years</th>
<th>Percent Graduating in Four Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>1,414</td>
<td>88.4%</td>
<td>28.1%</td>
<td>66.4%</td>
<td>77.4%</td>
</tr>
<tr>
<td>1994</td>
<td>1,691</td>
<td>88.4%</td>
<td>29.7%</td>
<td>66.2%</td>
<td>76.2%</td>
</tr>
<tr>
<td>1995</td>
<td>1,749</td>
<td>85.5%</td>
<td>29.6%</td>
<td>64.8%</td>
<td>75.9%</td>
</tr>
<tr>
<td>1996</td>
<td>1,638</td>
<td>86.6%</td>
<td>30.7%</td>
<td>68.1%</td>
<td>77.7%</td>
</tr>
<tr>
<td>1997</td>
<td>1,634</td>
<td>85.1%</td>
<td>30.8%</td>
<td>67.9%</td>
<td>76.3%</td>
</tr>
<tr>
<td>1998</td>
<td>1,545</td>
<td>88.3%</td>
<td>36.4%</td>
<td>72.0%</td>
<td>80.1%</td>
</tr>
<tr>
<td>1999</td>
<td>1,394</td>
<td>89.5%</td>
<td>41.5%</td>
<td>74.0%</td>
<td>81.7%</td>
</tr>
<tr>
<td>2000</td>
<td>1,777</td>
<td>89.4%</td>
<td>38.4%</td>
<td>73.2%</td>
<td>83.6%</td>
</tr>
</tbody>
</table>

Retention is defined as enrollment at the third week census point of the fall term one year from initial fall term.
Graduation is defined as having received degree from UC Davis (does not include students who transferred to another institution to complete their degree).

\(^*\)Retention and graduation tracking limited to students enrolled full-time in their initial term of enrollment.

\(^**\)Students excluded from these counts include those who are now deceased or participated in any of the following: Military Service, Foreign Service, Religious Mission.

Source: Student Affairs Research & Information, UC Davis (March 23, 2007)

AVERAGE YEARLY SALARY OFFERED TO GRADUATES WITH BACHELOR’S, MASTER’S, AND DOCTORATE DEGREES

<table>
<thead>
<tr>
<th>Field of Study</th>
<th>Average Yearly Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>$49,647</td>
</tr>
<tr>
<td>Humanities/Social Sciences</td>
<td>$33,200</td>
</tr>
<tr>
<td>Physical Sciences</td>
<td>$50,750</td>
</tr>
<tr>
<td>Health Sciences/Life Sciences</td>
<td>$38,300</td>
</tr>
<tr>
<td>Average</td>
<td>$62,103</td>
</tr>
<tr>
<td>Source: 2007-2008 National Salary Survey data provided by the National Association of Colleges and Employers.</td>
<td>$62,103</td>
</tr>
</tbody>
</table>
2006 UC Davis welcomes 5,500 freshmen, the largest freshman class in UC history.

1972 The Domes are built by a group of students as an experiment in low-cost, student-constructed and student-maintained dwellings.
### INDEX

**A**
- academic calendar
  - School of Law 115
  - School of Medicine 121
  - School of Veterinary Medicine 124
  - UC Davis 1
- accreditation 539
- Activities and Recreation Center (ARC) 52, 53
- activities, extracurricular 52
- adding courses 68
- address change 68
- admission
  - advanced standing, School of Law 114
  - after you apply for 39
  - criteria, undergraduate
  - preparing for university work 32
  - deferred enrollment 39
  - filing dates 1, 32
  - freshman 32
  - residency eligibility 32
  - statewide context eligibility 32
  - graduate 104
  - applying for 104
  - international students 105
  - Graduate School of Management 117
  - international students 38
  - procedures, undergraduate
  - application fees 32
  - application filing information 32
  - School of Education 110
  - School of Law 113
  - School of Medicine 120
  - School of Veterinary Medicine 123
  - undergraduate 32
  - advanced placement examinations 34
  - application fee 32
  - application fee waiver 32
  - applying for 32
  - eligibility by examination 33
  - eligibility for non-california residents 33
  - eligibility in local context 33
  - transfer credit 33
- Adult Fitness Program 24
- Advanced Highway Maintenance & Construction Technology Center (AHMCT) 24
- Advanced Laboratory Fusion Science and Engineering (CALFUSE), Center for 25
- Advanced Transportation Infrastructure Research Center Facility (ATIRC) 24
- advising
  - academic
    - Agricultural and Environmental Sciences 59
    - Biological Sciences 59
  - career 61
    - First Resort 61
    - graduate student 61
    - health sciences 62
    - peer, academic 61
    - pre-law 62
    - Reentry Student Services 61
    - services 61
    - Transfer Student Services 61
    - Veterans Affairs 62
- Aerospace Studies (Air Force) 405
- African American and African Studies 128
- African Americans and Africans Cultivating Education (ACE) 57
- Aggie Student Store 55
- Agricultural and Environmental Chemistry, Graduate Group 130
- Agricultural and Environmental Education 131
- Agricultural and Environmental Sciences, College of 15, 59, 83
- Agricultural and Managerial Economics 132
- Agricultural and Resource Economics 132
- Agricultural Computing and Information Systems 131
- Agricultural Engineering 228
- Agricultural Management and Rangeland Resources 132
- Agricultural Sustainability Institute 24
- Agricultural Systems and Environment 136
- Agronomy 136
- Agronomy and Range Science 136
- aid, Federal Student Aid (FAFSA) 46
- Alcohol and Drug Abuse Prevention and Treatment (ADAPT) 51
- alumni 57
- Buehler Alumni and Visitors Center 6, 15
- Cal Aggie Alumni Association 57
- scholarships 47
- American College Test (ACT) 33
- American Indians for Recruitment and Retention (Ne’ Ue) 57
- American Studies 136
- Anatomy 138
- Anatomy, Physiology, and Cell Biology 138
- Anesthesiology and Pain Medicine 138
- Animal Behavior Graduate Group 138
- Animal Biology 139
- Animal Biology, Graduate Group 140
- Animal Genetics 141
- Animal Physiology 141
- Animal Science 141, 142
- Animal Science and Management 145
- Animal Surgery Laboratory 27
- Anthropology 145
- Application for Federal Student Aid (FAFSA) 46
- Applied Behavioral Sciences 152
- Applied Biological Systems Technology 152
- Applied Computing and Information Systems 153
- Applied Mathematics, Graduate Group 153
- Applied Physics 153
- Applied Science-Engineering 223
- Aquacultural Engineering 228
- Aquaculture 154
- Aquatic Animals 142
- Arabic 154
- Arboretum 21
- art 54
  - Basement Gallery 55
  - Carl Gorman Museum 55
  - Design Museum 54
  - Dramatic Art and Dance 54
  - Fine Arts Collection 55
  - galleries 54
  - Memorial Union Art gallery 54
  - Mondavi Center for the Performing Arts 54
  - music 54
  - Richard L. Nelson Gallery 55
- Art History 154
- Art Studio 156
- Asian American Studies 159
- Asian Studies 161
- Associated Students of UC Davis (ASUCD) 55
- Association of American Medical Colleges (AAMC) 120
- Astronomy 161
- athletics, intercollegiate 54
- Atmospheric Science 161
- Atmospheric Science, Graduate Group 163
- Avian Medicine 163
- Avian Sciences 142, 163
- Avian Sciences, Graduate Group 165
- awards 47, 79
- chancellor’s, for excellence in undergraduate research 80
- special prize 47

**B**
- bachelor’s degree requirements 89
- Basement Gallery 55
- bicycles 49
- Bike Barn 49
- Bike Barn 49
- Biochemistry 165
- Biochemistry and Molecular Biology, Graduate Group 165
- Biological and Agricultural Engineering 166
- Biological and Agricultural-Engineering 227
- Biological Chemistry 166
- Biological Sciences 166
Biological Sciences, College of 15, 59
Biomedical and Engineering Fluid Mechanics 262
Biomedical Engineering, Graduate Group 170
Biomedical-Engineering 232
Biophotonics Science and Technology, Center for 25
Biophysics, Graduate Group 171
Biostatistics, Graduate Group 171
Biotechnical Engineering 229
Biotechnology 172
Bodega Marine Laboratory and Reserve 22, 28, 85
Bodega Marine Laboratory Program 85, 169, 173
Botany 174
box office, campus 53
Breastfeeding Support Program, UC Davis 50
Buehler Alumni and Visitors Center 57
buses 50
intra-campus 50
passes 50
Business Management 174
Cal Aggie Alumni Association 57
Cal Aggie Marching Band UH 56
Cal Aggie Student Alumni Association (SAA) 57
calendar, academic 115
School of Law 121
School of Veterinary Medicine 124
UC Davis 1
California Aggie newspaper 55
California Agricultural Experiment Station 24
California Basic Educational Skills Test (CBEST) 110
California National Primate Research Center (CNPRC) 23
California Subject Examination for Teachers (CSET) 23
California Subject Examination for Teachers (CSET) 110
campus
facilities map 557
tours 15
Campus Events and Visitors Services (CEVS) 53
campus unions 53
Campus Violence Prevention Program 65
cancellation/withdrawal 43
Cantonese 174
Capital Area North Doctorate in Educational Leadership (CANDEL) 111
Career and Graduate Study Resource Center 61
Carl Gorman Museum 55
Cell and Developmental Biology, Graduate Group 174
Cell Biology 174
Cell Biology and Human Anatomy 175
Center for Applied Policy in Education (CAP-ED) 216
Center for Leadership Learning 66
certification
full-time status 69
major degree
College of Agricultural and Environmental Sciences 94
College of Letters and Science 101
Chancellor 5
Chancellor, Office of the 56
changing
address 68
grades 63
major 70
College of Biological Sciences 70
College of Engineering 70
name 68
Chemical Engineering and Materials Science-Engineering 236
Chemistry 175
Chicano/Chicana Studies 179
Child and Family Studies, Center for 25, 50
child care 50
breastfeeding support 50
community programs 50
on-campus 50
resources 50
Child Care Grant 50
Child Care Subsidy Program 50
Child Development, Graduate Group 182
Chinese 182
Civil and Environmental-Engineering 243
Civil Engineering 244
Class Schedule and Registration Guide (CSRG) availability 1, 68
course fees 42
course listings 4
enrolling in courses 68
exam schedule 74
GE courses 92
grade changes 63, 76
graduation 80
student ID card 68
student responsibilities 63
Summer Sessions 73
Classics 182
Clinical Nutrition 185
Clinical Nutrition and Metabolism 186
Clinical Psychology 186
Clinical Research, Graduate Group 186
Coffee House (MU) 53
College Board Advanced Placement (AP) Examination Credit 34, 35
college of engineering 70, 96, 107
College of Letters and Science 98
College Teaching, Seminar in 107
Combustion and the Environment 262
Communication 186
Community and Regional Development 188
Community Development, Graduate Group 191
Community Health 191
Community Nutrition 192
Companion and Captive Animals 142
Comparative Literature 192
Comparative Literature, Graduate Group 195
Comparative Pathology, Graduate Group 195
Computational Fluid Dynamics, Center for computer help 22
support 22
Computer Science 197
Computer Science, Graduate Group 197
Computer Science-Engineering 249
Computer Security Laboratory 26
conference
center, MU 53
management 52
rooms
Mann Laboratory 28
Pavilion 53
Silo Union 53
Conservation Biology 198
Consumer Science 198
Contemporary Leadership 198
Cooperative Research and Extension Services for Schools (CRESS) 216
Corral gift shop 53
Counseling and Psychological Services (CAPS) 51
counseling services 51
courses
100-199, description 126
199, description 126
200-299, description 126
300-399, description 126
400-499, description 126
adding 68
Aeronautical Science and Engineering (EAE)-Engineering 265
African American and African Studies (AAS) 128
Agricultural and Environmental Chemistry (AGC) 131
Agricultural and Resource Economics (ARE) 133
Agricultural Education (AED) 131
American Studies (AMS) 136
Anatomy, Physiology, and Cell Biology (APC) 506
Anesthesiology and Pain Medicine (ANE) 378
Animal Behavior (ANB) 136
Animal Biology (ABI), graduate 140
Animal Biology (ABI), undergraduate 139
Animal Genetics (ANG) 141
Animal Science (ANS) 143
Anthropology (ANT) 147
Applied Biological Systems Technology (ABT) 152
Applied Science-Davis (EAD)-Engineering 225
Arabic (ARB) 403
Art History (AHI) 154
Art Studio (ART) 157
Asian American Studies (ASA) 159
Astronomy (AST) 439
Atmospheric Science (ATM) 161
autotutorial 126
average units 69
Avian Sciences (AVS) 164
Biochemistry and Molecular Biology (BMB) 166
Biological Chemistry (BCM) 378
Biological Sciences (BIS) 169
Biological Systems (EBS)-Engineering 230
Biomedical (BIM)-Engineering 233
Biomedical Engineering (BIM) 233
Biophotonics (BPT) 227
Biophysics (BPH) 171
Biostatistics (BST) 172
Biotechnology (BiT) 173
Cantonese (CAN) 205
Cell and Developmental Biology (CDB) 174
Cell Biology and Human Anatomy (CHA) 379
Chemical [CAR]-Internal Medicine 385
Chemical (ECH) 240
Chemical and Materials Science (ECM) Engineering 239
Chemistry (CHE) 176
Chicana/Chicano Studies (CHI) 180
Chinese (CHN) 205
Civil and Environmental (ECI)-Engineering 245
Classics (CLA) 183
classification and numbering 126
Clinical Nutrition and Metabolism (NCM)-Internal Medicine 386
Clinical Psychology (CPS) 380
Clinical Research (CLR) 380
Communication (CMN) 186
Community and Regional Development (CRD) 189
Comparative Literature (COM) 192
Computer Science (ECS)-Engineering 250
concurrent 93, 96
Consumer Science (CNS) 198
critical theory (CRI) 198
Cultural Studies (CST) 200
Davis Honors Challenge (HNR) 322
descriptions 127
design (DES) 201
Dramatic Art (DRA) 495
dropping 68
East Asian Studies (EAS) 208
Ecology (ECL) 210
Economics (ECN) 212
Education (EDU) 216
Education Abroad Program (EAP) 222
Electrical and Computer Engineering (EEC)-Engineering 256
Emergency Medicine (EMR)-Internal Medicine 386
Endocrinology (EDO) 222
Endocrinology and Metabolism (ENM)-Internal Medicine 387
Engineering
Aeronautical Science and Engineering (EAE) 265
Applied Science-Davis (EAD) 225
Biological Systems (EBS) 230
Biophotonics (BPT) 227
Chemical (ECH) 240
Chemical and Materials Science (ECM) 239
Civil and Environmental (ECI) 245
Computer Science (ECS) 250
Electrical and Computer Engineering (EEC) 256
Mechanical (EME) 264
Mechanical and Aeronautical Engineering (MAE) 265
Engineering (ENG) 222
English (ENL) 268
enrolling in 68
Entomology (ENT) 273
Environmental and Resource Sciences (ERS) 279
Environmental Horticulture (ENH) 276
Environmental Science and Policy (ESP) 281
Environmental Toxicology (ETX) 285
Epidemiology (EPI) 287
Epidemiology and Preventive Medicine (EPP) 380
Evolution and Ecology (EVE) 289
Exercise Biology (EXB) 422
Exercise Science (EXS) 291
expanded descriptions 127
expected progress 69
extension 74
Family and Community Medicine (FAP) 382
Fiber and Polymer Science (FPS) 292
Film Studies (FMS) 293
Food Science and Technology (FST) 296
Food Service Management (FSM) 297
Forensic Science (FOR) 298
French (FRE) 299
Freshman Seminar (FRS) 302
Gastroenterology (GAS)-Internal Medicine 387
General Medicine (GMD)-Internal Medicine 387
Genetics (GGG) 303
Geography (GEO) 305
Geology (GEL) 306
German (GER) 311
grade levels 75
Greek (GKR) 184
Hebrew (HEB) 466
Hematology-Oncology (HNO)-Internal Medicine 387
Hindi (HIN) 403
History (HIS) 316
Horticulture (HRT) 323
Human Development (HDE) 324
Human Physiology (HPH) 384
Humanities (HUM) 327
Hydrologic Science (HYD), graduate courses 328
Hydrologic Science (HYD), lower division courses 330
Immunology (IMM) 331
Infectious Diseases (ID)-Internal Medicine 388
Integrated Pest Management (IPM) 332
Integrated Studies (IST) 333
Internal Medicine (IM) 384
Internal Medicine-Cardiology (ICAR) 385
Internal Medicine-Clinical Nutrition and Metabolism (NCM) 386
Internal Medicine-Emergency Medicine (EMR) 386
Internal Medicine-Endocrinology and Metabolism (ENM) 387
Internal Medicine-Gastroenterology (GAS) 387
Internal Medicine-General Medicine (GMD) 387
Internal Medicine-Hematology-Oncology (HNO) 387
Internal Medicine-Infectious Diseases (IDI) 388
Internal Medicine-Nephrology (NFP) 388
Internal Medicine-Pulmonary Medicine (PUL) 388
Internal Medicine-Rheumatology (RAL) 388
International Agricultural Development (IAD) 334
International Commercial Law (ICL) 336
International Relations (IRE) 338
Italian (ITA) 339
Japanese (JPN) 206
Jewish Studies (JST) 342
Landscape Architecture (LAD) 343
Latin (LAT) 185
Law (LAW) 347
Linguistics (LIN) 354
load 69
limits 69
Management (MGT)/MGP 358
Master of Public Health (MPH) 390
Mathematical and Physical Sciences (MPS) 362
Mechanical (EME)-Engineering 264
Mechanical and Aeronautical Engineering (MAE)-Engineering 265
Medical Informatics (MID) 315
Medical Microbiology (MMI) 389
Medical Pharmacology and Toxicology (PH) 390
Medical Sciences (MDS) 376
Medicine and Epidemiology (MEE) 506
Medieval Studies (MST) 399
Microbiology (MIC) 400
Middle East and South Asian Studies (MPS) 404
Military Science (MSC) 405
<table>
<thead>
<tr>
<th>Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>minimum progress requirements                                      69</td>
</tr>
<tr>
<td>Molecular and Cellular Biology (MCB)                                408</td>
</tr>
<tr>
<td>Molecular Biosciences (WMB)                                         508</td>
</tr>
<tr>
<td>Molecular, Cellular, and Integrative Physiology (MCP)               410</td>
</tr>
<tr>
<td>Music (MUS)                                                         413</td>
</tr>
<tr>
<td>Native American Studies (NAS)                                       416</td>
</tr>
<tr>
<td>Nature and Culture (NAC)                                            419</td>
</tr>
<tr>
<td>Nematology (NEM)                                                   419</td>
</tr>
<tr>
<td>Nephrology (NEP)-Internal Medicine                                 388</td>
</tr>
<tr>
<td>Neurobiology, Physiology, and Behavior (NPB)                       423</td>
</tr>
<tr>
<td>Neurology (NEU)                                                    390</td>
</tr>
<tr>
<td>Neuroscience (NSC)                                                 426</td>
</tr>
<tr>
<td>Neurosurgery (NSU)                                                 391</td>
</tr>
<tr>
<td>Nutrition (NUT)                                                    428</td>
</tr>
<tr>
<td>Obstetrics and Gynecology (OBG)                                     391</td>
</tr>
<tr>
<td>Ophthalmology (OPT)                                                392</td>
</tr>
<tr>
<td>Orthopaedic Surgery (OSU)                                          392</td>
</tr>
<tr>
<td>Otolaryngology (OTO)                                               393</td>
</tr>
<tr>
<td>Pathology (PMD)                                                    393</td>
</tr>
<tr>
<td>Pathology, Microbiology, and Immunology (PMI)                      509</td>
</tr>
<tr>
<td>Pediatrics (PED)                                                   394</td>
</tr>
<tr>
<td>Pharmacology and Toxicology (PTX)                                  432</td>
</tr>
<tr>
<td>Philosophy (PHI)                                                   433</td>
</tr>
<tr>
<td>Physical Education (PHE)                                           436</td>
</tr>
<tr>
<td>Physics (PHY)                                                      439</td>
</tr>
<tr>
<td>Physiology                                                        410</td>
</tr>
<tr>
<td>Plant Biology (PBL)                                                446</td>
</tr>
<tr>
<td>Plant Biology (PLB)                                                444</td>
</tr>
<tr>
<td>Plant Pathology (PLP)                                              447</td>
</tr>
<tr>
<td>Plant Sciences (PLS)                                               449</td>
</tr>
<tr>
<td>Plastic Surgery (PSU)                                              395</td>
</tr>
<tr>
<td>Political Science (POL)                                            454</td>
</tr>
<tr>
<td>Population Biology (PBG)                                           459</td>
</tr>
<tr>
<td>Population Health and Reproduction (PHR)                           510</td>
</tr>
<tr>
<td>Portuguese (POR)                                                   483</td>
</tr>
<tr>
<td>prerequisites                                                      126</td>
</tr>
<tr>
<td>Preventive Veterinary Medicine (MPM)                               511</td>
</tr>
<tr>
<td>Psychiatry (PSY)                                                   395</td>
</tr>
<tr>
<td>Psychology (PSC)                                                   462</td>
</tr>
<tr>
<td>Public Health Sciences (SPH)                                       396</td>
</tr>
<tr>
<td>Pulmonary Medicine (PUL)-Internal Medicine                        388</td>
</tr>
<tr>
<td>Radiation Oncology (RON)                                           396</td>
</tr>
<tr>
<td>Radiology-Diagnostic (RDI)                                         397</td>
</tr>
<tr>
<td>Radiology-Nuclear Medicine (RNU)                                   397</td>
</tr>
<tr>
<td>Religious Studies (RST)                                           466</td>
</tr>
<tr>
<td>repeating research                                                  76</td>
</tr>
<tr>
<td>research conference                                                126</td>
</tr>
<tr>
<td>Rheumatology-Allergy (RAU)-Internal Medicine                      388</td>
</tr>
<tr>
<td>Russian (RUS)                                                      468</td>
</tr>
<tr>
<td>School of Medicine                                                 375</td>
</tr>
<tr>
<td>Science and Society (SAS)                                          470</td>
</tr>
<tr>
<td>Science and Technology Studies (STS)                              472</td>
</tr>
<tr>
<td>Social Theory and Comparative History (STH)                        474</td>
</tr>
<tr>
<td>Sociology (SOC)                                                    476</td>
</tr>
<tr>
<td>Soil Science (SSC)                                                 480</td>
</tr>
<tr>
<td>Spanish (SPA)                                                      483</td>
</tr>
<tr>
<td>Statistics (STA)                                                   488</td>
</tr>
<tr>
<td>Surgery (SUR)                                                      397</td>
</tr>
<tr>
<td>Surgical and Radiological Sciences (VSR)                           512</td>
</tr>
<tr>
<td>Technocultural Studies (TCS)                                       491</td>
</tr>
<tr>
<td>Textiles and Clothing (TIX)                                        493</td>
</tr>
<tr>
<td>Transportation Technology and Policy (TTP)                         499</td>
</tr>
<tr>
<td>UC Davis Washington Center (WAS)                                   500</td>
</tr>
<tr>
<td>University Writing Program (UWP)                                   501</td>
</tr>
<tr>
<td>variable unit                                                      126</td>
</tr>
<tr>
<td>Veterinary Medicine (VMD)                                          504</td>
</tr>
<tr>
<td>virtual (Internet)                                                 126</td>
</tr>
<tr>
<td>Viticulture and Enology (VEN)                                      514</td>
</tr>
<tr>
<td>Wildlife, Fish and Conservation Biology (WFC)                      518</td>
</tr>
<tr>
<td>Women’s Studies (WMS)                                              520</td>
</tr>
<tr>
<td>Cowell Student Health Center                                          51</td>
</tr>
<tr>
<td>credit examination                                                 73</td>
</tr>
<tr>
<td>limitations</td>
</tr>
<tr>
<td>College of Agricultural and Environmental Sciences                  93</td>
</tr>
<tr>
<td>College of Biological Sciences                                      94</td>
</tr>
<tr>
<td>College of Letters and Science                                     99</td>
</tr>
<tr>
<td>transfer 33, 73</td>
</tr>
<tr>
<td>units 72</td>
</tr>
<tr>
<td>Crime awareness                                                    539</td>
</tr>
<tr>
<td>Critical Theory                                                    198</td>
</tr>
<tr>
<td>Crocker Nuclear Laboratory                                         23</td>
</tr>
<tr>
<td>Crop Science and Management                                        199</td>
</tr>
<tr>
<td>cross enrollment, UC/CSU/Community College                         73</td>
</tr>
<tr>
<td>Cross-Cultural Center                                              66</td>
</tr>
<tr>
<td>Cultural Studies, Graduate Group                                   199</td>
</tr>
<tr>
<td>culture days programs</td>
</tr>
<tr>
<td>Asian Pacific Culture week                                         56</td>
</tr>
<tr>
<td>Black Family week                                                  56</td>
</tr>
<tr>
<td>La Raza Cultural days                                              56</td>
</tr>
<tr>
<td>Native American Culture days                                       56</td>
</tr>
<tr>
<td>D Data Analysis and Visualization Center, Institute for            23</td>
</tr>
<tr>
<td>Davis</td>
</tr>
<tr>
<td>campus                                                              14</td>
</tr>
<tr>
<td>community                                                           14</td>
</tr>
<tr>
<td>Davis Honors Challenge                                              79, 322</td>
</tr>
<tr>
<td>degree check</td>
</tr>
<tr>
<td>College of Biological Sciences                                     95</td>
</tr>
<tr>
<td>College of Engineering                                             98</td>
</tr>
<tr>
<td>College of Letters and Science                                     102</td>
</tr>
<tr>
<td>degrees</td>
</tr>
<tr>
<td>combined program</td>
</tr>
<tr>
<td>School of Law                                                       114</td>
</tr>
<tr>
<td>School of Medicine                                                 121</td>
</tr>
<tr>
<td>doctoral</td>
</tr>
<tr>
<td>Education (Ed.D.) CANDEL                                           110</td>
</tr>
<tr>
<td>graduate, advanced                                                 104</td>
</tr>
<tr>
<td>Juris Docto (J.D.)                                                 114</td>
</tr>
<tr>
<td>Master of Business Administration                                  117</td>
</tr>
<tr>
<td>Master of Laws (LL.M.)                                             115</td>
</tr>
<tr>
<td>Master of Preventive Veterinary Medicine (M.P.V.M.)                 124</td>
</tr>
<tr>
<td>master’s                                                           105, 114</td>
</tr>
<tr>
<td>Education M.A.                                                     110</td>
</tr>
<tr>
<td>Ph.D.                                                               105</td>
</tr>
<tr>
<td>Education                                                          110, 111</td>
</tr>
<tr>
<td>School of Law                                                       114</td>
</tr>
<tr>
<td>teaching credential/M.A.                                           109</td>
</tr>
<tr>
<td>Dermatology                                                        200</td>
</tr>
<tr>
<td>Design                                                              200</td>
</tr>
<tr>
<td>Design Museum                                                      54</td>
</tr>
<tr>
<td>designated emphasis                                                106</td>
</tr>
<tr>
<td>Developmental Nutrition, Center for                                25</td>
</tr>
<tr>
<td>Dietetics                                                          204</td>
</tr>
<tr>
<td>dismissal                                                          77</td>
</tr>
<tr>
<td>qualitative                                                        78</td>
</tr>
<tr>
<td>quantitative                                                       78</td>
</tr>
<tr>
<td>disqualification                                                    77</td>
</tr>
<tr>
<td>Donald and Sylvia McLaughlin Reserve                               28</td>
</tr>
<tr>
<td>Dramatic Art                                                       204</td>
</tr>
<tr>
<td>dropping courses                                                   68</td>
</tr>
<tr>
<td>drug abuse                                                         539</td>
</tr>
<tr>
<td>E Eagle Lake Biological Field Station                               28</td>
</tr>
<tr>
<td>Earth Sciences                                                     204</td>
</tr>
<tr>
<td>East Asian Languages and Cultures                                  204</td>
</tr>
<tr>
<td>East Asian Studies                                                 208</td>
</tr>
<tr>
<td>Ecological Systems Engineering                                     229</td>
</tr>
<tr>
<td>Ecology, Graduate Group                                            209</td>
</tr>
<tr>
<td>Economics                                                          211</td>
</tr>
<tr>
<td>Education Abroad Center                                            65, 221</td>
</tr>
<tr>
<td>Education Abroad Program                                           65, 221</td>
</tr>
<tr>
<td>Education, Graduate Group                                          220</td>
</tr>
<tr>
<td>Education, School of                                                109, 215</td>
</tr>
<tr>
<td>Educational Opportunity Program (EOP)                              61</td>
</tr>
<tr>
<td>Educational Testing Service (ETS)                                  105</td>
</tr>
<tr>
<td>electives, School of Engineering                                  97</td>
</tr>
<tr>
<td>Electrical and Computer Engineering-Engineering                    254</td>
</tr>
<tr>
<td>employment, student                                                50</td>
</tr>
<tr>
<td>Endocrinology and Metabolism                                       222</td>
</tr>
<tr>
<td>Endocrinology, Graduate Group                                      222</td>
</tr>
<tr>
<td>Engineering                                                        222</td>
</tr>
<tr>
<td>Applied Science                                                    223</td>
</tr>
</tbody>
</table>
Biological and Agricultural 227
Biomedical 232
Chemical Engineering and Materials Science 236
Civil and Environmental 243
College of 19
Computer Science 249
Electrical and Computer Engineering 254
Mechanical and Aeronautical 261

Engineers, Graduate Certificate Program 107
English 267
enrolling in courses 68
Entertainment Council, ASUCD 55
Entomology 273
Entry Level Writing (English) 90, 92
Environmental & Water Resources Engineering, Center for 25
Environmental and Resource Sciences 278
Environmental Biology and Management 275
Environmental Engineering 244
Environmental Geology 276
Environmental Horticulture 276
Environmental Horticulture and Urban Forestry 277
Environmental Policy Analysis and Planning 277
Environmental Science and Policy 281
Environmental Sciences 284
Environmental Toxicology 284
Epidemiology 286
Epidemiology, Graduate Group 286
Equestrian Center 52
Equine Science 142
Evolution and Ecology 167, 288
examinations 74
accommodations
disability 74
religious 75
ACT 33
advanced placement 34
AP, Advanced Placement 34, 35
College Board Advanced Placement (AP) Examination Credit 34, 35
date changes for final 74
English Composition 93
final 74
IB, International Baccalaureate 36
International Baccalaureate (IB) Higher Level Examination Credit 36
midterms 74
requirements for final 74
SAT requirement 33
scheduling final 74
Test of English as a Foreign Language (TOEFL) 117, 123
Exercise Biology 291
Exercise Science, Graduate Group 291
expenses 42
international student 43, 117
living 43
Experimental College 55
Exploratory Program 59
extracurricular activities 52

Family and Community Medicine 292
Family Nurse Practitioner/Physician Assistant (FNP/PA) program 121
family services 50
Farmers Market 51
fees
application, undergraduate 32
bicycle license 43
course materials 42
employee-student 43
health services 51
late course add 68
late registration 68
non-resident tuition 536
parking 43
part-time student 42
refunds 43
retroactive course add 69
schedule of student 42
transportation 43

UC employee-student 43
fellowships 6, 106
graduate 47
graduate student 45, 106
graduate student deadline 104
Humanities Institute 27
Feminist Theory and Research 292
Fiber and Polymer Science 292
Filipino Outreach and Retention (BRIDGE) 57
Film Studies 293
financial aid 45, 106
Fine Arts Collection 55
First Resort 61
Fisheries 294
Fleet Services 50
FNP/PA program 121
Food Engineering 229
Food Science 294
Food Science and Technology 295
Food Science, Graduate Group 295
Food Service Management 257
Forest Engineering 229
Free Application for Federal Student Aid (FAFSA) 45, 47, 106
Freeborn Hall 53
French 299
Freshman Seminar Program 65, 302
Fuel Cell, Hydrogen, and Hybrid Vehicle (FCH2V) GATE Center of Excellence 27
full-time status 69
full-time student employment 50
Fungal Biology and Ecology 302
Future Information Technology, Center for 25

G
galleries
art 54
Basement 55
Memorial Union Art 54
Richard L. Nelson 55
Games Area 53
General Education
approved courses 92
requirement 91
Scholars, certificate program 93
theme options 92
Genetics 302
Genetics, Graduate Group 302
Geographic Information Systems 304
Geographic Studies 304
Geography 304
Geography, Graduate Group 304
Geophysical 310
Geotechnical Engineering 244
Geotechnical Modeling, Center for 25
Geotechnical Modeling, Center for 25
German 310
gift shop, Corral 53
Global and International Studies 314
government, student 55
Governmental Affairs, Institute of 23
grades 75
availability, final 77
changes, retroactive 76
changing 63
GPA 75
incomplete 76
in-progress 76
letter 92
mid-term standing 77
passed/not passed 75
point levels 75
repeating courses 76
satisfactory/unsatisfactory 76
SISWeb 77
Graduate Academic Achievement and Advocacy program (GAAAP) 57
Graduate Certificate Program for Engineers 107
graduate group: Agricultural and Environmental Chemistry 130
Animal Behavior 138
Animal Biology 140
Applied Mathematics 153
Atmospheric Science 163
Avian Sciences 165
Biochemistry and Molecular Biology 165
Biomedical Engineering, 170
Biophysics 171
Biostatistics 171
Cell and Developmental Biology 174
Child Development 182
Clinical Research 186
Community Development 191
Comparative Literature 195
Comparative Pathology 195
Computer Science 197
Cultural Studies 199
Ecology 209
Education 220
Endocrinology 222
Epidemiology 286
Exercise Science 291
Food Science 295
Forensic Science 298
Genetics 302
Geography 304
Health Informatics 314
Horticulture and Agronomy 323
Human Development 326
Hydrologic Sciences 328
Immunology 330
Integrated Pest Management 332
International Agricultural Development 335
International Commercial Law 336
Linguistics 336
Master of Education (M.Ed.) 361
Medical Informatics 314, 368
Microbiology 402
Molecular, Cellular, and Integrative Physiology 410
Neuroscience 425
Nutritional Biology 430
Pharmacology and Toxicology 432
Plant Biology 445
Population Biology 459
Soils and Biogeochemistry 481
Statistics 490
Textiles 492
Transportation Technology and Policy 498
Viticulture and Enology 516
Graduate Management Admission Test (GMAT) 117
Graduate Record Examination (GRE) 106, 123, 124
graduate student: deadlines 106
degrees 105
fellowships 45
funding 45
Graduate Student Association (GSA) 56
Graduate Studies 20, 104
Office of 20
graduation: filing dates 1
honors 78
grants 45
Bureau of Indian Affairs 46
Cal Grant A 45
Cal Grant B 45
Child Care 50
Federal Pell 45
UC Grant 45
Greek 314
Griffin Lounge 53
Ground Vehicle Systems 263
Guardian Scholars Program 61

H
harassment, sexual 538
Health and the Environment (CHE), Center for 23
Health Education and Promotion (HEP) 51
Health Informatics, Graduate Group 314
Health Sciences Research Laboratories 27
health services 51
acute care 51
advice nurse 51
after hours 51
alcohol prevention and treatment 51
drug abuse prevention and treatment 51
education 51
fees 51
health educators, peer 51
HIV counseling and testing 51
primary care clinics 51
promotion 51
specialty clinics 51
Heat Transfer, Thermodynamics, and Energy Systems 263
Hebrew 315
Herbarium, UC Davis 29
Hickey Pool 53
Hindi 315
History 315
History and Philosophy of Science 322
honorary societies 80
honors 78
Davis Honors Challenge 79, 322
deans list 78
graduation 78
graduation, College of Letters and Science 79
Integrated Studies Honors Program 79
program, College of Letters and Science 79
scholarships 78
Horticulture and Agronomy, Graduate Group 323
House and the Educational Opportunity Programs (EOP) 51
housing
dormitories 49
graduate, The Atriums 49
off-campus 49
on-campus 49
residence halls 49
student 49
Orchard Park 49
Primero Grove 49
Russell Park 49
Solano Park 49
The Atriums 49
Human Anatomy 323
Human and Community Development 324
Human Development 324
Human Development, Graduate Group 326
Human Performance Laboratory (HPL) 27
Humanities 327
Humanities Institute 27
Hutchinson Child Development Center 50
Hydrologic Sciences, Graduate Group 328
Hydrology 329

I
Immunology, Graduate Group 330
Independent Study Program 331
Individual Major: College of Agricultural and Environmental Sciences 332
College of Biological Sciences 332
College of Letters and Science 332
Information Technology in the Interest of Society (CITRIS), Center for 26
Integrated Pest Management, Graduate Group 332
Integrated Studies Honors Program 79, 333
Intercampus exchange program 106
intercampus visitor program 73
Intercollegiate Athletics 54
Interior Design 333
Internal Medicine 333
International Agriculture and Development 333
International Agricultural Development, Graduate Group 335
Index 551

International and Community Nutrition, Program 24
International Baccalaureate (IB) Higher Level Examination Credit 36
International Commercial Law, Graduate Group 336
International English Language Testing System (IELTS) 105
International Nutrition 337
International Relations 337
Internship Program 339
Intersegmental General Education Transfer Curriculum (IGETC) 92
College of Engineering 92
intracampus buses 50
intramural
clubs 54
sport clubs 52
sports 54
Italian 339
Japanese 341
Jepson Prairie Reserve 28
Jewish Studies 341
John Muir Institute of the Environment (JMIE) 24
Laboratory Animals 142
Land, Air, and Water Resources 342
Landscape Architecture 343
Landscape Restoration 346
LaRue Park Child Development Center 50
Latin 346
Latin American and Hemispheric Studies 346
Law School Admission Council (LSAC) 113
Law School Admission Test (LSAT) 113, 114
Law School Data Assembly Service (LSDAS) 114
Law, School of 112, 346
academic calendar 115
admission 113
Learning Resource Centers 64
Learning Skills Center 64
Letters and Science, College of 20
library
Agricultural and Resource Economics 20
Blaisdell Medical Library 20
General 20
general 20
Loren D. Carlson Health Sciences 20
Physical Sciences & Engineering 20
resources
HARVEST 21
MELVYL 21
Shields 20
Linguistics 353
Linguistics, Graduate Group 356
Literature in Translation 357
Livestock and Dairy 142
loans 46
assistant 46
direct 45
Direct Grad Plus 46
Direct PLUS 46
emergency 46
Federal Direct parent 46
Federal Direct Subsidized 46
Federal Perkins 46
Health Profession student 46
short-term 46
undergraduate students 46
Unsubsidized William D. Ford Student 46
majors
changing 70
College of Agricultural and Environmental Sciences 69
College of Biological Sciences 69
College of Engineering 70
College of Letters and Science 70
cross-college
College of Agricultural and Environmental Sciences 71
College of Biological Sciences 71
College of Engineering 71
College of Letters and Science 71
colleges
College of Agricultural and Environmental Sciences 70
College of Biological Sciences 70
College of Engineering 70
College of Letters and Science 70
Department of Computer Science 70
programs
College of Agricultural and Environmental Sciences 83
College of Biological Sciences 84
College of Engineering 86
College of Letters and Science 87
Management, Graduate School of 114, 117, 358
Managerial Economics 360
Mann Laboratory, Louis K. 27
Manufacturing 263
map, campus facilities 557
marching band, Cal Aggie 56
Marine Biology 167
Master of Education (M.Ed.), Graduate Group 361
Master of Preventive Veterinary Medicine (M.P.V.M.) 124
master’s and doctoral degree 105
Materials Science and Engineering 245
Materials Science Central Facilities 28
Maternal and Child Nutrition 361
Mathematical and Physical Sciences 361
Mathematics 362
Mathematics and Science Teaching Program (MAST) 65
Mechanical and Aeronautical-Engineering 261
Mechanical Design 262
Medical College Admission Test (MCAT) 120
Medical Informatics, Graduate Group 314, 368
Medical Microbiology 368
Medical Pharmacology and Toxicology 368
Medicine and Epidemiology 399
Medicine, School of 120, 368
Medieval and Early Modern Studies 399
Memorial Union (MU) 53
Memorial Union Art gallery 54
Mentorships for Undergraduate Research in Agriculture, Letters and Science (MURALS) 61
Mexican-American (Chicano) Studies 399
Microbiology 167, 400
Microbiology, Graduate Group 402
Middle East/South Asia Studies 403
Military Science 404
minimum progress requirements 69
minors 72
Education 109, 110
programs
College of Agricultural and Environmental Sciences 83
College of Biological Sciences 84
College of Engineering 86
College of Letters and Science 87
Molecular and Cellular Biology 168, 406
Molecular Biosciences 406
Molecular Genomic Imaging (CMGI), Center for 26
Molecular, Cellular, and Integrative Physiology, Graduate Group 410
Mondavi Center for the Performing Arts 54
Motorist Assistance Services 50
MURALS 61
Music 411
Department of 54
N
name change 68
Nanomaterials in the Environment, Agriculture and Technology (NEAT) 24
Native American Studies 415
Natural Reserve System 28
Natural Sciences 418
Nature and Culture 418
Nematology 419
Neurobiology, Physiology, and Behavior 168, 420
Neurology 427
Neuroscience 425
Neuroscience, Center for 26
Neuroscience, Graduate Group 425
Neurosurgery 427

newspaper, California Aggie 55
nondiscrimination 538
Northern California Nanotechnology Center 28
Nuclear Magnetic Resonance Facility 28
Nutrition 427
Nutrition Science 431
Nutrition, Program in International and Community 24
Nutritional Biology, Graduate Group 430

O
Obstetrics and Gynecology 431
Oceanography 431
Open Campus-Concurrent 93, 96
Ophthalmology 432
Organizational Studies 432
Organized Research Units (ORUs) 22
Orientation, New Student 61
Orthopaedic Surgery 432
Otolaryngology 432
Outdoor Adventures 52

P
parking 49
Parks and Recreation 432
part-time student
em
employment 50
minimum progress requirements 69
status 69
Pathology 432
Pathology, Microbiology, and Immunology 432
Pavement Research Center 28
Pavilion 52, 53
Pediatrics 432
peer counseling
health education 51
outreach presentations 51
The House 52
permanent residence 536
Pharmacology and Toxicology 432
Pharmacology and Toxicology, Graduate Group 432
Philosophy 433
photo ID, student 68
Physical Education 436
Physical Medicine and Rehabilitation 437
Physics 438
Physiology 443
Picnic Day 55
Planned Educational Leave Program (PELP) 44, 81
Plant Biology 168, 443
Plant Biology, Graduate Group 445
Plant Diversity, UC Davis Center for 29
Plant Pathology 447
Plant Physiology 448
Plant Protection and Pest Management 448
Plant Sciences 448
Plastic Surgery 453
Political Science 453
Polymer Interfaces and Macromolecular Assemblies (CPIMA), Center on 26
Pomology 459
Population Biology, Graduate Group 459
Population Health and Reproduction 460
Poultry 142
Precision Agriculture 460
prerequisites 126
Preventive Veterinary Medicine 460
priority registration 68
prizes 78, 79
College of Agricultural and Environmental Sciences, 79
College of Biological Science 80
College of Engineering 80
College of Letters and Science 80
university medal 79


probation 77
programs
bachelor’s degree requirements 89
collegewide
College of Agricultural and Environmental Sciences 84
College of Biological Sciences 85
College of Letters and Science 89
combined degree
School of Law 114
School of Medicine 121
craft 53
doctoral, Ph.D. in Education 109
elementary credential 110
Family Nurse Practitioner 121
graduate
admission 104
Intercampus exchange 106
internship 64
master’s
Arts in Education 109

MBA
Graduate School of Management 117
working professionals, Graduate School of Management 118
Physician Assistant 121
School of Medicine 121
School of Veterinary Medicine 124
secondary credential 110
teacher credential
M.A. 109
teaching
Integrated Teaching Credential with Master’s Degree 109
undergraduate
College of Agricultural and Environmental Sciences 83
College of Biological Sciences 84
College of Engineering 85
College of Letters and Science 88
Veterinary Medical Opportunity Program (VMOP) 123
Psychiatry 460
psychological services 51
Psychology 460
Putah Creek Lodge 53

Q
Quail Ridge Reserve 28
Quantitative Biology and Bioinformatics 465
quarter system, explanatory note 127

R
Radiation Oncology 465
radio station, KDVS 55
Radiology 466
Range Science 466
readmission
after an absence 39
deadlines for 39
graduate 105
Rec Pool Lodge 53
reciprocity, UC 92
recreation 52
Activities and Recreation Center (ARC) 53
aquatics 53
athletics, intercollegiate 54
campus 52
campus memberships 52
craft programs 53
Equestrian Center 52
fitness and wellness 52
Games Area 53
Hickey Pool 53
informal 52
intramural sports and clubs 54
intramural sports and sport clubs 52
Memorial Union (MU) 53
Outdoor Adventures 52
Recreation Swimming Pool 53
Silo Union 53
Recreation Swimming Pool 53
Reentry Student Services 61
refunds
admission fee 44
after dismissal 78
after withdrawals 81
application fees 32
graduate application fee, international 105
schedule of 44
School of Law application fee 113
School of Medicine application fee 120
student health insurance plan fee (SHIP) 44
registration
guide 1, 4, 42, 63, 68, 73, 74, 76, 80, 92
late fee 68
priority 68
procedure 68
SISWeb 68
Registration Fee Deferred Payment Plan (RFDPP) 42
Religious Studies 466
requirements 105
American History and Institutions 90
area breadth, College of Letters and Science 100
Bachelor, additional, College of Biological Sciences 95
bachelor’s degree 89, 91
college 93
College of Agricultural and Environmental Sciences 93
College of Biological Sciences 94
College of Letters and Science 98
university 90
catalog rights, College of Biological Sciences 96
composition 92
declaration of major, College of Biological Sciences 95
degree changes
College of Agricultural and Environmental Sciences 94
College of Biological Sciences 96
College of Letters and Sciences 102
degree check
College of Biological Sciences 95
College of Engineering 98
College of Letters and Science 102
Engineering Design, College of Engineering 97
English Composition
College of Agricultural and Environmental Sciences 93
College of Biological Sciences 95
College of Engineering 97
College of Letters and Science 100
Entry Level Writing (English) 90, 92
financial independence 536
foreign language, College of Letters and Science 101
General Education 91
fulfilling 92
social-cultural diversity 91, 92
topical breadth 91
writing experience 91, 92
graduate
English 105
minors (underage) 536
permanent residence 536
residence 536
College of Agricultural and Environmental Sciences 93
College of Biological Sciences 95
College of Engineering 97
College of Letters and Science 99
state 91
scholarship 91
College of Agricultural and Environmental Sciences 93
College of Biological Sciences 95
College of Engineering 97
College of Letters and Science 99
subject, org 32
units 90
College of Agricultural and Environmental Sciences 93
College of Biological Sciences 94
College of Engineering 96
College of Letters and Science 98
residence
permanent 536

requirements 536
Statement of Legal Residence (SLA) 68
tuition purposes, for 536
Richard L. Nelson Gallery 55
ridesharing 50
ROTC
CSU Sacramento 406
U.S. Air Force 405
U.S. Army 404
U.S. Navy 406
UC Berkeley 406
Russell Park Child Development Center 50
Russian 468
S
scholarships 47
alumni 47
graduate 47
honors 78
military 47
regents 47
Scholastic Assessment Test (SAT) 33
scholastic deficiencies 77
schools
Education 109
Law 112
Management 114, 117
Medicine 120
Science and Society 470
Science and Technology Studies 472
Security, campus 539
senate bill 361 73
senate, ASUCD 55
services
counseling 51
health 51
psychological 51
sexual harassment 538
Sexuality Studies 473
shuttles 50
Silo Union 53
SISWeb 68
Social and Ethnic Relations 473
Social Science Data Service 29
Social Sciences 474
social security numbers 539
Social Theory and Comparative History 474
Sociology 474
Soil and Water Science 481
Soil Science 480
Soils and Biogeochemistry, Graduate Group 481
Southeast Asians Furthering Education (SAFE) 57
Spanish 482
Special Transitional Enrichment Program 44
standards
qualitative 77
quantitative 77
Statement of Legal Residence (SLA) 68
Statistics 487
Statistics, Graduate Group 490
Stebbins Cold Canyon Reserve 28
Structural Engineering 244
Structural Mechanics 244
student
aid, Federal Student Aid (FAFSA) 46
court, ASUCD 56
employment 50
Employment Center 50
graduate, designated emphasis 106
international 105, 117
organizations 56
orientation 61
records, disclosure 539
transfer, School of Medicine 121
Student Farm 65
Student Programs and Activities Center (SPAC) 56
Student Regent 62
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student–Faculty Relationships, Committee on</td>
<td>63</td>
</tr>
<tr>
<td>study list</td>
<td>68</td>
</tr>
<tr>
<td>study plan, approval, College of Agricultural and Environmental Sciences</td>
<td>94</td>
</tr>
<tr>
<td>Subject A</td>
<td>491</td>
</tr>
<tr>
<td>Summer Sessions</td>
<td>73</td>
</tr>
<tr>
<td>Surgery</td>
<td>491</td>
</tr>
<tr>
<td>Surgical and Radiological Sciences</td>
<td>491</td>
</tr>
<tr>
<td>swimming pool</td>
<td>53</td>
</tr>
<tr>
<td>Recreation</td>
<td>53</td>
</tr>
<tr>
<td>Systems Dynamics and Control</td>
<td>263</td>
</tr>
<tr>
<td>Tahoe Environmental Research Center (TERC)</td>
<td>29</td>
</tr>
<tr>
<td>teaching</td>
<td></td>
</tr>
<tr>
<td>assistantships</td>
<td>106</td>
</tr>
<tr>
<td>seminar on college</td>
<td>107</td>
</tr>
<tr>
<td>Teaching Resources Center</td>
<td>107</td>
</tr>
<tr>
<td>Technocultural Studies</td>
<td>491</td>
</tr>
<tr>
<td>Test of English as a Foreign Language (TOEFL)</td>
<td>105, 117</td>
</tr>
<tr>
<td>Textile Arts and Costume Design</td>
<td>492</td>
</tr>
<tr>
<td>Textile Science</td>
<td>492</td>
</tr>
<tr>
<td>Textiles and Clothing</td>
<td>492</td>
</tr>
<tr>
<td>Textiles, Graduate Group</td>
<td>492</td>
</tr>
<tr>
<td>The First Resort</td>
<td>127</td>
</tr>
<tr>
<td>The House</td>
<td>52</td>
</tr>
<tr>
<td>The Loft</td>
<td>53</td>
</tr>
<tr>
<td>Theatre and Dance</td>
<td>494</td>
</tr>
<tr>
<td>Theatre and Dance, Department of</td>
<td>54</td>
</tr>
<tr>
<td>tours, campus</td>
<td>15</td>
</tr>
<tr>
<td>transcripts</td>
<td></td>
</tr>
<tr>
<td>concurrent enrollment</td>
<td>77</td>
</tr>
<tr>
<td>UC Davis</td>
<td>77</td>
</tr>
<tr>
<td>UC Davis Extension</td>
<td>77</td>
</tr>
<tr>
<td>Transfer Core Curriculum (TCC)</td>
<td>92</td>
</tr>
<tr>
<td>College of Engineering</td>
<td>92</td>
</tr>
<tr>
<td>Transfer Student Services</td>
<td>61</td>
</tr>
<tr>
<td>transportation</td>
<td>49</td>
</tr>
<tr>
<td>bicycles</td>
<td>49</td>
</tr>
<tr>
<td>bus passes, Unitrans</td>
<td>50</td>
</tr>
<tr>
<td>buses</td>
<td>50</td>
</tr>
<tr>
<td>intracampus</td>
<td>50</td>
</tr>
<tr>
<td>Unitrans</td>
<td>50</td>
</tr>
<tr>
<td>Motorist Assistance Services</td>
<td>50</td>
</tr>
<tr>
<td>parking</td>
<td>49</td>
</tr>
<tr>
<td>ridesharing</td>
<td>50</td>
</tr>
<tr>
<td>shuttles</td>
<td>50</td>
</tr>
<tr>
<td>Transportation and Parking Services (TAPS)</td>
<td>49</td>
</tr>
<tr>
<td>Transportation Planning</td>
<td>244</td>
</tr>
<tr>
<td>Transportation Studies, Institute of</td>
<td>23</td>
</tr>
<tr>
<td>Transportation Systems</td>
<td>263</td>
</tr>
<tr>
<td>Transportation Technology and Policy, Graduate Group</td>
<td>498</td>
</tr>
<tr>
<td>tuition</td>
<td></td>
</tr>
<tr>
<td>non-resident</td>
<td>536</td>
</tr>
<tr>
<td>non-resident exceptions</td>
<td>537</td>
</tr>
<tr>
<td>U</td>
<td></td>
</tr>
<tr>
<td>U.S. Air Force ROTC</td>
<td>405</td>
</tr>
<tr>
<td>U.S. Army ROTC</td>
<td>404</td>
</tr>
<tr>
<td>U.S. Navy ROTC</td>
<td>406</td>
</tr>
<tr>
<td>U.S. Post Office, campus</td>
<td>55</td>
</tr>
<tr>
<td>UC Agricultural Issues Center</td>
<td>29</td>
</tr>
<tr>
<td>UC Davis Center for Plant Diversity</td>
<td>29</td>
</tr>
<tr>
<td>UC Davis Extension</td>
<td>93, 97</td>
</tr>
<tr>
<td>UC Davis Faculty-Led Programs Abroad</td>
<td>221</td>
</tr>
<tr>
<td>UC Davis Quarter Abroad</td>
<td>65, 221</td>
</tr>
<tr>
<td>UC Davis Summer Abroad</td>
<td>65, 221</td>
</tr>
<tr>
<td>UC Education Abroad Program</td>
<td>221</td>
</tr>
<tr>
<td>UC Office of the President</td>
<td>55</td>
</tr>
<tr>
<td>UC/CSU/Community College cross enrollment</td>
<td>73</td>
</tr>
<tr>
<td>Ultra-Scale Visualization, Institute for</td>
<td>27</td>
</tr>
<tr>
<td>undergraduate colleges</td>
<td></td>
</tr>
<tr>
<td>Agricultural and Environmental Sciences</td>
<td>15</td>
</tr>
<tr>
<td>Biological Sciences</td>
<td>15</td>
</tr>
<tr>
<td>Engineering</td>
<td>19</td>
</tr>
<tr>
<td>Letters and Science</td>
<td>20</td>
</tr>
<tr>
<td>undergraduate education</td>
<td>82</td>
</tr>
<tr>
<td>unions</td>
<td>53</td>
</tr>
<tr>
<td>United States Medical Licensing Examination (USMLE)</td>
<td>121</td>
</tr>
<tr>
<td>Unitrans buses</td>
<td>50</td>
</tr>
<tr>
<td>units</td>
<td></td>
</tr>
<tr>
<td>converting quarter to semester</td>
<td>72</td>
</tr>
<tr>
<td>credit</td>
<td>72</td>
</tr>
<tr>
<td>requirements</td>
<td>90</td>
</tr>
<tr>
<td>variable</td>
<td>126</td>
</tr>
<tr>
<td>University Club</td>
<td>54</td>
</tr>
<tr>
<td>University Extension, UC Davis</td>
<td>74</td>
</tr>
<tr>
<td>university medal</td>
<td>79</td>
</tr>
<tr>
<td>University of California, Davis Washington Program</td>
<td>500</td>
</tr>
<tr>
<td>University of California, overview</td>
<td>14</td>
</tr>
<tr>
<td>University requirements for the bachelor's degree</td>
<td>90</td>
</tr>
<tr>
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