PROGRAMS AND COURSES
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, 98, 99, 190X, 192, 194H, 197T, 197TC, 198, 199) to interested students. These 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.

Online & Hybrid Courses are courses in which instruction is delivered on the Internet. Courses that are delivered:
- Completely online can be identified by the letter V at the end of their course numbers, e.g., 10V, 162V.
- As a combination on online and classroom can be identified by the letter Y at the end of their course numbers, e.g., 10Y, 162Y.

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

The course offerings and instructors listed in this catalog are subject to change without notice.

For the most current offerings and instructors, refer to the General Catalog Supplement at http://catalog.ucdavis.edu/.

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 two times with consent of instructor. GE credit: SciEng | Ol, SE, VL — F, W, S. (F, W, S.) Zidenberg-Cherr

Top line is course number; title; units (in parentheses).

Paragraph following is course instructional format; prerequisite; course description; grading, if other than letter grading; GE attributes, if any; quarter offered 2016–17; quarter offered 2017–18 (in parentheses); instructor (if specified).

Quarters offered is the quarter in which a course is intended to be given is shown as follows:

• F. Fall Quarter (September to December) or Fall Semester (August to December), School of Law
• W. Winter Quarter (January to March)
• S. Spring Quarter (April to June) or Spring Semester (January to May), School of Law & Veterinary Medicine
• Su. Summer Quarter (July to September)

The quarter a course is offered is subject to change. For more information, consult the department.

Alternate Year Designation

Some course descriptions will include the phrase “Offered in alternate years.” If the course will be offered in the 2016–17 academic year, the quarter designation immediately follows the description. If the course will be offered in the 2017–18 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 or the Biology Academic Success Center, advisers’ offices, advising centers, and departmental offices.
African American and African Studies

(College of Letters and Science)
Department Office, 2201 Hart Hall
530-752-1548; http://coas.ucdavis.edu

Faculty
Wole Adebanwi, Ph.D., Associate Professor
Moradeyin Adejunmobi, Ph.D., Professor
Milmon F. Harrison, Ph.D., Senior Lecturer
Laurie Lambert, Ph.D., Assistant Professor
Betifna Ng’weno, Ph.D., Associate Professor
Hallu Osumaore, Ph.D., Emeritus
Elisa Joy White, Ph.D., Associate Professor

Emeriti Faculty
John Stewart, Ph.D., Professor Emeritus

The Major Program
African American and African Studies is an interdisciplinary field with students in the United States and throughout the world. The major introduces students to the social, political, economic, and cultural dimensions of African Diaspora and Black communities in the United States and Africa. Students are exposed to and trained to think critically about the conditions and demands of global societies. Students may choose to enrich their education studying for a summer, a quarter, or a year in Africa or by studying for a quarter in the Caribbean. Majors and Minors are also encouraged to take advantage of relevant internship opportunities.

The Program. The purpose of this program is to give students a sense of the individual characteristics and common concerns of Black people in Africa, the United States, and the wider Diaspora. The African American emphasis includes courses in 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 enables students to study the way Black communities have developed in Africa and the United States and have dealt with questions of race and ethnicity. The students have chosen to and trained to think critically about the conditions and demands of global societies. Students may choose to enrich their education studying for a summer, a quarter, or a year in Africa or by studying for a quarter in the Caribbean. Majors and Minors are also encouraged to take advantage of relevant internship opportunities.

A.B. Major Requirements:

- Preparatory Subject Matter

One course from: African American and African Studies 10, 12 ........................................ 4
One course from: African American and African Studies 15, 17, 18, 50, 51, 52, 80 ........................................ 4

- Core Courses

One course from: Anthropology 2; Economics 1A, 1B; Geography 2; Sociology 1; Political Science 1, 2; Psychology 1 .......................... 4
One course from: Chicano/a Studies 10; Native American Studies 1, 10; Women & Gender Studies 50; American Studies 10; Asian American Studies 1 .................. 2

- Upper Division Courses

Select one course from: African American and African Studies 10, 12, 15, 17, 18, or 80 ........................................ 4

- Depth Subject Matter

Select any five upper division courses 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 10, 100; see also Undergraduate Requirements, on page 107.

Courses in African American and African Studies (AAS)

Lower Division

10. African-American Culture and Society (4)

- Lecture: 3 hours; discussion: 1 hour. Critical examination of historical, political, social, and economic factors that have affected the development and status of African-American people in contemporary society. GE credit: SocSci, Div W | AGCH, DD, SS, WE. — F. (F.) 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 or SocSci, Div W | AH or SS, WC, WE. — W. (W.) Adebanwi, Adejunmobi

15. Introduction to African American Humanities (4)

- Lecture: 3 hours; discussion: 1 hour. Class size limited to 165 students. Introduction to the humanist tradition developed by writers, philosophers, and artists of African descent in the West. Attention also given to African sources, as well as European, Caribbean, Latin-American, and North American variations on this tradition. GE credit: W | AGCH, AH, DD — W. (W.) Harrison

16. Verbal and Performance Arts in Africa (4)


17. Women in African Societies (4)


18. Introduction to Caribbean Studies (4)

- Lecture: 3 hours; discussion: 1 hour. Introduction to the contemporary culture, peoples, politics, and sociopolitical dimensions of the Caribbean. Topics include movements of people, goods and ideas across the Atlantic world and creative productions within the Caribbean. GE credit: ArtHum or SocSci | AH or SS, WC. — F. (F.) Ng’weno

50. Black Popular Culture (4)

- Lecture: 3 hours; discussion: 1 hour. Survey of the American African images in popular culture (film, television, comedy, sports and music). GE credit: AH or SS, WC. — S. (S.) Harrison, White

51. History of Afro American Dance (4)

- Lecture: 4 hours. Evolution of African-American dance, tracing its history and development from West and Central Africa to the United States. Investigates the spiritual and cultural relevance of African American dance and its artistic merits through contributions from its choreographers and performers. GE credit: ArtHum | AH, DD, VL — S. (S.)

52. African Traditional Religion (4)

- Lecture: 2 hours; discussion: 2 hours. Introduction to 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 related to sacred kingship, divination system, women, prophecy, conversion and adaptation to Islam and Christianity. GE credit: ArtHum, Div W | AH, WC. — W. (W.)

80. Introduction to Black Politics (4)


Fall 2011 and on Revised General Education (GE): AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; AGCH—American Cultures; DD—Diverse Diversity; OL—Oral Skills; QL—Quantitative; VL—Visual; WC—World Cultures; WE—Writing Experience
Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Diverse Diversity; Wrt—Writing Experience
Quarter Offered: F=Fall, W=Winter, S=Spring, Su=Summer; 2017/2018 offering in parentheses
100. Survey of Ethnicity in the U.S. (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing or consent of instructor. Limit- ed enrollment. 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 | ACHG, AH, DD. —W. (W.) Harrison

101. Introduction to Research in the Afro-American Community (4)
Lecture—4 hours. Prerequisite: course 10 or consent of instructor. Introductory survey of African-American Studies methods and techniques; problems and methodology in Afro-American Studies. —S. (S.) Harrison, White

107A. African Descent Communities and Culture in the Caribbean and Latin America (4)
Lecture/discussion—4 hours. Prerequisite: upper division standing. Origin and development of African descent communities and cultures in the Caribbean and Latin America. The similarities and differences among African descent communities and cultures in terms of religious practices, music, and national identity. GE credit: ArtHum, Div, Wrt | WC. —F. (F.) Lamberti, 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., Canada, and Mexico from the African slave trade to contemporary urban society. Offered alternate years. GE credit: ArtHum, Div. —F. (F.) White

107C. African Descent Communities and Culture in Asia (4)
Lecture/discussion—4 hours. Study of the origin and development of African Descent communities and cultures in Asia. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC. —W. (W.) Ng’weno

107D. African Descent Communities and Cultures in Europe (4)
Lecture/discussion—4 hours. Study of the origin and development of African Descent communities and cultures in Europe. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC. —S. (S.) White

110. West African Social Organization (4)

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 or SocSci, Div, Wrt | AH or SS, WC. —W. (W.) Adebanwi, 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. Black women’s experience of Africa and philosophical underpinnings of the feminist movement. Offered in alternate years. GE credit: ArtHum or SocSci, Div | ACHG, DD, SS. —S. (S.) Lamberti

130. Education in the African-American Community (4)
Lecture—2 hours; discussion—1 hour; fieldwork—3 hours. Prerequisite: course 10 or course 100, completion of the subject A requirement. Examination of the history of the education of African Americans in the United States. An examination of contemporary theories concerning the schooling of African Americans. (Former course 140) Offered irregularly. GE credit: SocSci | DD, SS. —F. (F.)

133. The Black Family in America (4)
Lecture—2 hours; discussion—1 hour. Prerequisite: upper division standing or consent of instructor. Analysis of social science research to examine relationships between black (African-descent) family structures, patterns of functioning, and political, economic, and social conditions in the U.S. Offered in alternate years. GE credit: SocSci, Div | ACHG, DD, SS. —S. (S.) Safran, Safran

141. Psychology of the African American Experience (4)
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 Afrocentric frameworks. Emphasis on Optimality Theory, a psychological theory based on an Afrocentric world view. —S. (S.)

145A. 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. Offered in alternate years. GE credit: SocSci, Div | SS, WC. —W. (W.) Harrison

145B. Black Intellectuals (4)
Lecture—4 hours. Prerequisite: course 10, 80, 145A, or consent of instructor. Exposition and critical analysis of selected theoretical writings of Black intellectuals, and especially political and social thinkers. Offered in alternate years. GE credit: SocSci, Div | DD, SS, WE. —F. (F.) Harrison, Lamberti

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. —F. (F.)

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. —W. (W.)

151. African-American Vernacular Music and Verbal Arts (4)
Lecture—2 hours; discussion—2 hours. Sociopoliti- cal dimensions of African-American musical forms like spiritual, work song, minstrelsy blues, rhythm and blues, jazz, gospel, soul and contemporary pop, and related verbal arts like preaching, storytelling, rap- ping. —S. (S.)

152. Major Voices in Black World Literature (4)
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: upper division standing, completion of course 10, or course 12, or course 18. Recurrence of cultural tropes 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. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, DD, WC, WE. —(W.) Adejunmobi

153. African American Folklore (4)
Lecture—3 hours; term paper. Prerequisite: completion of Entry Level Writing Requirement (EWWR). Colonial and post-colonial sub-Saharan African literature and the African oral traditions from which it emerged. Genre and themes of African literature from the nineteenth century to the present. (Same course as Comparative Literature 154.) Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE. —S. (S.) Adejunmobi

155A. African-American Dance and Culture in the United States, Brazil and the Caribbean (4)
Lecture/discussion—4 hours. Comparative study of the African American dance forms in the U.S., Brazil, Haiti, Cuba, Jamaica, Barbados, and Trinidad. Examination of ritual, folk, and popular dance forms with the social/historical context that has influenced these forms. (Same course as Dramatic Art 155A.) GE credit: ArtHum | AH, VL, WC. —W. (W.)

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, traditional African languages and impact of language policies. Offered irregularly. GE credit: ArtHum, Div | AH, DD, WC. —S. (S.) Adejunmobi

157. Literature and Society in South Africa (4)
Lecture/discussion—4 hours. Prerequisite: upper division standing. Political and social developments in 20th-century South Africa as illustrated by a range of South African writings, historical and contemporary, that explore race relations, impact of government policy on types and context of writing. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE. —(W.) Adejunmobi

160. African-American Folklore (4)
Lecture—2 hours; discussion—1 hour; fieldwork—3 hours. Prerequisite: course 10. History and theory of African American folklore and folklife, including music, material culture, oral narrative, proverbs, and humor. African and Caribbean cultural influences on New World folk genres will be probed. GE credit: ArtHum, Div. —S. (S.)

162. Islam in Africa and the Americas (4)
Lecture/discussion—4 hours. Prerequisite: Religious Studies 60 or course 12 or course 110. Comparative and historical survey of Islam in the regional and cultural settings of Sub-Saharan Africa and the Americas. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, WC, WE. —S. (S.)

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 Candomble, Santeria, Shango, Vodun, and Rastafricanism in the New World. (Former course 153.) GE credit: ArtHum, Div | AH, WC, WE. —S. (S.)

165. Afro-Christianity and the Black Church (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing; course 10, 15 or consent of instructor. Examination of the historical role of Chris- tian 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 | ACHG, DD, SS. —S. (S.) Harrison

168. Black Documentary: History and Practice (4)
Lecture—3 hours; laboratory—5 hours. Prerequisite: Film Studies 1, course 170; course 50 recommended; consent of instructor. 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. GE credit: ArtHum, Div | AH, DD, VL, WC. —S. (S.)
Courses in Agricultural and Environmental Chemistry (AGC) Graduate

290. Seminar (1) Seminar—1 hour. Selected topics in agricultural and environmental chemistry, presented by students. (S/U grading only)—F, W, S. (F, W, S.)

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) Arrangement with faculty member of the Group in Agricultural and Environmental Chemistry. (S/U grading only.)

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 science in schools or in non-formal settings such as nature preserves, environmental camps, or other venues. This major prepares graduates to direct programs in the agricultural and environmental sciences as well as to provide them with a set of skills necessary to work within social science careers related to these fields. This program of study meets state and federal requirements for entry into teacher preparation in agriculture and science, as well as requirements in Career Technical Education (CTE).

The Program 

The 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 placement in sites related to a student’s focus of study. Through this major students will have the opportunity to explore and understand agricultural and environmental issues into educational and development settings.

Career Alternatives 

The need for scientists, technicians, and 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.

B.S. Major Requirements (AEE): 

Units

Government/U.S. Constitution ................. 4
History 17A or Political Science 1 .............. 4

Preparatory Subject Matter ...................... 50

A minimum of eight (8) units is required in each area of Animal Science, Agricultural Business and Economics, Applied Biological Systems Technology, Environmental Horticulture, Environmental Science and Natural Resources; and Plant and Soil Science.

Animal Science 1, 2, 21, 41 ...................... 8
Applied Biological Systems Technology 16, 52, 49, 101, 9
Agricultural & Resource Economics 15 and either Economics 1A or 1B ............... 8
Environmental Horticulture 1, 6, Plant Sciences 5
Environmental Science and Policy 10
Environmental Toxicology 10, Hydrologic Science 10, 47 ......................... 8
Plant Sciences 1, 2, 9, Plant Science 10, 9
Mathematics 16A & 16B, or 17A&8, or 21A&8 ............ 6-8
Physics 7A & 7B ................................ 8

Depth Subject Matter ............................. 20
Agricultural Education 100 & 160 .......... 6
Education 1, 2, 10 ................................ 10
Environmental Science and Policy 110 .......... 4

Focused Depth Subject Matter ............... 16

The specialized focus will consist of a minimum of 16 units in one of the six areas listed below:

Agricultural Business and Economics:
Agricultural and Resource Economics 100A, 100B, 120, 130, 135, 138, 140, 150, 170, 176

Animal Science: Select upper division units from any Animal Genetics, Animal Science, Avian Sciences, or Animal Behavior.

Food Science and Technology:
Food Science and Technology 102F, Food Science and Technology 109;
Nature and Culture 140;
Neurobiology, Physiology, and Behavior 101, 121;
Nutrition 113, 122, 123

Applied Biological Systems Technology:
Applied Biological Systems Technology 121:
Environmental Horticulture 102, 105, 120, 129, 125, 133, 160;
Nature and Culture 120, Plant Sciences 175

Environmental Science and Natural Resources:
Environmental Science and Resource Sciences 121, 131;
Environmental Science and Policy 100, 101, 110, 116, 123, 151, 161, 170, EV 101, 111, 134;
Plant Sciences 101, 105, 110A; Wildlife, Fish, and Conservation Biology 110, 111, 120, 154

Plant and Soil Science:
Plant and Soil Science 102, 105, 116, 117, 160, 172, 176; Plant Sciences 150;
Soil Science 100, 102, 118;
Viticulture and Enology 101A, 101C

Restricted Electives .................. 16

At least four additional upper division courses (minimum 16 units; duplicate from Depth specialization courses not counted) selected with approval of an advisor to supplement or expand depth subject matter courses chosen from Animal Biology, Animal Genetics, Animal Science, Agricultural and Resource Economics, Avian Sciences, Environmental Horticulture, Environmental and Resource Sciences, Environmental Sciences and Policy, Environmental Science and Technology, International Agricultural Development, Nature and Culture, Neurobiology, Physiology, and Behavior, Nutrition, Plant Sciences, Plant Biology, and Viticulture and Enology.

Total Units For Major ....................149-151

Master Adviser. Cary J. Trexler, Associate Professor

Major Advisers. Lynn Martindale, Lecturer/Supervisor School of Education; Cary J. Trexler, Associate Professor

Undergraduate Advising Center for the major (including peer advising) is located in the Animal Science Advising Center in 1202 Meyer Hall 530-754-7915; http://asac.ucdavis.edu/.

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 

92. Internship (1-12) Internship—3-36 hours. Prerequisite: lower division standing, consent of instructor. Supervised internship off and on campus in areas of agricultural education. (P/NP grading only.)

98. Directed Group Study (1-5) Prerequisite: consent of instructor. (P/NP grading only)—F, W, S, F, W, S

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only)—F, W, S, F, W, S

Upper Division 

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.—W. (W.) 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.—F. (F)

171. Audiovisual Communications (2) Lecture—1 hour; laboratory—3 hours. Prerequisite: upper division standing. Theory and principles of audiovisual communication. Comparison of audiovisual materials such as transparencies, slides, computer-generated graphics, and videos. Operation and use of audiovisual equipment is stressed. Offered irregularly.

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 irregularly. GE credit: SocSci, Wrt.

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)—W. (W)

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 

300. Directed Field Experience in Teaching (2) Discussion—1 hour; field experience—3 hours. Prerequisite: course 100. Experience as teaching assistant in agriculture or home economics programs in public schools. May be repeated one time for credit. (S/U grading only.)

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
Agricultural and Managerial Economics

See Managerial Economics, on page 416.

Agricultural and Resource Economics

[College of Agricultural and Environmental Sciences]
Richard J. Sexton, Ph.D., Chair of the Department
Department Office, 2116 Social Sciences and Humanities Building 530-752-9995
Undergraduate Student Information for the Managerial Economics major, 1176 Social Sciences and Humanities Building 530-752-9356; http://manecon.ucdavis.edu
Graduate Student Information, 1171 Social Sciences and Humanities Building 530-752-6185; http://www.agecon.ucdavis.edu
Faculty
Julian M. Alston, Ph.D., Distinguished Professor
Timothy Beatty, Ph.D., Professor
Stephen R. Boucher, Ph.D., Associate Professor
Stephen R. Beaulieu, Ph.D., Assistant Professor
Karen K. Jessee, Ph.D., Associate Professor
Kristin Kiesiel, Ph.D., Lecturer
Douglas M. Larson, Ph.D., Professor
C. Y. Cynthia (Cindy) Lowell, Ph.D., Associate Professor
Kevin M. Novan, Ph.D., Assistant Professor
Quinroo Paris, Ph.D., Professor
Richard J. Sexton, Ph.D., Professor
Aaron D. Smith, Ph.D., Professor
Daniel A. Sumner, Ph.D., Distinguished Professor
J. Edward Taylor, Ph.D., Professor
James Wilen, Ph.D., Distinguished Professor
Distinguished Graduate Mentoring Award
Jeffrey C. Williams, Ph.D., Professor
Emeritus Faculty
Hoy F. Carman, Ph.D., Professor Emeritus
Y. Hossein Farzin, Ph.D., Professor Emeritus
B. Delworth Gardner, Ph.D., Professor Emeritus
Arthur M. Havener, Ph.D., Professor Emeritus
Richard E. Howitt, Ph.D., Professor Emeritus
Warren E. Johnston, Ph.D., Professor Emeritus
Karen Klonsky, Ph.D., Specialist in Cooperative Extension Emeritus
Samuel H. Logan, Ph.D., Professor Emeritus
Philip L. Martin, Ph.D., Professor Emeritus
Alexander F. McColla, Ph.D., Professor Emeritus
Chester O. McCorkle, Jr., Ph.D., Professor Emeritus
Refugio I. Rochin, Ph.D., Emeritus
Lawrence E. Shepard, Ph.D., Senior Lecturer SOE Emeritus
Affiliated Faculty
Leslie J. Butler, Ph.D., Specialist in Cooperative Extension
John H. Constantine, Ph.D., Lecturer
Robert L. Cook, Ph.D., Specialist in Cooperative Extension
Sherman D. Hardesty, Ph.D., Specialist in Cooperative Extension
Hyunok Lee, Ph.D., Professional Researcher
Gerald T. Lundblad, M.B.A., Lecturer
John Maxey, M.B.A., J.D., Lecturer
Tina L. Saito, Ph.D., Associate Project Scientist
Stephen A. Vosti, Ph.D., Adjunct Professor
Marilyn D. Whitney, Ph.D., Lecturer
Major Program. See the undergraduate program in Managerial Economics, on page 416.
Major Advisers. Contact the Department office.
Related Courses. See courses in Economics and Environmental Science and Policy.
Courses in Agricultural and Resource Economics (ARE)

Lower Division
1. Economic Basis of the Agricultural Industry (4)
Lecture—4 hours. Agriculture and man; the agricultural industry in U.S. and world economies; produc-
tion and supply, marketing and demand; agricultural land, capital and labor markets; economic and social problems of agriculture in an urban and indus-
trialized economy emphasizing California. GE credit: SocSci | SS.

15. Economic Basis of the Agricultural Industry (4)
Lecture—4 hours. Agriculture and man; the agricultural industry in Australia and world economies; produ-
tion and supply, marketing and demand; agricultural land, capital and labor markets; eco-
nomic and social problems of agriculture in an urban and industrialized economy emphasizing Aus-
tralia. Taught in Australia under the supervision of a UC Davis faculty member. Not open for credit to stu-
dents who have completed course 1. GE credit: SocSci | SS, WC.

15. Population, Environment and World Agriculture (4)
Lecture—3 hours, discussion—1 hour. Economic analysis of interactions among population, environ-
ment, natural resources and development of world agriculture. Introduces students to economic thinking about population growth, its causes and con-

18. Business Law (4)
Lecture—4 hours. Prerequisite: sophomore standing. General principles of business law in the areas of
contracts, business organization, real property, unif

Fall 2011 and on Revised General Education (GE): AH=Arts and Humanities; SC=Science and Engineering; SS=Social Sciences; ACGH=American Cultures; DI=Domestic Diversity; OL=Oral Skills; QL=Quantitative; VL=Visual; WC=World Cultures; WE=Writ|Writing Experience
Pre-Fall 2011 General Education (GE): ArtHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Domestic Diversity; Writ=Writ|Writing Experience
Quarter Offered: F=Fall; W=Winter; S=Spring; Su=Summer; 2013/2012 offering in parentheses
1205. Agricultural Policy (4) Lecture—4 hours. Prerequisite: course 100A or consent of instructor. Analytical treatment of historical and current economic policies influencing agriculture. Uses of economic theory to develop historical and conceptual understanding of agriculture's functions in the economy, 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. Offered irregularly. GE credit: SocSci | SS, W, WC.

121. Economics of Agricultural Sustainability (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Plant Sciences 15; Community and Regional Development 20, Economics 1A; Mathematics 12 or equivalent. Application of economic concepts to agro-environmental issues relevant to agricultural sustainability. Topics include market efficiency, production externalities, government policies, agricultural trade, product differentiation, all linked to sustainability issues. Case studies include biofuels, genetically modified foods and biologically differentiated products. GE credit: SocSci | SS.

130. Agricultural Markets (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A and 1B. Macroeconomic issues of developing countries include issues in generating capital, capital market, financial policies, foreign aid and investment. Important issues of policy concerning international borrowing and external debt of developing countries. (Same course as Economics 112E.) GE credit: SocSci | Div, SS, WC.—F, W, S, Su.

135. Agribusiness Marketing Plan Development (2) Lecture/discussion—2 hours. Prerequisite: upper division standing. Fundamental components required to develop a marketing plan. Appreciation of the concept of a marketing plan, appropriate research required, including the use of library and Internet sources. Development of marketing strategies, market analysis and conclusions, financial evaluation and monitoring. (P/N grading only.) GE credit: SocSci | SS.—F, F (W).


139. Futures and Options Markets (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 100B. Pass One open to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Principles, procedures, and practice of the valuation process with specific emphasis placed on farm real estate. Concepts 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 practice. GE credit: SocSci | SS.—W (W).

140. Farm Management (4) Lecture—4 hours. Prerequisite: Economics 1A. Pass One open to Managerial Economics majors. Farm organization and management. Problems in organizing and managing the farm business. GE credit: SocSci | SS.—W (W).


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 raw land, single family, multifamily, industrial and office real estate markets. GE credit: SocSci | SS.—S (S).


147. Resource and Environmental Policy Analysis (3) Lecture—3 hours. Prerequisite: Economics 1A. Open to non-majors only. Natural resource use problems with emphasis on past and current policies and institutions affecting resource use, determinants, principles, and patterns of natural resource use; property rights; conservation; private and public resource use problems; and public issues. Students who have had or are taking course 100A, Economics 100, or the equivalent, may receive only 2 units of credit, so must enroll in course 147M instead. GE credit: SocSci | AGCH, SS.—S (S).

147M. Resource and Environmental Policy Analysis (2) Lecture—3 hours. Prerequisite: Economics 1A. Open to non-majors only. Natural resource use problems with emphasis on past and current policies and institutions affecting resource use, determinants, principles, and patterns of natural resource use; property rights; conservation; private and public resource use problems; and public issues. Students who have had or are taking course 100A, Economics 100, or the equivalent, may receive only 2 units of credit, so must enroll in course 147M instead. GE credit: SocSci | AGCH, SS.—S (S).


155. 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 changes, human welfare, population growth and health, labor markets and internal migration. Important issues of policy concerning international trade and industrialization. (Same course as Economics 112F.) GE credit: SocSci, Div | SS, WC.—F, W, S, Su.

158. Economic Development (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A and 1B. Macroeconomic issues of developing countries include issues in generating capital, capital market, financial policies, foreign aid and investment. Important issues of policy concerning international borrowing and external debt of developing countries. (Same course as Economics 112F.) GE credit: SocSci, Div | SS, WC.—F, W, S, Su.


Agricultural and Resource Economics 155
155. Operations Research and Management Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A. Pass One open to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Analysis of methods of capital budgeting; calculating the cost of capital; dividend policies; mergers and acquisitions; and special current topics in finance. GE credit: SocSci|SS.—W. (W.)

156. Introduction to Mathematical Economics (4)
Lecture—4 hours. Prerequisite: courses 100B, 155. Pass One open to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Linear algebra for economists; necessary and sufficient conditions in static optimization problems; implicit function theorem; economic methodology and mathematics; comparative statics; envelope theorem; Le Chatelier principle; applications to production and consumer models. Offered irregularly. GE credit: SocSci|QL, SS.—Su. (Su.)

157. Analysis for Operations and Production Management (4)

165. Emerging Economies and Globalization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 100A, 111A, 115B; completion of course 106 and Economics 162 strongly recommended. Pass One open to Managerial Economics and graduate majors. Economic drivers and policy challenges in the major emerging markets, with an emphasis on the effects of rising incomes, population growth, urbanization, and relative wages on world markets and natural resources. GE credit: SocSci|SS.—F. (F)

171A. Financial Management of the Firm (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 106, Management 11A-11B. Financial analysis at the firm level: methods of depreciation; influence of the tax structure; inventory, cash, and accounts receivable management; sources of short-term and long-term financing, and financial firmsolving using a computer spreadsheet program. Not open for credit to students who have completed Eco- nomics 134. GE credit: SocSci|QL, SS.—F, W, Su. (F, W, Su.)

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. GE credit: SocSci|SS.—W. (W.)

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 populations) and non-renewable resources (minerals and energy resources, soil). (Same course as Environmental Science and Policy 175.) GE credit: SocSci|SS.—S. (S.)

176. Environmental Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100B or Economics 100 or the equivalent. The role of the environment in economic activity and methods for protecting and enhancing environmental quality; implications of market failures for public policy; design of environmental policy; theory of welfare measurement; measuring the benefits of environmental improvement. GE credit: SocSci|SS.—W. (W.)

190. Topics in Managerial Economics (3)
Lecture—3 hours. Prerequisite: passing grades in course 100A and Statistics 103; consent of instructor. Selected topics in managerial economics, focusing on current research. May be repeated four times for credit when topic differs. Offered irregularly. GE credit: SocSci|SS.

192. Internship (1-6)
Internship—3 1/2-18 hours. Internship experience off 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] GE credit: SS.

194HA. Special Study for Honors Students (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; consent of instructor. 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.] GE credit: SocSci|QL, SS, WE.

194HB. Special Study for Honors Students (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; 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.] GE credit: SocSci|QL, SS, WE.

197T. Tutoring in Managerial Economics (1-6)
Lecture—3 hours; discussion—1 hour. Prerequisite: passing grades in course 100A or Statistitcs 103; consent of instructor. Selected topics in managerial economics, focusing on current research. May be repeated four times for credit when topic differs. Offered irregularly. GE credit: SocSci|SS.

200A. Microeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 200A or 204A. 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 failure. (Same course as Economics 200A.)—W. (W.)

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. Applications to to com- petitors or consumers that are imperfectly imperfect competititonons. GE credit: SocSci|SS.—S. (S.)

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 researchable topics. Method of communication and constructive criticism.—(F.)

202B. Applied Microeconomics I: Consumer and Producer Behavior (3)
Lecture/discussion—3 hours. Prerequisite: courses 200A and 202A; course 200B concurrently. Application 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 equilib- trium displacement models.—W. (W.)

202C. Research Design for Applied Microeconomics (3)
Lecture/Discussion—3 hours. Prerequisite: courses 240A and 202B. Third of three courses in the Ph.D level applied microeconomics sequence. Examines the design of empirical research and the application of econometric theory.—S. (S.)

204A. Microeconomic Analysis I (4)
Lecture—4 hours. Prerequisite: course 100B or Eco- nomics 100; 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 those methods to real-world problems.—F. (F.)

204B. Microeconomic Analysis II (4)
Lecture—4 hours. Prerequisite: course 204A or con- sent of instructor. Behavior in imperfectly competitive markets-monopoly and price discrimination; oligop- olcy. Introduction to noncooperative game theory. Analysis of decisions made under risk and uncer- tainty and imperfect information. The economics of externtalities and public goods.—W. (W.)

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 eco- nomic development theories and development strate- gies and their application to specific policy issues in developing country contexts. (Same course as Eco- nomics 214.)—F. (F.)

215A. Microdevelopment Theory and Methods I (4)
Lecture—3 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.)—F. (F.)

215B. Open Macroeconomics of Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200A or 204A; 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 open developing country. The basic analytical focus is real exchange rate and its impact on sectoral allocation of resources. (Same course as Economics 215B.) — W. (W.)

215C. Microevelopment Theory and Methods II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 215A. Extension of development theory and microeconomic methods. Agricultural growth and technological change, policy issues, and income inequality; multisectoral, including village and regional models. Computable general equilibrium methods and applications. (Same course as Economics 215C.) — S. (S.)

215D. Environment and Economic Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A, 204A or 275. Interdisciplinary course drawing on academic and empirical treatments of the relations between environmental resource use and economic development processes. Analysis of issues emerging at the interface of environmental and development economics. (Same course as Economics 215D.) — S. (S.)

222. International Agricultural Trade and Policy (4)
Lecture—4 hours. Prerequisite: course 100B or 204A and 240A or consent of instructor. Analysis of country interdependence through world agricultural markets. Partial equilibrium analysis is used to study the impacts of national intervention on world prices. National policy choice in an open economy and multinational policy issues. — F. (F.)

223. Economics of Agriculture (4)
Lecture—4 hours. Prerequisite: courses 204A and 256A or equivalent completed or concurrent required. Open to MS students in Agricultural and Resource Economics, Ph.D. students in Agricultural and Resource Economics and qualified students from other UC Davis graduate programs. Analytic treatment of the historical development and contemporary role of agriculture in the global, U.S. and California economies. Uses economy reasoning and evidence to develop historical and conceptual understanding of the economics of agriculture, agricultural issues, and related government policies. — F. (F.)

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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 techniques with econometric methods, and other empirical procedures, in conducting applied analysis of supply and demand at the firm and industry level. — F. (F.)

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 food goods and agricultural goods. (Same course as Economics 232.) — W. (W.)

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 concepts, notably commodity market equilibrium under perfect and imperfect competition, with and without government involvement. — W. (W.)

239. Econometric Foundations (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing or consent of instructor. The course will prepare students for econometric theory and empirical work by examining the statistical foundations 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.) — F. (F.)

240A. Econometric Methods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Stat 134 or equivalent. Econometric treatment of the linear regression model and related models in matrix form. (Same course as Economics 240A.) — W. (W.)

240B. Econometric Methods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 240A. Topics include economic theory and instrumental variables, pooled time-series cross-section estimation, seemingly unrelated regression, classical hypothesis tests, identification of simultaneously determined systems, and autocorrelation. (Same course as Economics 240B.) — S. (S.)

240C. Time Series Econometrics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 240B or consent of instructor. Probability theory; estimation, inference and forecasting of time series models; trends and non-standard asymptotic theory; vector models and cointegration; time series models for higher order moments and transition data; state-space modeling; the Kalman filter. (Same course as Economics 240C.) — W. (W.)

240D. Cross Section Econometrics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 240C or consent of instructor. 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 240D.) — F. (F.)

240E. Topics in Time Series Econometrics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 240C or consent of instructor. 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.) — S. (S.)

240F. Topics in Cross Section Econometrics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 240D or consent of instructor. 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.) — S. (S.)

252. Optimization with Economic Applications (4)
Lecture—3 hours; discussion—1 hour. Applied linear programming methods emphasizing uses for business decisions: production, diet, blending, network and related problems. — W. (W.)

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 of Kuhn-Tucker theorem and transversality conditions; infinite horizon problems and phase diagrams, local stability and comparative statics of the steady state, comparative dynamics. — F. (F.)

255. Applied Dynamic Structural Econometric Modeling (4)
Lecture—4 hours. Prerequisite: course 254. Course covers structural econometric models of static games of incomplete information, single-agent dynamic optimization problems and multi-agent dynamic games, with a focus on applications to issues relevant to the environment, energy, natural resources, agriculture, and development. — F. (F.)

256A. Applied Econometrics I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 106 or Economics 140; or consent of instructor. First of two courses in the Masters-level econometrics sequence. The linear regression model and generalizations are applied to topics in agricultural and resource economics. Tools for empirical research for problems requiring more sophisticated tools than standard regression models are emphasized. — F. (F.)

256B. Applied Econometrics II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 256A or consent of instructor. Second of two courses in the Masters-level econometrics sequence. The linear regression model and generalizations are applied to topics in agricultural and resource economics. Tools for empirical research for problems requiring more sophisticated tools than standard regression models are emphasized. Offered in alternate years. — W. (W.)

258. Demand and Market Analysis (4)
Lecture—4 hours. Prerequisite: courses 204B and 256 or consent of instructor. Application of theoretical material covered in 204A/B, with particular focus on production theory/ factor demand and imperfect competition/market power. Use of theoretical material as a foundation for Macroeconomic analysis, and empirical exercises. Independent research on chosen topics, with empirical application. — S. (S.)

275. Economic Analysis or Resource and Environmental Policies (4)
Lecture/discussion—4 hours. Prerequisite: course 204A. Development of externality theory, market failure concepts, welfare economics, theory of renewable and non-renewable resource use, and political economic models. Applications to policy issues regarding the agricultural/environmental interface and managing resources in the public domain. (Same course as Environmental Science and Policy 275.) — S. (S.)

276A. Environmental Economics: Externalities (4)
Lecture—4 hours. Prerequisite: students should have completed the first year graduate-level sequence in microeconomics and econometrics. Course introduces fundamental and recent research in environmental economics, focusing on the design, implementation and evaluation of environmental policy instruments to correct market failures. It will expose students to economic theories and empirical techniques frequently used in this field. — W. (W.)

276B. Environmental Economics: Non-Market Valuation (4)
Lecture—4 hours. Prerequisite: students should have completed the first year graduate-level sequence in microeconomics and econometrics. Second PhD field course in environmental economics, covering theory and econometrics of methods for valuing non-market goods and environmental quality changes. Topics include revealed preference (travel cost, hedonic, sorting equilibrium) and stated preference (contingent valuation, choice experiments, conjoint analysis) techniques. — S. (S.)

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, traditional and state lands, soil, global climate, and wildlife. — S. (S.)

290. Topics in Agricultural and Resource Economics (4)
Lecture—3 hours. Selected topics in agricultural and resource economics, focusing on current research. May be repeated 4 times for credit. Offered irregularly.
Agricultural and Rangeland Resources

Agricultural systems and Environment

Select one of the following tracks: Sustainable Agriculture track

Plant Science 100 .................................... 4
Soil Science 100 ........................................ 5
Plant Sciences 105 or 176 or Entomology 110 ................................................................. 3-5
Minimum of six units from the following:

Range and Natural Resources track

Plant Science 130 ..................................... 3
Minimum of 15 units from the following:
Plant Sciences 112, 131, 135, 150, 163, Environmental Science and Policy 123, 172, Wildlife, Fish and Conservation Biology 110, 151

Minor Advisers: T. Gradziel (Plant Sciences)

Advising Center is located in 1220 Plant and Environmental Sciences 530-752-1715.

Agronomy

See Plant Sciences, on page 516.

Agronomy and Range Science

See Plant Sciences, on page 516.

American Studies

[College of Letters and Science]

Department Office. 2134A Hart Hall
530-752-6429; http://ams.ucdavis.edu

Faculty

Javier Arbona, Ph.D., Post Doctoral Scholar
Charlotte Billekeff, Ph.D., Associate Professor
Ryan Cartwright, Assistant Professor
Caren Kaplan, Ph.D., Professor
Eric Smoodin, Ph.D., Professor
Julie Sze, Ph.D., Professor
Carolyn Thomas, Ph.D., Professor
Grace Wang, Ph.D., Associate Professor
Emeriti Faculty

Jay Mechling, Ph.D., Professor Emeritus
Academic Senate Distinguished Teaching Award
Michael L. Smith, Ph.D., Senior Lecturer Emeritus
David Scafield Wilson, Ph.D., Senior Lecturer Emeritus

The Major Program

American Studies explores the cultures of the United States, as well as their transnational exchanges and impact. The discipline’s practitioners seek to understand the historical origins of particular cultures and practices held by individuals and groups within the United States and the various values and beliefs that shape social and political realities within and beyond U.S. borders. The approach that American Studies takes is interdisciplinary, meaning that in American Studies we answer these questions using tools developed by numerous disciplines including history, sociology, anthropology, literary criticism, folklore, media and science and technology studies.

American Studies takes as its subject American cultures and provides an excellent, broad education in the liberal arts. Our aim is to make each student a culture critic, a person capable of bringing a thoughtful and humane approach to bear upon our understanding of the wide variety of American experiences. Making connections is the way we like to characterize our work in American Studies. American Studies majors are good critical thinkers, develop excellent writing skills, and most importantly “learn how to learn,” that is, learn to figure out what intellectual tools and specialized knowledge you will need to perform a task or solve a problem. These intellectual and communication skills will prepare majors for a broad array of careers.

The Program. American Studies majors take five upper division courses devoted to close study of major issues crucial to the practice of American Studies. Advanced work in at least two other departments or programs allows each student to address tailored to his or her own individual education goals. Sample emphases include: Culture and Consumption, Youth Education, Social Identities, Nature, Culture and Environment, Marketing, Advertising and Business, and Food and Health, for example. Students have the option of writing a senior thesis within this emphasis.

Career Opportunities. As an interdisciplinary program, American Studies provides a good liberal arts and sciences undergraduate education. American Studies maximizes a student’s contact with a variety of courses and faculty and approaches. Graduates have moved into a broad range of career settings, including journalism, law, teaching, marketing, non-profit and community organizations, government, social work, environmental planning, library science, museum curatorship, and business. Students discover new career possibilities through their internships in American institutions.

A.B. Major Requirements:

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, Chicana/o 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, 72C .............................................. 4
One course from: English 30A, 30B, Film Studies 1, or an equivalent course introducing critical approaches to literary and visual texts in the human sciences .............................................. 4

Depth Subject Matter ...................... 12
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 chooses the senior thesis option (190A-190B) for 8 units of the emphasis and takes 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. J. Arbona, C. Bilkoff, C. Kaplan, A. Nath, E. Smoody, J. Sze, G. Wang

Courses in American Studies (AMS) Lower Division

1A. 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, philosophy, art, architecture, literature, music, and common sense. GE credit: ArtHum or SocSci, Div, Wrt| AH or SS, DD, WE.—F. (F.)

1B. 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| ACGH, AH or SS, DD, WE.—F. (F.)

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 on the individual’s life course. GE credit: ArtHum or SocSci, Div, Wrt| ACGH, AH or SS, DD, WE.—W.

1E. Nature and Culture in America (4) Lecture—3 hours; discussion—1 hour. 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 models of healing: stewardship, ecology, the “rights” movement. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt| ACGH, AH or SS, DD, WE.—S. (F.)

4. Freshman Seminar (2) Seminar—2 or 3 hours. Prerequisite: open only to students who have completed fewer than 40 quarter units. Class size limited to 25 students. Investigation of a special topic in American Studies through shared readings, discussions, written assignments, and special activities (such as fieldwork, site visits). Emphasis on student participation in learning.—F, S, (F, S, S.)

5. Technology in American Lives (4) Lecture—2 hours; discussion—2 hours. 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 popular culture; 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 models of healing: stewardship, ecology, the “rights” movement. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt| ACGH, AH or SS, DD, WE.—F. (F.)

10. Introduction to American Studies (4) Lecture—3 hours; discussion—1 hour. United States history, culture and society. Examination of everyday objects and social practices. Topics include popular culture (film, TV, Internet), cultural diversity, social activism, play, and communication. GE credit: GE credit: ArtHum or SocSci, Div, Wrt| ACGH, AH or SS, DD, WE.—S. Wang, Sze

21. Objects and Everyday Life (4) Lecture—3 hours; discussion—1 hour; term paper. Material culture (objects and artifacts ranging from everyday objects like toys and furnishings to 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. Offered in alternate years. GE credit: ArtHum, Div, Wrt| ACGH, AH or SS, DD, WE.—S. Kaplan

25. United States as a Business Culture (4) Lecture—3 hours; discussion—1 hour. Business as a cultural system and its relation to religion, politics, arts, science, technology, and material culture; business themes of success, creativity, invention, and competition in American autobiographies, fiction, advice literature, film, and television; cultures of the workplace; multinational business. Offered irregularly. GE credit: ArtHum or SocSci, Div, Wrt| ACGH, AH or SS, DD, WE.—F. (F.)

30. Images of America and Americans in Popular Culture (4) Lecture—3 hours; discussion—1 hour. Investigation of verbal and visual discourses about American diversity in popular culture products, including film, television, radio, music, fiction, art, advertising, and commercial experiences; discussion about the United States in the popular culture of other societies. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt| ACGH, AH or SS, DD, WE.—F. (F.) Kaplun, Smoody

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 in literature, art, popular culture (film, television, advertising, folk culture); the food industry and business. GE credit: ArtHum or SocSci, Div, Wrt| ACGH, AH or SS, DD, WE.—S. (S.) Bilkoff

59. Music and American Culture (4) Lecture—3 hours; discussion—1 hour. An examination of music and American culture. Studies will explore music in its cultural contexts, which may include examinations of recording and broadcasting, role of race, class, and gender; the role of technology, and relationships between musical production, consumption and listening. GE credit: ArtHum or SocSci, Div, Wrt| ACGH, AH or SS, DD, WE.—F. (F.)

95. Careers and Identity in American Culture (2) Lecture—1 hour; discussion—1 hour. Defining one’s identity through the career. The life course, preparta, and choices that define personality and career. Gender, ethnicity, sexuality, and social class in the workplace. The transnational workplace. Conflicts between the career and other social roles.—F, W, S, S., F, W, S, S. (F.)

98. Directed Group Study (1-5) Prerequisite: consent of instructor. (F/NP grading only.)

99. Individual Study for Undergraduates (1-5) (F/NP grading only.)

Upper Division

100. Methods in American Studies (4) Lecture/discussion—3 hours; term paper. Design and implementation of interdisciplinary research projects and analysis and writing for American Studies and other cultural studies fields. Library and Internet research skills, project/problem definition, methods for study of texts, individuals, communities, Hand-on, skill-building, focused reading, discussion.

101A. Special Topics: Popular Culture Studies (4) Seminar—3 hours. Intensive reading, writing, and special projects. Interdisciplinary group study of special topics in American Culture Studies, designed for non-majors as well as majors. May be repeated for credit in different subject area only.

101B. Special Topics: Women’s Studies (4) Seminar—3 hours. Intensive reading, writing, and special projects. Interdisciplinary group study of special topics in American Culture Studies, designed for non-majors as well as majors. May be repeated for credit in different subject area only.

101C. Special Topics: Material Aspects of American Culture (4) Seminar—3 hours. Intensive reading, writing, and special projects. Interdisciplinary group study of special topics in American Culture Studies, designed for non-majors as well as majors. May be repeated for credit in different subject area only.

101D. Special Topics: American National Character (4) Seminar—3 hours. Intensive reading, writing, and special projects. Interdisciplinary group study of special topics in American Culture Studies, designed for non-majors as well as majors. May be repeated for credit in different subject area only.

101E. Special Topics: American Lives Through AutoBiography (4) Seminar—3 hours. Intensive reading, writing, and special projects. Interdisciplinary group study of special topics in American Culture Studies, designed for non-majors as well as majors. May be repeated for credit in different subject area only.

101F. Special Topics: Interrelationship Between Arts and Ideas (4) Seminar—3 hours. Intensive reading, writing, and special projects. Interdisciplinary group study of special topics in American Culture Studies, designed for non-majors as well as majors. May be repeated for credit in different subject area only.

101G. Special Topics: New Directions in American Culture Studies (4) Seminar—3 hours. Intensive reading, writing, and special projects. Interdisciplinary group study of special topics in American Culture Studies, designed for non-majors as well as majors. May be repeated for credit in different subject area only.

101H. Special Topics: Problems in Cross-Cultural American Studies (4) Seminar—3 hours. Intensive reading, writing, and special projects. Interdisciplinary group study of special topics in American Culture Studies, designed for non-majors as well as majors. May be repeated for credit in different subject area only.

110. A Decade in American Civilization (4) Lecture—2 hours; discussion—2 hours. 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, gender, age, and sexuality in the decade. May be repeated for credit if decades studied are different. GE credit: ArtHum or SocSci, Div, Wrt| ACGH, AH or SS, DD, WE.

120. American Folklore and Folk Life (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, ethnic institutions, voluntary organizations, and occupational groups. GE credit: ArtHum or SocSci, Div, Wrt| ACGH, AH or SS, DD, WE.

125. Corporate Cultures (4) Lecture—2 hours; discussion—1 hour; fieldwork—1 hour. Prerequisite: 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.—S. (S.)

130. American Popular Culture (4) Lecture/discussion—3 hours; fieldwork—1 hour. American popular expression and experience as a cultural system, and the relationship between this system and elite and folk cultures; exploration of theories and methods for discovering and interpreting symbols of meaning in American popular culture. GE credit: ArtHum or SocSci, Div, Wrt| ACGH, AH or SS, DD, WE.

139. Feminist Cultural Studies (4) Lecture/discussion—4 hours. The histories, theories, and practices of feminist traditions within cultural studies. (Same course as Women’s Studies 139.) Offered irregularly. GE credit: ArtHum or SocSci, Div, Wrt| ACGH, AH, DD, SS, VL, WE.

151. American Landscapes and Places (4) Lecture—2 hours; discussion—1 hour; fieldwork—3 hours. Comparative study of several American cultural populations inhabiting a region, including their

Fall 2011 and on Revised General Education (GE) AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; ACGH—American Cultures; DD—Domestic Diversity; VL—Visual; WC—World Cultures; WE—Writing Experience

Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; ScEng—Science and Engineering; SocSci—Social Sciences; DD—Domestic Diversity; Wrt—Writing Experience

Quarter Offered: Fall, Winter, Spring, Summer; 2017/2018 offering in parentheses

American Studies

159
152. The Lives of Children in America (4)
Lecture—2 hours; discussion—2 hours. Interdisciplinary examination of the lives of boys and men in America, toward understanding cultural definitions of masculinity, the ways individuals have accepted or resisted these definitions, and the broader consequences of the social construction of gender. Offered irregularly. GE credit: ArtHum or SocSci, Div, Wtr|ACGH, AH or SS, DD, WE.—S. (JS) Smoordin

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, Wtr|ACGH, AH or SS, DD, WE.

154. The Lives of Men in America (4)
Lecture—2 hours; discussion—2 hours. Interdisciplinary examination of the lives of boys and men in America, toward understanding cultural definitions of masculinity, the ways individuals have accepted or resisted these definitions, and the broader consequences of the social construction of gender. Offered irregularly. GE credit: ArtHum or SocSci, Div, Wtr|ACGH, AH or SS, DD, WE.

155. Eating in America (4)
Lecture—3 hours; fieldwork. Prerequisite: course 1. Interdisciplinary examination of the culture of food in America. Exploration of eating as a richly symbolic event integral to how Americans express and negotiate values, politics and identity. Offered irregularly. GE credit: ArtHum or SocSci, Div, Wtr|ACGH, AH or SS, DD, WE.—W. (W)

156. Race, Culture and Society in the United States (4)
Lecture—2 hours; discussion—2 hours. Interdisciplinary examination of the significance of race in the making of America; how race shapes culture, identities and social processes in the United States; the interweaving of race with gender, class and nationhood in self and community. Offered irregularly. GE credit: ArtHum or SocSci, Div, Wtr|ACGH, AH or SS, DD, WE.—W. (W)

157. Animals in American Culture (4)
Lecture—3 hours; discussion—1 hour. Animals as symbols in American thought, as found in folklore, popular culture, literature, and art; customs and stories around human-animal interactions, including hunting, religion, foodways, pets, zoos, circuses, rodeos, and scientific research on animals. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wtr|ACGH, AH or SS, DD, WE.—W. (W)

158. Technology and the Modern American Body (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Technocultural Studies 1 and either course 1A or 5. The history and analysis of the relationships between human 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: GE credit: ArtHum | ACGH, AH, WE.

160. Undergraduate Seminar in American Studies (4)
Seminar—3 hours; term paper. Prerequisite: open to junior and senior American Studies majors only. Limited enrollment. 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. May be repeated one time for credit when content differs. —F. (F, S)

190A. Senior Thesis Research Seminar (4)
Seminar—2 hours; extensive writing. Research and prospectus writing for senior thesis.—F. (F)

190B. Senior Thesis (4)
Independent study—12 hours. Prerequisite: course 190A; consent of instructor. In consultation with adviser, student writes an extended research paper on a topic proposed in course 190A.—F, W, S. (F, W, S)

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 ethnographical data. May be repeated for credit for a total of 12 units. (P/NP grading only.)

197T. Tutoring in American Studies (1-5)
Tutorial—1-3 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 or Advanced Undergraduates (1-8)
Prerequisite: consent of instructor and chairperson of American Studies Program. (P/NP grading only.)

Graduate
220. American Folklore and Folklife (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.—S. (JS) 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.]—W.

255. Food in American Culture (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. 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. Offered irregularly.—W. (W)

298. Group Study (1-5)
[S/U grading only]

299. Individual Study (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional
396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S)

Anatomy

See Anatomy, Physiology and Cell Biology, on page 160; and Courses in Cell Biology and Human Anatomy (CHA), on page 433.

Anatomy and Cell Biology

See Medicine, School of, on page 428.

Anesthesiology and Pain Medicine

See Medicine, School of, on page 583.
Advanced Statistics: Psychology 204A, 204B, 204C, or 204D; Statistics 106, 108, 138, 205, 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 Pop-Biology 231 and Psychology 120.

Courses in Animal Behavior (ANB) Graduate

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. —S. (S.)

203. Advanced Animal Welfare (3)
Lecture—3 hours. Prerequisite: Animal Science 103 or equivalent course. Advanced animal welfare. Key concepts used when evaluating and understanding the welfare of animals kept by humans. Topics include animal pain, stress, cognition, motivation and emotions. Critical discussion of primary literature. May be repeated one time for credit. Offered in alternate years. —S. (S.) Tucker

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.)

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 behavior, such as Psychology 101, 122, 123, Neurobiology, Physiology, and Behavior 102, 150, 152, Wildlife, Fish, and Conservation Biology 141, Entomology 104, or Animal Behavior 105. Survey of the phenomena and theory of animal behavior from the perspectives of multiple biological disciplines, including evolution, ecology, psychology, genetics, neurobiology, endocrinology, and animal science. (Same course as Psychology 218B) —W. (W.) Silh

221. Animal Behavior, Ecology and Evolution (3)
Lecture—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 102, Evolution and Ecology 101, 102 (or equivalent), graduate standing, and consent of instructor. 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 222.) Offered irregularly.

230A. Interdisciplinary Approaches to Animal Behavior (3)
Seminar—3 hours; term paper. Prerequisite: consent of instructor. Reading and discussion of key papers from animal behavior and an allied discipline or disciplines that offer the potential, in combination, to advance the understanding of a topic in animal behavior conceptually and empirically. Topics will vary from year to year.

230B. Interdisciplinary Approaches to Animal Behavior (5)
Workshop—4 days total; discussion—2 hours; term paper. Prerequisite: course 230A the previous quarter. Development of an empirical or theoretical interdisciplinary approach to research on a current topic in animal behavior.

270. Research Conference in Behavioral Ecology (1)
Conference—1 hour. Prerequisite: graduate standing and consent of instructor. Limited enrollment. Critical presentation and evaluation of current literature and ongoing research in behavioral ecology. May be repeated for credit. (S/U grading only.)

287. 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 Population Biology 287.) May be repeated twice for credit.

290. Seminar in Animal Behavior (1-3)
Seminar—1-3 hours. Prerequisite: consent of instructor. Selected topics in animal behavior. (S/U grading only) —F, W, S. (F, W, S.) Tucker

294. Seminar: Evolutionary Ecology of Predators and Prey (1-3)
Seminar—2 hours. Prerequisite: graduate standing. Presentation and analysis of research papers on social and foraging behavior of predatory animals, antipredator strategies, co-evolution of predators and prey, and ecology of predator-prey interactions. May be repeated two times for credit. (Same course as Wildlife, Fish, and Conservation Biology 294.) Offered in alternate years. —Caro

298. Group Study in Animal Behavior (1-5)
Prerequisite: graduate standing; consent of instructor. May be repeated two times for credit. —F, W, S. (F, W, S, S.)

299. Research (1-12)
Prerequisite: and consent of instructor. (S/U grading only)

Professional

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)

Animal Biology

(College of Agricultural and Environmental Sciences) Department of Entomology and Nematology.

Faculty
Edward P. Caswell-Chen, Ph.D., Professor
Joanna Chiu, Ph.D., Assistant Professor
Brian R. Johnson, Ph.D., Assistant Professor
Neal M. Williard, Ph.D., Associate Professor
Robert Kimsey, Ph.D., Lecturer

The Major Program
The Animal Biology major offers students training in the biological and natural sciences as they apply to the study of animals. The major covers the basic biological sciences that explain animal evolution, systematic, 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 knowing. Emphasis is on biological 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 the general education courses, students have the option of specializing in various interdisciplinary aspects of animal biology, and plan their chosen emphasis of study as part of a required discussion course and in consultation with and approval of an 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 logical internship and career choices. On and off-campus internships and work 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 education at the graduate or professional level in a variety of biological disciplines.

B.S. Major Requirements:

Preparatory Subject Matter ................ 68-74
Biological Sciences 2A, 2B, and 2C ................ 14
Chemistry 2A-2B-2C, and 8A-8B or 118A-118B ................ 21-23
Mathematics 16A-16B-16C or 17A-17B-17C or 21A-21B-21C ................ 9-12
Physics 7A-7B-7C ................ 12
One course from: Statistics 13 or 102 or Agricultural Management and Rangeland Resources 120 ................ 4
Animal Biology 50A, 50B, 50C ................ 8

Depth Subject Matter ................ 29-38
One course from: Neurobiology, Physiology, and Behavior 101, 117, Entomology 102, Wildlife, Fish, and Conservation Biology 121 ................ 3-5
One course from: Anatomy, Physiology and Cell Biology 100, Entomology 101, Neurobiology, Physiology, and Behavior 123 ................ 3-4
Evolution and Ecology 100 ................ 4
One course from: Environmental Science and Policy 100, 121; Evolution and Ecology 101, 102 ................ 4
Animal Biology 187 ................ 4
Animal Biology 189 and 189D ................ 3-5

Restricted Electives ................ 25
Focused specially upper division courses as outlined in the student’s major proposal (from course 187) with approval of an adviser.

Total Units for the Degree ................ 122-137

Master Adviser. R. Kimsey

Major Adviser. E. Galvan Hack

Advising Center for the major, including peer advising, is located in 150 and 152 Hutchison Hall 5307-547-7277; abr advising@ucdavis.edu

Courses in Animal Biology (ABI) Lower Division

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. —F. (F.) Kimsey

Fall 2011 and on Revised General Education (GE): AH=Arts and Humanities; SC=Science and Engineering; SS=Social Sciences; AG=American Cultures; DD=Dominant Diversity; OI=Oral Skills; QL=Quantitative; SL=Scientific; VL=Visual; WC=World Cultures; WE=Writing Experience

Pre-Fall 2011 General Education (GE): A=Arts and Humanities; Sc=Science and Engineering; S=Social Sciences; D=Dominant Diversity; W=Writing Experience

Quarter Offered: F=Fall, W=Winter, S=Spring, Su=Summer; 2017-2018 offering in parentheses

Animal Biology 161
508. Animal Biology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, Biological Sciences 1B or may be taken concurrently.
Basic biological disciplines important to an understanding of practical animal biology issues including the evolution of animal groups, genetic mechanisms, development and the environment. All 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 Undergraduates (1-5)
(P/NP grading only.)

**Animal Biology (A Graduate Group)**

Trish Berger, Ph.D., Interim Chairperson of the Group

**Group Office.** 1249 Meyer Hall
530-752-2382; Fax 530-752-0175
http://animalbiology.ucdavis.edu

**Faculty**

Danika L. Bannasch, Ph.D., Associate Professor
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Rebecca Bellone, Ph.D., Associate Adjunct Professor
(Population Health and Reproduction; School of Veterinary Medicine)

Trish Berger, Ph.D., Professor (Animal Science)

Chris C. Calvert, Ph.D., Professor, Emeriti Faculty
(Animal Science)

Bruce W. Christensen, D.V.M., Assistant Professor
(Population Health and Reproduction; School of Veterinary Medicine)

Alan J. Conley, Ph.D., Professor
(Population Health and Reproduction; School of Veterinary Medicine)

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(Animal Science)

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Amy S. Kapakgin, D.V.M., Professor
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Ermias Kebreab, Ph.D., Professor (Animal Science)

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(Animal Science)

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(Animal Science)

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(Animal Science)

Brenda J. McCowan, Ph.D., Professor (Veterinary Medicine Teaching and Research Center and California Institute of Agricultural Research Center)

Juan F. Menardo, Ph.D., Professor (Animal Science)

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Deanne Meyer, Ph.D., Specialist in Cooperative Extension and Lecturer (Animal Science)

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Roberto D. Sainz, Ph.D., Professor
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Brian D. Todd, Ph.D., Associate Professor
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Anne Todgham, Ph.D., Assistant Professor
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M. Cecilia Torres-Penedo, Ph.D., Associate Research Geneticist (Veterinary Genetics Laboratory; School of Veterinary Medicine)

Cassandra B. Tucker, Ph.D., Associate Professor
(Animal Science)

Alison L. Van Eenennaam, Ph.D., Specialist in Cooperative Extension and Lecturers
(Animal Science)

Jason Wolters, Ph.D., Associate Adjunct Professor
(Animal Science)

Huaqan Zhou, Ph.D., Associate 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 focuses on 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 or interdisciplinary approach involving physiology, nutrition, genetics, ecology and/or behavior within the context of organismal animal biology.

**Preparation.** Applicants should have undergraduate preparation in a field appropriate to the course of study selected, including upper division coursework in most of the following subjects: biochemistry, genetics, nutrition, physiology, and integrative animal biology such as animal management.

**Graduate Advisers.** R.C. Hovey, E.A. Maga, C.B. Tucker, J.D. Murray, E.Kebreab, P.J. Ross

**Courses in Animal Biology (ABG) Graduate**

**200A. Integrated Animal Biology I (3)**
Lecture/discussion—3 hours. Prerequisite: graduate standing; Biological Sciences 101 or equivalent or consent of instructor. Class size limited to 20 students. Pass One restricted to Animal Biology Graduate Group students. Natural history, management, historical and current uses, and specialized disciplinary features of model experimental animal systems used in research. Development of conceptual approaches in organismal biology to improve experimental design and interpretation of interdisciplinary research studies. (F) (S) (W)

**200B. Integrated Animal Biology II (3)**
Lecture/discussion—3 hours. Prerequisite: course 200A. Limited enrollment; Pass One restricted to Animal Biology Graduate Group students. Natural history, management, historical and current uses, and specialized disciplinary features of model experimental animal systems used in research. Development of
Mathematical Modeling in Biological Systems (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing; Mathematics 16A, 16B, or equivalents required; Mathematics 16C or equivalent recommended; Statistics 100 or equivalent required; more than one course in statistics recommended; recommended: Biology 102 or Biological Sciences 102 recommended or equivalent coursework in biochemistry. Limited enrollment. Model development and evaluation including sensitivity analyses using R. Four principle modeling methodology included: algebraic functions of biological processes, physiological-based compartmental models, linear programming and metabolic networks. Fundamental biological background and understanding of mathematical modeling principles in biological systems. —W. [W.] Fadel, Kebreab

Physiology of the Stress Response (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing; 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.) —S. [S.] Kuhlitz

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.) —F, W, S, F, W, S

Research Conference (1)
Discussion—1 hour. Prerequisite: graduate standing and 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.) —F, W, S, Su

Group Study in Animal Biology (1-5)
Prerequisite: graduate standing; consent of instructor. —F, W, S, Su

Research (1-11)
Prerequisite: graduate standing and consent of instructor. Faculty member in Animal Biology Graduate Group. May be repeated for credit. (S/U grading only.) —F, W, S, Su

Professional
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, formulating quiz and exam questions under instructor supervision. May be repeated for credit. (S/U grading only.) —F, W, F, W, F, W, S, Famula, Oberbauer

396. Teaching Assistant Training Practicum (1-4)
Variable—3-12 hours. Prerequisite: graduate standing as a teaching assistant. May be repeated for credit. (S/U grading only.) —F, W, S, F, W, S

401. Ethics and Professionalism in Animal Biology (2)
Discussion—2 hours. Restricted to graduate standing. Pass/No Pass. Contact one of the graduate group students. Case studies and discussion of ethical and professional issues for animal biologists, including the use of animals in research and teaching, potential and intellectual property, consulting and conflict of interest, scientific integrity, dealing with the media, and mentoring relationships. Offered in alternate years. —F. [F.] Menc

Animal Genetics
(See Agricultural and Environmental Sciences Faculty. See under Department of Animal Science, on page 163.

Major Program. See the major in Animal Science, on page 163.

Related Courses. See Biology Courses 101, 101D; Evolution and Ecology 102, 175; Genetics Graduate Group courses; Microbiology 150, 170, 215, 255, 274, 292; Molecular and Cellular Biology 121, 141, 160L, 161, 162, 163, 164, 178, 182, 221C, 257, 262, 263; Neurobiology, Physiology, and Behavior 131; Plant Biology 151, 152, 154, 161A, 161B; Plant Pathology 215X, 217; Plant Sciences 220, 221

Courses in Animal Genetics (ANG)
Questions pertaining to the following courses should be directed to the instructor or to the Animal Science Advising Center in 1202 Meyer Hall 5307-54-7915.

Upper Division
101. Animal Cyto genetics (3)
Laboratory/discussion—1 hour; laboratory—6 hours. Prerequisite: Biological Sciences 101, 102 or the equivalent. Principles and techniques of cytageneic applied to animal systems; chromosome harvest techniques, analysis of mitosis and meiosis, karyotyping, chromosome banding, cytogenetic mapping, chromosome structure and function, comparative cytogenetics. GE credit: SciEng [SE]

105. Horse Genetics (2)
Lecture—2 hours. Prerequisite: Animal Science 15; Biological Sciences 101. Coat color, parentage testing, medical genetics, pedigrees, breeds, the gene map and genus Equus. Emphasis on understanding horse genetics based on the unity of mammalian genetics and making breeding decisions based on fundamental genetic concepts. GE credit: SciEng [SE]

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. GE credit: SciEng [SE]—F, W, F, W, Medrano, Miller

111. Molecular Biology Laboratory Techniques (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1C, 101, 102, 103. Introduces 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 and technologies in molecular biology. GE credit: SciEng [SE], SL, VI, VE—F

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. Selected topics relating to animal genetics. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

Graduate
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.

206. Advanced Domestic Animal Breeding (3)
Lecture—3 hours. Prerequisite: course 107 and Animal Science 205; course 204 recommended. Procedures for the genetic evaluation of individuals to include selection indices and mixed models evaluation for single and multiple traits. Methods of estimating genetic trends. Offered in alternate years.

208. Estimation of Genetic Parameters (3)
Lecture—3 hours. Prerequisite: course 107 and Animal Science 205; courses 204 and 108 recommended. General methods for the estimation of components of variance and covariance and their application to the estimation of heritability, repeatability and genetic correlations are considered. Specific emphasis is given to procedures applicable to livestock populations under selection.

211. Genetic Engineering of Animals (2)
Lecture—1 hour; lecture/discussion—1 hour. Review of techniques for the genetic engineering of animals and their limitations and applications. Student discussions of recent papers in the field and possible future applications of genetically engineered animals in basic research and applied agricultural and medical research. (S/U grading only.) —Murray

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. —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)
Prerequisite: consent of instructor. (S/U grading only)

Animal Physiology
See Animal Biology, on page 161; Animal Science, on page 163; Neurobiology, Physiology, and Behavior, on page 479; and Molecular, Cellular, and Integrative Physiology (A Graduate Group), on page 467.

Animal Science
(See Agricultural and Environmental Sciences Faculty. Anita M. Oberbauer Ph.D., Chairperson of the Department

Department Office. 2223 Meyer Hall 530-752-1250; http://animalscience.ucdavis.edu/

Master Adviser. E.J. DePeters

Undergraduate Advising. 1202 Meyer Hall 530-754-7915; http://animalscience.ucdavis.edu/

Advising Center for the major, minors and course offerings (including peer advising) is located in the Animal Science Advising Center in 1202 Meyer Hall 530-754-7915. Each student will be assigned a faculty adviser through this office upon entering the major.
Graduate Advising: 1249 Meyer Hall
530-752-2382

Faculty
Trish J. Berger, Ph.D., Professor
Mary E. Delany, Ph.D., Professor and Executive Associate Dean, CAS-FS
Edward J. DePeters, Ph.D., Professor, Academic Senate Distinguished Teaching Award, UC Davis Prize for Undergraduate Teaching and Scholarly Achievement
John M. Eadie, Ph.D., Professor
Silas S. O. Hung, Ph.D., Professor
Emriess Kebreab, Ph.D., Professor
Annie J. King, Ph.D., Professor
Kirk C. Klausing, Ph.D., Professor
Yanhong Liu, Ph.D., Assistant Professor
Maja M. Makkagon, Ph.D., Assistant Professor
Juan F. Medrano, Ph.D., Professor
Michael J. Mienkowski, Ph.D., Assistant Professor
Michael R. Mills, Ph.D., Assistant Professor
Frank M. Mitloehner, Ph.D., Professor and Specialist in Cooperative Extension
James D. Murray, Ph.D., Professor
Anita M. Oberbauer, Ph.D., Professor, Academic Senate Distinguished Teaching Award
Anne Rodman, Ph.D., Associate Professor
Anne Rodman, Ph.D., Professor
Cassandra B. Tucker, Ph.D., Associate Professor
Richard A. Zinn, Ph.D., Professor

Emeritus Faculty
Hans Alphanlopis, Ph.D., Professor Emeritus
SocSci

Academic Senate Distinguished Teaching Award
Gary B. Anderson, Ph.D., Professor Emeritus, Academic Senate Distinguished Teaching Award, Graduate, UC Davis Prize for Undergraduate Teaching and Scholarly Achievement, Academic Senate Distinguished Teaching Award
C. Robert Ashmore, Ph.D., Professor Emeritus
C. Christopher Calvert, Ph.D., Professor Emeritus
Richard A. Zinn, Ph.D., Professor Emeritus

Animal Science Faculty
Peter H. Robinson, Ph.D., Specialist in Cooperative Extension and Lecturer
Andrea Schreier, Ph.D., Assistant Adjunct Professor
Alison L. Van Eenennaam, Ph.D., Specialist in Cooperative Extension and Lecturer

The Major Program
The Animal Science major is devoted to the sciences central to understanding biological function of domestic and captive animals, their care, management, and utilization for food, fiber, companionship and recreation. Advances in science and technology, and an ever-growing human population, have increased the complexity of issues surrounding the care and management of animals. Specializations within the major allow students to develop a scientific appreciation of animals and their relationship to their environment. Graduates in Animal Science are able to advance the science and technology of animal care and management in an objective and effective manner for the betterment of animals and society.

The Program. The curriculum provides depth in the biological and physiological sciences and allows students to specialize within the broad field of applied animal science. Study begins with introductory courses in animal science, biology, chemistry, mathematics, and statistics. Students undertake advanced courses in animal behavior, biochemistry, genetics, nutrition, and physiology and the integration of these sciences to animal function, growth, reproduction, and lactation. Students complete the curriculum by choosing a specialization in either an animal science discipline (behavior, biochemistry, genetics, nutrition, or physiology) or in the sciences particular to a class of animals (aquatic, companion and captive, equine, laboratory, livestock, dairy, or poultry).

Career Alternatives. A wide range of career opportunities are available to graduates. The primary goal of the major is to prepare students for graduate study leading to the M.S. and Ph.D. degrees; for continued study in a professional school or for continued study in a professional school or for continued study in a professional school or for continued study in a professional school or for continued study in a professional school or for continued study in a professional school or for continued study in a professional school or for continued study in a professional school or for continued study in a professional school or for continued study in a professional school or for continued study in a professional school.

Area of Specialization

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
Animal Science 18 and 131; Nutrition 124; and Animal Science 118 or 119.

Select additional upper division 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 to meet their Laboratory Depth Subject Matter requirement.

Company and Captive Animals
Animal Science 42, 142; Nutrition 115 or 122 or 123 or 123L; Animal Science 170.

Select additional upper division units from any Animal Genetics, Animal Science or Avian Sciences course, or from Nutrition 115, 122, 123, 123L or other courses approved by your faculty advisor.

Laboratory Animals
Animal Science 42, 103, 140, Nutrition 123, 123L, Animal Science 104 or Neurobiology, Physiology, and Behavior 102, and Anatomy, Physiology and Cell Biology 100 or Neurobiology, Physiology, and Behavior 123.

Livestock and Dairy
Select two of Animal Science 43, 144, 146; Animal Science 145 or 147; Nutrition 115

Select additional upper division units from any Animal Genetics, Animal Science or Avian Sciences course, or from Nutrition 122, 123, 123L or other courses approved by your faculty advisor.

Poultry
Select two of Animal Science 11, 100, 150; Animal Science 143; Animal Science 149 or Food Science 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 advisor.
Animal Science—Animal Biology .......................... 20
Animal Science 15, 42, 41L, or 41 and 21 3–4
Additional upper division courses 3–4
Additional upper division courses 3–4
Animal Science 123, 124, or Neurobiology, Physiology, and Behavior 121 and 121L 4
Additional upper division courses 8–10
Additional upper division courses 8–10
Additional upper division courses 9–12
Additional upper division courses 5–7
Variable unit courses 92, 99, 192, 197T, 198, 199 6–8
Variable unit courses 92, 99, 192, 197T, 198, 199 8–10
Variable unit courses 92, 99, 192, 197T, 198, 199 6–8
Variable unit courses 92, 99, 192, 197T, 198, 199 6–8
Variable unit courses 92, 99, 192, 197T, 198, 199 6–8
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Variable unit courses 92, 99, 192, 197T, 198, 199 6–8
Animal Science

49G. Animal Management Practices: Meats (2)
Discussion—1 hour; laboratory—3 hours. Application of the principles of elementary biology to the management of a specific animal species. Up to four different topics may be taken. (P/NP grading only.)—F, W, S. (F, S.)

49H. Animal Management Practices: Poultry (2)
Discussion—1 hour; laboratory—3 hours. Application of the principles of elementary biology to the management of a specific animal species. Up to four different topics may be taken. (P/NP grading only.)—F, W, S. (F, S.)

49I. Animal Management Practices: Sheep (2)
Discussion—1 hour; laboratory—3 hours. Application of the principles of elementary biology to the management of a specific animal species. Up to four different topics may be taken. (P/NP grading only.)—F, W, S. (F, S.)

49K. Animal Management Practices: Captive and Companion Avian (2)
Discussion—1 hour; laboratory—3 hours. Application of the principles of elementary biology to the management of a specific animal species. Up to four different topics may be taken. (P/NP grading only.)—F, W, S. (F, S.)

90C. Research Group Conference (1)
Discussion—1 hour. Prerequisite: lower division standing, consent of instructor. Restricted to lower division standing. Weekly conference on research problems, progress and techniques in the animal sciences. May be repeated for credit. (P/NP grading only.)—F, W, S. (F, S.)

92. Internship in Animal Science (1-12)
Internship—3-18 hours. Prerequisite: consent of instructor. Restricted to lower division standing. 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 Approval form must be met. (P/NP grading only.)—F, W, S. (F, S.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Restricted to lower division standing. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: instructor. Restricted to lower division standing. (P/NP grading only.)

Upper Division

100. Animal Physiology (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A, Chemistry 2B. Pass One restricted to students in the Animal Science and Animal Science and Management majors. Basic principles of animal physiology in domesticated and captive animals with a comparative approach. Molecular, biochemical, chemical and physical aspects and their metabolic functions on function of physiological systems in animals. Not open for credit to students who have taken Neurobiology, Physiology and Behavior 101. GE credit: Scien | SE. (F, S.)

103. Animal Welfare (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: course 104 or Neurobiology, Physiology, and Behavior 102 or Wildlife, Fish, and Conservation Biology 145A or instructor. Restricted to upper division standing. 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 enrichment methods. GE credit: Scien | SE. (F, S.)

104. Principles and Applications of Domestic Animal Behavior (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or Biological Sciences 2B. Basic principles of animal behavior to domesticated species. Emphasis placed on application of the principles of animal behavior. GE credit: Scien | SE. (F, S.)

106. Domestic Animal Behavior Laboratory (2)
Laboratory—6 hours. Prerequisite: course 104 or Neurobiology, Physiology, and Behavior 102 or consent of instructor. Research experience with the behavior of large domestic animals. Experimental design, methods of data collection and analysis, and reporting of experimental results. GE credit: Scien, Writ | QL, SE, SL, VL, WE. (F, W) Tucker

112. Sustainable Animal Agriculture (3)
Lecture/discussion—3 hours. Prerequisite: course 1 or Biological Sciences 2B, Statistics 100 or Plant Sciences 120. Recommended current applications of sustainable animal agriculture including the challenges of animal production, animal welfare, animal well-being, and protection of the environment and resources for future food supply systems. Various scenarios for meeting sustainability objectives are evaluated using computer simulation. GE credit: Scien or SocSci | QL, QL, SE or SS. (S.) Kebrab

115. Advanced Horse Production (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 15, 100 or Neurobiology, Physiology, and Behavior 103; or consent of instructor. Influences of feeding, breeding, and management of horses; application of the basic principles of animal science to problems of production of all types of horses. Designed for students who wish to become professionally involved in the horse industry. GE credit: Scien | QL, SE, SL, WE. (F, F, S.)

118. Fish Production (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Wildlife, Fish, and Conservation Biology 120. 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: Scien | SE.

119. Invertebrate Aquaculture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 104 or instructor. Breeding and feeding of aquatic invertebrates; application of basic principles of physiology, reproduction, and nutrition to production of mollusks and crustaceans for human food or commercial use. GE credit: Scien | SE.

120. Principles of Meat Science (3)
Lecture—3 hours. Prerequisite: course 2. Restricted to upper division standing. 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: Scien | SE.

121. Animal Science Laboratory (2)
Discussion—1 hour; laboratory—3 hours. Prerequisite: course 2, 120. Restricted to upper division standing. Laboratory exercises and student participation in transformation of live animal to carcass and meat, and structural and biochemical changes related to aging, chemical and sensory evaluation of meat, and field trips to packing plant and processing plant. GE credit: Scien | SE.

123. Animal Growth and Development (4)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: course 2 or Neurobiology, Physiology, and Behavior 101. Animal Science 103 or Biological Sciences 103. Growth and development of animals from conception to maturity, viewed from practical and biological perspectives; includes genetic, metabolic, nutritional control of cell and organism function. GE credit: Scien | QL, QL, SE, VL, WE. —S. (S.) Ross

124. Lactation (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 100 or Neurobiology, Physiology, and Behavior 101. Animal Biology 103 can be concurrent or Biological Sciences 103 can be concurrent. Consideration of the biochemical, genetic, physiologic, nutritional, and structural factors relating to mammary gland development, the initiation of lactation, the composition of milk and lactation performance. GE credit: Scien, Writ | SE, SL. —W. (W) Hoven

125. Equine Exercise Physiology (3)
Lecture—3 hours. Prerequisite: course 15, 100 or Neurobiology, Physiology, and Behavior 101. Basic and applied physiology of the exercising horse. Includes physiological stressors of lameness, pharmacology, sports medicine; horse sport performance evaluation and conditioning. Offered in alternate years. GE credit: Scien | SE. —S. (S.)

127. Advanced Equine Reproduction (3)
Lecture—3 hours. Prerequisite: courses 111, 115, 100 or Neurobiology, Physiology, and Behavior 101. Reproductive physiology, anatomy and endocrinology of the mare and stallion. Emphasis on structure/functional relationships as they pertain to improving equine reproductive management and efficiency. GE credit: Scien | SE, WE. —S. (S.)

128. Agricultural Applications of Linear Programming (4)
Lecture—2 hours; laboratory—2 hours; discussion—1 hour. Prerequisite: Plant Sciences 21 or Engineering Computer Science 15 or consent of instructor. Restricted to upper division standing. 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. GE credit: Scien | QL, SE, SL. —W. (W) Fadel

129. Environmental Stewardship in Animal Production Systems (3)
Lecture—3 hours. Prerequisite: Biological Sciences 10 or 1A and 1B, Chemistry 2A, 2B, 8A, 8B. Class size limited to 24 students. Management principles of environmental stewardship for grazing lands, animal feeding, operations and animal production systems, including existing regulations, sample analyses, interpretation and utilization of data, evaluation of alternative practices, and policy development. Offered in alternate years. GE credit: Scien | SE, SL. —W. (W) Meyer

131. Reproduction and Early Development in Aquatic Animals (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Molecular and Cellular Biology 115, and Wildlife, Fish and Conservation Biology 120; or consent of instructor. Physiological and developmental functions related to reproduction, breeding efficiency and fertility of animals commonly used in aquaculture. GE credit: Scien | SE, WE.

136. Techniques and Practices of Fish Culture (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: general biology and chemistry, and approval and maintenance of fish in residential aquaria and research and commercial facilities. Biological and environmental factors important to sound management of fish. Laboratories focus on fish culture including growth trials and biochemical assays. Not open for credit to students who have previously completed course 136A or 137. GE credit: Scien, Writ | QL, QL, SE, VL, WE. —F. (F, S.)

137. Techniques and Practices of Avian Culture (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: basic understanding of general biology and chemistry; course 2. Not open for credit to students who
have previously completed course 136B or 137. Daily care and maintenance of birds for research, commercial production and companion or hobby uses. Biological and environmental factors important to sound management of birds. Topics include: bird husbandry, manure management and disease control. Recommended for seniors majoring in animal science. GE credit: SciEng | SE, SL, VL, WE — F. (F, W, S.)

143. Pig and Poultry Care and Management (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: course 42, Biological Sciences 101, course 100 or Neurobiology, Physiology and Behavior 101; Animal Biology 102 or Biological Sciences 102 and Animal Biology 103 or Biological Sciences 103 recommended. Management and production of companion animals. Integration of the disciplinary principles of behavior, genetics, nutrition, and physiology as related to the care of companion animals. GE credit: SciEng | OL, QL, SE, SL, VL, WE — F. (F) Obert, P.

144. Beef Cattle and Sheep Production (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: course 41, Nutrition 115 or consent of instructor; Animal Genetics 107 recommended. Genetics, physiology, nutrition, economics and business in beef cattle and sheep production. Resources used, special management and marketing techniques. Emphasis on integration and information needed in methods of management of livestock enterprises. One or two Saturday field trips. GE credit: SciEng | OL, QL, SE, SL, VL, WE — F. (S) Sainz, Zinn.


146. Dairy Cattle Production (5) Lecture—3 hours; laboratory—3 hours; fieldwork — 1 hour; discussion—1 hour. Prerequisite: Nutrition 115; consent of instructor. Animal Genetics 107 recommended. Scientific principles from genetics, nutrition, physiology, and related fields applied to conversion of animal feed to human food through dairy animals. Management and economic decisions are related to animal biology considering the environment and animal well-being. Mandatory Saturday field day. GE credit: SciEng | OL, QL, SE, SL, VL, WE — F. (S) J. DePeters

147. Dairy Processing and Marketing (3) Lecture—2 hours; laboratory—3 hours. Prerequisite: course 146 or consent of instructor. Examination of dairy farm systems, processing practices, product quality, impact of government policy (domestic and foreign), marketing alternatives, and product development. GE credit: SciEng | SE.

148. Enterprise Analysis in Animal Industries Lecture/discussion—4 hours. Restricted to students with upper division standing. Examination and application of decision making and problem solving in the animal industries. The areas of production, analysis, problem solving, and decision-making and cost-benefit analysis will be examined in terms of the total enterprise. GE credit: SocSci, Writ | OL, QL, SS, WE — F. (F). 149. Farrier Science (3) Lecture—3 hours. Prerequisite: course 115. In-depth examination of the structure-function relationship of the equine hoof and how it relates to conformation, injury and performance. Offered irregularly. GE credit: SciEng | SE.

149L. Farrier Science Laboratory (1) Laboratory—3 hours. Prerequisite: course 149 (may be taken concurrently) or consent of instructor. Art and science of horseshoeing in equine related fields. Proper use of the tools, materials and techniques in the fabrication of shoes and safe preparation of the hoof for application of shoes. (P/NP grading only.)

170. Ethics of Animal Use (4) Lecture—3 hours; discussion—1 hour. Prerequisite: any basic course in communication or speech, or completion of college English requirement. Ethical 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 agriculture, research, and as companions. Ethical responsibilities regarding wildlife and the environment. GE credit: SocSci, Writ | OL, SS, SE, WE — F. (F, W, S.) 190C. Research Group Conference (1) Discussion—1 hour. Weekly conference on research problems, progress and techniques in the animal sciences. May be repeated for credit. (P/NP grading only.) — F. W. S. (F, W, S.)

192. Internship in Animal Science (1-12) Internship—3.36 hours. Prerequisite: completion of 84 units and consent of instructor. Internship offered 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 Approval Form must be met. (P/NP grading only.) — F. W. S. (F, W, S.)

194. Research in Animal Science (3) Laboratory—6 hours; discussion—1 hour. Prerequisite: course 106 or 133 or 135 or 136 or 137 or 139 or Animal Genetics 111 and consent of instructor. Research with a faculty mentor. Weekly conference and specific research topic. May include a seminar to research group. Choose from sections: (1) Animal Genetics; (2) Animal Industry; (3) Animal Nutrition; (4) Animal Physiology. May be repeated for credit for a total of four times. — F. W. S. (F, W, S.)

194HA. Undergraduate Honors Thesis in Animal Science (4) Lecture—1 hour; laboratory—9 hours. Prerequisite: course 100 or Neurobiology, Physiology and Behavior 101, Animal Biology 103 or Biological Sciences 103; minimum cumulative GPA of 3.200 and selection by the Honors Selection Committee; consent of instructor. Students will carry out a research project (chosen from faculty-suggested or approved proposals) during the academic year under the guidance of a faculty member. Upon completion, student will write a thesis and present a public seminar describing his/her research. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | OL, SE.

194HB. Undergraduate Honors Thesis in Animal Science (4) Lecture—1 hour; laboratory—9 hours. Prerequisite: course 100 or Neurobiology, Physiology and Behavior 101, Animal Biology 103 or Biological Sciences 103; minimum cumulative GPA of 3.200 and selection by the Honors Selection Committee; consent of instructor. Students will carry out a research project (chosen from faculty-suggested or approved proposals) during the academic year under the guidance of a faculty member. Upon completion, student will write a thesis and present a public seminar describing his/her research. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE, VL.

194HC. Undergraduate Honors Thesis in Animal Science (4) Lecture—1 hour; laboratory—9 hours. Prerequisite: course 100 or Neurobiology, Physiology and Behavior 101, Animal Biology 103 or Biological Sciences 103; minimum cumulative GPA of 3.200 and selection by the Honors Selection Committee; consent of instructor. Students will carry out a research project (chosen from faculty-suggested or approved proposals) during the academic year under the guidance of a faculty member. Upon completion, student will write a thesis and present a public seminar describing his/her research. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE, WE.

1977. Tutoring in Animal Science (1-2) Tutorial—1.2 hours. Prerequisite: Animal Science or related major; upper division standing; consent of instructor. Tutoring of students in lower division animal science courses; weekly conference with instructors in charge of courses; written critiques of teaching procedures. May be repeated one time 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. Restricted to students with upper division standing. (P/NP grading only.)

Graduate

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.

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.

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.)
Current research in animal science explored at W, S.) ahead. Preparatory courses, students focus on both the animal disciplines major will be well positioned to adjust to new animal species 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 thorough education in the basic biology of domestic animal species with a strong background in agricultural economics. Students preparing for professional study (medical, law, veterinary, and graduate business schools) as well as other courses will include an introduction, and/or marketing aspects of the animal of interest. 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 schools 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 farms of all scales. 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 degrees open doors to work as extension specialists, farm advisors, and teachers, and prepare students for international service.

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 through this office upon entering the major. http://asac.ucdavis.edu

The Major Program

Animal Science and Management major combines a thorough education in the basic biology of domestic animal species 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 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 degrees open doors to work as extension specialists, farm advisors, and teachers, and prepare students for international service.

B.S. Major Requirements:

Written and Oral Expression

Select two courses (if not selected for English college requirement from: Communication 130, 134, 135, 140; Neurobiology 150; University Writing Program 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 104A, 104B, 104C, 104D, 104E, 104F

Preparatory Subject Matter

Animal Science 1 and 2

Biological Sciences 2A, 2B, and 2C

Chemistry 2A, 2B, 8A, 8B

Plant Sciences for Computer Science Engineering 15


Mathematics 1A, 1B, 1C, 1D, 1E, 1F, 1G, 1H, 1I, 1J, 1K, 1L, 1M, 1N, 1O, 1P, 1Q, 1R, 1S, 1T, 1U, 1V, 1W, 1X, 1Y, 1Z

Plant Sciences 120, Statistics 100 or 103, or other courses in quantitative skills with prior approval of the Master Adviser.

Depth Subject Matter

Biological Sciences 101

Nutrition 115

Neurobiology, Physiology, and Behavior 147

Business Management 147

Agricultural and Resource Economics 100A


Plus one course from: Animal Science 128 or Agricultural and Resource Economics 155.

Area of Specializations

Choose one area of specialization below:

Aquatic Animals

Animal Science 118 or 119, 131, and 148.

Companion Animals

Animal Science 41, 41L, 146, 147, and 148.

Equine

Animal Science 15, 151, 141, and 148.

Livestock


Poultry


Individualized

Students must have 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


Avian Sciences 100, 103, 151, 121, 123, 149, 150; Animal Genetics 101, 105, 107, 111; Nutrition 122, 123, 123L, 124; Animal Biology 102 (strongly recommended), 103;
ogy is the study of the history or prehistory by analysis of a people's artifacts, or their material culture, with the goal of interpreting culture history and human behavior. Human behavioral ecology is the study of how variation in ecology and social organization can help us understand variation in human behavior. Paleoanthropology is the study of human evolution through fossil and archaeological records, drawing on relevant studies in biological anthropology, Paleolithic archaeology, genetics, and geology. Primatology involves 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 human morphology and behavior. Genetists can use DNA to address anthropological questions about population history, migrations, mixing, and adaptations to local context. Bozeman is a thriving business and arts mecca, it is a research institution that investigates the biology behind the geographic distribution of species and human cultures. 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.

Sociocultural. Sociocultural anthropologists study the varied ways in which people around the world organize their activities and interpret the circumstances in which they operate. Their main 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 undergraduate courses are globalization and transnationalism; human ecology and environmental change; cultures of healing, health and medical care; history and anthropology (incorporating Indigenous and oral traditions); migration, multiculturalism and urban life; colonialism and neocolonialism development and post-development; race, class and gender; politics and the globalized; cult of everyday life; language and discourse; and self, identity and family. The track in sociocultural anthropology thus offers a 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, or B.A., degree in anthropology, forms the basis of the cultural and biological anthropology and closely related disciplines. Students in both tracks are encouraged to gain practical experience through courses taken while studying abroad (under the administration of the UC Davis Study Abroad Program) and through undergraduate research or internships performed for credit (under ANT 192, 198, or 199 units provided by the advising office). Students showing exceptional ability are welcome to see their permission from instructors to participate in graduate seminars offered by the department.

Career Opportunities. A Bachelor of Arts degree in Anthropology is suited for students seeking a solid liberal arts education with its broad goal 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 which inter-cultural skills are increasingly required in social and environmental activism, business, diplomacy and social administration, journalism, law, education and international relations. Students that focus on evolutionary processes will be well prepared for such careers as medical or health anthropology, museum studies, cultural resource management and wildlife conservation. A Bachelor of Science degree in Anthropology provides good training for a variety of health professions including pre-medical, pre-dental, and pre-veterinary training, and the educational background for further training in the biological/evolutionary sciences and forensic investigation. The B.A. 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:

Evolutionary Emphasis: Preparatory Subject Matter …………………… 19-21
Anthropology 1, 2, 4, 5, 10, 12, 18A, 18B, 18C, 141C, 145A, 145B, 154C, 154Cl, 158B, 179 …… 7-9
Select 2 additional units from any of the: Evolutionary track anthropology courses (see list below) chosen in consultation with an evolutionary track undergraduate advisor. ………… 20

Total Units for the Major ………… 62-69
Note: Evolutionary track courses at the upper division level are those with numbers from 100 to 149B, with the exception of 101, 103, 105, 128A, and 141C. Sociocultural track courses are those that refer in their titles to one or more peoples or regions of the world.

B.S. Major Requirements:

Evolutionary Emphasis: Preparatory Subject Matter …………………… 54-60
Anthropology 1, 2, 3, 4, 5, 10, 12, 18A, 18B, 18C, 141C, 145A, 145B, 154C, 154Cl, 158B, 179B, 186B, 186D …… 16-18
Mathematics 16A, 16B-16C or 17A, 17B-17C or 21A, 21B-21C ………… 9-12
Physics 3A-3B, 3A-3B-3C, 3P-3Q-3R ………… 10-14

Selective Subject Matter ………… 30-34
Two additional units from any of the: Evolutionary track anthropology courses (see list below) chosen in consultation with an evolutionary track undergraduate advisor. ………… 20

Total Units for the Major ………… 99-105
Recommended
Anthropology 5, 15, 50; Geology 1; Psychology 1

Major Advisers. Consult Department office.
Anthropology

Minor Program Requirements:

UNITS

Anthropology 1-30

General emphasis 19-21

One course from: Anthropology 101, 102, 103, 104, 105, 151, 152, 153, 154A, 155, 156, 157, 158, 159 3-5

One course from: Anthropology 170, 171, 172, 173, 174, 176, 177, 179, 180, 182, 183, 184, 185 4

One course from: Anthropology 140A through 1498, 178 or any other sociocultural track course that refers in its title to one or more people or regions of the world. 4

Two courses from: Anthropology 100 through 1398N, excluding 101, 103, 105, 128A, and 141B. 8

Archaeology emphasis 20-25

Archaeology 170. 4

Two courses from: Anthropology 173, 174, 175, 176, 177, 178, or 179 8

Two courses from: Anthropology 156A, 156B, 171, 180, 181, 182, 183, 184, or 185 10

Evolutionary emphasis 18-30

Any five upper division Evolutionary Anthropology courses chosen in consultation with an evolutionary track adviser. 8

Sociocultural emphasis 19-21

Anthropology 100. 4

One upper division area focus sociocultural track course. 4

(area focus sociocultural track courses are those that refer in their titles to one or more people or sociocultural regions of the world. Two courses from: Anthropology 102 through 1398N, excluding 103, 105, and 128A. 8

One additional upper division Anthropology course chosen in consultation with a sociocultural track undergraduate adviser. 3-5

Minor Advisers. Consult Department office in 1282 Social Sciences Building for names of Minor Advisers.

Honors Program. Candidates for high or highest honors in Anthropology must write a senior thesis under the direction of a faculty member. The thesis project will have a minimum duration of two quarters. Honors candidates must take at least six units of Anthropology 194H. Only students who, at the end of their junior year (135 units), have attained a cumulative grade point average of 3.500 in Anthropology courses will be eligible for the honors program. The quality of the thesis work will be the primary determinant for designating high or highest honors at graduation.

Teaching Credential Subject Representative. Consult the Teaching Credential/M.A. Program on page 125.

Graduate Study. The Department offers a program of study leading to the M.A. and Ph.D. degrees in Anthropology. Further information regarding graduate study may be obtained at the Department office and at Graduate Studies.

Courses in Anthropology (ANT)

Lower Division

1. Human Evolutionary Biology (4)

Lecture—3 hours; discussion—1 hour. Processes and course of human evolution; primatology; biological and social diversity within Homo sapiens; human paleoanthropology. Students may not take both course 1 and course 1Y for credit. GE credit: CE, WE—W, (W)K, WE.

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, religion, and religion in a wide range of societies. Current problems in tribal and peasant societies. GE credit: SciEng, Div, Wrt|1 ACGH, DD, SS, WE—F, W, S, Su; (F, W, S, Su)

3. Introduction to Archaeology (4)

Lecture—3 hours; discussion—1 hour. Development of archaeology as an anthropological study; objectives and methods of modern archaeology. GE credit: SciEng or SocSci, Div|SE or SS, SL—F, W, S, Su, J

4. Introduction to Anthropological Linguistics (4)

Lecture—3 hours; discussion—1 hour. Exploration of the role of language in social interaction and world view, minority languages and dialects, bilingualism, literacy, the social motivation of language change. Introduction of analytical techniques of linguistics and demonstration of their relevance to language change. GE credit: SciEng, Div, Wrt|1 SS, WE, WC.

5. Seminar in Biological Anthropology (4)

Lecture—2 hours; laboratory/discussion—1 hour; fieldwork—1 hour. Skills for scientific thinking; designing, implementing, analyzing, interpreting, and criticizing research. Collection and analysis of original data. Basic statistical methods. GE credit: SciEng or SocSci, Div|Wrt|1 SS, WE.


Lecture—3 hours; 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 with cultural variation in humans by study of selected cases. GE credit: SciEng, Div, Wrt|1 SE, OL, WE—Isbell

7. Scientific Method in Physical Anthropology (4)

Lecture—2 hours. Laboratory/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: SciEng or SocSci, Wrt|1 OL, SE, VL, WE.

8. Cultural Anthropology of South America (4)

Lecture—3 hours; discussion—1 hour. Introduction to the anthropological study of cultural diversity in South America. Case studies of eight societies will be presented to illustrate and compare the distinctive features of major cultural regions of the world. Concludes with a discussion of modern popular culture. GE credit: AnthHum or SocSci, Div|ACGH, AH or SS, DD, WC, WE—Sawyer

9. Introduction to World Prehistory (4)

Lecture—3 hours; discussion—1 hour. Broadly surveys prehistoric peoples of the human species' physical and cultural evolution from earliest evidence for “humanness” to recent development of large-scale complex societies or “civilizations.” Lectures emphasize problem formulation and reconstructing the past. GE credit: SocSci, Div, Wrt|1 SS, WE, WC

10. Ancient Crops and People (4)

Lecture—3 hours; discussion—1 hour. The archaeological evidence for domestication of plants and the origins of agriculture. Anthropological context of agriculture and the effects on sexual division of labor, social inequality, wealth accumulation, warfare, human health, and sedentism. Offered in alternate years. GE credit: SocSci, Div, Wrt|1 SS, WC, WE—Eerkens

11. 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 primate; consideration of hypotheses for their origin. GE credit: SciEng or SocSci, Div|Wrt|1 SE or SS, SL, WE

12. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only)
99. Special Study for Lower Division Students (1-5)
Prerequisite: consent of instructor. [F/NP grading only]

Upper Division

100. Theory in Social-Cultural Anthropology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Discussion of the theoretical and philosophical developments in cultural anthropolo-

Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 2 or Environmental Science & Policy 30 or Evolution and Ecology 100 or Biological Sciences 101 recommended. Interdisciplinary study of diver-

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 or Environmental Science and Policy 101 recommended. Integration of the inter-

104N. Cultural Politics of the Environment (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Relationship between social inequality (based on race, class, and/or gender) and ecological degradation. Articulation of local peoples, national policy, and the international global economy in the contestation over the use of environmental resources. Not open for credit to students who have completed course 121N. [Former course 121N] Offered in alternate years. GE credit: SocSci, Div, Wrt|ACGH, DD, OL, SS, WW, WE.—Mulder

105. Evolution of Societies and Cultures (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 2 and Environmental Science and Policy 30 or Evolution and Ecology 100 or Biological Sciences 101 recommended. Interdisciplinary study of social and cultural evolution in humans. Culture as a system of inheritance, psychological principles of cultural learning, culture as an adaptive system, evolution of mal-

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 recom-

110. Language and Sociocultural Anthropology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. The role of language analy-

117. Language and Society (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 4 or Linguistics 1 recommended; course 2 recommended. Consideration of language in its social context. Methods of investigation and analy-

121. Special Topics in Medical Anthropology (4)
Lecture/discussion—4 hours. Prerequisite: course 2 recommended. Introduction to critical medical anthropology. Topics include anthropological analy-

122. Anthropology and Political Economy (4)
Lecture—3 hours; discussion—1 hour. Variety of production, exchange, and consumption behavior in precapitalist economies, their interaction with culture 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] Offered in alternate years. GE credit: SocSci, Div, Wrt|ACGH, DD, SS, WW, WE.—Giordano

122A. Economic Anthropology (4)
Lecture—3 hours; discussion—1 hour. Varieties of production, exchange, and consumption behavior in precapitalist economies, their interaction with culture 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] Offered in alternate years. GE credit: SocSci, Div, Wrt|ACGH, DD, SS, WW, WE.—Giordano

123A. Resistance, Rebellion, and Popular Movements (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Analysis of popular protest in Third World and indigenous societies ranging from covert resistance to national revolts. Compara-

124. Religion in Society and Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Disciplinary theoretical theories of religion with emphasis on non-literate societies. Sur-

125A. Structuralism and Symbolism (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Survey of anthropological approaches to understanding the language and symbolism in social analysis. Focus on how structural and symbolic interpretations relate to cultural and linguis-

125B. Postmodernism(s) and Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. The U.S. Eurocentric, post-

126A. Anthropology of Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Theories of development and current crises. Colonial legacies and post-

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, organi-

128A. Kinship and Social Organization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Comparative examination of social kinship, descent 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] Offered irregularly. GE credit: SocSci, Div, Wrt|SS, WW, WE.—Su. (Su.)

128B. Self, Identity, and Family (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Exploration of self, identity, and family systems cross-culturally. Impact of class, gender, race, ethnicity, ruralization, urbanization, and globalization on notions of selfhood in different sociocultural systems. Not open for credit to students who have completed course 128. [Former course 128] Offered in alternate years. GE credit: SocSci, Div, Wrt|SS, WW, WE.—Su. (Su.)

129. Health and Medicine in a Global Context (4)
Lecture/discussion—3 hours; term paper. Prerequi-

129A. Structuralism and Symbolism (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Survey of anthropological approaches to understanding the language and symbolism in social analysis. Focus on how structural and symbolic interpretations relate to cultural and linguis-

129B. Postmodernism(s) and Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. The U.S. Eurocentric, post-

129C. Anthropology of Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Theories of development and current crises. Colonial legacies and post-

129D. Women and Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Course 2 recommended. Theories of development and current crises. Colonial legacies and post-

130. Language and Socio-cultural Anthropology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. The role of language analy-

132. Religion in Society and Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2. Disciplinary theoretical theories of religion with emphasis on non-literate societies. Sur-

134. Language and Society (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 4 or Linguistics 1 recommended; course 2 recommended. Consideration of language in its social context. Methods of investigation and analy-

140. Language and Sociocultural Anthropology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. The role of language analy-

142. Anthropology and Political Economy (4)
Lecture—3 hours; discussion—1 hour. Varieties of production, exchange, and consumption behavior in precapitalist economies, their interaction with culture 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] Offered in alternate years. GE credit: SocSci, Div, Wrt|ACGH, DD, SS, WW, WE.—Giordano

150. Language and Sociocultural Anthropology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. The role of language analy-

152. Postmodernism(s) and Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. The U.S. Eurocentric, post-

160. Language and Sociocultural Anthropology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. The role of language analy-

162. Anthropology of Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Theories of development and current crises. Colonial legacies and post-

166. Women and Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Course 2 recommended. Theories of development and current crises. Colonial legacies and post-

171. Anthropology

Fall 2011 and on Revised General Education (GE) AJH=Arts and Humanities; SE=Science and Engineering; SS=Social Sciences; ACGH=American Culture; DD=Dominant Diversity; QC=Quantitative; SL=Scientific; VL=Visual; WC=World Cultures; WE=Writing Experience

Pre-Fall 2011 General Education (GE): AH=Arts and Humanities; SE=Science and Engineering; SS=Social Sciences; ACGH=American Culture; DD=Dominant Diversity; QC=Quantitative; SL=Scientific; VL=Visual; WC=World Cultures; WE=Writing Experience

Quarter Offered: F=Fall, W=Winter, S=Spring, Su=Summer; 2017/2018 offering in parentheses
130A. Cultural Dimensions of Globalization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. The cultural dimensions of recent economic and political developments frequently termed “globalization.” Offered in alternate years. GE credit: SocSci, Writ| SS, WC, WE.

130BN. Migration and the Politics of Place and Identity (4)
Lecture/discussion—4 hours. Prerequisite: course 2 recommended. Internal and international migration from an anthropological perspective, including causes, processes, and political, economic, and cultural effects of 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. Offered irregularly. GE credit: SocSci, Writ| SS, WC, WE.

131. Ecology and Politics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Analysis of the complex interactions between ecological dynamics and political processes employing the emerging approach of political ecology. Case studies of environmental degradation (e.g., deforestation, logging, mineral extraction, petroleum from various cultural and geographic regions. Offered in alternate years. GE credit: SocSci, Div| SS.

132. Psychological Anthropology (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 2 recommended. History of the relationship between anthropology and psychoanalysis. Exploration of anthropology of emotions, colonial psychology, contemporary ethnopsychotherapy; studies on personality, possession, magic, altered states, subjectivity, and definitions of the normal and the pathological in different contexts and cultures. GE credit: SocSci, Div| SS, WC, WE. —G. (G.)

134. Buddhism in Global Culture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Class size limited to 50 students. Buddhist meditation and ritual as a cultural system that adapts to global and local forces of change. Anthropological theory and method in understanding global culture transmission, including Buddhist reform movements in Asia and Buddhist practice in the West. GE credit: ArtHum or SocSci, Div| Writ| AH or SS, WC, WE. —Klima

136. Ethnographic Film (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Overview of the use of film in anthropology and the ethical and aesthetic limits and limitations in comparison to written ethnographic descriptions. Essential features of ethnographic films. Film production in anthropological research and problems encountered in producing films in the field. Offered irregularly. GE credit: SocSci, Writ| SS, VL, WC, WE.

137. Meditation and Culture (4)
Lecture/discussion—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Class size limited to 50 students. Study and practice of the relation between meditation and cultural conditioning, comparison of Buddhist practice with other cultural orientations of mind, body, brain, thought, emotion, and self. —Klima

138. Ethnographic Research Methods in Anthropology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Methodological and theoretical approaches to anthropological field research. Problem formulation, research design, quantitative and qualitative data collection procedures, and techniques for organizing, retrieving, and analyzing information. Ethnographic observation, description, and controlled inference. Students will organize and conduct individual research projects. Offered in alternate years. GE credit: SocSci| SS, WC, WE. —de la Cadena

139AN. Race, Class, Gender Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Comparative analysis of the ways in which beliefs about descent, “blood,” and biological difference interact with property and marital systems to affect distribution of political power in society. Not open for credit to students who have completed course 139. Offered irregularly. GE credit: SocSci, Div| Writ| SS, WC, WE. —S. (S.) Zwyns

139BN. Gender and Sexuality (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Gender and sexuality in forging, sustaining, and contesting social categories affecting social organization, political, cultural, and religious lives of Russian, American, Canadian, and Greenlandic Arctic people (Yup’ik, Inup’ik, Innu, Inuit, etc.). Gender in traditional and contemporary contexts. GE credit: SocSci, Div| Writ| SS, WC, WE.

140A. Cultures and Societies of West and Central Africa (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Ethnographic survey of West Africa and Congo Basin with analyses of representative societies where both general and specific problems of patrimonial theoretical concern. Major consideration will be the continuities and discontinuities between periods prior to European contact and the present. Offered irregularly. GE credit: SocSci, Div| Writ| SS, WC, WE. —Donham

140B. Cultures and Societies of East and South Africa (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Consent of instructor. Description and analysis of the native peoples of California and the Great Basin, and their lifeways at the time of European contact. (Former course 1.41C.) GE credit: SocSci, Div| Writ| ACHG, DD, SS, WE. —Bettinger

141C. People of the Arctic: Contemporary and Historic Cultures of the Circumpolar Region (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 or 3 recommended; consent of instructor. Recent studies of the archaeo-historical record of human occupation, ethno-historical and ethnographic accounts, artic peoples in popular culture, and contemporary issues. Offered in alternate years. —F. Darwent

142. Peoples of the Middle East (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Peoples of the Middle East (including North Africa). Discussions of class relations, kinship systems, religious beliefs and behavior, ethnic relations, political systems. Impact of world systems, political and religious movements, and social change. (Former course 1.36.) GE credit: SocSci, Div| Writ| SS, WC, WE.

143A. Ethnology of Southeast Asia (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Patterns of culture and social organization from prehistory to the present, in selected societies which illustrate problems of interest and concern. The cultural dimensions of colonialism, nationalism, religion, contemporary European, and ethnomedical and ethnomaterial differences. GE credit: SocSci, Div| Writ| SS, WC, WE. —Klima

144. Contemporary Societies and Cultures of Latin America (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Introduces to contemporary social structure of Latin America. Origins, maintenance and changes in inequality: economic responses to political structures, political and economic policies. Emphasis on the role of ethnicity among national states. Offered irregularly. GE credit: SocSci, Div| Writ| SS, WC, WE. —de la Cadena

145. Performance, Embodiment, and Space in Southeast Asia (4)
Lecture/discussion—4 hours. Prerequisite: course 2 recommended. Recent ethnographies of different sociocultural spaces in Southeast Asia. Offered in alternate years. GE credit: SocSci, Div| Writ| SS, WC, WE. —Srinivas

146N. Topics in the Anthropology of Europe (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Recent ethnographies of different nations’ states and sociopolitical spaces in Europe. Topics include the question of old and new boundaries, historical and contemporary constructions of Europe, migration and ethnicity, citizenship, and modernity. GE credit: ArtHum or SocSci, Div| Writ| AH or SS, WC, WE. —Srinivas

148A. Culture and Political Economy in Contemporary China (4)
Lecture/discussion—4 hours. Prerequisite: course 2 recommended. Examining the impact of global 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 mobility, city space, and gender. GE credit: SocSci, Div| Writ| SS, WC, WE. —Zhang

149A. Traditional Japanese Society (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Patterns of culture and social organization from prehistoric to early twentieth-century Japan. Origins, prehistory, and tradition religion and political systems, marriage and kinship, and language and culture. Offered irregularly. GE credit: SocSci, Div| Writ| SS, WC, WE. —O. (O.)

151. Primate Evolution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Biological Sciences 2B or Biological Sciences 2C. Primate Evolution and Ecology 10 recommended. Origin and radiation of the primates, monkeys, and apes. GE credit: SciEng, Writ| SE, WE. —S. (S.) Iubb

152. Human Evolution (5)
Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: course 1 recommended. Nature and results of the evolutionary processes involved in the formation and differentiation of humankind. GE credit: SciEng, Writ| SE, WC. —J. (J.) Zwyns

153. Human Biological Variation (5)
Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: course 1 or Biological Sciences 2B recommended. Origin, adaptive significance and methods of analysis of genetic differences among human populations. Special attention given to racial differences such as those in blood groups, plasma pro-
teins, red cell enzymes, physiology, morphology, pigmentation and dermatoglyphics. GE credit: SciEng|OL, QL, SE, WE.—D. G. Smith

154A. The Evolution of Primate Behavior (5)
Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: course 1 or 54 or Evolution and Ecology 10 recommended. Examination of the ecological divergence and evolution of social systems of primatians, monkeys, and apes, placing the social behavior of the primates in the context of appropriate ecological and biogeographical history. GE credit: SciEng, Wnt|OL, SE, WE.—F. (S.) Isbell

154B. Primate Evolutionary Ecology (5)
Lecture—3 hours; lecture/discussion—1 hour; term paper. Prerequisite: course 1 or Evolution and Ecology 10 recommended. Examination of the ecology of primates within an evolutionary framework. Theoretical concepts in individual, population, and community ecology, illustrated with primates (and other vertebrate) examples, with an additional emphasis on primate and rainforest conservation. GE credit: SciEng, Wnt|QL, SE, WE.

154C. Behavior and Ecology of Primates (2)
Lecture/discussion—2 hours. Prerequisite: course 54, 154A, or 154BN. Statistics 13 or its equivalent. Methods for studying of primates, including methods of analysis and interpreting the behavior and ecology of primates. (P/NP grading only.) Offered in alternate years. GE credit: SE.—S. (S.) Crofoot

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 studies on the behavior of wild primate populations at the California National Primate Research Center. Offered in alternate years. GE credit: SciEng|OL, SE, WE.—S. (S.) Crofoot

156A. Human Osteology (4)
Lecture—3 hours; laboratory—4 hours. Prerequisite: course 1 or course 1Y recommended. Not open to students who have previously completed course 156. Human skeleton from archaeological, forensic, and paleontological perspectives, including anatomical nomenclature, variation with sex and age, function, evolution, growth, and development of bones and teeth. Hands-on study and identification of human skeletal remains. GE credit: SciEng|SE.—F. (F.) Weaver

156B. Advanced Human Osteology (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: course 156A or equivalent. Not open to students who have previously completed course 156. Human skeletons from archaeological, forensic, and paleontological contexts. Bone and tooth structure, growth, and development; measurement, statistics, and biomechanics of age, sex, weight, height, and ancestry; and indicators of illness, injuries, diet, and activities. Offered in alternate years. GE credit: SciEng|SE.—S. (S.) Weaver

157. Anthropological Genetics (3)
Lecture—3 hours. Prerequisite: course 1 or Biological Sciences 2C recommended. Method and theory of genetic and genomic analysis of molecular evolution of human and non-primate populations. Special emphasis on molecular evolutionary transitions to humans and genetic differences among extant human populations and their adaptive significance. Offered in alternate years. GE credit: SciEng|QL, SE.—D. G. Smith

157L. Laboratory in Anthropological Genetics (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 1 or Biological Sciences 2C recommended; enrollment concurrently or following course. Methods for identifying genetic variation in human blood group antigens, serum proteins and red cell enzymes (hematoglogin), general electrophoresis on starch, cellulose acetate and polyacrylamide, immunoelectrophoresis and immunofixation, isoelectric focusing, and agarose. (P/NP grading only.) Offered irregularly. GE credit: QL, SE.—D. G. Smith

158. The Evolution of Females and Males: Biological Perspective (4)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 1 recommended. Current theoretical frameworks for explaining the evolution of sex differences and for understanding the interrelationship between biological and cultural construction of gender roles. GE credit: SciEng, Div|Wnt|OL, WE.

159. Molecular Anthropology of Native America (4)
Seminar—3 hours; term paper. Prerequisite: course 1 or Biological Sciences 2B, or consent of instructor. Use of DNA analysis and other genetic polymorphisms to test hypotheses regarding genetic relationships among different Native American tribes and about prehistoric population replacements and migrations to and within the Americas. Integration with craniometric, archaeological, paleoenvironmental, linguistic and ethnohistorical evidence. Offered irregularly. GE credit: SciEng|OL, SE.

160. Neandertals and Modern Human Origins (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or course 1Y or equivalent recommended. Origins, evolution, and disappearance of Neandertals. Emergence of humans like us in both anatomical and behavioral interpretation of the fossil and archaeological records of Europe and Africa. Genetics of living and fossil humans in alternate years. GE credit: SciEng|SE.—Weaver

170. Archeological Theory and Method (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 recommended. Introduction to history and development of archeological theory and method, with particular emphasis on understanding the relationship of the latter on the former. Stress is on historical development of archeology in the New World. GE credit: SocSci, Div, Wnt|SS, WE.—W. (W)

172. New World Prehistory: The First Arrivals (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 recommended. Survey of data relating to the peopling of the New World. Cultural adaptation and development of early inhabitants of the New and South America. Offered in alternate years. GE credit: SocSci, Div, Wnt|SS, WC, WE.—Darwent

173. New World Prehistory: Archaic Adaptations (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 recommended; consent of instructor. Introduction to and survey of prehistoric hunting and gathering adaptations across North America with particular emphasis on the Southeast, Midwest, Plains, Southwest, and Northwest. Offered irregularly. GE credit: SocSci, Div, Wnt|SS, WE.—Weaver

174. European Prehistory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 recommended. Survey of the prehistory of Europe from its earliest human inhabitants, to the Neandertals and first modern humans, and through early agricultural and complex societies. Analysis and interpretation of the European archeological record for understanding human dispersals into Europe. Offered in alternate years. GE credit: SocSci|SS, WE, W.—Weaver

175. Andean Prehistory: Archaeology of the Incas and their Ancestors (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 recommended. Prehistory of the Andean region, especially Peru, from the earliest hunting and gathering societies to the collapse of the Inca Empire. Focus on the use of archaeological data to reconstruct ancient human adaptations to the varied Andean environments. Offered in alternate years. GE credit: SocSci|SS, WE, W.—Eerkens

176. Prehistory of California and the Great Basin (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 recommended; consent of instructor. Description and analysis of prehistoric peoples of California and the Great Basin from earliest times to European contact. Offered in alternate years. GE credit: SocSci, Div|Wnt|ACGH, DD, SS, WE.—Eerkens

177. African Prehistory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 recommended. Survey of prehistory of Africa from early human ancestors, through modern human origins, and into cultural and complex societies and the Bantu expansion. Analysis and interpretation of the African archeological record, incorporating human paleontology and genetics. Offered in alternate years. GE credit: SocSci|SS, WC, WE.—Steele

178. Hunter-Gatherers (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 recommended. Study and interpretation of the ancient and modern lifeways in which people support themselves with primitive technologies and without benefit of domesticated plants and animals. Offered in alternate years. GE credit: SocSci, Div|Wnt|SS, WC, WE.—Steele

179. Asian Prehistory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 recommended. Survey of the prehistory of Asia from the earliest human occupations to the rise of complex societies. Special focus on cultural and archeological records. Offered in alternate years. GE credit: SocSci.—Zwyns

180. Zoarcheology (4)
Lecture—2 hours; discussion/laboratory—3 hours. Prerequisite: course 1 recommended. Restricted to junior or senior standing. Theories and methods for studying animal skeletal remains from archaeological sites. Identification and quantification of zooarchaeological material, cultural and natural processes affecting animal bones pre- and postburial, and use of faunal remains for determining past human diets and past environments. Offered in alternate years. GE credit: SciEng|SE—W. (W) Darwent, Steele

181. Field Course in Archeological Method (9)
Lecture—6 hours; daily field investigation. Prerequisites: course 3 recommended. On-site experiences illustrating the use of different methods. Preparation and analysis of archaeological records held at a field location in the western United States, generally California or Nevada. Introduces basic methods of archaeological survey, mapping, and excavation. GE credit. SciEng|SE—S. (S.)

182. Archeometry (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 3 recommended. Scientific techniques used to study the physical and chemical properties of archaeological materials. Types of anthropological questions that can be addressed with different methods. Preparation and analysis of archaeological materials in alternate years. GE credit: SciEng|OL, SE, VL, WE.—Eerkens

183. Laboratory in Archeological Analysis (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 3 recommended. On-site experiences illustrating the use of different methods. Preparation and analysis of archaeological materials. GE credit: SciEng|OL, QL, SE, WE.—Darwent

184. Prehistoric Technology: The Material Aspects of Prehistoric Adaptation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 recommended. Examination of the role of lithic, ceramic, textile and wooden implements as elements in prehistoric survival and development. Emphasis is descriptive, but the significance of material resources as a basis for prehistoric adaptation, settlement patterns, and culture change are discussed. Offered in alternate years. GE credit: SocSci|SS, WE.—Eerkens

185. Lithic Analysis (4)
Lecture/lab/or workshop. Prerequisite: course 3 recommended. Basic concepts of lithic analysis. General introduction on the place of stone tool tech-
nology in the archæological record, Physics, terminol-
yogy and methodological concepts behind the study of
of stone tools from its emergence. Offered in alter-
nate years. GE credit: SocSci | SS—Zwyns

186A. Museum Studies: Analysis of Native American Basketry (4)
Lecture—Discussion—3 hours; discussion/labora-
tory—1 hour. Class size limited to 25 students. Study of ethnographic and prehistoric basketry from North America, especially California and Oregon, in a multidisciplinary historical context. Techniques for basketry attribution and textile analysis. GE credit: ArtHum or SocSci | ACGH, AH or SS, DD, OL, VL, WE. —F (F) Bettiger

191. Topics in Anthropology (4)
Lecture—Discussion—3 hours; term paper. Prerequi-
site: junior or senior standing in anthropology. Inten-
sive treatment of a special anthropological topic or prob-
lem. May be repeated one time for credit when topic dif-
sers.

192. Internship in Anthropology (1-12)
Internship—3-36 hours. Prerequisite: Upper division
standing; consent of instructor. Work experience offered
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 depart-
ments. (P/NP grading only.)

194H. Special Study for Honors Students (1-5)
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.) GE credit: UC, W.

197T. Tutoring in Anthropology (1-5)
Tutorial—1-5 hours. Prerequisite: upper division
standing in anthropology and consent of
Department Chairperson. Leading of small voluntary
discussion groups affiliated with one of the depart-
ment’s regular courses. May be repeated for credit.

198. Directed Group Study (1-5)
(P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)

Graduate

200. History of Anthropology (4)
Lecture/discussion—2 hours; term paper. Historical
development of sociocultural theory within anthro-
pology from 19th to mid-20th Centuries. Focus on original
texts in context of historical develop-
ments in the field as a whole. Offered in alternate
years.

201. Critical Readings in Ethnography (4)
Seminar—3 hours; term paper. Prerequisite: gradu-
ate student in Anthropology or consent of instructor.
Critical readings of selected ethnographies that
examine a wide range of important topics and ana-
lytical issues in social and cultural anthropology.
Emphasis on how and why ethnographic writing has
changed over time and its relationship with contem-
porary theoretical explorations. —F (F) Zhang

202. History and Theory of Biological Anthropology (4)
Seminar—3 hours; term paper. History of thought in
biological anthropology and analysis of major theo-
retical problems in the field. Suggested for all first-
year graduate students lacking intensive preparation
in biological anthropology. —Weaver

203. History and Theory of Archaeology (4)
Seminar—3 hours; term paper. Generally restricted
to graduate students; outstanding undergraduates
with extensive training in archaeology with consent
of instructor. History of archaeology and archaeo-
logical theory and analysis of archaeological research
methodology. —F (F) Bettiger

204. Contempary Issues in Anthropological Theory (4)
Seminar—3 hours; term paper. Prerequisite: course 2, 137 or consent of instructor. Advanced consider-
ation of fundamental issues in anthropological the-
ory. Emphasis on critical examination of major
contemporary debates between proponents of com-
peting theories.

205. History and Theory in Anthropological Linguistics (4)
Seminar—3 hours; term paper. History of thought in
anthropological linguistics. Consideration of the his-
torical development of the principal ideas in anthro-
pological linguistics, of major theoretical issues, and
of research methodology.

206. Research Design and Method in Social Anthropology (5)
Seminar—4 hours. Prerequisite: consent of instructor.
Limited enrollment. Formulation of research problems
and preparation of research proposals; relationships
between theory and method, funding, pre-fieldwork
preparations, entering the community, field research
techniques, and problems of ethics; intensive work
on proposal writing. May be repeated one time for
credit.

207. Ethnographic Writing (4)
Seminar—3 hours; term paper. Prerequisite: courses 137, 201, or the equivalent. Relationship between
directing participant observation of others and
writing it up, emphasizing the processual rift
between the reality of fieldwork and its written repre-
sentation. Study of various literary genres and tex-
trat strategies used in cultural anthropology. May be
repeated for credit.

210. Aspects of Culture Structure (4)
Seminar—3 hours; term paper. Analysis of various
phases of culture, such as religion, economics, law,
and folklore. May be repeated for credit when topic
differs. —F, W, S. (F, W, S.)

211. Advanced Topics in Cultural Ecology (4)
Lecture/discussion—3 hours; term paper. Prerequi-
tive: Environmental Science and Policy/Anthropol-
yogy 133, graduate standing in Anthropology or
Ecology. Topics of current analytical and method-
ological importance in cultural ecology. Examination
of general issues in cultural ecology through study of
human response to and influence on climate. (Same
course as Ecology 211.)

212. Political Ecology (4)
Lecture/discussion—3 hours; term paper. Prerequi-
tive: graduate standing or consent of instructor.
Inter-
disciplinary seminar evaluating contributions from
ecological anthropology, political economy, cultural
constructivism, postmodernism, and feminism
towards development of theories of political ecology.
Historical relationships between local/global power
structures, environmental degradation, and resis-
tance movements. Case studies of desertification,
deforestation, mining, conservation, development.

216. Problems in Archeological Method (4)
Seminar—3 hours; term paper. Techniques for ana-
lyzing archeological data; application to various
prehistoric cultures. May be repeated for credit with
consent of instructor. —Darwent, Steele

217. Quantitative Modeling in Archaeology (4)
Lecture/discussion—3 hours; term paper. Examina-
tion of the nature of archaeological data with a
focus on the quantitative and statistical techniques
available to model, analyze, display, and make
sense of such data. Offered irregularly. —Erkens

218. Topics in New World Prehistory (4)
Seminar—3 hours; term paper. Advanced study on
current problems in New World Prehistory and
archaeology. May be repeated for credit only if
material is unique for that student and with consent
of instructor. May be repeated for credit. Offered
irregularly. —Darwent, Erkens

219. Topics in Old World Prehistory (4)
Seminar—3 hours; term paper. Advanced study on
current problems in Old World prehistory and
archaeology. May be repeated for credit only if
material is unique for that student and with consent
of instructor. May be repeated for credit. Offered
irregularly—Steele, Zwyns

220. Field Course in Linguistics (4)
Seminar—2 hours; laboratory—2 hours. Prerequi-
site: courses 110, 111. Techniques of eliciting,
recording, and analyzing; work with a native
speaker.

221. Rural Transformation in Postcolonial Societies (4)
Seminar—3 hours; term paper. Prerequisite: courses
223, 265, or consent of instructor. Problems of rural
transformation arising out of political and economic
interaction between national and regional and
local populations under varying condi-
tions of induced change in postcolonial societies.
Attention will be given to the implications of this
interaction for rapid economic change. May be
repeated for credit.

222. Cities and Citizenship (4)
Seminar—3 hours; term paper. Prerequisite: gradu-
ate standing; consent of instructor. Explores the
nature of modern cities, urbanization and life, and
urban culture and politics from an anthropologi-
cal perspective. —F (F) Zhang

223. Economic Anthropology (4)
Seminar—3 hours; term paper. Prerequisite: course
122 or consent of instructor. Selected current and
methodological and theoretical problems in the analysis
of nonindustrial economic systems.

224. Problems in Comparative Religion (4)
Seminar—3 hours; term paper. Advanced study of
current problems in the anthropological study of reli-
gion.

225. State and Nation in the Modern World (4)
Seminar—3 hours; term paper. A presentation of
current anthropological theories of the state and
dature of the modern nation-state in both the First
and Third Worlds, with special reference to state ide-
ology (nationalism) and forms of control.

226. Consciousness and Resistance (4)
Seminar—3 hours; term paper. Prerequisite: comple-
tion of first-year graduate work or consent of instruc-
tor. Consideration of approaches to the study of
social inequality, and responses of subordinated
groups. Emphasis on situating approaches to con-
temporary social theory, concrete research prob-
lems, and political strategies. Topics: formation of
consciousness and identity; collective action, accom-
mmodation to frontal resistance; resistance.

228. Culture and Power (4)
Seminar—3 hours; extensive writing. Prerequisite:
graduate standing or consent of instructor. Explora-
tion of one of the core paradigms within contempora-
y anthropological theory: “culture and power.” Focus
on how distinct theoretical perspectives—
Marxism, post-Marxism, structuralism, post-structural-
ism, and feminism—have examined the mutually
cotonomous nature of culture and power. —W. (W.)
Sawyer

229. Gender, Identity, and Self (4)
Seminar—3 hours; term paper. Intersections of gen-
er, identity, and selfhood cross-culturally and histor-
ically. How the self is feminized and masculinized,
and interfaces with sexual, race, class, work,
national, minority, and majority identities under dif-
ferent historical, cultural, and social structural condi-
tions. May be repeated for credit when topic
differs. —W. (W.) Joseph

Lecture—1.5 hours; seminar—1.5 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

Fall 2011 and on Revised General Education (GE): AH—Arts and Humanities; SS—Science and Engineering; SS—Social Sciences;
AGCH—American Cultures; DD—Domestic Diversity; OL—Oral Skills; OL—Quantitative; SL—Scientific; VL—Visual; WC—World Cultures; WE—Writing Experience
Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Domestic Diversity; Wrt—Writing Experience
Quarter Offered: F=Fall, W=Winter, S=Spring, Su=Summer; 2017-2018 offering in parentheses
232. Political Movements (4)
Seminar—3 hours; term paper. Prerequisite: completion of first-year graduate work recommended. An interdisciplinary approach to political movements of protest, reform, and revolution 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 the culture aboriginally found 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 ethnohistory 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. Seminar on current topics in the anthropology of Chinese society. Focus on one or more of the following topics: state-society dynamics, family and gender, urbanization 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 or the equivalent. Analysis of primate behavior, with emphasis on the ecology and the biology of different primates. Attention to theory models and their use in ethnographic and ecological research on primates. May be repeated for credit if topic differs.

251. Modeling the Evolution of Social Behavior (4)
Lecture—3 hours; extensive problem solving. Prerequisite: Mathematics 15C 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 culture, with an emphasis on reproduction, marriage, parental investment and family structure; implications of evolutionary theory for social organization in human communities, historical and contemporary. Offered in alternate years. —Borgerhoff, Mulder

263. Human Applications of Foraging Theory (4)
Discussion—3 hours; laboratory—3 hours. Foraging theory models and their application to anthropological and ecological research on foraging behavior. May be repeated once for credit.

265. Language, Performance, and Power (4)
Seminar—3 hours; term paper. Restricted to graduate standing or consent of instructor. Exploration of the intersection between linguistic and social theories in the language-state relationship and the performance of identity, ideological sources of language differentiation; nation-building and linguistic difference. Political economic, sociolinguistic, and ethnographic approaches to understanding linguistic inequality. (Same course as Linguistics 265.) Offered in alternate years. —Shibamota-Smith

270. Anthropology Colloquium Seminar (1)
Seminar—1 hour. Reports and discussions of recent advances in anthropology and in the four subfields of anthropology. To be presented by guest speakers. May be repeated two times for credit. [S/U grading only.]—F, W. S. (F, W, S)

280. Current Anthropology Journal Editorial Workshop (4)
Workshop—1 hour; independent study—3 hours. Prerequisite: consent of instructor. Students must enroll for all three quarters. Reading and offering critiques of manuscripts submitted 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. Participation 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 up to 12 units for credit with consent of instructor.

291. Advanced Topics in Human Behavioral Ecology (4)
Discussion—3 hours; term paper. Prerequisite: course 261, 262, or 263, or comparable experience in anthropology or related disciplines and consent of instructor. Topics focused, critical discussion of current and emerging research in the field of human behavioral ecology, with special attention to theory, concepts, models, and methods for the evolutionary analysis of ethnographic and archaeological evidence. May be repeated one time for credit if topic differs.
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

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<th>UNITS</th>
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<td>18</td>
<td>Three or more 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: Resources 145, 149, 151, 152 (6-12 units)</td>
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Minor Adviser: T. R. Famula (Animal Science)
Arabic

See Classics, on page 212.

Art History

(College of Letters and Science
Department Office, 101 Art Building 530-752-0105; http://arthistory.ucdavis.edu

Faculty
Katharine Burnett, Ph.D., Associate Professor
cal Grigor, Professor
Lynn Roller, Ph.D., Professor
Diana Strazdins, Ph.D., Associate Professor
Hegnar Waterpough, Ph.D., Associate Professor

Emirati Faculty
Robert J. Grigg, Ph.D., Professor Emeritus
Seymour Howard, Ph.D., Professor Emeritus
Jeffrey Ruda, Ph.D., Professor Emeritus
Dianne Sachiko Maclead, Ph.D., Professor Emerita

The Major Program
Art History studies the changing visual expression of values, beliefs and experiences across diverse cultures and times. It provides training in historical, social and aesthetic understanding, critical thinking, scholarly research, and aesthetic understanding and writing. More than any other discipline art history sharpens its students’ visual acuity and deepens their visual literacy. In so doing, it prepares them to face the increasingly complex visual world we find ourselves in today.

The Program. The major begins with a series of courses that surveys major landmarks in the history of visual culture, art and architecture in Asia, Europe, and the United States. More advanced lecture courses and seminars focus on particularly important periods and issues. Students are encouraged to personalize their training with internships, independent study, and focused upper-division study. Top students considering graduate study are encouraged to engage in more advanced study in the Honors program.

Career Options. A major in Art History develops critical thinking and the integration of research, interpretation and understanding. It provides an excellent liberal arts basis for professions as far ranging as advertising, law, medicine, politics and business. The major prepares students for advanced study in Art History, Architecture, Museum Studies and Cultural Studies. It also serves as the foundation for careers in teaching, arts, administration, museums, galleries, historic preservation, art libraries, publishing, journalism, advertising, art conservation, and art investment. As the world becomes increasingly flooded with images, the critical visual literacy gained through art history becomes more important for a wide variety of careers.

A.B. Major Requirements:

Preparatory Subject Matter .................................. 20
Any four of the following courses: Art History 1A, 1B, 1C, 1D, 1DY, 1E, 5, and 25 … 16 Any lower division Art Studio course except Art 10 or 30

Depth Subject Matter .................................. 40
Four courses, one each in four of the following six areas. Two courses must be from areas a, b, c, and two courses must be from areas d, e, f.

(a) Ancient Mediterranean Art: Art History 172A, 172B, 173, 175
(b) East Asian Art: Art History 163A, 163B, 163C, 163D, 164
(c) Islamic Art: Art History 120A, 155, 156
(d) European Art before 1700: Art History 178B, 178C, 178E
(e) Western Art 1700-1900: Art History 110, 130, 168, 182, 183A, 183B, 188A, 188B, 188C
(f) Art after 1900: Art History 120A, 148, 163D, 183C, 184, 185, 186, 189

Three additional courses chosen from three of the following areas with at least one course in area d or e.

Electives .................................................. 20
Five additional upper-division Art History 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

Emphasis in Architectural History

Art History ........................................ 60

Emphasis in Architectural History follows the same requirements as for the Art History major above, applying at least six of the following courses to their respective required areas or as electives: Art History 10, 210, 120A, 155, 163A, 168, 172A, 172B, 173, 175, 176A, 176B, 176C, 178B, 178C, 184, 188A, 188B.

Fulfilling the undergraduate seminar requirement (Art History 190A-H) through an architectural topic is highly recommended.

Minor Program Requirements:

Art History ........................................ 20

Three courses chosen from three of the following areas with at least one course in area d or e.

Electives .................................................. 20
Five additional upper-division Art History courses to be chosen in consultation with the major adviser. Appropriate course substitutions may be made in consultation with the major adviser. Art History 401 and 402 may be counted among the elective units.

Honors Program. The Honors Program is encouraged for Art History majors who are considering attending graduate school. To be eligible for the program, a student must have a grade point average of 3.700 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 100 or 190A-L), and writes an honors thesis (course 194H) after completing Art History 100 or equivalent. In preparing a preliminary thesis draft through a preparatory special study (Art History 199), supervised by the prospective thesis adviser. Students participating in this Program are candidates for Departmental recommendation for graduation with High or Highest Honors. See the Academic Information chapter, Letters and Science honors section, for this catalog and consult the department website for more information.

Teaching Credential Subject Representative. Department Chairperson; see the Teacher Education program.

Pre-Fall 2011 General Education (GE): AH = Arts and Humanities; SE = Science and Engineering; SS = Social Sciences; AG = American Cultures; DD = Domestic Diversity; DL = Child Skills; SL = Scientific; VL = Visual; WC = World Cultures; WE = Writing Experience
Upper Division

100. Methods of Art History (4)

Extensive writing or discussion—3 hours; term paper. Prerequisite: prior completion of two-division Art History courses recommended. Methods of art historical research and analysis, and general issues in critical thought. Writing skills appropriate to a range of art-historical exposition. Offered irregularly. GE credit: ArtHum, Div | AH, VL, WE. —Ruda

110. Cultural History of Museums (4)

Lecture/discussion—3 hours; term paper. Evolution of museums in the western world from the "cabinet of curiosities" of sixteenth-century Europe to the modern "art center." The changing motives behind collecting, exhibiting, and interpretation of objects. Attention to museums' historical legacies and continuing philosophical dilemmas. Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE. —Strazdins

120A. Art, Architecture, and Human Rights (4)

Lecture/discussion—4 hours. Study of human rights as they relate to art, architecture, and cultural heritage. Examines museums, art collections, and cultural-heritage management, their relation to the cultural prerogatives of communities and indigenous groups, and problems of cultural heritage during war and conflict. (Same course as Human Rights 120A.) Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, DD, DL, VL, WE. —Watennpaugh

130. Landscape, Nature, and Art (4)

Lecture—3 hours; term paper. Interpretation of the natural world in the western world 1600-1900, with perspectives on the present; landscape painting, ideology of picturesque, and landscape art of post-travel, reshaping the land as art; dialogues between art and science; nature as national identity. GE credit: ArtHum | AH, VL, WE, WC.

148. Theory and Criticism: Painting & Sculpture (4)

Lecture—3 hours; term paper. Prerequisite: Art Studio 5 or recommended. Study of forms and symbols in historic and contemporary masterpieces. (Same course as Art Studio 148.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE. —Pardee

150. Arts of Sub-Saharan Africa (4)

Lecture/discussion—3 hours; term paper. Traditional arts and crafts of sub-Saharan Africa from prehistoric times to the present; African, American, and archaic art; nature, cycles of life, and religion; art as expression of power; sculpture and culture in West and Central Africa; Colonialism and collecting. Offered irregularly. GE credit: ArtHum, Div | AH, VL, WC.

151. Arts of the Indians of the Americas (4)

Lecture/discussion—3 hours; term paper. Development of art in North America, emphasizing ancient Mexico, South American relationships and parallels. Recent and contemporary crafts from Alaska to Chile. Offered irregularly. GE credit: ArtHum, Div | AH, VL, WE.

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 the European and Near East. GE credit: ArtHum, Div | AH, VL, W

154. The Hindu Temple (4)

Lecture—3 hours; term paper. Comparative history of architecture and symbolism of the Hindu Temple in India, Southeast Asia and the United States. Attention to the temple as a religious knowledge, political authority, and cultural heritage through the lenses of colonialism and postcolonialism. (Same course as Religious Studies 154.) Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, VL, VL, WE. —Venkatesan

155. The Islamic City (4)

Lecture—3 hours; term paper. Prerequisite: course 154 recommended. Introduction to the urban history of the Islamic world. Includes critical study of the historiography of the Islamic city, development of urban form, institutions and rituals, and analysis of selected themes. GE credit: ArtHum, Div, Wrt | AH, VL, WE—Watennpaugh

156. Arts of the Islamic Book (4)

Lecture—3 hours; term paper. Prerequisite: prior completion of course 154 recommended. Critical study of the arts of the luxury book in the pre-modern Islamic world. Representation of the relationship of word and image, the discipline of calligraphy, aesthetics and representation in Persianate painting. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WE. —Watennpaugh

163A. Chinese Art (4)

Lecture/discussion—4 hours. Thematic and chronological examination of 3000 years of Chinese art and culture from Neolithic through Tang Dynasty (7th c. CE). Study of ceremonial and secular objects manifesting folk beliefs and belief systems of ancestor worship, Buddhism, Daoism, and Confucianism. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WE, WC. —Burnett

163B. Chinese Painting (4)

Lecture/discussion—4 hours. Thematic and chronological examination of Chinese painting and culture from the Tang Dynasty (7th c. CE) through the early 20th century. Issues considered include painting as art (made to support or protest regimes), art and the market, art and individual expression. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WE, WC. —Burnett

163C. Early Modern Chinese Painting (4)

Lecture/discussion—4 hours. Topics in Chinese Art History, 13th-19th century. Study of issues pertaining to self and society, gender and gendering, religion and philosophy, political engagement and protest; economy and the market, the effects created by periods of transition on visual expression. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WE, WC. —Burnett

163D. Art from China 1900 to the Present (4)

Lecture/discussion—4 hours. Prerequisite: course 163B or consent of instructor. Forms of modern and avant-garde expression from China's industrialization to the 21st century. Interactions of art and politics, individual and state, art for the free market versus art for the state, expressions of modernity; China on the world stage, the effects created by periods of transition on visual expression. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WE, WC. —Burnett

164. The Arts of Japan (4)

Lecture/discussion—3 hours; term paper. Japanese painting, architecture, decorative arts, and print; folk art, heritage, ancient times to the 20th century in literary, political, intellectual, and spiritual contexts; impact of Japanese art on the West and the West's transformation in Japan; Japan's opening in the 19th century. GE credit: ArtHum, Div, Wrt | AH, VL, WC. —Burnett

168. Great Cities (4)

Lecture—3 hours; term paper. Transformation in architecture and urban form in Paris, London, and Vienna in the context of decorative arts, urban, and economic systems as well as very different cultural traditions, concentrating on the years 1830-1914. Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE. —Roller

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. [Same course as Classics 172A] Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE. —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
173. Roman Art and Architecture (4) Lecture—3 hours; term paper. Art and architecture of Rome and the Roman Empire, from the founding of Rome through the fourth century C.E. (Same course as Classics 172.) Offered in alternate years. GE credit: ArtHum, Wrt|AH | VL, WE.—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 Greco-Roman urbanism. (Same course as Classics 175.) Offered in alternate years. GE credit: ArtHum, Div, Wrt|AH | VL, WE. —Roller

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 and Byzantine Empires. Through the later Roman Empire in the West and to the final capture of Constantinople in the East. GE credit: ArtHum, Wrt|AH | VL, WE, WC.

176B. Art of the Middle Ages: Early Medieval (4) Lecture—3 hours; term paper or gallery studies and review. Painting, sculpture and architecture in western Europe in the early medieval era; from the rise of the barbarian kingdoms through the twelfth century. GE credit: ArtHum, Wrt|AH | VL, WE, WC.

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. GE credit: ArtHum | AH | VL, WE.

177. Northern Renaissance Art (4) Lecture/discussion—3 hours; term paper. Artistic culture of Western and Central Europe c. 1530-1600. Topics include development of "realism" in portrait and landscape, prints and print culture, urbanism, science and the exotic, anti-religious art, religious attacks on art, contacts with Renaissance Italy. Offered irregularly. GE credit: ArtHum | AH | VL, WE.

178B. Early Italian Renaissance Art and Architecture (4) Lecture—3 hours; term paper. Fifteenth century artists: Ghiberti, Donatello, Masaccio, Botticelli, in their artistic, architectural, and cultural setting; the impact of Humanism and the rebirth of classical learning. GE credit: ArtHum, Wrt|AH | VL, WE.

178C. High and Late Italian Renaissance Art and Architecture (4) Lecture—3 hours; term paper. High Renaissance and Mannerism in 16th century Italy: Leonardo, Michelangelo, Raphael, and Titian in their artistic and cultural settings; Florence, Rome, and Venice; the architecture of Bramante, Michelangelo, and Palladio. GE credit: ArtHum, Wrt|AH | VL, WE.

179B. Baroque Art (4) Lecture—3 hours; term paper. Seventeenth century painting, sculpture, and graphic arts, including such artists as Caravaggio, Rubens, Rembrandt, and Velazquez in their political and social context. GE credit: ArtHum | VL, WE.

182. British Art and Culture, 1750–1900 (4) Lecture—3 hours; term paper. 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 "Victorian" esthetic, and the impressionists. GE credit: ArtHum, Wrt|AH | VL, WE.

183A. Art in the Age of Revolution, 1750–1850 (4) Lecture—4 hours; term paper. Prerequisite: prior completion of course 1C recommended. Emergence of modernism in Europe from the late 18th century to the middle of the 19th century. Major artistic events viewed against the backdrop of widespread cultural changes and the impact of the romantic movement. GE credit: ArtHum | AH | VL, WE, WC.

183B. Impressionism and Post-Impressionism: Manet to 1900 (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 1C recommended. Post-Impressionists, Post-Impressionism, and Symbolists in relation to social changes. Assessment of role of dealers and critics, myth of the anticommerical and gender relations in French art and culture of the late 1800’s. GE credit: ArtHum, Div, Wrt|AH | VL, WE, WC.

183C. Modernism in France, 1880–1940 (4) Lecture—3 hours; term paper. Development of modern art in France, its social context, and its transnational aspects. Post-Impressionism, Fauvism, Cubism, Expressionism, and Surrealism are considered in relation to successive movements, the formation of new artistic groups, new forms of patronage, and new audiences. GE credit: ArtHum, Div, Wrt|AH | VL, WE.

184. Twentieth Century Architecture (4) Lecture—3 hours; term paper. Prerequisite: prior completion of course 25 recommended. Major movements in twentieth century in Europe and America. Formal innovations are examined within the social, political, and economic circumstances in which they appeared. GE credit: ArtHum, Wrt|AH | VL, WE.—Sadler

185. Avant-Gardism and its Aftermath, 1917-1960 (4) Lecture/discussion—4 hours. Social, cultural, aesthetic, and theoretical development for artists and their audiences in the context of the larger issues like the Mexican, Russian and German revolutions, WWI, the Depression, WWII, etc., and a critical-theoretical examination of the impact of new media and aesthetics in the context of such cultural and political phenomena as modernism, modernity, and postmodernity. Offered in alternate years. GE credit: ArtHum, Div, Wrt|AH | VL, WE.—Simson

186. Contemporary Art 1960–Present (4) Lecture/discussion—4 hours; term paper. Development of new media and aesthetics in the context of the larger issues like the Mexican, Russian and German revolutions, WWI, the Depression, WWII, etc., and a critical-theoretical examination of the impact of new media and aesthetics in the context of such cultural and political phenomena as modernism, modernity, and postmodernity. GE credit: ArtHum, Div, Wrt|AH | VL, WE.

188A. The American Home (4) Lecture/discussion—4 hours; term paper. American domestic architecture and its responsiveness to changes in daily life from Colonial times to the 1960s. Vernacular domestic architecture and its relationship to shifting social-economic conditions, and women's role in shaping the home receive special attention. GE credit: ArtHum, Div, Wrt|ACGH, AH, DD, VL, WE.—Sadler

188B. Architecture of the United States (4) Lecture/discussion—3 hours; term paper. Major movements from colonial times to the present. The role of buildings in a changing American society. The interplay of style, function, and technology. GE credit: ArtHum, Wrt|ACGH, AH, VL, WE.—Cogdell, Strazdes

188C. American Art to 1910 (4) Lecture/discussion—4 hours; term paper. Major movements in American art from the 17th-century English-speaking colonists through World War I. Offered in alternate years. GE credit: ArtHum | ACGH, AH, VL, WE.—Strazdes

189. Photography in History (4) Lecture/discussion—3 hours; Social, cultural, aesthetic, and technical developments in the history of photography including patronage and reception, commercial, scientific, political and artistic applications, and a critical-theoretical inquiry into photography's impact on the development of the history of subjectivity. Offered in alternate years. GE credit: ArtHum, Div, Wrt|AH | VL.

190A. Undergraduate Seminar in Art History: Mediterranean Antiquity (4) Lecture/discussion—3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Class size limited to 25 students for majors, minors, other advanced students. Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, OL, VL, WE.—Roller

190B. Undergraduate Seminar in Art History: Medieval (4) Lecture/discussion—3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Class size limited to 25 students for majors, minors, other advanced students. Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, OL, VL, WE.

190C. Undergraduate Seminar in Art History: Renaissance (4) Lecture/discussion—3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Class size limited to 25 students for majors, minors, other advanced students. Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, OL, VL, WE.

190D. Undergraduate Seminar in Art History (4) Lecture/discussion—3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Class size limited to 25 students for majors, minors, other advanced students. Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, OL, VL, WE.—Strazdes

190E. Undergraduate Seminar in Art History: Gendering of Culture (4) Lecture/discussion—3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Class size limited to 25 students for majors, minors, other advanced students. Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, OL, VL, WE.—Sadler

190F. Undergraduate Seminar in Art History: Chinese (4) Lecture/discussion—3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Class size limited to 25 students for majors, minors, other advanced students. Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, OL, VL, WE.—Burnett
190G. Undergraduate Seminar in Art History: Japanese (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Class size limited to 25 students; for majors, minors, other advanced students. Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, OL, VL, WE.

190H. Undergraduate Seminar in Art History: Modern-Contemporary (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Class size limited to 25 students; for majors, minors, other advanced students. Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, OL, VL, WE.

190I. Undergraduate Seminar in Art History: 17th-18th Century (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Class size limited to 25 students; for majors, minors, other advanced students. Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, OL, VL, WE.

190J. Undergraduate Seminar in Art History: Islamic (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Class size limited to 25 students; for majors, minors, other advanced students. Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, OL, VL, WE. —Watenpaugh

190K. Undergraduate Seminar in Art History: 19th Century (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Class size limited to 25 students; for majors, minors, other advanced students. Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing. GE credit: ArtHum | AH, OL, VL, WE.

190L. Undergraduate Seminar in Art History: Ancient Heritage (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Art History major, minor, or other significant training in Art History recommended. Class size limited to 25 students; for majors, minors, other advanced students. Study of a broad problem or theoretical issue in art, architecture, or material culture. Intensive reading, discussion, research, writing. GE credit: ArtHum | AH, OL, VL, WE.

192. Internship—1-12
Internship—term paper or catalogue. Supervised program of internships at professional art institutions such as museums, galleries, and art archives including collections of slides and photographs. May be repeated for credit, subject to review of a structured, 4 (P/NP grading only).

194H. Special Study for Honor Students (4)
Independent study—12 hours. Prerequisite: course 190 or the equivalent, as determined by the major advisor. Open 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).

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only).

Graduate

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 one time for credit. —Roller, Watenpaugh

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 research skills used by art historians, technical writing, research in the arts, graphic design, and creative thinking. May be repeated for credit. —Hearne Pardee

200C. Thesis Writing Colloquium (1)
Discussion—1.5 hour; autotutorial. Prerequisite: course 200, taken by all Art History M.A. students in their first year. Restricted to graduate students in Art History. Meeting concurrently with course 200, the colloquium provides a supportive, supportive environment for second-year Art History graduate students mastering masters' theses. Offers a forum for technical discussions, discussion of writing/editing procedures, and peer review of written work. (S/U grading only.) —Burnett, Strazdes

210. Museums, Art Exhibitions and Culture (4)
Seminar—3 hours; extensive writing or discussion; term paper. Prerequisite: graduate status in art history or an allied field. Class size limited to 20 students. Issues accompanying the evolution and function of museums from cabinets of curiosities in sixteenth-century Europe to modern art centers. Examination of divergent museums' historical legacies and continuing philosophical and political concerns. Offered in alternate years. GE credit: ArtHum, Wrt. —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.

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. —Burnett

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. —Burnett

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. —Burnett

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. Offered in alternate years.

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.

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. —Fedele, Sadler

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. Offered irregularly.

292. Internship—1-12
Internship—3-12 hours. Prerequisite: graduate student; consent of instructor. Restricted to graduate students in Art History only. 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. Offered irregularly. (S/U grading only)

298. Directed Group Study (1-5)
(S/U grading only)

299. Individual Study (1-6)
(S/U grading only)

Professional
Note: Various of the below courses are not offered each year.

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 (4)
Seminar—2 hours; Practice—10 hours. Prerequisite: graduate standing. Principles and techniques of effective teaching of undergraduate courses in history of art. May be repeated for credit as often as the student is awarded a TA-ship. (S/U grading only)

Professional

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. Experimentation with unusual presentation forms.

Art Studio

[College of Letters and Science]
Heanne Pardee, M.F.A., Chairperson of the Department

Department Office. 101 Art Building 530/752-0105; http://art.ucdavis.edu

Faculty
Tom Bills, M.F.A., Professor
Robin Hill, B.F.A., Professor
Darrin Martin, M.F.A., Associate Professor
Heanne Pardee, M.F.A., Professor
Lucy Puls, M.F.A., Professor
Art Studio

Art Studio provides the studio experience necessary for a broad understanding of the practice and interpretation of the visual arts. The Studio Art program is designed to deliver a broad range of hands-on studio practices, and studio majors focus on painting, sculpture, drawing, photography, ceramics, printmaking, and time-based media. Course choices/sequences are determined by the student according to major distribution requirements. Students are encouraged to explore a broad range of disciplines and are expected to take advantage of beginning classes which provide a critical introduction to the research majors, sites within the major, across disciplines. In addition to studio classes, students are encouraged to participate in a distinguished visiting artist lecture series, professional practice seminars, student exhibitions/competitions, internships, and benefit from exposure to cultural events and exhibitions in Davis, Sacramento, and the Greater Bay Area.

Portfolios. While portfolios are not required for admission to the major, students at all levels are expected to maintain current portfolios of completed work in order to qualify and compete for the numerous internships, scholarships, grants, awards, and exhibitions the program has to offer, as well as to prepare for the rigors of graduate school and/or an independent studio practice.

Career Options. Graduates of the Studio Art Program attend prestigious post-baccalaureate and graduate programs in studio art. Alumni often go on to develop professional studio practices. Commitment to the development of one's studio work leads to exhibition opportunities as well as accomplishments in the realm of fellowships, commissions, collaborations, and a host of other professional projects and opportunities. For the student wishing to explore additional arts-related trajectories, in the private or public sector, a studio arts education provides a strong foundation for careers and/or graduate work in K-12 art education, art therapy, arts administration, curatorial studies, set design, architecture, culinary arts, fashion, film, animation, art criticism/journalism among others.

A.B. Major Requirements:

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<tr>
<th>Course</th>
<th>UNITS</th>
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<tbody>
<tr>
<td>Depth Subject Matter</td>
<td>44</td>
</tr>
<tr>
<td>36 upper division units in Art Studio</td>
<td></td>
</tr>
<tr>
<td>Any two upper division theory or history courses from: History, Cinema, and Technocultural Studies, Design, Music or Theatre and Dance</td>
<td>8</td>
</tr>
</tbody>
</table>

Total Units for the Major .......................... 68

Major Advisers. Information on the current Academic Advisers can be obtained by contacting the Art Department Main Office at 530-752-0105 or at http://art.ucdavis.edu.

Minor Program Requirements:

<table>
<thead>
<tr>
<th>Course</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art Studio</td>
<td>20</td>
</tr>
</tbody>
</table>

Prerequisite courses must be taken prior to enrollment in upper division courses. Independent study courses are not applicable.

Upper division art studio courses in the following areas: 36

Area 1 Painting, Drawing, Printmaking
Area 2 Sculpture and Ceramic Sculpture
Area 3 Photography and Video

Note: One lower division substitute course permissible.

Teaching Credential Subject Representative
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 Graduate Adviser at 530-752-8710 or at http://art.ucdavis.edu.

Courses in Art Studio (ART)

Lower Division

2. Beginning Drawing (4)

Studio—6 hours. Introduction to drawing using various black and white media to articulate figures and organize space, with reference to historical and contemporary works. GE credit. ArtHum | AH, VL—F, W, S. (F, W, S). 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. GE credit. ArtHum | AH, VL—F, W, S, (F, W, S). Bills, Hill, Puls

7. Beginning Painting (4)


8. Beginning Ceramic Sculpture (4)

Studio—6 hours. Introduction to ceramic sculpture construction and processes. Large scale hand-building, glazing, kilns and kiln firing technology. GE credit. ArtHum | AH, VL—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. GE credit. ArtHum | AH, VL

10. Introduction to Art Appreciation (3)

Lecture—3 hours. The understanding and appreciation of painting, sculpture, architecture and industrial art. Illustrated lectures. Intended for non-majors. GE credit. ArtHum | AH, VL

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. GE credit. ArtHum | AH, VL

12. Beginning Video (4)

Studio—6 hours. Production techniques of video shooting, editing, lighting, sound and effects. A conceptual framework for video-art techniques. GE credit. ArtHum | AH, VL—Suh

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 and process. Conceptual and historical differences between film and video. Offered in alternate years. GE credit. ArtHum | AH, VL, WE—(F) Martin

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. Offered in alternate years. GE credit. ArtHum, Div, Wtri | AH, VL—F, W, F, W). Pardee

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

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. May be repeated one time for credit when topic differs. GE credit. ArtHum | AH, VL—F, W, S, (F, W, S). Pardee

102A. Advanced Painting: Studio Projects (4)

Studio—6 hours. Prerequisite: course 101. Pass One restricted to Art Studio majors. Sustained development of painting for advanced students. Approaches will vary according to the instructor. May be repeated for credit one time. GE credit. ArtHum | AH, VL—Pardee, Werfel

102B. Advanced Painting: Figure (4)

Studio—6 hours. Prerequisite: course 101. Pass One restricted Art Studio majors. Advanced painting using the human figure as subject. May be repeated for credit one time. GE credit. ArtHum | AH, VL—Pardee, Werfel

102C. Advanced Painting: Special Topics (4)

Studio—6 hours. Prerequisite: courses 2, 7, 101; course 102A or 102B. Pass One restricted to Art Studio majors. Special topics in painting for upper division students. Emphasis on development of a personal practice of painting informed by awareness of contemporary issues in painting and their historical background. Topics will vary with instructor. May be repeated for credit one time. GE credit. ArtHum | AH, VL—Pardee, Werfel

103A. Intermediate Drawing: Black and White (4)

Studio—6 hours. Prerequisite: courses 2, Pass One restricted to Art Studio majors. Advanced study of drawing composition using black and white media. GE credit. ArtHum | AH, VL—Pardee, Werfel

103B. Intermediate Drawing: Color (4)

Studio—6 hours. Prerequisite: courses 2, Pass One restricted to Art Studio majors. Study of drawing composition in color media. GE credit. ArtHum | AH, VL—Pardee, Werfel

105A. Advanced Drawing: Studio Projects (4)

Studio—6 hours. Prerequisite: courses 2; course 103A or 103B. Pass One restricted to Art Studio majors. Exploration of creativity and process in drawing. Emphasis on the role of drawing in contemporary art and on drawing as an interdisciplinary practice. May be repeated for credit one time. GE credit. ArtHum | AH, VL—Pardee, Werfel

105B. Advanced Drawing: Figure (4)

Studio—6 hours. Prerequisite: courses 2; course 103A or 103B. Pass One restricted to Art Studio majors. Study of the figure through drawing of the model. Exploration of creative and process of figure-drawing. May be repeated for credit one time. GE credit. ArtHum | AH, VL—Pardee, Werfel

110B. Intermediate Photography: Digital Imaging (4) Studio—6 hours. Prerequisite: course 11. Pass One restricted to Art Studio majors. Comprehensive introduction to all elements of digital photography, including scanned images. Focus on repetition and phase shifts. Creation of descriptive acoustic space recordings in combination with other artistic media. Audio as stand-alone or accompanied. May be repeated for credit one time. GE credit: ArtHum | AH, VL.—Suh

112. Sound for Vision (4) Studio—6 hours. Prerequisite: course 12 or Technocultural Studies 100. Pass One restricted to Art Studio majors. Sound composition and development of an audio data base. Examination of sound techniques, and multiple images. Animation using traditional drawing techniques, collage, and digital processes. May be repeated for credit one time. GE credit: ArtHum | AH, VL.—Martin

113. Interdisciplinarity Art (4) Studio—6 hours. Prerequisite: upper division standing in Art Studio, Theater and Dance, Design, Technocultural Studies, or Music. Experimental interdisciplinarity laboratories. Use of various media in creation of collaborative or independent works. Production of participatory audio-visual works, installations, or two dimensional explorations. May be repeated for credit one time. GE credit: ArtHum | AH, VL.—Hill, Martin, Puls, Suh

114A. Intermediate Video: Animation (4) Studio—6 hours. Prerequisite: course 12 or Technocultural Studies 100; one drawing course. Pass One restricted to Art Studio majors. Exploration of animation. Relationship between drawing, digital stills, and multiple images. Animation using traditional drawing techniques, collage, and digital processes. May be repeated for credit one time. GE credit: ArtHum | AH, VL.—Martin

114B. Intermediate Video: Experimental Documentary (4) Studio—6 hours. Prerequisite: course 12 or Technocultural Studies 100. Pass One restricted to Art Studio majors. Experimental documentary practice. Use of interviews, voice-overs, and still and moving images. Production of alternative conceptual and visual projects for credit one time. GE credit: ArtHum | AH, VL.—Martin

114C. Intermediate Video: Performance Strategies (4) Studio—6 hours. Prerequisite: course 12 or Technocultural Studies 100. Pass One restricted to Art Studio majors. Use of video to expand performance art production. Exploration of improvisation, direction, projection, and image processing in real time. May be repeated for credit one time. GE credit: ArtHum | AH, VL.—Martin

117. Advanced Video and Electronic Arts (4) Studio—6 hours. Prerequisite: course 12 or Technocultural Studies 100; one of the following: courses 112, 114A, 114B, or 114C; upper division standing in Art Studio majors. Pass One restricted to Art Studio majors. Independent study on video, digital, and/or performance projects. Further development in the electronic arts ranging from video installation to performance. May be repeated for credit one time. GE credit: ArtHum | AH, VL.—Martin

121. Reinterpreting Landscape (4) Studio—6 hours. Prerequisite: courses 2, 7. Pass One restricted to Art Studio majors. Interpretation of landscape through painting, drawing, and related media. Emphasis on the integration of historical, cultural, natural, and artistic settings. May be repeated for credit one time. GE credit: ArtHum | AH, VL.—Parede, Werfel

125A. Intermediate Printmaking: Relief (4) Studio—6 hours. Prerequisite: course 11. Pass One restricted to Art Studio majors. Woodcut, linocut, hard and soft ground, burnishing, plate, and multiple images. Plate, metal-plate, relief, and experimental uses of other materials for printmaking. May be repeated for credit one time. GE credit: ArtHum | AH, VL.

125B. Intermediate Printmaking: Intaglio (4) Studio—6 hours. Prerequisite: course 11. Pass One restricted to Art Studio majors. Metal plate etching, aqua-intaglio, hard and soft ground, burnishing, plate, and multiple images. Plate, metal-plate, relief, and experimental uses of other materials for printmaking. May be repeated for credit one time. GE credit: ArtHum | AH, VL.

125D. Intermediate Printmaking: Serigraphy (4) Studio—6 hours. Prerequisite: course 11. Pass One restricted to Art Studio majors. 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. GE credit: ArtHum | AH, VL.

129. Advanced Printmaking (4) Studio—6 hours. Prerequisite: completion of two of 125A, 125B, 125C, or 125D. Pass One restricted to Art Studio majors. Development of intermediate printmaking skills. Advanced study in techniques: relief, serigraphy, intaglio, surface, as well as addition of digitized imagery. Production of prints using multiple-plate prints and other methods. May be repeated for credit two times. GE credit: ArtHum | AH, VL.

138. The Artist's Book (4) Studio—6 hours. Prerequisite: completion of three upper division Art Studio courses. Pass One restricted to Art Studio majors. Creation of an artist's book in an edition of three. Use of a variety of media. May be repeated for credit one time. Offered in alternate years. GE credit: ArtHum | AH, VL.—Hill, Suh

142A. Intermediate Ceramic Sculpture: Industrial Production Methods (4) Studio—6 hours. Prerequisite: course B. Pass One restricted to Art Studio majors. Ceramic sculpture: creation using two forms of industrial processes: plaster mold design, fabrication and casting; and extrusion with dies, including die fabrication. May be repeated one time for credit. GE credit: ArtHum | AH, VL.—Rosen

142B. Intermediate Ceramic Sculpture: Material Study (4) Studio—6 hours. Prerequisite: course B. Pass One restricted to Art Studio majors. Examination of ceramic bodies and clay materials. Use of ceramic materials and processes. Areas studied include clay and clay bodies; glaze materials through temperature, color and texture; history and technology of kilns and kiln firing. Examination of material properties and characteristics through experimentation. May be repeated one time for credit. GE credit: ArtHum | AH, VL.—Rosen

142C. Intermediate Ceramic Sculpture: Special Topics (4) Studio—6 hours. Prerequisite: course B. Pass One restricted to Art Studio majors. Exploration of the ceramic surface for creative expression. Use of glazing techniques including china paint, decals, luster, and silkscreen with underglaze and overglaze as well as the use of common materials such as epoxy, paint, oil and wax. May be repeated two times for credit. GE credit: ArtHum | AH, VL.—Rosen

143B. Advanced Ceramic Sculpture: Issues in Contemporary Ceramics (4) Studio—6 hours. Prerequisite: course 8, 142A or 142B. Pass One restricted to Art Studio majors. Individual studio work in conjunction with readings, field trips, critiques and writing about contemporary ceramic art. May be repeated for credit two times. GE credit: ArtHum | AH, VL.—Bills, Hill, Puls

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, Writ | AH, VL.—Suh

148. Theory and Criticism: Painting and Sculpture (4) Lecture—3 hours; term paper. Prerequisite: course 5 or 7 recommended. Study of forms and symbols in historic and contemporary masterpieces. [Same course as Art History 148.] Offered in alternate years. GE credit: ArtHum, Writ | AH, VL, WE.—Parede

149. Introduction to Critical Theory (4) Lecture—3 hours; discussion—1 hour. Prerequisite: two of Art History 1B, 1C, or 138F. An overview of 20th century critical theories of culture and the relation to visual art and mass media. Offered in alternate years. GE credit: ArtHum, Dir, Writ | AH, VL

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 art form. Offered in alternate years. GE credit: ArtHum, Writ | AH, VL.—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 course 5. May be repeated two times for credit when topic differs. GE credit: ArtHum | AH, VL.—F, W, S (F, W, S.) Bills, Hill, Puls

152A. Advanced Sculpture: Studio Projects (4) Studio—6 hours. Prerequisite: course 5; 151. Pass One restricted to Art Studio majors. Sculpture for advanced students. Emphasis on concept, idea development and honing technical skills. Appropriate projects will vary according to the instructor. May be repeated for credit one time when topic differs. GE credit: ArtHum | AH, VL.—Bills, Hill, Puls

152B. Advanced Sculpture: Material Explorations (4) Studio—6 hours. Prerequisite: course 5; 151. Pass One restricted to Art Studio majors. 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. GE credit: ArtHum | AH, VL.—Puls
152C. Advanced Sculpture: Concepts (4)  
Studio—6 hours. Prerequisite: course 5. 151. Pass One restricted to Art Studio majors. Investigation of a specific idea chosen by the class. Relationship of the idea to form and content. Individual development of conceptual awareness. May be repeated for credit one time. GE credit: ArtHum | AH, VL. —Puls

152D. Advanced Sculpture: Metals (4)  
Studio—6 hours. Prerequisite: course 5. 151. Pass One restricted to Art Studio majors. Technical aspects of the use of metals in contemporary art practice. Projects assigned to demonstrate the evolution and application of metal processes. May be repeated for credit one time. GE credit: ArtHum | AH, VL. —Bills

152E. Advanced Sculpture: Site Specific Public Sculpture (4)  
Studio—6 hours. Prerequisite: course 5. 151. Pass One restricted to Art Studio majors. 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. GE credit: ArtHum | AH, VL. —Hill

152F. Advanced Sculpture: Figure (4)  
Studio—6 hours. Prerequisite: course 5. 151. Pass One restricted to Art Studio majors. 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, wax, plaster, plastics, found objects, and others. May be repeated for credit one time. GE credit: ArtHum | AH, VL.

152G. Advanced Sculpture: The Miniature and Gigantic (4)  
Studio—6 hours. Prerequisite: course 5. 151. Pass One restricted to Art Studio majors. Exploration of scale from the personal 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 one credit. GE credit: ArtHum | AH, VL.

171. Mexican and Chicano Mural Workshop (4)  
Studio—8 hours; independent study—1 hour. Prerequisite: Chicana/o Studies 70; consent or 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 one time for credit. (Same course as Chicana/o Studies 171.) GE credit: ArtHum | AH, VL. —S. (S.)

190. Seminar in Art Practice (4)  
Studio—6 hours. Prerequisite: upper division standing in Art Studio major. Pass One restricted to Art Studio majors. Introduction to professional practices. Development of an artist's packet including a resume, cover letter, artist statement, and statement of purpose. On completion, students will be able to create a portfolio of work with group critiques. Research on galleries and museums, and readings in contemporary theory and criticism. GE credit: ArtHum | AH, VL, WE. —F, W, S; (F, W, S.) Hill, Puls, Rosen, Werfel

192. Internship (2-12)  
Internship. Supervised program of internships in artists' studios and at professional art institutions such as museums, galleries, and art archives including collections of slides and photographs. May be repeated for credit for a total of 12 units. (F/NP grading only.)

193. Expanded Field: Artist Lecture Series (1)  
Lecture/discussion—3 hours. Prerequisite: consent of instructor. Exploration of the expanded field of practice, theory and criticism in the visual arts. Presentations and discussions with professional practitioners in the field. May be repeated up to 12 units for credit when topic differs. (F/NP grading only.)—F, W, S, (F, W, S.) Hill

198. Directed Group Study (1-5)  
Prerequisite: consent of instructor. (F/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)  
Prerequisite: consent of instructor. (F/NP grading only.)

Graduate

290. Seminar (4)  
Seminar—3 hours. Original works produced for group discussion and criticism; associated topics of a contemporary and historical nature. May be repeated for credit. —F, W, S; (F, W, S.)

291. Seminar: Critical Evaluation (1)  
Seminar—1 hour. May be repeated for credit. (S/U grading only. —W, (W.)

292. Seminar: Comprehensive Qualifying (1-)  
Seminar—1 hour. Further critical evaluation of the student's work to determine his eligibility to begin the Comprehensive Project. May be repeated for credit. (S/U grading only.)—F

299. Individual Study (1-6)  
(S/U grading only.)

299D. Comprehensive Project (9)  
An original body of work accompanied by a catalog summarizing the student's aesthetic position. May be repeated for credit. (S/U grading only.)—S. (S.)

Professional

Note: Various of the below courses are not offered each year.

401. Museum Training: Curatorial Principles (4)  

402. Museum Training: Exhibition Methods (4)  
Seminar—3 hours; exhibition. Approved for grade- 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. Experimentation with unusual presentation forms. Offered in alternate years.

Asian American Studies

(College of Letters and Science  
Richard S. Kim, Ph.D., Chairperson of the Department

Faculty  
Darrell Y. Hamamoto, Ph.D., Professor  
Wendy Ho, Ph.D., Senior Lecturer  
Richard S. Kim, Ph.D., Associate Professor  
Sunita Main, Ph.D., Associate Professor  
Sussete Min, Ph.D., Associate Professor  
Robyn Rodriguez, Ph.D., Associate Professor  
Caroline Kieu Linh Valverde, Ph.D., Associate Professor  
Nolan Zane, Ph.D., Professor

Emeriti Faculty  
Isho Fujimoto, Ph.D., Senior Lecturer Emeritus  
Bill Ong Hing, J.D., Professor Emeritus  
Stanley Sue, Ph.D., Professor 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 coursework in Asian American Studies. These courses offer diverse theoretical and methodological tools to develop and encourage student critical thinking, creativity, initiative, and independent research about a complex, multiethnic and racialized society in the United States and in a global world.

Career Alternatives

Asian American Studies prepares students for a variety of careers. Given the multicultural nature of society and increasing relations with different societies, many occupations seek individuals with background and expertise in ethnic relations and cultural issues. Graduates often enter the fields of teaching, government service, law, social services, etc., as well as graduate schools for advanced degrees in various disciplines.

A.B. Major Requirements:

Preparatory Subject Matter........................................ 32
Asian American Studies 1, 2, 3, and 4...................................... 16
At least two lower division courses from the following departments or programs:
African American and African Studies (AAS), American Studies (AMS), Chicana/o Studies (CHI), Middle East and South Asia Studies (ME/SA), Native American Studies (NAS), Women and Gender Studies (WGS) (all lower division courses of at least 4 units are acceptable except those numbered 92, 97T, 98, and 99)
Professional Methodology............................................ 8
At least two courses from any of the following methods courses:
African American and African Studies 101; American Studies 100; Anthropology 13; Art History 5, 100 Art Studio 10, 30; Chicana/o Studies 23; English 42, 110A, 110B; History 101; History 105; Latin American Studies (LAL); Philosophy 5; Political Science 51; Psychology 41; Sociology 46A, 46B; Statistics 13; Women and Gender Studies 104.

Depth Subject Matter................................................. 36
Asian American Studies 192 Community Internship (required)............................................ 4

Major Emphasis

As part of the depth subject matter requirement, all Asian American Studies majors must develop a major emphasis by choosing either a disciplinary or thematic specialization in consultation with the Student Affairs Officer (SAO) and/or faculty advisers. The major emphasis must include six Asian American Studies upper-division courses and two upper-division elective courses from other departments or programs.

At least six upper-division Asian American Studies courses........................................ 24
Asian American Studies 100, 102, 112, 113, 114, 115, 116, 121, 130, 131, 132, 140, 141, 150, 150C, 150D, 150E, 150F, 155, 189A, 189B, 189C, 189D, 189E, 189F, 189G, 189H, 189I, 194/195, 198 (1.5 units), 199 (1.5 units).
Up to six units in Asian American Studies 198 and or Asian American Studies 199 can be used to satisfy the Asian American Studies upper-division course requirement.

At least two upper-division elective courses from other departments or programs that relate to chosen emphasis ..................................... 8
Two courses (of up to eight units) from Study Abroad can be substituted for major
Minor criteria 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...................... 28

Two courses from Asian American Studies 1, 2, 3, or 4 interference grading only.)

Five courses from:

Asian American Studies 100, 102, 112, 113, 114, 115, 116, 121, 130, 131, 132, 140, 141, 150, 150b, 150c, 150d, 150e, 150f, 153, 189a, 189b, 189c, 189d, 189e, 189f, 189g, 189h, 191, 192, 198, and 199 (no more than 4 units of 192, 198, and 199 may be counted toward this total) ...................... 20

Minor Adviser, Joe Nguyen, Student Affairs Officer (SAO), 530-752-8617 or jovnguyen@ucdavis.edu

American History and Institutions. This univer-
sity requirement can be satisfied by one of 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 Depart-
ment in 3102 Hart Hall 530-723-9767.

Lower Division

1. Historical Experience of Asian Americans (4)

Lecture—3 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: ArtHum or SocSci, Div | ACGH, AH or SS, DD, VL, VC, WE, WE. (F – S.)

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, militarism, and integration since post-World War II on Asian Americans. Topics may include sexuality, criminality, class, hate crimes, and inter-ethnic relations. GE credit: ArtHum or SocSci, Div | Wrt | ACGH, AH or SS, DD, VL, VC, WE, WE. – F, S

3. Social and Psychological Perspectives of Asian Americans (4)

Lecture—3 hours; discussion—1 hour. Major psycho-

Asian American and the Political Culture of Fashion in the U.S. and Asia (4)

Lecture—4 hours. Prerequisite: course 1 or 2. Upper division standing. The politics of Asian American representation in print, radio, television, film, and new media will be examined both with and without the guidance of Asian American artists. GE credit: ArtHum, SocSci, Div | Wrt. – F (F.) Hamamoto, Maira

150. Filipino American Experience (4)

Lecture/discussion—4 hours. 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. GE credit: SocSci | ACGH, DD, SS, WE. – S. (S.)

150B. Japanese American Experience (4)

Lecture—3 hours; term paper. Critical approaches to understanding Japanese American history, culture and society. Offered in alternate years. GE credit: ArtHum or SocSci, Div | Wrt | ACGH, AH or SS, DD, VL, WC, WE. – W. Hamamoto

150C. Chinese American Experience (4)

Lecture/discussion—4 hours. 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 movement to the United States and its diasporic significance. Offered in alternate years. GE credit: ArtHum or SocSci, Div | ACGH, AH or SS, DD, VL, WC. – Ho

150D. Korean American Experience (4)

Lecture/discussion—4 hours. Interdisciplinary survey of the historical and contemporary experiences of Koreans in the United States from the late nineteenth
150F. South Asian American History, Culture, & Politics (4)
Lecture/discussion—4 hours. South Asian American experiences, focusing on the histories, cultures, and politics of Indian, Pakistani, Bangladeshi, and Sri Lankan communities in the U.S. Interdisciplinary approaches to migration, labor, gender, globalization, ethnicity, youth, community mobilization. Offered in alternate years. GE credit: Asian Amer. Stud., Asian Amer. Hist. and Cultures, on page 245; and East Asian Languages and Cultures, on page 183; East Asian Languages and Cultures, on page 183; and Asian American Studies; comparative race studies. GE credit: Asian Amer. Hist. and Cultures, Asian Amer. Studies, Asian Amer. Hist. and Cultures, on page 245; and East Asian Languages and Cultures, on page 183; East Asian Languages and Cultures, on page 183; and Asian American Studies; comparative race studies. GE credit: Asian Amer. Hist. and Cultures, Asian Amer. Studies, Asian Amer. Hist. and Cultures, on page 245; and East Asian Languages and Cultures, on page 183; East Asian Languages and Cultures, on page 183; and Asian American Studies; comparative race studies. GE credit: Asian Amer. Hist. and Cultures, Asian Amer. Studies, Asian Amer. Hist. and Cultures, on page 245; and East Asian Languages and Cultures, on page 183; East Asian Languages and Cultures, on page 183; and Asian American Studies; comparative race studies.

150G. Topics in South Asian American Studies: History (4)
Lecture—4 hours. Asian American and South Asian American history. May be repeated for credit when topic differs. Offered irregularly. GE credit: Asian Amer. Hist. and Cultures, Asian Amer. Studies, Asian Amer. Hist. and Cultures, on page 245; and East Asian Languages and Cultures, on page 183; East Asian Languages and Cultures, on page 183; and Asian American Studies; comparative race studies. GE credit: Asian Amer. Hist. and Cultures, Asian Amer. Studies, Asian Amer. Hist. and Cultures, on page 245; and East Asian Languages and Cultures, on page 183; East Asian Languages and Cultures, on page 183; and Asian American Studies; comparative race studies. GE credit: Asian Amer. Hist. and Cultures, Asian Amer. Studies, Asian Amer. Hist. and Cultures, on page 245; and East Asian Languages and Cultures, on page 183; East Asian Languages and Cultures, on page 183; and Asian American Studies; comparative race studies. GE credit: Asian Amer. Hist. and Cultures, Asian Amer. Studies, Asian Amer. Hist. and Cultures, on page 245; and East Asian Languages and Cultures, on page 183; East Asian Languages and Cultures, on page 183; and Asian American Studies; comparative race studies.

150H. Topics in South Asian American Studies: Politics and Social Movements (4)
Lecture—4 hours. Intensive treatment of a topic in South Asian American Studies; politics and social movements. May be repeated for credit when topic differs. Offered irregularly. GE credit: Asian Amer. Hist. and Cultures, Asian Amer. Studies, Asian Amer. Hist. and Cultures, on page 245; and East Asian Languages and Cultures, on page 183; East Asian Languages and Cultures, on page 183; and Asian American Studies; comparative race studies. GE credit: Asian Amer. Hist. and Cultures, Asian Amer. Studies, Asian Amer. Hist. and Cultures, on page 245; and East Asian Languages and Cultures, on page 183; East Asian Languages and Cultures, on page 183; and Asian American Studies; comparative race studies. GE credit: Asian Amer. Hist. and Cultures, Asian Amer. Studies, Asian Amer. Hist. and Cultures, on page 245; and East Asian Languages and Cultures, on page 183; East Asian Languages and Cultures, on page 183; and Asian American Studies; comparative race studies. GE credit: Asian Amer. Hist. and Cultures, Asian Amer. Studies, Asian Amer. Hist. and Cultures, on page 245; and East Asian Languages and Cultures, on page 183; East Asian Languages and Cultures, on page 183; and Asian American Studies; comparative race studies.

197T. Tutoring in Asian American Studies (1-5)
Tutoring—1—5 hours. Prerequisite: consent of instructor. Tutoring in Asian American Studies courses in small group discussion. Weekly meetings with instructor. May be repeated for credit once for a given course and also for a different course. (P/NP grading only.)—W, S. (W, S.)

198F. Directed Group Study (1-5)
Prerequisite: consent of instructor. Directed group study for upper division students. (P/NP grading only.)—F, W, S. (F, W, S.)

199F. Student Facilitated Course (1-4)
Student-facilitated (taught) course intended for upper division students. Offered irregularly. (P/NP grading only.)—F, W, S. (F, W, S.)

199A. Student Facilitated Course Development (1-4)
Under the supervision of a faculty member, an undergraduate student plans and develops the course they will offer under 99F/199F. Offered irregularly. (P/NP grading only.)—F, W, S. (F, W, S.)

199B. Student Facilitated Teaching (1-4)
Prerequisite: course 199F. Under the supervision of a faculty member, an undergraduate student teaches a course under 99F/199F. Offered irregularly. (P/NP grading only.)—F, W, S. (F, W, S.)
## Atmospheric Science

### Internship
- Atmospheric Science 192 or 199 [2 units]
- Atmospheric Science 192A, 199A or course selected with adviser’s approval [4 units]

### Upper Division
- Atmospheric Science courses selected with adviser's approval, not including courses 192 and 199 [8 units]
- Engineering 6, Atmospheric Science 150, Civil and Environmental Engineering 119A or course selected with adviser’s approval [4 units]

### Electives
- Restricted Electives [15 units]

### Minor Program Requirements

#### Minor Program
- The minor in Atmospheric Science provides a broad treatment of weather and climate, with the option to focus on such topics as climate change, meteorological instrumentation, and satellite remote sensing. Students undertaking the minor should have completed minimum preparatory coursework in calculus and physics (Mathematics 1A-1B, 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.

### Courses in Atmospheric Science (ATM)

#### Lower Division

##### 5. Global Climate Change (3)

##### 6. Fundamentals of Atmospheric Pollution (3)

##### 10. Severe and Unusual Weather (3)
- Lecture—2 hours; discussion—1 hour. Prerequisite: high school physics. Introduction to physical principles of severe weather events, such as blizzards, thunderstorms, lightning, tornadoes, and hurricanes. Emphasis on scientific understanding and human context. Not open to students who have received credit for course 100. (Former course 100.) GE credit: SciEng, Wrt [QL, SE, SL, VL—F, W, F (W.)] Chen, Grotjahn, Paw U

##### 60. Introduction to Atmospheric Science (4)
- Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16A or 21A or Physics 5A, 7A or 9A. Fundamental principles of the physics, chemistry, and fluid dynamics underlying weather and climate. Solar radiation, Earth’s temperature and energy budget, and the thermal budget of the Earth. Clouds and their role in climate processes, convection, precipitation, mid-latitude storm systems. GE credit: SciEng | QL, SE, SL, VL—F. (F.) Faloona

##### 12. Atmospheric Science Internship (1-12)
- Internship—1-36 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.)—F, W, S (S.) Stone

##### 98. Directed Group Study (1-5)
- Prerequisite: consent of instructor. (P/NP grading only.)—F, W, S (S.) Stone

##### 99. Special Study for Undergraduates (1-5)
- (P/NP grading only.)—F, W, S (S.) Stone

### Upper Division

##### 110. Weather Observation and Analysis (4)
- Lecture—3 hours; laboratory—3 hours. Prerequisite: course 60. Acquisition, distribution and analysis of meteorological data; experimental design, hypothesis testing, analysis, stability indices, probability of local severe weather, weather map analysis. Use of National Weather Service analyses and forecast products. Laboratory makes use of computer-generated analyses. Offered in alternate years. GE credit: SciEng | OL, QL, SE, SL, VL—S. Chen

##### 111. Weather Analysis and Prediction (3)
- Lecture—3 hours; prerequisites: courses 110, 121B, 128. (Concurrent enrollment in a programming language required.) Tools for analyzing observed properties of mid-latitude weather systems. The analysis–forecast system, including various weather forecast models. General structure and properties of mid-latitude weather systems. Offered in alternate years. GE credit: SciEng | OL, QL, SE, SL, VL—W. Grotjahn

##### 111F. Weather Analysis and Prediction Laboratory (2)
- Laboratory—2 hours; web virtual lecture—4 hours. Prerequisite: course 111 (concurrent). Subjective and objective analysis of weather data. Web-based learning of the analysis-forecast system and various weather forecasting situations. Weather map interpretation and forecast discussions. (P/NP grading only.) Offered in alternate years. GE credit: SciEng | OL, QL, SE, SL, VL—W. Grotjahn

##### 112. Weather Forecasting Practice (2)
- Discussion—2 hours; laboratory—1 hour. Prerequisite: course 110. Formal practice in preparing local weather forecasts. Analysis of current weather conditions and recent model performance. Verification and discussion of prior forecast. Interpretation of current forecast model guidance. Posting of forecast. May be repeated for credit up to three times. (P/NP grading only.)—F. (F.) Grotjahn

##### 115. Hydroclimatology (3)
- Lecture—3 hours. Prerequisite: course 60. Examination of climate as the forcing function for the hydrologic system. Emphasis on understanding the relationship between precipitation and evapotranspiration for meso-scale areas. Watershed modeling of floods and drought. Examination of the effects of climate fluctuations. Offered irregularly. GE credit: SciEng | QL, SE, SL—S. (S.) Anastasio

##### 116. Climate Change (4)
- Lecture—3 hours; extensive writing. Prerequisite: University Writing Program 1; consent of instructor. Climate trends and patterns spanning the past 100 years. Evidence of climate change. Evidence of climate change and the role of global climate models in understanding climate variability. Offered in alternate years. GE credit: SciEng | QL, SE, W, WE. (F.) Anastasio

### Atmospheric Thermodynamics and Cloud Physics (4)

#### Lower Division

- Lecture—3 hours; extensive problem solving. Prerequisite: Mathematics 21C, Physics 9B. Fundamental forces of atmospheric flow; noninertial reference frames; development of the equations of motion for rotating spherical atmospheres. Microphysical and natural coordinate systems; geostrophic flow; thermal wind; circulation and vorticity. GE credit: SciEng | QL, SE, SL, VL—F, W, S (W.) Ulrich

##### 121A. Atmospheric Dynamics (4)
- Lecture—3 hours; extensive problem solving. Prerequisite: course 120, Mathematics 21D, Physics 9B. Fundamental forces of atmospheric flow; noninertial reference frames; development of the equations of motion for rotating spherical atmospheres. Microphysical and natural coordinate systems; geostrophic flow; thermal wind; circulation and vorticity. GE credit: SciEng | QL, SE, SL, VL—F, W, S (W.) Ulrich

##### 121B. Atmospheric Dynamics (4)
- Lecture—3 hours; extensive problem solving. Prerequisite: course 121A. Dynamics of fluid motion in geophysical systems; quasi-geostrophic theory; fundamentals of wave propagation in fluids; Rossby waves; gravity waves; fundamentals of hydrodynamic instability; two-level model; baroclinic instability and cyclogenesis. GE credit: SciEng | QL, SE—S. (S.) Shen

### Meteorological Instruments and Observations (3)

- Lecture—2 hours; laboratory—3 hours. Prerequisite: course 60; Physics SC. Modern meteorological instruments and their use in meteorological observations and measurements. Basic instruments and micro-meteorological instruments are included. Offered in alternate years. GE credit: SciEng | QL, SE, SL, VL—W. (W.) Nathan

### Radiation and Satellite Meteorology (4)

- Laboratory/discussion—3 hours; extensive problem solving—1 hour. Prerequisite: course 60; Physics 9B, Mathematics 22B, 21D. Concepts of atmospheric radiation and the use of satellites in remote sensing. Emphasis on the modification of solar and infrared radiation by the atmosphere. Estimation from satellite data of atmospheric variables such as temperatures and cloudiness. GE credit: SciEng | QL, SE, SL, VL—W. (W.) Nathan

### Biome (4)

- Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 in a biological discipline and Mathematics 16B or consent of instructor. Atmospheric and biological interactions. Physical and biological basis for water vapor, carbon dioxide and energy exchanges with the atmosphere associated with plants and animals, including the contribution of plant canopies and microclimatic modification such as frost protection and windbreaks. GE credit: SciEng | OL, QL, SE, VL—W. (W.) Paw U

### Air Pollution (4)

- Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21D, 22B; C- or better in Chemistry 2B; Atmospheric Science 121A or C- or better in Engineering 103. Physical and technical aspects of
Environmental and Climate Change (1-3) Lecture/discussion—1 hour. Prerequisite: consent of instructor. Review and discussion of current literature and research in Environmental and Climate Change. May be repeated up to 6 units for credit. (S/U grading only)—F, W, S (F, W, S).

291C. Research Conference in Atmospheric Science; Boundary Layer Meteorology (1-3) Lecture/discussion—1-3 hours. Prerequisite: consent of instructor. Review and discussion of current literature and research in Boundary Layer Meteorology. May be repeated up to 6 units for credit. (S/U grading only)—F, W, S (F, W, S).

291D. Research Conference in Atmospheric Science; Climate Change (1-3) Lecture/discussion—1-3 hours. Prerequisite: consent of instructor. Review and discussion of current literature and research in Climate Change. May be repeated up to 6 units for credit. (S/U grading only)—F, W, S (F, W, S).

291E. Research Conference in Atmospheric Science; General Meteorology (1-3) Lecture/discussion—1-3 hours. Prerequisite: consent of instructor. Review and discussion of current literature and research in General Meteorology. May be repeated up to 6 units for credit. (S/U grading only)—F, W, S (F, W, S).

291F. Research Conference in Atmospheric Science; Atmospheric Chemistry (1-3) Lecture/discussion—1-3 hours. Prerequisite: consent of instructor. Review and discussion of current literature and research in Atmospheric Chemistry. May be repeated up to 6 units for credit. (S/U grading only)—F, W, S (F, W, S).

298. Group Study (1-5) Prerequisite: graduate standing and consent of instructor. (S/U grading only)—F, W, S (F, W, S).

299. Research (1-12) Prerequisite: consent of instructor. May be repeated up to 6 units for credit. (S/U grading only)—F, W, S (F, W, S).

Professional

393. Teaching Assistant Training Practicum (1-4) Prerequisite: graduate standing. May be repeated for credit. (P/NP grading only)—F, W, S (F, W, S).

394. Teaching Assistant Training Practicum (1-4) Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—F, W, S (F, W, S).

Avian Sciences

This major has been discontinued as of Fall 2011; see Animal Science, on page 163.

Avian Science (A Graduate Group)

Christopher Cappa, Ph.D., Assistant Professor (Civil and Environmental Engineering)
Shu-Hua Chen, Ph.D., Associate Professor
Ian Faloona, Ph.D., Associate Professor
Richard Grothjahn, Ph.D., Professor
Michael J. Kleman, Ph.D., Professor (Civil and Environmental Engineering)
John Largier, Ph.D., Professor
Evelyn Foodel, Ph.D., Professor
Michael L. Snyder, Ph.D., Biometeorology Specialist
Dorothy A. Krey, Ph.D., Associate Professor
Robert F. Flach, Ph.D., Associate Professor
Susan Ustin, Ph.D., Professor
Anthony Wexler, Ph.D., Professor (Mechanical and Aerospace Engineering; Civil and Environmental Engineering)
Bruce White, Ph.D., Professor (Mechanical and Aerospace Engineering)
Zhang Qi, Assistant Professor (Environmental Toxicology)
Emeriti Faculty
Thomas A. Cahill, Ph.D., Professor Emeritus
Robert Flachini, Ph.D., Professor Emeritus (Crocker Nuclear Laboratory)
Ruth Reck, Ph.D., Professor Emeritus
Bryan Wares, Ph.D., Professor Emeritus
Affiliated Faculty
Lowell Ashbaugh, Ph.D., Associate Researcher Emeritus (Crocker Nuclear Laboratory)
Steven S. Cliff, Ph.D., Assistant Researcher (Applied Science)
Ann Dillner, Ph.D., Assistant Researcher (Crocker Nuclear Laboratory)
Richard L. Snyder, Ph.D., Biometeorology Specialist
Richard Anthony VanCuren, Ph.D., Professional Researcher (Air Pollution Research Center)
Graduate Study. The Graduate Group in Atmospheric Science offers both the M.S. and Ph.D. degrees. A student may place emphasis on graduate work in one or more of the following fields: air quality meteorology, atmospheric chemistry, biometeorology, micrometeorology, numerical weather prediction, remote sensing, climate dynamics, large scale dynamics, and meso-scale 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 will be allowed for students with high academic potential, but it is expected that deficiencies in preparatory material and in key undergraduate atmospheric science courses will be completed within the first year of graduate study.

Graduate Adviser. Terrence Nathan, Ph.D.
Graduate Admissions Officer. Christopher Cappa, Ph.D.

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 avairy.

Minor Program Requirements:

Avian Sciences

Choose one from: Avian Sciences 11, 13, 141, 141L, 151, 16L, 293
Choose remaining units from: Avian Sciences 100, 103, 115, 121, 123, 149, 150, 160; Animal Science 143; Neurobiology, Physiology, and Behavior 117; Wildlife, Fish, and Conservation Biology 111, 136; Environment and Global Change 141, 142, 143; Environmental Toxicology 150; Earth and Planetary Science 150, 151, 152; Integrative Biology 150, 152, 160; Zoology 150, 152
Graduate Study. The Avian Sciences Graduate Group offers a program of study and research leading to the M.S. degree in Avian Sciences. The M.S. degree is offered in Avian Sciences. For details, see Graduate Studies, on page 121.

Related Courses. See Agricultural and Resource Economics 130; Animal Science 143; Food Science and Technology 120, 121, 121L, Molecular and Cellular Biology 150, 1500; Nutrition 123, 123L.

Courses in Avian Sciences (AVS)

Lower Division

11. Introduction to Poultry Science (3) Lecture—3 hours. The mosaic of events that have shaped poultry science; scientific disciplines and poultry to humans. Poultry science techniques and production methods from the time of domestication to the present. One field trip required. GE credit: SciEng, Wrt1 SE.

13. Birds, Humans and the Environment (3) Lecture—2 hours; discussion—1 hour. Interrelationships of the worlds of birds and humans. Lectures, discussions, field trips and projects focus on ecology, avian evolution, physiology, microevolution, flight behaviors, folklore, identification, toxicology and conservation. Current environmental issues are emphasized. Half-day field trip. GE credit: SciEng, Wrt1 SE.

14L. Management of Captive Birds (2) Fieldwork—3 hours; lecture/discussion—1 hour. Prerequisite: consent of instructor. One weekly discussion and field trip to study practical captive management (housing, feeding, equipment, market-diseases). Visit facilities rearing birds such as commercial parrots, hobbyist exotics, ostrich, raptors, waterfowl, game birds, poultry and pigeons. GE credit: SciEng, Wrt1 SE.

15L. Captive Raptor Management (2) Laboratory—3 hours; independent study—3 hours; one field trip. Hands-on experience handling birds of prey. Students are taught all of the skills required to handle and care for birds, including their husbandry, biology, habitat requirements, cage design, veterinary care, rehabilitation methods, research potential and long-term care requirements. GE credit: SciEng, Wrt1 SE.

16A. Raptor Migration and Population Fluctuations (2) Fieldwork—4 hours; discussion—1 hour. Prerequisite: consent of instructor. Identify raptors: study of effects of weather, crops, agricultural practices on fluctuations in raptor species and numbers. Familiarize with literature; design a project; survey study sites; collect, computerize, analyze data, compare with previous years. Species, locations, emphasis different each quarter. One Saturday field trip. GE credit: SciEng, Wrt1 SE.

16B. Raptor Migration and Population Fluctuations (2) Fieldwork—4 hours; discussion—1 hour. Prerequisite: consent of instructor. Identify raptors: study of effects of weather, crops, agricultural practices on fluctuations in raptor species and numbers. Familiarize with literature; design a project; survey study sites; collect, computerize, analyze data, compare with previous years. Species, locations, emphasis different each quarter. One Saturday field trip. GE credit: SciEng, Wrt1 SE.
sites; collect, computerize, analyze data, compare with previous years. Species, observations, emphasis different each quarter. One Saturday field trip. GE credit: SciEng | SE.

16LC. Raptor Migration and Population Fluctuations (2)
Fieldwork—3 hours; discussion—1 hour. Prerequisite: Introduction to avian behavior and population biology. Focus on identifying raptors, study of effects of weather, crops, agricultural practices on fluctuations in raptor species and numbers. Familiarize with literature, design a project; survey study sites; collect, computerize, analyze data, compare with previous years. Species, observations, emphasis different each quarter. One Saturday field trip. GE credit: SciEng | SE.

92. Internship in the Avian Sciences (1-12) (F, W, S.)
Internship—3 hours. Prerequisite: Sophomore standing preferred; consent of instructor. Internship on and off campus in poultry, game birds or exotic bird production, management and research; or in a business, industry, or agency concerned with these entities. Compliance with Internship Approval form essential. (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)
Prerequisite: consent of instructor. (P/NP grading only)

Upper Division

100. Avian Biology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 2A, 2B. Animal Science 2 preferred. Biology of domesticated poultry, specifically chickens and turkeys, with emphasis on avian genetics, immunology, reproduction, growth and development, broiler and layer management. GE credit: SciEng | SE.—S. (S. Zhou)

103. Avian Development and Genomics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 2A, 2B. Laboratory: understanding avian development and genomics: Incubation; Staging; Egg Structure/Function; Fertilization; Pre-oviposition; Ovogenesis, Cold Tolerance; Post-oviposition Development; Organogenesis; Growth; Sexual Differentiation; Extramammary Membranes; Mortality/Hatching; Genome Organization; Comparative Avian Genomics; Telomere Biology; Sex Chromosomes/Sex Determination; Advanced Technologies; Genome Manipulation; Mutations. GE credit: SciEng | SE.—F, F. (F. Delany)

115. Raptor Biology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 2A or the equivalent. Study of birds of prey: classification, distribution, habits and habitats, migration, unique anatomical and physiological adaptations, natural and captive breeding, health and diseases, environmental concerns, conservation, legal considerations, rehabilitation, and falconry. Includes two Saturday field trips. Offered irregularly. GE credit: SciEng | SE.—Su. (Su.)

121. Avian Reproduction (2)
Lecture—2 hours. Prerequisite: Biological Sciences 2A, 2B. Breeding cycles and reproductive strategies, egg and sperm formation, incubation, sexual development, imprinting, hormonal control of reproductive behavior and song. Species coverage includes wild and captive birds. Course has a physiological orientation. GE credit: SciEng | SE, SL.

123. Management of Birds (3)
Lecture—3 hours. Prerequisite: Biological Sciences 2A, 2B. Captive propagation of birds, including reproduction, genetic management, health, feeding, artificial incubation, artificial insemination, and related legal aspects, including trade and smuggling. Emphasis on exotic species and the role of captive propagation in conservation. GE credit: SciEng | SE, SL, WE.

149. Egg Production Management (2)
Lecture—2 hours. Prerequisite: course 111 or consent of instructor. Management of commercial table egg flocks as related to environment, nutrition, disease control, economics, housing, equipment, egg processing and raising replacement pullets. One Saturday field trip required. GE credit: SciEng | SE.

150. Nutrition of Birds (1)
Lecture—1 hour. Prerequisite: Animal Biology 103 or Biological Sciences 103 (may be taken concurrently). Principles of nutrition specific to avian species, including feedstuffs, feed additives, nutrient metabolism, energy systems, and nutritional support of egg production and growth. Use of computers for feed formulation to support production. GE credit: SciEng | SE.—S. (S. Klasing)

160. Designing and Performing Experiments in Avian Sciences (2)
Laboratory—6 hours. Prerequisite: course 100 or Wildlife, Fish, and Conservation Biology 111 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 three times for credit. GE credit: SciEng | SE.—F, F, W, F, W, S. (F. Klasing)

170. Advanced Avian Biology (4)
Lecture/discussion—3 hours; project—1 hour. Prerequisite: course 100 or Wildlife, Fish, and Conservation Biology 111. Ecology, behavior, functional morphology and life-history evolution of birds. Emphasis on the importance of body size as a principle determinant of most aspects of avian performance from life-history to reproduction and species abundance. Analytical synthesis and critical thought emphasized. GE credit: SciEng | SE.

170A. Research Conference (1) (F, W, S.)
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 presented and evaluated. Format will combine seminar and discussion. (S/U grading only.—F, W, S. [F, W, S.])

297T. Supervised Teaching in Avian Sciences (1-4)
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)—F, W, F, W, S. (F, W, S.)

298. Group Study (1-5)
Prerequisite: consent of instructor.

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only)

Avian Sciences (A Graduate Group)

Kirk Klasing, Ph.D., Chairperson of the Group

Group Office. 1249 Meyer Hall
530-752-2382; http://aviansciences.ucdavis.edu

Faculty

Richard Blatchford, Ph.D., Assistant Poultry Extension Specialist (Animal Science)
C. Christopher Calvert, Ph.D., Professor (Animal Science)
Thomas P. Coombs-Hahn, Ph.D., Associate Professor (Neurobiology, Physiology, and Behavior)
Mary E. Delany, Ph.D., Professor (Animal Science)
John M. Estes, Ph.D., Professor (Wildlife, Fish, and Conservation Biology, Animal Science)
Michelle Hawkins, V.M.D., ABVP, Associate Professor (Medicine and Epidemiology, School of Veterinary Medicine, Veterinary parasitology)
Joshua M. Hull, Ph.D., Assistant Adjunct Professor (Animal Science)
Annie J. King, Ph.D., Professor (Animal Science)
Kirk C. Klasing, Ph.D., Professor (Animal Science)
Maja M. Makagon, Ph.D., Assistant Professor (Animal Science)
Jay A. Mench, Ph.D., Professor (Animal Science)
James R. Millam, Ph.D., Professor (Animal Science)
Gabrielle Nevitt, Ph.D., Professor (Neurobiology, Physiology, and Behavior)
Joanne R. Paul-Murphy, D.V.M., Ph.D., Professor (Medicine & Epidemiology, School of Veterinary Medicine)

Maurice E. Pitesky, D.V.M., M.P.V.M., Dipl. ACVPM, Associate Specialist in Cooperative Extension (Population Health, Reproduction; School of Veterinary Medicine)
Lisa A. Tell, D.V.M., Professor (Medicine and Epidemiology, School of Veterinary Medicine)
Huaqian Zhou, Ph.D., Associate Professor (Animal Science)

Emeriti Faculty

Hans Abplanalp, Ph.D., Professor Emeritus
Dan Anderson, Ph.D., Professor Emeritus
Francine A. Bradley, Ph.D., Specialist Emeritus
Dalton E. Ernst, Ph.D., Specialist Emeritus
Peter Marler, Ph.D., Professor Emeritus
Barry W. Wilson, Ph.D., Professor Emeritus

Affiliated Faculty

Lowell Ashbaugh, Ph.D., Associate Researcher Emeritus (Cancer Research Laboratory)
Steven S. Clift, Ph.D., Assistant Researcher (Applied Sciences)
Ann Dillner, Ph.D., Associate Researcher (Cancer Research Laboratory)
Richard L. Snyder, Ph.D., Biometeorology Specialist
Biochemistry and Molecular Biology

See Biochemistry, Molecular, Cellular and Developmental Biology, on page 190; Molecular and Cellular Biology, on page 464

Biochemistry and Molecular Biology (A Graduate Group)

The Biochemistry and Molecular Biology program has merged with the Cell and Developmental Biology program to form Biochemistry, Molecular, Cellular, and Developmental Biology (BMCDB), see Biochemistry, Molecular, Cellular and Developmental Biology, on page 190.

Group Office. 2278 Life Sciences
530.752.9091; http://biosci3.ucdavis.edu/GradGroups/BMCDB/

Biological Chemistry

See Medicine, School of, on page 428.

Biochemistry, Molecular, Cellular and Developmental Biology

Daniel Starr, Ph.D., Chairperson of the Group
530.754.6083

Group Office. 2278 Life Sciences
530.752.9091; http://biosci3.ucdavis.edu/GradGroups/BMCDB/

Faculty

Iannis, Adamopoulos, Ph.D., Associate Professor (Medical Division of Internal Medicine, Rheumatology)
Jawad Al-Bassam, Ph.D., Assistant Professor (Molecular and Cellular Biology)
John Albeck, Ph.D., Assistant Professor (Molecular and Cellular Biology)
F. Javier Arsuaga, Ph.D., Professor (Mathematics, Molecular and Cellular Biology)

Shota Atsumi, Ph.D., Associate Professor (Chemistry)
Erioch Baldwin, Ph.D., Associate Professor (Molecular and Cellular Biology)
Jacqueline Barlow, Ph.D., Professor (Microbiology and Molecular Genetics)
Peter Barry, Ph.D., Professor (Pathology)
Andreas Braun, Ph.D., Professor (Medical Microbiology and Immunology)
Peter A. Beal, Ph.D., Professor (Chemistry)
Alan Bennett, Ph.D., Professor (Plant Sciences)
Donald M. Bers, Ph.D., Professor (Pharmacology)
Charles Bevins, Ph.D., Professor (Medical Microbiology and Immunology)

Preparation.

Applicants should have undergraduate preparation in a field appropriate to the course of study selected, including courses in most of the following subjects: general biology, general and organic chemistry, biochemistry, avian biology, genetics, nutrition, physiology, and statistics.

Graduate Advisers.

Graduate Study.

Preparation.

Applicants should have undergraduate preparation in a field appropriate to the course of study selected, including courses in most of the following subjects: general biology, general and organic chemistry, biochemistry, avian biology, genetics, nutrition, physiology, and statistics.

Graduate Advisers.

Biochemistry and Molecular Biology

See Biochemistry, Molecular, Cellular and Developmental Biology, on page 190; Molecular and Cellular Biology, on page 464
121. Molecular Biology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 104, or equivalent. Analysis of the fundamental biological processes in prokaryotes and eukaryotes that govern the central dogma of molecular biology (DNA-RNA-protein). No credit for students that have taken course 221C. —F. (S.) Chedin, Fraser, Heyer

215. Graduate Reading Course (2)
Graduate Advisers.
Lecture—1.5 hours; seminar—1.5 hours. Prerequisite: course 221C. Analysis of the basic processes governing cell organization, division, and transport. Study of the integration and regulation of cell behavior in response to changes in the cellular environment. Two five-week assignments in BMCDB research laboratories. Offered in alternate years. —F. (F.) Egelbretch

211. Macromolecular Structure and Interactions (3)
Lecture—3 hours. Prerequisite: Biological Sciences 104, or equivalent, or consent of instructor. Investigation of the paradigm form systems and model systems to address fundamental biological questions. Introduces and emphasizes the genomic approaches to address fundamental biological questions. Preparation should include a year of calculus, physics, general chemistry and organic chemistry, and courses in statistics, biochemistry, genetics, and cell biology. No credit for students that have taken course 221D. —W. (S.) Chedin, Fraser, Heyer

220L. Advanced Biochemistry Laboratory
Quarter Offered: =Spring, =Summer; 2017-2018 offering in parentheses =Social Sciences; =Political Science; =Arts and Humanities; =American Cultures; =Arts and Humanities; =Scientific; =Domestic Diversity; =World Cultures; =Writing Experience; =Writing Experience
Laboratory—15 hours. Prerequisite: course 210 and 211 (may be taken concurrently) and 120L or the equivalent. Open to graduate students. Two five-week assignments in BMCDB research laboratories. Individual research problems with emphasis on methodological/procedural work. Students design, proposal writing and oral communication of results. May be repeated twice for credit. —F. (F.) Albeck, Baldwin, Haudenschild, Tian

231. Molecular Mechanisms in Early Development (3)
Lecture—3 hours. Prerequisite: graduate standing or consent of instructor. Introduction to the cellular and molecular mechanisms underlying development. Two five-week assignments in BMCDB laboratories. Offered in alternate years. —F. (F.) Draper

255. Molecular Mechanisms in Pattern Formation and Development (3)
Lecture—3 hours. Prerequisite: graduate standing or consent of instructor. Introduction to the cellular and molecular mechanisms underlying development. Two five-week assignments in BMCDB laboratories. Offered in alternate years. —F. (F.) Draper

257. Cell Proliferation and Cancer Genes (3)
Lecture—1.5 hours; seminar—1.5 hours. Prerequisite: course 221C and 221D or equivalent. Genetic and molecular alterations that regulate the conversion of normal cells to cancers, emphasizing regulatory mechanisms and pathways. Critical reading of the current literature in cell biology, oncology, and mouse genetic model systems. Offered in alternate years. —F. (F.) Nattle, Rose

290. Seminar (1-5)
Seminar—1 hour. Prerequisite: consent of instructor and/or graduate standing. Presentation and discussion of faculty and graduate-student research. (S/U grading only) —F. (F.) W. S. (F. S.)

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only) —F. (F. S.) W. S.
Biological and Agricultural Engineering

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)—F, W, S. (F, W, S.)

Biological and Agricultural Engineering

[College of Agricultural and Environmental Sciences and College of Engineering]
Bryan M. Jenkins, Ph.D., Chair of the Department
Department Office. 2030 Bainer Hall; 530-752-0102; http://bae.engineering.ucdavis.edu

Faculty
Gail M. Bornhorst, Ph.D., Assistant Professor
Juliana de Moura Bell, Ph.D., Assistant Professor (Food Science and Technology)
Irwin Donis-Gonzalez, Ph.D., Assistant Extension Specialist
Zhiliang (Julia) Fan, Ph.D., Associate Professor
Fadi A. Fahdallah, Ph.D., Professor
D. Ken Giles, Ph.D., Professor
Mark E. Grismer, Ph.D., Professor (Lands, Air and Water Resources)
Bryan M. Jenkins, Ph.D., Professor Emeritus
Tina Jeoh, Ph.D., Associate Professor
Michael J. McCarthy, Ph.D., Professor (Food Science and Technology)
Nitin Nitin, Ph.D., Associate Professor
Ning Pan, Ph.D., Professor (Textiles and Clothing)
David C. Slaughter, Ph.D., Professor
Shriniwas K. Udupa, Ph.D., Professor Emeritus
Jean S. VanderGheynst, Ph.D., Professor
Stavros V. Vougioukas, Ph.D., Assistant Professor
Ruihong Zhang, Ph.D., Professor

Emeriti Faculty
William J. Chancellor, Ph.D., Professor Emeritus
Picshaw (Paul) Chen, Ph.D., Professor Emeritus
Michael J. Delwiche, Ph.D., Professor Emeritus
Roger E. Garrett, Ph.D., Professor Emeritus
John W. Goss, M.S., Professor Emeritus
Bruce R. Hartsough, Ph.D., Professor Emeritus
David J. Hills, Ph.D., Professor Emeritus
John M. Krochta, Ph.D., Professor Emeritus
Michael A. Maritito, Ph.D., Professor Emeritus
Kathryn McCarthy, Ph.D., Professor Emeritus
R. Larry Meson, Ph.D., Professor Emeritus
John A. Miles, Ph.D., Professor Emeritus
Stanley R. Morrison, Ph.D., Professor Emeritus
Raul H. Piemonte, Ph.D., Professor Emeritus
Richard E. Plant, Ph.D., Professor Emeritus
James W. Rumsey, M.S., Senior Lecturer Emeritus
Thomas R. Rumsey, Ph.D., Professor Emeritus
Verne H. Scott, Ph.D., Professor Emeritus
R. Paul Singh, Ph.D., Distinguished Professor Emeritus
James F. Thompson, M.S., Extension Specialist Emeritus
Wesley W. Wallender, Ph.D., Professor Emeritus
Wesley L. Yates, M.S., Professor Emeritus

Affiliated Faculty
Tien-Chieh Hung, Ph.D., Assistant Adjunct Professor
Kurt Konruth, Ph.D., Assistant Adjunct Professor
Zhangli Pan, Ph.D., Adjunct Professor
Herbert Schiebe, Ph.D., Researcher
Mir S. Shalzf, Ph.D., Lecturer

Major Programs and Graduate Study. For the Bachelor of Science program, see the major in Engineering: Biological and Agricultural, on page 267, for graduate study, see also Graduate Studies, on page 271.

Minor Programs. The Department of Biological and Agricultural Engineering offers two minors through the College of Agricultural and Environmental Sciences: Geographic Information Systems and Precision Agriculture.

The minor in Geographic Information Systems is open to all majors, including those in engineering. This minor is for students interested in information processing of spatial data related to remote sensing for geographical and environmental planning and related areas.

The minor in Precision Agriculture is open to all majors, including those in engineering, and acquaints students with recent developments and their applications to agriculture, in geographic information systems, global positioning systems, and variable rate technologies.

The Department of Biological and Agricultural Engineering also administers three minors through the College of Engineering in Energy Science and Technology, Energy Efficiency, and Energy Policy.

Courses. Courses are listed under Applied Biological Systems Technology, and Engineering: Biological and Agricultural (Biological Systems Engineering).

Biological Sciences

[College of Biological Sciences]
Biology Academic Success Center (BASC), 1023 Sciences Laboratory Building, 530-752-0410; http://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 Department of Environmental Evolution, 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 and Molecular Genetics; 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 (B.S.) and Bachelor of Arts (A.B) programs include preparatory work in mathematics, general and organic chemistry, physics, and introductory level biology, as well as upper division core classes emphasizing the breadth of biological sciences. Students in the B.S. degree program complete additional upper division coursework, for which they can choose classes from a variety of different areas such as molecular biology and genetics, animal behavior, plant growth and development, bioinformatics, marine biology, forensics, and microbiology. Students in the Bachelor of Arts (A.B) program can pursue upper division coursework outside of the biological sciences. 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 either 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.

A.B. Major Requirements:

Preparatory Subject Matter. 45-57

Biology Sciences

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A-2B-2C</td>
<td>116**</td>
<td>4-5</td>
</tr>
</tbody>
</table>

Mathematics 17A-17B or 21A-21B ……… 8

Physics 1A-1B or 7A-7B-7C ……… 6-12

(Recommended: Chemistry 2C and Math 17C or 21C)

Depth Subject Matter. 28-36

Biological Sciences 101 ……… 4

Biological Sciences 105 *(or 102 + 103) ……… 3-6

Statistics 100 ……… 4

Evolution and Ecology 100 ……… 4

* Select one course from each topic.

Electology: Environmental Science and Policy 100 or Evolution and Ecology 101 ……… 4

* Microbiology: Food Science and Technology 104, Microbiology 102, 162, 170 ……… 3-6

* Animal Physiology, Behavior or Development: Biological Sciences 104, Molecular and Cellular Biology 150, Neurobiology, Physiology, and Behavior 100, 101, 102, 141 ……… 3-5

* Plant Physiology or Development: Plant Biology 105** *, 111, 112, 113, 116** ……… 3-5

Laboratory Requirement
Select course(s) for a minimum total of 6 hours/week of laboratory or field work from the list of courses below.

** PIB 105 or PIB 116 may fulfill the topical area and laboratory requirement.

Courses with 3 hours lab or field work/week (select two): Evolution and Ecology 110, 117, 119, 140, 180A, 180B; Exercise Biology 104L, 115L; Microbiology 103L; Neurobiology, Physiology, and Behavior 100, 101L, 121L, 123L; Plant Biology 117, 119, other courses with approval of the master adviser.

Courses with 6 hours lab or field work/week (select one): Biological Sciences 180L; Evolution and Ecology 105, 106, 108, 112L, 113L; Exercise Biology 106L; Food Science and Technology 104L, Microbiology 104L, 105L; Molecular and Cellular Biology 120L, 140L, 160L, Neurobiology, Physiology, and Behavior 111L, 114P; Plant Biology 102, 105**, 116**, 148; other courses with approval of the master adviser.

Total Units for the Major ……… 73-93

B.S. Major Requirements:

Preparatory Subject Matter. 56-66

Biological Sciences 2A-2B-2C ……… 15

Chemistry 2A-2B-2C ……… 15

Chemistry 8A-8B or 116**, 118A-118B-118C ……… 6-12

Mathematics 17A-17B-17C or 21A-21B (C1C recommended) ……… 8-12

Physics 7A-7B-7C ……… 12

Depth Subject Matter. 42-51

Genetics: Biological Sciences 101 ……… 4

Biochemistry: Biological Sciences 105 (or 102 + 103) ……… 3-6

Cell Biology: Biological Sciences 104 ……… 3

Statistics 100 ……… 4

* Select one course from each topic.

* Evolution: Evolution and Ecology 101 or Environmental Science Policy 100 ……… 4

* Microbiology: Microbiology 102, 104, 162, 170; Food Science & Technology 104 ……… 3-5

* Animal Physiology, Behavior or Development: Neurobiology, Physiology and Behavior 100, 101, 102, 141; Molecular and Cellular Biology 150 ……… 3-5

* Plant Physiology or Development: Plant Biology 105**, 111, 112, 113, 116** ……… 3-5

Laboratory Requirement
Select course(s) for a minimum total of 6 hours/week of laboratory or field work from the list of courses below.

Pre-Fall 2011 General Education (GE) M: World Cultures; W: Writing Experience
Approved Upper Division Restricted Electives

Total Units for the Major: 98-117

Restricted Electives: 18

Students may choose any combination of approved courses that align with their academic or career objectives, or choose from the list of approved courses provided on the BASC website at http://basc.ucdavis.edu/. Up to 3 of the 11 units may be fulfilled by approved seminar or research courses.

Minor Program Requirements:

Biological Sciences: 

Complete at least three units from each of the five numbered groups to reach 18 units. Appropriate alternative courses may be used with approval of an adviser.

1. Cell and Molecular Biology: Biological Sciences 101 (3-4)
2. Animal Biology: Biological Sciences 101, 102, 105 (3-4)
3. Microbiology: Biological Sciences 101, 102, 105
4. Evolution and Ecology: Biological Sciences 101, 102, 105
5. Exploring Biological Sciences (1)

Approved Seminar/Research Courses

Courses in ABI, ANS, BIS, BIT, ENH, ENL, ETX, EVE, MB, MCB, MIC, NPB, PL, PIP, PL, VEN, WEP, numbered 189, 190, 190C, 192, 194H, 194T, 197, 197P, 197S, 133, 133E; MIC 191, MCB 138, 139, 148, 158, 178, 191, 193; NPB 139, 159, 169

Bodega Marine Laboratory Program

Located in Bodega Bay, California. Course offerings include lecture and laboratory instruction in the developmental biology and physiological adaptations of marine organisms, and population biology and ecology; and a weekly colloquium; and an intensive individual research experience under the direction of laboratory faculty.

http://bml.ucdavis.edu/

Courses in Biological Sciences (BIS)

Lower Division

2A. Introduction to Biology: Essentials of Life on Earth (5)
Lecture—3 hours; discussion—2 hours. Essentials of life including sources and use of energy, information storage, responsiveness to natural selection and cellularity. Origin of life and importance 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. GE credit: SciEng | SE—F, W, S, Su.

2B. Introduction to Biology: Principles of Ecology and Evolution (5)
Lecture—3 hours; discussion—1 hour. Laboratory—3 hours. Prerequisite: grade of C- in course 1A or 2A. Introduction to basic principles of ecology and evolutionary biology, focusing on the fundamental mechanisms that generate and maintain biological diversity across scales ranging from genomes to genes to global processes and patterns. Not open for credit to students who have completed Biological Sciences 18 with a grade of C- or better. GE credit: SciEng | GL, SI, SL, W, V, W, S, Su. F, W, S, Su.

2C. Introduction to Biology: Biodiversity and the Tree of Life (5)
Lecture—4 hours; laboratory—3 hours. Prerequisite: course 1B or 2B completed with a C- or better. Introduction to organismal diversification 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. GE credit: SciEng | GL, SI, SL, W, V, W, S, Su. F, W, S, Su.

5. Exploring Biological Sciences (1)
Seminar—1 hour. Prerequisite: consent of instructor. Enrollment limited to first year CBS students. Introduces to biology at UC Davis through discussions with faculty and speakers from arts and medicine. (P/NF grading only) — F, W, S, F, W, S, W, S, Su.

10. Everyday Biology (4)
Lecture—3 hours; discussion—1 hour. Everyday biological concepts using contemporary readings for non-scientists. Key topics include: personal genomics; food and health; climate and evolution; brain and the law. Innovative projects apply bio-

Citation for Outstanding Performance. The College of Biological Sciences offers citations for Outstanding Performance on undergraduate majors 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 Biological Education); see the Teaching Credential/MA. Program on page 125.
logical concepts to current events. For students not specializing in biology, not open for credit to students who have completed Animal Biology 102 or 105 recommended. Overview of genomic principles, 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. GE credit: SciEng | SE, VI, WE.—S. (S.) Morgan

123. Undergraduate Colloquium in Marine Science (1) Seminar—1 hour. Prerequisite: course 101 (concurrently). Instructor. Seminars by recognized authorities in various disciplines of marine science from within and outside the UC system. Includes informal discussion with speaker. Credit may be held at Bodega Marine Laboratory. (P/NP grading only.) See above description for Bodega Marine Laboratory Program.—S. (S.) Chern, Morgan

124. Coastal Marine Research (3) Laboratory—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. Instructor. 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. GE credit: SciEng | OL, QL, SE, VI, WE.—S. (S.) Bayard, Maloof

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) GE credit: SciEng | SE, WE.
Biomedical Engineering (A Graduate Group)

J. Kent Leach, Ph.D., Chairperson of the Group
530-754-9149

Group Office, 2316 Genome and Biomedical Sciences Facility 530-752-2611; http://www.ucdavis.edu/graduate/

Faculty

Ralph C. Aldredge, Ill, Ph.D., Professor
(Mechanical and Aerospace Engineering)
Kyrriacos Athanasiou, Ph.D., Distinguished Professor
(Biomedical Engineering, Orthopaedic Surgery)
Sharon Aviran, Ph.D., Assistant Professor
(Biomedical Engineering)
Keith Baar, Ph.D., Associate Professor
(Physiology & Membrane Biology, Neurobiology, Physiology, and Behavior)
Ramsey D. Badawi, Ph.D., Associate Professor
(Diagnostic Radiology, Biomedical Engineering)
Stanley Benedict, Ph.D., Professor
(Radiation Oncology)
Craig J. Benham, Ph.D., Professor
(Biomedical Engineering, Mathematics)
John M. Boone, Ph.D., Professor
(Diagnostic Radiology, Biomedical Engineering)
James Chan, Ph.D., Assistant Professor
(Pathology and Laboratory Medicine)
Abhijit J. Chaudhari, Ph.D., Assistant Professor
(Diagnostic Radiology)
Ye Chen-Izu, Ph.D., Associate Professor
(Biomedical Engineering, Pharmacology)
Simon R. Cherry, Ph.D., Distinguished Professor
(Biomedical Engineering, Radiology)
Blaine Christiansen, Ph.D., Assistant Professor
(Orthopaedic Surgery, Medicine)
Caleen Clancy, Ph.D., Professor
(Pharmacology)
Cristina Davis, Ph.D., Professor
(Mechanical and Aerospace Engineering)
Sonja Dieterich, Ph.D., Associate Professor
(Radiation Oncology)
Yong Duan, Ph.D., Professor
(Biomedical Engineering)
Marc T. Facciotti, Ph.D., Assistant Professor
(Biomedical Engineering)
Fadi A. Fathallah, Ph.D., Professor
(Biomedical Engineering)
Katherine W. Ferrara, Ph.D., Professor
(Pharmacology)
David Fyhrie, Ph.D., Professor
(Orthopaedic Surgery, Medicine, Biomedical Engineering)
Jeffery C. Gibling, Ph.D., Professor
(Chemical Engineering and Materials Science)
Mark Goldman, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)
Frederic Garin, Ph.D., Professor
(Imaging and Medical Physics)
Eleonora Grandi, Ph.D., Assistant Professor
(Pharmacology)
Dominik R. Haudek-schild, Ph.D., Associate Professor
(Orthopaedic Surgery)
Thomas Hue, Ph.D., Adjunct Professor
(Biomedical Engineering)
Sanjay Joshi, Ph.D., Associate Professor
(Mechanical and Aerospace Engineering)
Thomas Jue, Ph.D., Professor
(Biomedical Engineering)
Gerald J. Kast, Ph.D., M.D., Professor
(Pathology)
Tonya L. Kuhl, Ph.D., Professor
(Chemical Engineering and Materials Science, Biomedical Engineering)
Kit S. Lam, Ph.D., Professor
(Biochemistry & Molecular Medicine)
J. Kent Leach, Ph.D., Professor
(Biomedical Engineering, Orthopaedic Surgery)
Jamal Lewis, Ph.D., Assistant Professor
(Neurobiology)
Angelique Louie, Ph.D., Professor
(Biomedical Engineering)
Laura Marco, Ph.D., Professor
(Biomedical Engineering, Neurological Surgery)
Dennis L. Matthews, Ph.D., Professor
(Neurological Surgery)
Alexandre Mather, Ph.D., Professor
(Mathematics)
Christopher J. Murphy, D.V.M., Ph.D., Professor
(Surgical & Radiological Sciences)
Nitin Nitin, Ph.D., Associate Professor
(Food Science and Technology, Biological and Agricultural Engineering)
Jan Nolta, Ph.D., Professor
(Internal Medicine)
Tingrui Pan, Ph.D., Assistant Professor
(Biomedical Engineering)
Atul Parikh, Ph.D., Professor
(Biomedical Engineering, Chemical Engineering and Materials Science)
Anthony G. Parisi, Ph.D., Associate Professor
(Biomedical Engineering)
Jinyi Qi, Ph.D., Professor
(Biomedical Engineering)
Bahram Ravani, Ph.D., Professor
(Mechanical and Aerospace Engineering)
A. Hari Reddi, Ph.D., Professor
(Orthopaedic Surgery, Medicine)
Alexander Rezvani, Ph.D., Professor
(Biomedical Engineering)
Crystal M. Rippinger, Ph.D., Assistant Professor
(Pharmacology)
David Rocke, Ph.D., Distinguished Professor
(Biomedical Engineering, Public Health Sciences)
Leonar Saiz, Ph.D., Associate Professor
(Biomedical Engineering)
Nesrin Sarioglu-Klijn, Ph.D., Professor
(Mechanical and Aerospace Engineering)
Michael A. Savageau, Ph.D., Distinguished Professor
(Biomedical Engineering)
J. Anthony Seibert, Ph.D., Professor
(Diagnostic Radiology)
Erik Seker, Ph.D., Assistant Professor
(Electrical and Computer Engineering)
Eduardo Silva, Ph.D., Assistant Professor
(Biomedical Engineering)
Scott L. Simon, Ph.D., Professor
(Biomedical Engineering)
Vivek J. Srivason, Ph.D., Assistant Professor
(Biomedical Engineering)
Nesrin Sarigul-Klijn, Ph.D., Professor
(Surgery)
Yoshikazu Takada, M.D., Professor
(Dermatology)
Cheemeng Tan, Ph.D., Assistant Professor
(Biomedical Engineering)
Alice Tarantal, Ph.D., Professor
(Pediatrics, Biomedical Engineering, Neurology)
Maury L. Hull, Ph.D., Distinguished Professor
Emeritus (Mechanical and Aerospace Engineering, Biomedical Engineering)

Graduate Study. The Graduate Group in Biomedical Engineering offers programs of study and research leading to the M.S. and Ph.D. degrees. The programs of study prepare students for professional work in the effective integration of engineering with medical and biological sciences. Research strengths lie in the areas of imaging, tissue engineering and regenerative medicine, sensor and MEMS systems, cellular and molecular mechanics, computational modeling, targeted therapeutics, orthopedic biomechanics, biofluids and transport, and human movement. This broad interdepartmental program is best suited for students who are capable of and comfortable with considerable independence. Each student, together with an adviser, defines a specific course of study suited to individual goals.

Preparation. The Group regards strong competence in mathematics and engineering as necessary for successful completion of study. Prior course work in these areas is emphasized in the evaluation of applications. Some undergraduate training can be acquired after admission to the Group, but it may require an additional year of study.

Courses. See Engineering: Biomedical, on page 272.

Biophysics (A Graduate Group)

John Voss, Ph.D., Chairperson of the Group
530-752-4863
http://bpl.ucdavis.edu/

Faculty

Jawad Al-Bassam, Ph.D., Assistant Professor
(Molecular and Cellular Biology)
James B. Ames, Ph.D., Associate Professor
(Chemistry)
Enoch Baldwin, Ph.D., Associate Professor
(Molecular and Cellular Biology)
R. David Brit, Ph.D., Professor
(Chemistry)
Tsung-Yu Chen, Ph.D., Professor
(Physics)

Biophysics (A Graduate Group)

John Voss, Ph.D., Chairperson of the Group
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Faculty

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(Molecular and Cellular Biology)
R. David Brit, Ph.D., Professor
(Chemistry)
Tsung-Yu Chen, Ph.D., Professor
(Physics)
Yin Yeh, Ph.D., Professor Emeritus

Graduate Study. The Biophysics Graduate Group offers a program leading to a Ph.D. degree in biophysics. The interdisciplinary program prepares students to conduct independent research at the interface of physics, chemistry, and biology. Faculty members have particular research interests in structural biology, molecular dynamics, mechanisms of catalysis and energy transduction, computational biology, theory, neuroscience, and imaging. Students choose from the broad biophysics research venues a research laboratory that matches their interests and career goals.

Courses in Biophysics (BPH) Graduation 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.)—W. (W.) Faller 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, etc., high resolution nmr, and in vivo nmr. (S/U grading only.)—S. (S.) Jue

200A. Biophysics Laboratory (3) Laboratory—16 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. —F. W. S. (F, W, S.) 200B. 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. —F. W. S. (F, W, S.)

231. Biological Nuclear Magnetic Resonance (5) Lecture—3 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 design of techniques useful in the studies of protein-nucleic acid interactions. Principal optical techniques used to study biological structures and their related functions. Specific optical techniques useful in the studies of protein-nucleic acid, protein-membrane and protein-protein interactions. Biomedical applications of optical techniques. (Same course as Applied Science Engineering 271.)—S. (S.) Husar, Parikh, Yeh

290. Biophysics Seminar (1) Seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Presentation of current research by experts in biophysics. MAY BE REPEATED FOR CREDIT. (S/U grading only.)—F. W. S. (F, W, S.)

290C. Research Conference in Biophysics (1) Discussion—1 hour. Prerequisite: graduate standing in Biophysics and/or consent of instructor; course 299 concurrently. Presentation and discussion of faculty and graduate-student research in biophysics. MAY BE REPEATED FOR CREDIT. (S/U grading only.)—F. W. S. (F, W, S.)

290D. Introduction to Research Topics (1) Seminar—1 hour. Prerequisite: current research activities of the Biophysics Graduate Group faculty. Facilitation of students in developing their research interest, and promoting collegial interactions. MAY BE REPEATED FOR CREDIT IF TOPICS DIFFER. (S/U grading only.)—F. (F, W, S.)

298. Group Study (1-5) (S/U grading only.)

299. Research (1-12) (S/U grading only.)

Biostatistics (A Graduate Group) Bruce Rannala, Ph.D. (Evolution and Ecology), Chairperson of the Group

Group Office. 4118 Mathematical Sciences Building 530-692-5194; http://biostat.ucdavis.edu/ Faculty

Shariif Aly, Ph.D., Assistant Professor (Population Health & Reproduction)

Rahman Azari, Ph.D., Lecturer (Statistics)

Hsueh Bang, Ph.D., Associate Professor (Public Health Sciences)

Laurel Beckett, Ph.D., Professor (Public Health Sciences)

Prabir Burman, Ph.D., Professor (Statistics)

Hong Chen, Ph.D., Associate Professor (Statistics)

Andrew J. Clifford, Ph.D., Professor (Nutrition)

Christiana Drake, Ph.D., Professor (Statistics)

Thomas B. Farver, Ph.D., Professor (Population Health and Reproduction)

Emilio Ferrer, Ph.D., Associate Professor (Psychology)

Valdimir Filkov, Ph.D., Associate Professor (Computer Science)

Danielle Harvey, Ph.D., Associate Professor (Public Health Sciences)

Fushing Hsieh, Ph.D., Professor (Statistics)

Ana-Maria Iosif, Ph.D., Assistant Professor (Public Health Sciences)

Jiming Jiang, Ph.D., Professor (Statistics)

Philip H. Kass, Ph.D., Professor (Population Health and Reproduction)

Kyoungmi Kim, Ph.D., Associate Professor (Population Health & Reproduction)

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Jiming Jiang, Ph.D., Professor (Statistics)

Philip H. Kass, Ph.D., Professor (Population Health and Reproduction)

Kyoungmi Kim, Ph.D., Associate Professor (Population Health & Reproduction)

Jiming Jiang, Ph.D., Professor (Statistics)

Philip H. Kass, Ph.D., Professor (Population Health and Reproduction)

Kyoungmi Kim, Ph.D., Associate Professor (Population Health & Reproduction)

Jiming Jiang, Ph.D., Professor (Statistics)
Biostatistics (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 medical data. (Same course as Statistics 226.) Offered in alternate years. — S.

226. Statistical Methods for Bioinformatics (4)
Lecture—3 hours; discussion/laboratory—1 hour.
Prerequisite: course 222, 223. Biostatistical methods and models; modern statistical methods. (Same course as Statistics 226.) Offered in alternate years. — W

252. Advanced Topics in Biostatistics (4)
Lecture—3 hours; discussion/laboratory—1 hour.
Prerequisite: course 222, 223. Biostatistical methods and models; modern statistical methods. (Same course as Statistics 252.) Offered in alternate years. — S.

290. Seminar in Biostatistics (1)
Seminar—1 hour. Restricted to graduate standing. Seminar on advanced topics in the field of biostatistics. Presented by members of the Biostatistics Graduate Group and other guest speakers. May be repeated for credit with consent of adviser when topic differs. (Same course as Statistics 290.) Offered in alternate years. — S.

299. Special Study for Biostatistics Graduate Students (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

299D. Dissertation Research (1-12)
Prerequisite: advancement to candidacy for Ph.D. and consent of major professor. Research in biostatistics under the supervision of major professor. (S/U grading only.)

Biotechnology
(College of Agricultural and Environmental Sciences)
Faculty. Faculty includes members of the Department of Animal Science, on page 162; Engineering: Chemical Engineering 177; Computer Science, on page 231; Engineering: Biological and Agricultural, on page 267; Food Science and Technology, on page 341; Land, Air and Water Resources, on page 514; Plant Pathology, on page 516; Viticulture and Enology, on page 585; and the College of Biological Sciences, on page 192.

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 courses (representing the subject areas of Biological Sciences, Chemistry, and Mathematics) with a grade point average of at least 2.500 in each subject area. All of these courses must be taken for a letter grade:

Biological Sciences 2A, 2B, 2C .............. 15
Chemistry 2A, 2B, 2C ......................... 15

Mathematics, one of the following groups: ........................................ 6-8
Mathematics 1A, 1B, 1C, or Mathematics 17A, 17B, or Mathematics 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 molecular biology and cell biology. Four options, Animal Bio- technology, 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 improve products, creating new and exciting career opportunities for individuals trained in biotechnology in the agricultural, food and beverage, health care, chemical, pharmaceutical and biochemical, and environmental and bioremediation 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:

UNITS
Preparatory Subject Matter .................... 57-69
Biological Sciences 2A,2B-2C .................... 15
Chemistry 2A-2B-2C .................. 15
Chemistry 8A, 8B or 118A, 118B, 118C or 128A, 128B, 128C, 129AA ............... 6-12
Mathematics 16A, 16B, or 17A, 17B, or 21A, 21B .................. 18
Physics 7A-7B .................. 8
Plant Sciences 120 or Statistics 100 ............ 4
Biotechnology 1 ............ 1
Select one course from: .......................... 4

Depth Subject Matter .................... 16-20
Biological Sciences 101 ............ 4
Biological Sciences 104 ............ 3
Molecular and Cellular Biology 121 or 161 ............ 3
Biotechnology 171 ............ 3
Molecular and Cellular Biology 189, or internship or independent research; course 192 or 199 or Biotechnology 198L ............ 3
Undergraduate research proposal: Biotechnology 188 (J) .................. 2
Honors undergraduate thesis (optional) ............ 1

Areas of Specialization (choose one)
Fermentation/Microbiology Biotechnology Option ........................................ 38-45
Microbiology 104, Biological Sciences 102 and 103, or Animal Biology 115 and 116, Microbiology 104L or Food Science and Technology 104L, Molecular and Cellular Biology 160L or Biotechnology 161A; One of Microbiology 115, 120, 121C, 124, 130, 170, Plant Pathology 130; and a second course from the previous list or one of Biological Sciences 181, 183, Molecular and Cellular Biology 182, 230 Restricted Electives ............ 15


Courses in Biotechnology (BIT) are listed below; courses in Biotechnology; Design Emphasis (NEB) follow, see Courses in Biotechnology; Design Emphasis (NEB) page 198.

Lower Division

1. Introduction to Biotechnology (4)
   Lecture—2 hours; lab virtual lecture—1 hour; discussion—1 hour. Prerequisites and technologies of biotechnology as applied to agriculture, the environment, and medicine. Business plans and presentation skills. Bioinformatics approaches exploring genomic databases and DNA manipulations in silico. GE credit: SciEng | SE. — J. Sandkuler, Yoder

92. Internship in Biotechnology (1-12)
   Internship—3-36 hours. Prerequisite: consent of instructor. Work experience on or off campus in a 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

150. Applied Bioinformatics (4)
   Lecture—2 hours; lab/office discussion—2 hours. Prerequisites: Computer Science Engineering 10 or 15 or Plant Science 21; Biological Sciences 101 or 104; Plant Science 120 or Statistics 13 or Statistics 100. Limited enrollment. Concepts and programs needed to apply bioinformatics in biotechnology research. Sequence analysis and annotation and use of plant and animal databases for students in biological and agricultural sciences. Two units of credit for students who have completed Computer Science Engineering 124. GE credit: SciEng | SE, VLL—Runcie.

160. Principles of Plant Biotechnology (3)
   Lecture—3 hours. Prerequisites: 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 Laboratory 160.) GE credit: SciEng | SE—W. (W.) Dandekar

161A. Genetics and Biotechnology Laboratory (6)
   Lecture—3 hours; laboratory—9 hours. Prerequisite: Plant Sciences 152 or Biological Sciences 101; consent of instructor. 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. GE credit: SciEng | SE—W. (W.) Beckles

161B. Plant Genetics and Biotechnology Laboratory (4)
   Lecture—1 hour; laboratory—8 hours. Prerequisite: Plant Sciences 152 or Biological Sciences 101; consent of instructor. Advanced techniques of genetic analysis at the molecular and cellular levels, including transformation, gene expression and analysis of transgenic plants. Not open for credit to students who have taken Plant Biology 161B. (Former course Plant Biology 161B.) GE credit: SciEng | SE, SL—S. (S.) Bennett, Slumwold

Bodega Marine Laboratory Program

http://bml.ucdavis.edu/

See also Biological Sciences, Bodega Marine Laboratory Program, on page 193.

In 2014, the new multi-college B.S. in Marine and Coastal Science (MCS) major started and the MCS field requirement can be fulfilled by any of the courses below.
Spring Quarter Program
A full quarter (15 units) 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 development of marine 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 122, 122P, 125; 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://bml.ucdavis.edu/.

Summer Session Courses
This integrated program offers students a multidisciplinary understanding of coastal ecosystems through intensive, hands on and field courses taught at Bodega Marine Laboratory. Applications are due April 15.

For more course detail, see full description under appropriate academic department listing or http://bml.ucdavis.edu/. Course offerings 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.

Additional information is available from the Biology Academic Success Center, in 1023 Sciences Laboratory Building, or directly from: Bodega Marine Laboratory P.O. Box 247 Bodega Bay, CA 94923 707-875-2211; http://bml.ucdavis.edu/.

Cell and Developmental Biology
(A Graduate Group)

The Cell and Developmental Biology program has merged with the Biochemistry and Molecular Biology program to form Biochemistry, Molecular, Cellular, and Developmental Biology (BMCD); see Biochemistry, Molecular, Cellular and Developmental Biology, page 190.

Group Office. 227B Life Sciences 530-752-9901; http://bioisci.ucdavis.edu/GradGroups/BMCD8/

Cell Biology and Human Anatomy

See Medicine, School of, on page 428.

Chemistry

(College of Letters and Science)

Department Administration. For a complete list of department administration, see http://chemistry.ucdavis.edu/homepage/department_administration.html

Department Office. Bodel Chemistry Building 530-752-8900; Fax 530-752-8995; http://chemistry.ucdavis.edu

Faculty

James Ames, Ph.D., Professor
Shota Atsumi, Ph.D., Associate Professor
Matthew P. Augustine, Ph.D., Professor
Alon L. Balsh, Ph.D., Professor
Engen Baldwin, Ph.D., Associate Professor
Peter Beal, Ph.D., Professor
Louise A. Berben, Ph.D., Associate Professor
R. David Britt, Ph.D., Professor
William Casey, Ph.D., Professor
Julia Chamberlain, Ph.D., Lecturer PSOE
Xi Chen, Ph.D., Professor
Kyle Crabtree, Ph.D., Assistant Professor
Stephen Cramer, Ph.D., Professor
Sheila David, Ph.D., Professor
Dave Davide Donadio, Ph.D., Assistant Professor
Andrew J. Fisher, Ph.D., Professor
Annaleise K. Franz, Ph.D., Associate Professor
Jacquelyn Geryv Hague, Ph.D., Professor
David Goodin, Ph.D., Professor
Ozcan Gulacor, Ph.D., Lecturer PSOE
Ting Guo, Ph.D., Professor
Susan M. Kauzlarich, Ph.D., Professor
Distinguished Graduate Mentoring Award
Perry B. Kelly, Ph.D., Professor
Kirlil Kovnir, Ph.D., Assistant Professor
Mark J. Kurth, Ph.D., Professor
Donald P. Land, Ph.D., Professor
Delmar Larsen, Ph.D., Associate Professor
Carito B. Lebrilla, Ph.D., Professor
Gang-Yu Liu, Ph.D., Professor
C. William McCurdy, Ph.D., Professor
Mark Mascal, Ph.D., Professor
Alexandra Novotvsky, Ph.D., Professor
Cheuk-Yiu Ng, Ph.D., Professor
David Olson, Ph.D., Assistant Professor
Frank Osterloh, Ph.D., Professor
Philip P. Power, FRS, Ph.D., Professor
Neil E. Schore, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Jared T. Shaw, Ph.D., Professor
Justin Siegel, Ph.D., Assistant Professor
Alexei P. Stuchebrukhov, Ph.D., Professor
Deon Tantillo, Ph.D., Professor
Academic Senate Distinguished Teaching Award

Additional information is available from the Biology Academic Success Center, in 1023 Sciences Laboratory Building, or directly from: Bodega Marine Laboratory P.O. Box 247 Bodega Bay, CA 94923 707-875-2211; http://bml.ucdavis.edu/.

Botany

See Plant Biology, on page 511; and Plant Biology (A Graduate Group), on page 513.

Business Management

See Managerial Economics, on page 416, for undergraduate study; and Management, Graduate School of, on page 412.

Cantonese

See Asian American Studies, on page 183.

Cell Biology

See Molecular and Cellular Biology, on page 464.
B.S. Major Requirements:  

Preparatory Subject Matter .......................... 53  
Chemistry 2A-2B-2C or 2AH-2BH-2CH ....15  
Physics 7A, 7B, 7C or 9A-9B-9C ....... 12-15  
Mathematics 1A-1B-1C or 17A-17B-17C or 21A-21B-21C ....9-12  
Biological Sciences 2A ............... 4  
Statistics 13 or 12 or 100 .......................... 3-4  

Depth Subject Matter .............................. 53-62  
Chemistry 100, 105, 115, 124A .......................... 14  
Chemistry 107A-107B or 110A-110B-110C ....6-12  
Chemistry 111A-111B-111C or 128A-128B-128C-129A-129B ....12-13  
Environmental Science and Policy 110 ........4  
Environmental Toxicology 101 .............. 4  
At least three courses from: Atmospheric Science 160; Environmental Science and Policy 151; Environmental Toxicology 102A, 102B, 120, 131, 135, 146; Geology 150A; Soil Science 111 .................. 9-13  
At least three additional upper-division units in chemistry [Chemistry 199 or 194h strongly encouraged] .......... 3  

Total Units for the Major .......................... 95-113

Chemistry  

Forensic Chemistry Emphasis:  

B.S. Major Requirements:  

Preparatory Subject Matter .......................... 47-54  
Chemistry 2A-2B-2C or 2AH-2BH-2CH ....15  
Physics 7A-7B-7C or 9A-9B-9C ....... 12-15  
Mathematics 1A-1B-1C or 17A-17B-17C or 21A-21B-21C ....9-12  
Biological Sciences 2A ............... 4  
Environmental Toxicology 101 .............. 4  
Statistics 13, 32 or 100 and 102 ............ 3-4  

Depth Subject Matter .............................. 51-61  
Chemistry 104, 105, 115 ....................... 11  
Chemistry 107A-107B or 110A-110B-110C ....6-12  
Chemistry 111A-111B-111C or 128A-128B-128C-129A-129B ....12-13  
Environmental Toxicology 101, 102A, 102B ................. 13  

At least two courses from: Biological Sciences 101; Environmental Science and Policy 161;  
Environmental Toxicology 103A, 103B, 111, 135, 138; Statistics 108, 130A .......... 6-9  
At least three additional upper division units in chemistry [Chemistry 199 or 194h strongly encouraged] .......... 3  

Total Units for the Major .......................... 98-115

Chemical Physics  

B.S. Major Requirements:  

Preparatory Subject Matter .......................... 57  
Chemistry 2A-2B-2C or 2AH-2BH-2CH ....15  
Physics 9A, 9B, 9C, 9D ......... 12-15  
Mathematics 21A, 21B, 21C, 21D, 22A, 22D, 22E ........... 23  

Depth Subject Matter .............................. 53  
At least four additional upper-division units in chemistry [except Chemistry 107A, 107B] .......................... 4  

Total Units for the Major .......................... 110

Pharmaceutical Chemistry  

B.S. Major Requirements:  

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 1A-1B-1C or 17A-17B-17C or 21A-21B-21C ............. 9-12  
Biological Sciences 2A ............... 4  
Statistics 13, 32 or 100 .......................... 3-4  

Depth Subject Matter .............................. 48-64  
Chemistry 124A, 130A-130B-135 ....150  
Chemistry 107A-107B or 110A-110B-110C .......................... 6-12  
Chemistry 111A-111B-111C or 128A-128B-128C-129A-129B ....12-13  
Environmental Science and Policy 102 or Chemistry 131 ................. 3  
At least four courses (used to satisfy the above requirements) from: Biological Sciences 102, 103, Biotechnology 171 or Veterinary Medicine 170, Chemistry 131, 195 (minimum 2 hours or 194h)  
Environmental Toxicology 103A, Microbiology 104, Neurobiology, Physiology, and Behavior 100, 101, Plant Biology 126 ................. 12-19  

Total Units for the Major .......................... 96-119

Major Adviser: To contact a major adviser in the Department of Chemistry, see http://chemistry.ucdavis.edu/undergraduate/  

contact_undergraduate_affairs.html.

Minor Program Requirements:  

At least one additional course from: Chemistry 118B, 124B, and 124C ................. 3-4  
Note: The minor program has prerequisites of Chemistry 2A-2B-2C, Mathematics 16A-16B-16C, and Physics 7A-7B-7C or their equivalents. Students wishing to earn a Chemistry minor should consult with a Chemistry major adviser.  

Honors and Honors Program: The student must take courses 194AH, 194H, 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 regarding graduate study may be obtained by contacting the Graduate Adviser, Department of Chemistry. See also Graduate Studies, on page 121.

Courses in Chemistry (CHE)  

Chemistry Placement Requirement. Students who enroll in Chemistry 2A, 2AH or Workload Chemistry 41C must satisfy the Chemistry Placement Requirement. See the Department of Chemistry website at http://chemistry.ucdavis.edu/undergraduate/chemistry_placement_exam.html well in advance of enrolling in these general chemis- try courses for further details about the placement requirements. Students who do not meet the place- ment requirements will be administratively dropped from these Chemistry courses.  

The Student Academic Success Center (SASC) provides review materials, workshops, drop-in and group tutoring, and additional resources.  

Chemistry Graduate Students Tutors are also listed on the Department of Chemistry website at http://chemistry.ucdavis.edu/undergraduate/tutors_in_chemistry.html.

Lower Division  

2A. General Chemistry (5)  

Lecture—3 hours, laboratory/discussion—4 hours. Prerequisite: high school chemistry and physics strongly recommended; any one of the following: (A) SAT Mathematics score = 600+; (B) ACT Mathematics score = 27+; (C) AP Chemistry exam score of = 3+; (D) SAT Chemistry subject test score = 700+; (E) UC Davis Chemistry Placement Examination score = 24+ on first attempt; in lieu of A-E, either completion of ALEKS online Preparatory Chemistry course with 100% Mastery or completion of Chemistry 107B with a grade C or better (offered only in fall quar- ter to students who do not meet A-E). Periodic table, stoichiometry, chemical equations, physical proper- ties and kinetic theory of gases, atomic and molecu- lar structure and chemical bonding. Laboratory experiments in stoichiometric relations, properties and collection of gases, atomic spectroscopy, and introductory quantitative analysis. Not open for credit to students who have taken course 2AH. GE credit: SciEng|QI, SE, SL.—W, F, W.  

2AH. Honors General Chemistry (5)  

Lecture—3 hours, laboratory/discussion—4 hours. Prerequisite: high school chemistry and physics. Any ONE of the following: (A) SAT Mathematics score = 670+; (B) ACT Mathematics score = 30+; (C) AP Chemistry exam score = 4+; (D) SAT Chemistry subject test score = 700+; (E) UC Davis Chemistry Placement Examination score = 33+ on first attempt; (F) UC Davis Chemistry Placement Examination score = 30+ AND UC Davis Mathematics Placement Examination score = 45+, both on first attempts; consent of instructor. Limited enrollment course with a more rigorous treatment of material covered in course 2A. Students completing course 2AH can continue with course 2B or 2H. Not open for credit to students who have taken course 2A. GE credit: SciEng|QI, SE, SL.—F, F.  

28. General Chemistry (5)  

Lecture—3 hours, laboratory/discussion—4 hours. Prerequisite: C- or better in Chemistry 2A or 2AH. Con- tinuation of course 2A. Condensed phases and inter- molecular forces, chemical thermodynamics, chemical equilibrium, acids and bases, solubility, lab- oratory experiments in thermochromics, equilibria, and quantitative analysis using volumetric methods. Not open for credit to students who have taken course 2B. GE credit: SciEng|QI, SE, SL.—W, S, W.  

28H. Honors General Chemistry (5)  

Lecture—3 hours, laboratory/discussion—4 hours. Prerequisite: course 2A with consent of instructor or course 2AH with a grade C or better; and Mathem- atics 218 (may be taken concurrently) or consent of instructor. Limited enrollment course with a more rigorous treatment of material covered in course 2B.
 Students completing course 2BH can continue with course 2CH or 2C. GE credit: SciEng | QL, SE, SL.—W. (W.)

2C. General Chemistry (5)
Lecture—3 hours; laboratory/discussion—4 hours. Prerequisite: C- or better in course 2BH. Kinetics, electrochemistry, spectroscopy, structure and bonding in transition metal compounds, application of principles to chemical reactions. Laboratory experiments in selected analytical methods and synthesis. Not open for credit to students who have taken course 2CH. GE credit: SciEng | QL, SE, SL.—F, S. (F, S.)

2CH. Honors General Chemistry (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: course 2B with consent of instructor or course 2BH with a grade of C- or better; Mathematics 21C (may be taken concurrently) or consent of instructor. Limited enrollment course with a more rigorous treatment of material covered in course 2C. Not open for credit to students who have completed course 2CH. GE credit: SciEng | QL, SE, SL.—S. (S.)

3A. Chemistry for Life Sciences: Determining Structure and Predicting Properties (5)
Lecture—5 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: high school chemistry and physics strongly recommended; satisfactory score on the Chemistry and Mathematics Placement Examinations or satisfactory performance on the ALEKS Summer Chemistry Prep Course, a satisfactory grade in Workload 41C ([P] or [C] or better) will suffice in lieu of a satisfactory Chemistry Placement Examination score. Concurrent enrollment with course 2A, 2B, 2C, 2A-H, 2BH, 2CH prohibited; not open for enrollment to students who have completed CHE 2C or 2CH with a [C- or better. Integrated General and Organic Chemistry intended primarily for majors in the life sciences. Core concepts of chemical composition, structure and properties. Includes phase changes, separation methods, composition, spectroscopy, atomic and molecular structure, periodicity, bonding, charge distribution, intermolecular forces, and physical properties. Only 3 units credit for students who have completed course 2A or 2AH with a [C- or better. Only 1 unit credit to students who have completed course 2B or CHE 2BH with a [C- or better. GE credit: SciEng | QL, SE, SL.—F, W. (F, W.)

3B. Chemistry for Life Sciences: Predicting and Characterizing Chemical Change (5)
Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: C- or better in course 3A; note: C- or better in course 2A or 2AH does not satisfy the prerequisite requirement. Concurrent enrollment with course 2A, 2B, 2C, 2AH, 2BH, 2CH prohibited. Continuation of course 3A covering core concepts of characterization of chemical processes and predicting chemical changes. Includes modeling chemical reactions, understanding proportions/stoichiometry, tracking energy, activation energy, reaction kinetics, thermodynamics, and equilibrium. Only 3 units credit for students who have completed course 2B or 2BH with a [C- or better. GE credit: SciEng | QL, SE, SL.—W. (W.)

3C. Chemistry for Life Sciences: Controlling Processes and Synthetic Pathways (5)
Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: C- or better in course 3B; note: C- or better in course 2B or 2BH does not satisfy the prerequisite requirement. Concurrent enrollment with course 2A, 2B, 2C, 2AH, 2BH, 2CH prohibited. Continuation of course 3B covering core concepts of harnessing energy, controlling reaction extent, and organic chemistry synthetic pathways. Includes acids and bases, thermodynamics, chemical equilibria, organic reactions, and stereochemistry. Only 3 units credit for students who have completed course 2C or 2CH with a [C- or better. GE credit: SciEng | QL, SE, SL.—S. (S.)

8A. Organic Chemistry: Brief Course (2)
Lecture—2 hours. Prerequisite: C- or better in course 2B or 2CH. 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. No credit to students who have completed courses 118A or 128A. GE credit: SciEng | SE.—F, S. (F, S.)

8B. Organic Chemistry: Brief Course (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 8A, 118A, or 128A. Laboratory primarily with organic laboratory techniques and the chemistry of the common classes of organic compounds. Lecture portion a continuation of course 8A. Varying credit hours according to courses taken previously and corresponding expected workload for this course; full credit to students who complete course 118A or 128A; 3 units credit to students who have completed courses 128A and 129A (students who have completed course 128A are exempt from the laboratory portion of course 8B); 2 units credit to students who have completed course 128B; 1 unit credit to students who have completed course 118B or courses 128B and 129A (students who have completed course 118B are exempt from the laboratory portion of course 8B). GE credit: SciEng | SE.—F, W. (F, W.)

10. Concepts of Chemistry (4)
Lecture—4 hours. Survey of basic concepts and contemporary applications of chemistry. Designed for non-sci-major and non-science preparation for Chemistry 2A. Not open for credit to students who have had Chemistry 10A with credit for course 10 may take Chemistry 2A for full credit. GE credit: SciEng, Wrt | SE, SL.—F (F)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Primarily for lower division students. GE credit: SciEng, Wrt | SE, SL.—F (F)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. [F/NP grading only.]

Upper Division

100. Environmental Water Chemistry (3)
Lecture—3 hours. Prerequisite: course 2C or 2CH. Practical aspects of water chemistry in the environment, including thermodynamic relations, coordination chemistry, and stoichiometry, reaction rates and reaction mechanisms. Computer modeling of the evolution in water chemistry from contact with minerals and gases. W. (W.) Casey

104. Forensic Applications of Analytical Chemistry (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 2C or 2CH. Theory and application of standard methods of chemical analysis to evidentiary samples. Use and interpretation of results from screening tests, FTIR, GC and GCMS to various sample types encountered in forensics. —F (F)

105. Analytical and Physical Chemical Methods (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 110A (may be taken concurrently) or course 107B (may be taken concurrently). 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 separations. UV-visible spectroscopy, lasers. GE credit: SciEng | QL, SE, SL.—F, S. (F, S.)

107A. Physical Chemistry for the Life Sciences (3)
Lecture—3 hours. Prerequisite: course 2C. Mathe- matics 16C or 21C, one year of college level physics. Physical chemistry intended for majors in the life sciences area. Introduction to development of classical and statistical thermodynamics including equilib- rium processes and solutions of both non-electrolytes and electrolytes. The thermodynamic basis of electro- chemistry and membrane potentials. —F (F)

107B. Physical Chemistry for the Life Sciences (5)

108. Molecular Biochemistry (3)
Lecture—3 hours. Prerequisite: course 118C or 128C. Pass One open to Chemistry majors. Chemi- cal principles and experimental methods applied to the biological sciences to understand the molecular structure and function of proteins, nucleic acids, car- bohydrites, and membrane lipids. —S. (S.) Ames, Fisher

110A. Physical Chemistry: Introduction to Quantum Mechanics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2C, Mathematics 16C or 21C, one year of college physics. Introduction to the postulates and general principles of quantum mechanics. Approxima- tions based on variational method and time inde- pendent perturbation theory. Application to harmonic oscillator, one-electron, one-electron and many-electron atoms, and homo- and hetero-nuclear diatomic molecules. GE credit: SciEng | QL, SE.—F, S. (F, S.)

110B. Physical Chemistry: Properties of Atoms and Molecules (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 110A. Group theory. Application of quantum mechanics to polyatomic molecules and molecular spectroscopy. Interpretation of spectra, liq- uid and solid states. Dispersions, ensembles and partition functions. Transport properties. —F, W, W.

110C. Physical Chemistry: Thermodynamics, Equilibria and Kinetics (4)

118A. Organic Chemistry for Health and Life Sciences (4)
Lecture—3 hours; laboratory—6 hours. Prerequisite: courses 105 and 107B. Open to Chemistry majors. GE credit: SciEng, Wrt | QL, SE, SL.—F, W. (F, W.)

118B. Organic Chemistry for Health and Life Sciences (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 118A or 128A. Continuation of course 118A, with emphasis on spectroscopy and the preparation and reactions of aromatic hydrocar- bons, organometallic compounds, aldehydes and ketones. —W, S. (F, W, S.)

118C. Organic Chemistry for Health and Life Sciences (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 118A or courses 128B and 129A. Open to students changing from the Chemistry 128 course sequence only if they have completed prior organic laboratory work (at least course Chemistry 129A). Continuation of course 118A, with emphasis on the preparation, reactions and identification of carbox- ylic acids and their derivatives, alky and acyl...
amins, β-carbonyl compounds, and various classes of naturally occurring, biologically important compounds. —S. (S.)

121. Introduction to Molecular Structure and Spectra (4)
Lecture—4 hours. Prerequisite: course 110B. Modern theoretical and experimental methods used to study problems of molecular structure and bonding; emphasis on spectroscopic techniques. —S. (S.)

122. Chemistry of Nanoparticles (3)
Lecture—3 hours. Prerequisite: course 110C (may be taken concurrently) or 107B (may be taken concurrently). Chemical aspects of inorganic nanoparticles. Topics include synthesis, structure, colloidal behavior, catalytic activity, size and shape dependence of physical properties, analytical methods and applications. —S. (S.) Osterloh

124A. Inorganic Chemistry: Fundamentals (3)
Lecture—3 hours. Prerequisite: course 2C or course 2CH. Symmetry, molecular geometry and structure, molecular orbital theory of bonding (polyatomic molecules and transition metals), solid state chemistry, energetics and spectroscopy of inorganic compounds. GE credit: SciEng (SE—F, W, S. F. W, S.)

124B. Inorganic Chemistry: Main Group Elements (3)
Lecture—3 hours. Prerequisite: course 124A. Synthesis, structure and reactivity of inorganic and heteroatomic molecules containing the main group elements. —W (W)

124C. Inorganic Chemistry: d and f Block Elements (3)
Lecture—3 hours. Prerequisite: course 124A. Synthesis, structure and reactivity of transition metal complexes, organometallic and organic-inorganic chemistry, the lanthanides and actinides. —S. (S.)

124L. Laboratory Methods in Inorganic Chemistry (2)
Laboratory—6 hours. Prerequisite: course 124B or 124C (may be taken concurrently), The preparation, purification and characterization of main group and transition metal inorganic and organometallic compounds. —S. (S.)

125. Advanced Methods in Physical Chemistry (3)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 110C (may be taken concurrently) and 115. Advanced theory and laboratory techniques in analytical and physical chemistry. Advanced spectroscopic methods. Thermodynamic and statistical mechanical methods. Kinetics. Chemical literature. Digital electronics and computer interfacing. Laboratory measurements and vacuum techniques. GE credit: SciEng, Writ 1 (QL, SE, WE—F, W, S.)

128A. Organic Chemistry (3)
Lecture—3 hours. Prerequisite: course 2C with a grade of C or higher; chemistry majors should enroll in course 129A concurrently. Introduction to the basic concepts of organic chemistry. Synthetic and analytical laboratory studies on stereochemistry and the chemistry of hydrocarbons. Designed primarily for majors in chemistry. —F, W, F, W

128B. Organic Chemistry (3)
Lecture—3 hours. Prerequisite: course 128A or consent of instructor, course 129A strongly recommended; chemistry majors should enroll in course 129B concurrently. Continuation of course 128A with emphasis on advanced laboratory techniques. —W, F, W, S.

128C. Organic Chemistry (3)
Lecture—3 hours. Prerequisite: course 128B, chemistry majors should enroll in course 129C concurrently. Continuation of course 128B with emphasis on catalytic transformations and the chemistry ofamines, phenols, and sugars; selected biologically important compounds. —F, F, S. (S.)

129A. Organic Chemistry Laboratory (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 2C with a grade of C or higher; course 128A (may be taken concurrently). Introduction to laboratory techniques of organic chemistry. Emphasis is on methods used for separation and purification of organic compounds. —F, W, S.

129B. Organic Chemistry Laboratory (2)
Laboratory—6 hours. Prerequisite: courses 128B (may be taken concurrently) and 129A. Continuation of course 129A. Emphasis is on methods used for synthesis and isolation of organic compounds. —F, S, F, S.

129C. Organic Chemistry Laboratory (2)
Laboratory—6 hours. Prerequisite: courses 128C (may be taken concurrently) and 129B. Continuation of course 129B. —F, W, S.

130A. Pharmaceutical Chemistry (3)
Lecture—3 hours. Prerequisite: course 118C or 128C. Examination of the design principles and experimental methods used in pharmaceutical and medicinal chemistry. —W (W)

130B. Pharmaceutical Chemistry (3)
Lecture—2 hours; laboratory—1 hour. Prerequisite: course 130A. Continuation of course 130A with emphasis on case studies of various drugs and the use of computational methods in drug design. —S. (S.)

130C. Case Studies in Pharmaceutical Chemistry (1)
Seminar—2 hours; independent study. Prerequisite: courses 130A and 130B concurrently. Seminar. Exploration of medicinal and pharmaceutical chemistry topics through seminars presented by professional chemists (and allied professionals). Designed to highlight career opportunities for students with a degree in pharmaceutical chemistry. (P/NP grading only.)—S. (S.)

131. Modern Methods of Organic Synthesis (3)
Lecture—3 hours. Prerequisite: course 118C or 118C. Separation, purification, identification and determination of organic compounds using modern methods of synthesis, computational chemistry and instrumentation. Emphasis on pharmaceutical and medicinal substances. —F, S. (F, S.)

135. Advanced Bio-organic Chemistry Laboratory (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: course 118C or 129C. Separation, purification, identification and determination of organic compounds using modern methods of synthesis, computational chemistry and instrumentation. Emphasis on pharmaceutical and medicinal substances. —F, S. (F, S.)

145. Good Quality Practices (3)
Discussion—1 hour; laboratory—6 hours. Prerequisite: course 129B or 118B. Open to Chemistry and science majors. Preparation for work in GQP laboratories. Emphasis on current context within GQP-Good Quality Practices (GMP Good Manufacturing Practice, GCP Good Clinical Practices). Lab practice in GQP skills. GE credit: SciEng (SE—F, W, S.)

150. Chemistry of Natural Products (3)
Lecture—3 hours. Prerequisite: course 128C. Chemistry of terpenes, steroids, acetonides, and alkaloids: isolation, structure determination, biosynthesis, chemical transformations, and total synthesis. GE credit: SciEng, Writ 1 (QL, SE, WE—F, S.)

192. Internship in Chemistry (1-6)
Internship—3-18 hours. Prerequisite: upper division standing; project approval by faculty sponsor prior to enrollment. Supervised internship; course requires a final written report. May be repeated for credit for a total of 6 units. (P/NP grading only.)—F, W, S.

194AH. Undergraduate Honors Research (2)
Independent study—2 hours. Prerequisite: open only to chemistry majors who have completed 135 units and who qualify for the honors program. Original research under the guidance of a faculty adviser, culminating in the writing of an extensive report. (Deferred grading only; pending completion of sequence.)—F, W, S. (F, W, S.)

194BH. Undergraduate Honors Research (2)
Independent study—2 hours. Prerequisite: open only to chemistry majors who have completed 135 units and who qualify for the honors program. Original research under the guidance of a faculty adviser, culminating in the writing of an extensive report. (Deferred grading only; pending completion of sequence.)—F, W, S. (F, W, S.)

194HC. Undergraduate Honors Research (2)
Independent study—2 hours. Prerequisite: open only to chemistry majors who have completed 135 units and who qualify for the honors program. Original research under the guidance of a faculty adviser, culminating in the writing of an extensive report. (Deferred grading only; pending completion of sequence.)—F, W, S. (F, W, S.)

195. Careers in Chemistry (1)
Seminar—2 hours. Prerequisite: junior or senior standing in Chemistry. Designed to give Chemistry undergraduate students an in-depth appreciation of career opportunities with a bachelors degree in chemistry. Professional chemists (and allied professionals) describe research and provide career insights. (P/NP grading only.)—F, W, S. (F, W, S.)

197. Projects in Chemical Education (1-4)
Discussion and/or laboratory. Prerequisite: consent of instructor. Participation may include development of laboratory experiments, lecture demonstrations, autotutorial modules or assistance with laboratory sessions. May be repeated for credit for a total of 12 units. (P/NP grading only.)—F, W, S. (F, W, S.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor based upon adequate preparation in chemistry, mathematics and physics. (P/NP grading only.)—F

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor based upon adequate preparation in chemistry, mathematics, and physics. (P/NP grading only.)

Graduate

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. —F. (F)

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 spectropscopy; other spectroscopic methods. —W. (W)

209. Special Topics in Physical Chemistry (3)
Lecture—3 hours. Prerequisite: courses 210A and 21A. Graduate standing in Chemistry. Advanced topics in physical chemistry, biophysical chemistry or chemical physics chosen from areas of current research interest. May be repeated for credit when topic differs. Offered irregularly.
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 transformations, total synthesis, biological activity, and biosynthesis. Biochemical origins will be used as a unifying theme. —W (W)

237. Bio-organic Chemistry (3) Lecture—3 hours. Prerequisite: course 128C or the equivalent. Structure and function of biomolecules; molecular recognition, enzyme reaction mechanisms; desalientases for enzymes, enzyme engineering; design of artificial enzymes and application of enzymes in organic synthesis. Offered alternate years. —W

238. Introduction to Chemical Biology (3) Lecture—3 hours. Prerequisite: course 118C or 128C, or the equivalent; course 130A & B & Biological Sciences 102, 103, & 104, or the equivalents recommended. Synthesis of complex molecules in nature. Use of biosynthetic pathways in synthesis of new chemical entities. Applications of small molecules in chemical genetics and structural biology. Solving biological problems using synthetic biomolecules. —F (F)

240. Advanced Analytical Chemistry (3) Lecture—3 hours. Prerequisite: courses 110A and 115 or the equivalent. Numerical treatment of experimental data; thermodynamics of electrolyte and non-electrolyte 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. —F (F)

241A. Surface Analytical Chemistry (3) Lecture—3 hours. Prerequisite: course 110C or the equivalent. Concepts of surfaces and interfaces: physical properties, unique chemistry and electronic effects. Focus on gas-solid interfaces, with some discussion of liquid-solid interfaces. Offered in alternate years. —F

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 spectroscopic methods, including multiphoton spectroscopy, time-resolved laser and x-ray photoemission, and phase-contrast x-ray imaging. Offered in alternate years. —F

241C. Mass Spectrometry (3) Lecture—3 hours. Prerequisite: course 110C and 115 or the equivalent. Mass spectrometry and related methods: an introduction methods, mass analyzers, and detectors. Related methods may include ion-molecule reactions, unimolecular dissociation of organic and bio-organic molecules, and applications in biological and environmental analysis. Offered in alternate years. —W

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 potentiometric and galvanostatic control, and their application in chemical analysis. Offered in alternate years. —W

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, and scanning electron microscopy. Application to nanoscience and analytical and bioanalytical chemistry. Some laboratory demonstrations. Offered in alternate years. —W

245. Mechanistic Enzymology (3) Lecture—3 hours. Advanced topics in chemical kinetics relevant to enzymes, enzyme kinetics, theory of enzyme catalysis, and principles of a selection of organic enzyme reaction mechanisms by the tools introduced in the first part of the course. —F (F)

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. —F, W, S. (F, W, S)

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 topic differs. [S/U grading only]—F, W, S. (F, W, S)

264. Advanced Chemical Research Methodology (6) Laboratory/discussion—18 hours. Prerequisite: course 293 and 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 the preparation of material for publication. May be repeated for credit when topic differs. [S/U grading only]—F, W, S. (F, W, S)

280. Seminar in Ethics for Scientists (2) Seminar—2 hours. Restricted to 20 students; 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. (Same course as Physics 280 and Engineering Chemical and Materials Science 280.) [S/U grading only]—S

290. Seminar (2) Seminar—2 hours. Prerequisite: consent of instructor. [S/U grading only]—F, W, S. (F, W, S)

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]—F (F)

294. Presentation of Chemistry Research (1) Seminar—2 hours. Prerequisite: graduate standing. Restricted to graduate students in Chemistry who have not yet given their departmental presentation. Introduces first and second-year Chemistry graduate students to the process of giving an effective research presentation. Advanced Ph.D. students give formal seminars describing the design and execution of their research projects. May be repeated three times for credit. [S/U grading only]—F, S, (F, S)

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]—F (F)

296. Research in Pharmaceutical Chemistry (6) Laboratory—18 hours. Prerequisite: courses 130A and 130B, 135, and 233 (may be taken concurrently); consent of instructor. Offered to students in the Integrated B.S./M.S. Program in Chemistry. Lab oratory provides qualified graduate students with the opportunity to pursue original investigation in Pharmaceutical Chemistry and allied fields in order to fulfill the letter-graded research requirement of the Integrated B.S./M.S. Program in Chemistry (Pharma ceutical Chemistry Emphasis). May be repeated three times for credit when topic differs. —F, W, S, Su. (F, W, S, Su)

298. Group Study (1-5) W (W)

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

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 sections and student laboratories. Participation in the teaching program required for Ph.D. in Chemistry. May be repeated for credit. [S/U grading only]—F, W, S. (F, W, S)

392. Advanced Methods of Teaching Chemistry (2) Lecture—2 hours. Prerequisite: course 390. 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]—S

Chicana/Chicano Studies

[College of Letters and Science]

Carlos F. Jackson, M.F.A., Chairperson of the Department
Department Office. 2102 Hart Hall 530-752-2421; Fax 530-752-8814; http://chi.ucdavis.edu

Faculty

Angie Chabram, Ph.D., Professor Sergio de la Mora, Ph.D., Associate Professor Alex Serrano de la Torre, Ph.D., Professor Yvette Flores, Ph.D., Professor Carlos F. Jackson, M.F.A., Associate Professor Kevin R. Johnson, J.D., Professor (School of Law) Macario Montoya, M.F.A., Assistant Professor Clarissa Rojas, Ph.D., Assistant Professor Natalia Deeb-Sossa, Ph.D., Associate Professor Susy Zepeda, Ph.D., Assistant Professor

Emeriti Faculty

Maluquias Montoya, B.F.A., Professor Emeritus Beatriz Paezmino, Ph.D., Associate Professor Emerita Regina Rochin, Ph.D., Professor Emerita Adaljiza Sosa-Riddell, Ph.D., Senior Lecturer Emerita

The Major Program

The Department of Chicana/Chicano Studies offers an interdisciplinary curriculum focusing on the Chicana/Chicano experience through an analysis of class, race, ethnicity, gender and sexuality, and cultural expression. The department offers a major leading to the Bachelor of Arts degree and a minor that can satisfy breadth requirements for the College of Letters and Science. Both the major and minor frame an analysis within the historical 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 are no language requirements for the minor. The Chicana/o Studies courses are offered 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 are prerequisites for certain upper division courses. At the upper division level, majors pursue advanced interdisciplinary coursework in both the humanities/arts and the social sciences. At this level, students will find courses in Chicana/Chicana/o history, theory, health 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. The Cultural Studies emphasis prepares students for professional work in cross-cultural education, cultural/art centers, artistic expression and communications. The Social/Policy Studies emphasis orient students towards 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:

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<thead>
<tr>
<th>Units</th>
<th>Cultural Studies Emphasis:</th>
<th>Preparatory Subject Matter</th>
<th>Depth Subject Matter</th>
<th>Total Units for the Major</th>
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<tbody>
<tr>
<td>16-31</td>
<td>Chicana/o Studies 150, 181</td>
<td>One course from: Chicana/o Studies 10, 50, 60, 65, 70, or 73</td>
<td>One course from: Chicana/o Studies 110, 111, 112, 130, 131, 132</td>
<td>56-71</td>
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<td>Spanish 1, 2, 3, or 28, 31, 32 or the equivalent</td>
<td>Spanish 1, 2</td>
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Social/Policy Studies Emphasis:

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<th>Units</th>
<th>Preparatory Subject Matter</th>
<th>Depth Subject Matter</th>
<th>Total Units for the Major</th>
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<td>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</td>
<td>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</td>
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Cultural Studies Emphasis:

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<tr>
<th>Major Course Requirement</th>
<th>Chicana/o Studies</th>
<th>Social/Policy Studies Emphasis</th>
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<tbody>
<tr>
<td>10. Introduction to Chicana/o Studies (4)</td>
<td>Lecture—3 hours; discussion—1 hour. Analysis of the situation of the Chicana/o (Mexican-American) people, emphasizing their history, literature, political movements, education and related areas. Offered in alternate years. GE credit: Div</td>
<td>Wrt</td>
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<tr>
<td>21. Chicana/o and Latina/o Health Care Issues (4)</td>
<td>Lecture—3 hours; discussion—1 hour. Prerequisite: course 10. Overview of health issues of Chicana/o and Latinas/os in the State of California; role of poverty/lack of education in limited access to health care. GE credit: Div</td>
<td>OL, WE.—Flores, de la Torre</td>
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<tr>
<td>21S. Chicana/o and Latina/o Health Care Emphasis (4)</td>
<td>Lecture—4 hours. Prerequisite: Spanish 3 or the equivalent. Overview of health issues of Chicana/o and Latinas/os in the State of California; role of poverty/lack of education in limited access to health care. All course instruction for this course will be in Spanish. Course is taught abroad. Not open for credit to students who have completed course 21. GE credit: Div</td>
<td>OL, WE, WC, WE.—W. (M.) de la Mora</td>
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<tr>
<td>23. Qualitative Research Methods (4)</td>
<td>Lecture/discussion—3 hours; discussion—1 hour. Dominant models of qualitative inquiry in ethnic/lateral studies, Chicana/o studies, and Chicano/a studies; applications of these models to Chicana/o studies and Chicano/a studies. Offered in alternate years. GE credit: Div</td>
<td>SOCSCI, AH, OL, SS, WE.—S. (S.)</td>
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<tr>
<td>30. United States Political Institutions and Chicana/o (4)</td>
<td>Lecture/discussion—3 hours; term paper. Overview of the major political institutions and ideologies of the United States and the Chicana/o people’s historical and contemporary role in, effects from, and responses to them. Theory, method and critical analysis. Offered irregularly. GE credit: Div</td>
<td>ACGH, DD, OL, SS, WE</td>
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<td>40. Comparative Health: Top Leading Causes of Death (4)</td>
<td>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 40S. GE credit: SciEng, Div, Wrt</td>
<td>QL, SE, WE.—W. Deeb-Sossa, Rojas</td>
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<tr>
<td>60. Chicana and Chicano Representation in Cinema (4)</td>
<td>Lecture—4 hours. Survey of contemporary Chicana/o art in context of the social turmoil from which it springs. Includes poster art, murals, and the influence of the Mexican mural and graphic movement, and social responsibility of the artist. GE credit: Div</td>
<td>ACGH, AH, DD, DL, VL, WE, WC, WE.—W. Jackson, M. Meza</td>
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<td>73. Chicana/o Art Expression Through Silk Screen (4)</td>
<td>Studio—8 hours; laboratory—4 hours. Introductory level studio course using silk screen and basic printing techniques to explore the Chicana/o cultural themes and expressions. Students will experiment with images and symbols from their immediate environment/culture. Integrated approach to Chicana/o culture and Chicana/o art. GE credit: ACH, AH, DD, DL, VL, WE.—W. Jackson, M. Meza</td>
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Chicana/Chicano Studies

Major Adviser: A. Martinez

Minor Program Requirements:

This minor provides a broad overview of the historical, social, political, economic, ideological and cultural forces that shape the Chicana/o and Latina/o experience. The minor requires students to complete without course work in Spanish. Students should contact the minor advisor for a plan approval and verification of the minor.

UNITs

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<tr>
<th>Chicana/o Studies</th>
<th>Social/Policy Studies</th>
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<td>181</td>
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<td>169A or 169B</td>
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40S Comparative Health: Top Leading Causes of Death (4) | 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 40S. GE credit: SciEng, Div, Wrt|QL, SE, WE.—W. Deeb-Sossa, Rojas |

405. Comparative Health: Leading Causes of Death (4) | Lecture—4 hours. Prerequisite: Statistics 13 or consent by instructor. Introduction to epidemiology of 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: SciEng, Div, Wrt|QL, SE, WC, WE |

50. Chicana and Chicano Culture (4) | Lecture—3 hours; discussion—1 hour. Interdisciplinary study of Chicana and Chicano experience by Chicana/o filmmakers, as well as non-Chicana/os, including independent filmmakers and the commercial industry. GE credit: Div|ACGH, AH, DD, DL, VL, WE.—W. de la Mora |

65. New Latin American Cinema (4) | Lecture/discussion—2 hours; discussion—1 hour; film viewing—2 hours. Introductory-level study of Chicana and Chicano representation in cinema. Depiction of Chicana and Chicano experience by Chicana/o filmmakers, as well as non-Chicana/os, including independent filmmakers and the commercial industry. GE credit: Div|ACGH, AH, DD, DL, VL, WE.—W. (M.) de la Mora |

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 poster art, murals, and the influence of the Mexican mural and graphic movement, and social responsibility of the artist. GE credit: Div|ACGH, AH, DD, DL, VL, WE, WC, WE.—W. Jackson, M. Meza |

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 the Chicana/o cultural themes and expressions. Students will experiment with images and symbols from their immediate environment/culture. Integrated approach to Chicana/o culture and Chicana/o art. GE credit: ACH, AH, DD, DL, VL, WE.—W. Jackson, M. Meza |

Chicana/o Studies 205
Upper Division

100. Chicana/o/Chicano Theoretical Perspective (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 10 or Sociology 1. The Chicana/o experience in the American society and economy viewed from theoretical perspectives. Immigrant history, integration of Chicana/o labor into American class structure, education inequality, ethnicity, the family and Chicana/o politics. (Former course Sociology 110.) GE credit: SocSci, Div | Wrt | ACGH, DD, OL, SS, WE. — S. (S.) Chabram, Zepeda

110. Sociology of the Chicana/o Experience (4)
Lecture/discussion—4 hours. Prerequisite: course 10 or Sociology 1. The Chicana/o experience in the American society and economy viewed from theoretical perspectives. Immigration, history of integration of Chicana/o labor into American class structure, education inequality, ethnicity, the family and Chicana/o politics. (Former course Sociology 110.) GE credit: ACGH, DD, SS, WC, WE. — S. Deeb-Sossa, Zepeda

111. Chicana/os/Mexicanos in Contemporary Society (4)
Lecture/discussion—4 hours. Prerequisite: course 10 or Sociology 1; recommended History 169B. Analysis of the role and status of Chicana/os/Mexicanos in contemporary society. Special emphasis on their historical role, the political, economic and social institutions that have affected their status, and their contributions to society and their community. (Former course 102.) GE credit: ArtHum | ACGH, DD, SS, WE. — Deeb-Sossa

112. Globalization, Transnational Migration, and Chicana/o and Latina/o Communities (4)
Lecture—4 hours. Prerequisite: course 10. Chicana/o and Latina/o migration experiences within a global context. Topics include national and/or transnational migration in Mexico, Central America, and the United States. GE credit: SocSci, Div | Wrt | ACGH, DD, OL, SS, WE. — Deeb-Sossa

113. Latin American Women's Engagement in Social Movements (4)
Lecture/discussion—3 hours; term paper. Examination of how women of different racial/ethnic and class backgrounds in Latin America challenge their marginalization. Exploration of US foreign policy, its effects on Latin American institutions and on Latin American citizens. Using Chicana feminist perspectives. Offered in alternate years. GE credit: SocSci, Div | Wrt | ACGH, DD, SS, WE. — Deeb-Sossa

114. Women of Color Reproductive Health and Reproductive Politics in a Global Perspective (4)
Lecture/discussion—3 hours; term paper. Study of contemporary issues in reproductive health and reproductive politics, both globally and in the U.S., for women of color. Offered in alternate years. GE credit: SocSci | ACGH, DD, SS, WC, WE. — W. (W.) Deeb-Sossa

115. Women of Color Reproductive Health and Gender Politics in Cuba and the US (4)
Lecture/discussion—3 hours; term paper. Study of contemporary issues in reproductive health, reproductive politics, both in Cuba and in the U.S., for women of color. Offered in alternate years. GE credit: SocSci | ACGH, DD, SS, WC, WE. — W. (W.) Deeb-Sossa

120. Chicana/o Psychology (4)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 21; introductions to psychology course recommended. Introduction to the field of Chicana/o psychology. Analysis of socio-cultural context of Chicana/o issues and Latin American themes. Special attention to issues of ethnic identity development, bilingualism, and development of self esteem. Impact of minority experience, migration, acculturation are examined. GE credit: SocSci, Div | ACGH, DD, OL, SS, WE. — Flores

121. Chicana/o Community Mental Health (4)
Lecture—3 hours; term paper. Prerequisite: course 10 or 20. Mental health needs, problems, and service utilization patterns of Chicana/os and Latinas/os will be analyzed. An analysis of social service policy, and the impact of mental health programs. Offered Alternate Years. GE credit: SocSci, Div, Wrt | ACGH, DD, OL, SS, WE. — Flores

122. Psychology Perspectives Chicana/o and Latina/o Family (4)
Lecture—4 hours. Prerequisite: course 10; introductory psychology course highly recommended, and/or consent of instructor. Role of migration and acculturation on family structure and functioning. From a psychological and Chicana/o/Chicano Studies perspective, contemporary gender roles and variations in family structures are examined. Special topics include family violence, addiction, family resilience and coping strategies. GE credit: SS, WE. — F. Flores

125. Psychology Perspectives Chicana/o and Latina/o Family (4)
Lecture—4 hours. Role of migration and acculturation on family structure and functioning. From a psychological and Chicana/o/Chicano Studies perspective, contemporary gender roles and variations in family structures are examined. Special topics include family violence, addiction, family resilience and coping strategies. This course is not open for credit to students who have completed course 122. GE credit: OL, SS, WC, WE. — Flores

123. Psychological Perspectives on Chicana/o and Latina/o Children and Adolescents (4)
Lecture—3 hours; term paper. Prerequisite: course 10 or 21. Restricted to upper division standing. Psychological and educational development of Chicana/o/Latina children and adolescents, with particular attention to the formation of ethnic, gender, class, race, and sexual identities. GE credit: SocSci, Div, Wrt | ACGH, DD, OL, SS, WE. — Flores

1255. 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 Latin American families in contact with American culture. 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. 1255 GE credit: SS, WE. — F. Flores

130. United States-Mexican Border Relations (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing. Theories of U.S.-Mexican border relations, with an emphasis on economic, social, and political issues in the border region. Related to women's organizations, economic crises, and legal issues. GE credit: Div | ACGH, DD, SS, WE. — F. (F.) Chabram, Rojas

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 movement, Chicana movement, and Chicana movement. Course deals with political policy process and the relationship of Chicanas/Latinas to public policy formation. Offered in alternate years. GE credit: SocSci, Div | ACGH, DD, OL, SS, WE.

1315. 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, 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: SocSci, Div | ACGH, DD, OL, SS, WE.

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 Marxian theories and concepts applicable to Chicana/o communities, case studies of Chicana/o communities, especially in California and Texas. GE credit: ACGH, DD, OL, WE. — S.

1335. 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 political economy of 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. Offered irregularly. GE credit: OL, WC, WE.

140A. Quantitative Methods: Chicano/ Latino Health Research (4)
Lecture—3 hours; discussion—1 laboratory—1 hour. Prerequisite: two years of high school algebra or the equivalent in college. Focuses on measuring Latino/Chicano health outcomes using a quantitative approach. Assesses main hypothesis and addresses measurement of disease frequency and health effects. Offered in alternate years. GE credit: SciEng | ACGH, DD, QL, SS, WE. — S. (S.) Deeb-Sossa

141. Community-Based Participatory Research and Chicana/o and Latina/o Health (4)
Lecture/discussion—3 hours; term paper. Overview of CBPR, as well as methodological CBPR considerations in building community partnerships, community assessment, issue analysis, research planning, data gathering, and data sharing with Chicana/o and Latina/o communities in particular. GE credit: WE. — F. Flores, de la Torre

1455. Bi-National Health (5)
Lecture—5 hours. Prerequisite: Biological Sciences 1A-1B-1C, Spanish 21 or 3 or consent of instructor; upper division standing only. Examination of health status and intervention strategies presented in public health care settings, private clinics and by外籍 healers in Mexico. Analysis of impact of high risk diseases. Offered in a Spanish speaking country under supervision of UC Davis faculty/lecturer. GE credit: OL, WC, WE. — F. Flores, de la Torre

1465. Public Health in Latin America (5)
Lecture/discussion—4 hours; term paper. Critical examination of emerging Public Health issues in Latin America in light of economics, politics, social conditions, Contemporary behavioral framework works used in public health. Includes analysis of clinical medical and health care systems. — de la Torre

1475. Indigenous Healing and Biodiversity in Latin America (5)
Lecture—4 hours; term paper. Contrast between western and traditional healing practices in Latin America and the role of the natural environment in creating sustainable health delivery systems. Questions of health status attributable to public health and environmental risk factors. GE credit: OL, WC, WE. — F. Flores, de la Torre

150. The Chicana and Chicano Movement (4)
Lecture—3 hours; term paper. Development of the Chicana Movement within the context of the socio-political movements of the 1960's in a national and global perspective. Historical and political perspectives and the implications for political strategies. GE credit: ArtHum, Div, Wrt | ACGH, AH or SS, DD, WC, WE. — W. (W.)
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. Bilingual readings, lectures, discussions, and writing in Spanish. (Former course Spanish 126C.) GE credit: ArtHum, Div | AGCH, AH, DD, OL, WI, VC, WE. — W. Chabram, Montoya

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 126E.) GE credit: AGCH, AH, DD, OL, WI, VC, WE. — W. Chabram

156. Chicana/o 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.) GE credit: ArtHum, AH, DD, OL, WI, VC, WE. — S. Chabram

157. Chicana and Chicano Narrative (4)
Lecture/discussion—3 hours; term paper. Exploration of the consciousness of the Chicana and Chicano narratives, encompassing visual art, fiction, poetry, film, theater, and creative nonfiction. Exposure to a variety of artists and scholars whose work shapes our evolving understanding of the Chicana/o experience. GE credit: ArtHum | AGCH, AH, DD, OL, VI, VC, WE. — S. Montoya

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 Chicana/o identity. Showcases genres, periods, auteurs, movements, and emphasis on gendered and sexualized narratives. GE credit: ArtHum, Div | AH, VI, VC, WE. — de la Mora, Zepeda

165. Chicanas, Latinas and Mexicanas in Commercial Media (4)
Lecture/discussion—4 hours; laboratory—2 hours. Prerequisite: course 60 or other film or feminist theoretical work. Exploration of Chicana/o feminist narratives of Chicana/o experience. GE credit: ArtHum | AGCH, AH, DD, OL, WI, VC, WE. — Montoya

170. Contemporary Issues in Chicano Art (4)
Lecture—4 hours. Issues and conflicts in the dismantling of the Contemporary Chicano Art Movement: Response and challenge to the dominant culture. GE credit: ArtHum, AH, DD, OL, WI, VC, WE. — de la Mora

171. Mexican and Chicano Mural Workshop (4)
Studio—8 hours; independent study—1 hour. Prerequisite: course 70; 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 one time for credit. (Same course as Art Studio 171.) GE credit: ArtHum [AH, VL. — S. Jackson, Montoya]

172. Chicana/o Voice/Poster Silk Screen Workshop (4)
Studio—8 hours; independent study—1 hour. Prerequisite: course 70 or course 73 and consent of instructor. The forms used by Chicana/os and other people of color to reach the defies of social and political existence and the possibility of change for the Chicanas/o art's perspectives. May be repeated one time for credit. GE credit: AH, OL, WI, VC, WE. — W. Jackson

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 granting. Topics include community needs assessments, development of human subjects protocols, data collection, methods, evaluation design and basic methodologies for grant development applications in the Latino community. Offered irregularly. — 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, Puerto Ricanas, and Cubans in the U.S. and their countries of origin. GE credit: ArtHum, Div, VI, OL, AH or SS, DD, WE.

182. Race and Juvenile Justice (4)
Lecture—4 hours. Prerequisite: course 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 or SocSci, Div, WRT | AGCH, DD, OL, SS, WE. — Rojas

184. Latino Youth Gangs in Global Perspective (4)
Lecture—3 hours; term paper. Comparative analysis of Latino youth gangs in Europe, Latin America, and the United States. Social, economic, political, and cultural factors leading to youth gangs as well as the responses are considered within a global perspective. Not open for credit to students who have completed course 1845. Offered irregularly. GE credit: SocSci | AGCH, DD, OL, SS, VC, WE.

1845. Latino Youth Gangs in Global Perspective (4)
Lecture—12 hours. Comparative analysis of Latino youth gangs in Europe, Latin America, and the United States. Social, economic, political, and cultural factors leading to youth gangs as well as the responses to the youths are considered within a global perspective. Not open for credit to students who have completed course 184. Offered irregularly. GE credit: SocSci | AGCH, DD, OL, SS, WC, WE.

192. Internship in the Chicana/o/Latina/o/Latino/Community (1-5)
Internship—3-36 hours. Prerequisite: course 10, 21, or 30, Spanish 3 or the equivalent. Academic guidance combined with internship in community agencies serving Latino/Chicana/o/Chicano clients. Use of bilingual skills and knowledge 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)

194A. 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.) GE credit: OL, WE. — F, W, S. (F, W, S)

194HB. 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.) GE credit: OL, WE. — F, W, S. (F, W, S)

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.) GE credit: OL, WE. — F, W, S. (F, W, S)

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 Program Chairperson. (P/NP grading only)

1995. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

Graduate

230. Chicano/Latino Hispanic Politics (4)
Seminar—3 hours; term paper. Prerequisite: two undergraduate courses in Chicana/o Studies or consent of instructor. Examination of Chicano/Latino political realities. Evaluate theories, ideology, and practice of Chicano politics. Brief history of Chicano/Latino/Hispanic political activity, comparing movements among political modes, gendered politics, and understanding relationships among Chicanos, Mexicans, and American and world politics. Offered irregularly. — Chabram

298. Group Study for Graduate Students (1-5)
Prerequisite: graduate standing, consent of instructor. May be repeated for credit when topic differs. (S/U grading only)

299. Special Study for Graduate Students (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only)

Professional

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)

Child Development (A Graduate Group)

Katherine J. Conger, Ph.D., Group Chairperson

Group Office.
1315 Hart Hall
530-754-4109
http://humandevelopment.ucdavis.edu/
Faculty. See Human Development (A Graduate Group), on page 374.

Graduate Study. The Graduate Group in Child Development offers a multidisciplinary program leading to an M.S. degree. The program provides students with an opportunity to pursue a coordinated course of graduate study in the field of child development which cuts across departmental boundaries. Students may work with children and families in the community, as well as at the University's Center for the Study of Child Development.
for Child and Family Studies. Recipients of the degree gain sufficient background to engage in pro-
fessions that directly (e.g., preschool, A-H) or indi-
rectly (e.g., social policy) involve children and
families, obtain positions in teaching or research set-
tings, or pursue further study leading to a doctorate in
child development, human development, clinical
psychology, or related fields.

Applicants seeking admissions and fellowships con-
sideration must submit all materials by our priority
December 15 deadline. The final admissions dead-
line is March 1. See our website for more details.

Graduate Adviser. Contact Group office.

Chinese

See Asian American Studies, on page 183; East Asian Languages
and Cultures, on page 245; and East
Asian Studies, on page 250.

Cinema and Digital Media

[College of Letters and Science]

Michael Neff, Ph.D., Program Director
Kris Ravetto-Biagioli, Ph.D., Program Director
Program Office, 101 Art Building
530-752-0890; http://catcs.ucdavis.edu

Committee in Charge

Stephanie Boluk, Ph.D. (English, Cinema and Digital Media)
Jesse Drew, Ph.D. (Cinema and Digital Media)
Jaimey Fisher, Ph.D. (German and Russian, Cinema and
Digital Media)
Patrick Lemieux, Ph.D. (Cinema and Digital Media)
Colin M. Milburn, Ph.D. (English, Science and
Technology Studies, Cinema and Digital Media)
Fiamma Montezemolo, Ph.D. (Cinema and
Digital Media)
Michael Neff, Ph.D. (Computer Science, Cinema and
Digital Media)
Bob Osteriaq, Ph.D. (Cinema and Digital Media)
Kris Ravetto-Biagioli, Ph.D. (Science and
Technology Studies, Cinema and Digital Media)
Eric Smoodin, Ph.D. (American Studies)
Julie Wyman, M.F.A. (Cinema and Digital Media)

Faculty

Stephanie Boluk, Ph.D.
Jesse Drew, Ph.D.
Jia Xiong, Ph.D.
Jaimey Fisher, Ph.D.
Timothy Lenoir, Ph.D.
Patrick Lemieux, Ph.D.
Colin M. Milburn, Ph.D.
Fiamma Montezemolo, Ph.D.
Michael Neff, Ph.D.
Bob Osteriaq, Ph.D.
Kris Ravetto-Biagioli, Ph.D.
Julie Wyman, M.F.A.

Emeriti Faculty

Frances Dyson, Ph.D., Professor Emerita
Lynn Hershman, M.A., Professor Emerita
Sarah Pia Anderson, B.A., Professor Emerita

The Cinema and Digital Media

Major Program

The Cinema and Digital Media (CDM) program
combines the study of audiovisual and digital
media, theories about such media, and the
relevant modes of artistic practice and production. CDM inte-
grates the analysis of audiovisual and digital texts
with their theoretical underpinnings and their meth-
ods of production. The program also addresses the
particular impact that technology has on culture in its
many forms and fields.

CDM faculty teach and research on various histo-
ries, theories, and current fields for teaching and research in cinema and digital media
include the history and analysis of film and
video, film and video production, electronic music,
digital content creation, digital arts, community media and activism, computer graphics,
animation, and gaming—as well as the theories
and politics of these various areas.

The Program. Preparatory course work involves a
solid introduction to the history, ideas and current
trends in cinema and digital media. For depth sub-
ject matter, students in the major select a combina-
tion of critical studies and creative production
courses. Two courses will be selected from the pro-
duction/programming distribution, two from the
history/distribution and four will be elected by the
student, allowing them to take up to six produc-
tion courses or six studies/theory classes, should
they so choose.

Career Alternatives. Cinema and Digital Media is
designed to prepare graduates to be highly adapt-
able analytical thinkers, collaborative, multi-skilled
and current with the latest developments in media,
technology, and the field. Perhaps most importantly is 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, rap-

cidly changing world. Final research papers and cre-
ative production portfolios will provide graduate
school admissions committees, employers or clients
with tangible evidence of Cinema and Digital Media
graduates’ track records and talents.

Course Changes. Cinema and Digital Media is
working on updating all of the existing FMS, TCS,
and CTS course codes. If you have any questions regarding the course code
changes and equivalent major requirements please contact
the Arts Group Advising Center at 530-752-
0890.

A.B. Major Requirements:

Preparatory Subject Matter.................25
Choose two courses from:
- Film Studies 1, Technocultural Studies 1 or
  5 ...................................................... 8
- Cinema and Technocultural Studies 12, 20
  ................................. 9
Choose two courses from:
- Cinema and Technocultural Studies 40A,
  40B, 41A, 41B; Film Studies 45 ............ 8

Depth Subject Matter ....................37-38
Film Studies 127 or Cinema and
Technocultural Studies 150 .............. 5
Choose two courses for a total of 8 units from
the following courses:
- Art Studio 114A, 114B, 114C, 117;
  Cinema and Technocultural Studies 116,
  124E, 174; Technocultural Studies 100,
  101, 103, 104, 111, 112, 113, 115,
  121, 122, 125, 130, 131, 170A-E,
  175, 192, 199, 199 .......................... 8
Choose two courses for a total of 8 units from
the following courses:
- Cinema and Technocultural Studies 146A,
  147A, 150; Film Studies 120, 121, 125,
  124, 125, 127, 129, 142, 176A, 189,
  194H, 195H, 198, 199; Cinema and
  Technology Studies 160; Technocultural
  Studies 151, 152, 155, 158, 159.
Some courses are identified as fulfilling more
than one requirement; a given course can only fulfill one such requirement
plus four additional courses chosen
from the lists above for a total of at least 16
units ................................................... 16

Total Units for the Major ..................62-63

Major Adviser. Information on the current Aca-
ademic Advisers can be obtained by contacting
the Arts Group Advising Center at 530-752-0890.

The Film Studies Major Program

Major is closed to new students beginning 2015-
2016.

Interested students are encouraged to explore the Film
Studies minor which is open to new and current
students, and the Cinema and Digital Media major which incorporates many of the courses previously
offered through Film Studies.

The Program. The interdisciplinary major in Film
Studies takes one of the most influential art forms of
the twentieth century and today as its object of study.
The field of Film Studies addresses the history, the-
ory, and culture of this art form and asks questions
about film texts themselves: modes of production
(including everything from filmmakers’ aesthetic
choices to 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 areas, have been central to
Film Studies almost since its inception and continue
to shape much of the work in the field. While the pro-
gram emphasizes film history, criticism, and the-
ory, students also have opportunities to explore film/
video production.

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 adviser, 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: for example, local and national
film and television production companies, local tele-
vision newsrooms, community television stations,
computer graphic companies, advertising and mar-
ket companies, public relations departments, and
film distribution companies. Students wishing to pur-
sue graduate work will be prepared to go on in film
studies, as well as a variety of other fields that draw
on interdisciplinary study: for example, American
studies, English, literatures and languages, drama,
communication, computer science, cultural studies,
women and gender studies, and ethnic studies pro-
grams. Many film students also choose to go on to
law school, and the analytical skills, writing abilities,
and familiarity with theoretical thought developed
through the film major prepare them well for the
study and practice of law.

The A.B. Major Requirements:

Preparatory Subject Matter ...............20-40
Film Studies 1 .................................... 4
A four-course sequence in a single language or
equivalent .................................. 0-20
One course from: African American
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, 30 ............................. 4
Two courses from: Art History 1A, 1B, 1C,
1D; American Studies 2, Cinema 10,
11; Classics 10; Comparative Literature 3,
4, 5, 6, 7; Dramatic Art 1, 20; English 43,
Arts Group Advising Center at 530-752-0890.

Depth Subject Matter.............36-40
One course from: English 161A, 161 B or Film Studies 124, 125..........4
One course from: English 162, Film Studies 127, Philosophy 127, Women and Gender Studies 162..............4
One course each from the following three topics areas: Cinematic Traditions and Movements, Popular Culture, Gender/Sexuality/Class, Race/Ethnicity/Class, Production and Performance .......12
A current list of approved classes is available from the Advising office and from the faculty adviser.

Total Units for the Major.............56-80
Major Adviser. Information on the current Aca-
demic Adviser can be obtained by contacting the Arts Group Advising Center at 530.752.0890.

Minor Program Requirements:

UNITs

Film Studies.............24

Preparatory Subject Matter.......................28

Preparatory coursework involves a solid introduction to the history, ideas and current activities of Techno-
cultural studies, along with technical skill 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 should 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 relevant to their area of study, upon approval from Technocultural Studies, and may take more courses with approval. The final project for the creative production emphasis will be a major individual or collabora-
tive work. Plans for final projects must be approved in advance.

A.B. Major Requirements:

Preparatory Subject Matter.............36-40

Preparatory coursework involves a solid introduction to the history, ideas and current activities of Techno-
cultural studies, along with technical skill 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 should 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 relevant to their area of study, upon approval from Technocultural Studies, and may take more courses with approval. The final project for the creative production emphasis will be a major individual or collabora-
tive work. Plans for final projects must be approved in advance.

Career Paths

Technocultural Studies is designed to prepare gradu-
tees to be highly adaptable, collaborative, multi-
Skilled, and creative individuals. It is also a research-based program. Perhaps most importantly is self-motivation: students do best when fueled by their own passions and plot their own directions, while held to very high stan-
dards. We feel this is the best education for living and working in a complex and rapidly changing world. Final research papers and creative produc-
tion portfolios will provide graduate school admis-
sions committees, employers, or clients with tangible evidence of Technocultural Studies graduates’ track records and talents.

44. German 48, History 4C, 10C, 17B, 72B; Humanities 5, 6; Japanese 10, Music 10, 28, Native American Studies 33; Russian 41, 42..................8
Note: One of these two courses may be from Design 15, 16 or Dramatic Art 10, 21A, 21B, 24.

Upper division courses selected from the following list, with no more than two courses from any one category: 20

(a) Problems and Themes in Cinema: Anthropology 136, Classics 102, Dramatic Art 115, English 160, 161A, 161B, 162, Film Studies 124, 125, Women’s Studies 162
(b) Cinema, Nation and Nationality: German 119, 142, Film Studies 176A, 176B, Italian 105, Japanese 106, Russian 129, Spanish 148
(c) Film and Social Identities: African American and African Studies 170, 171, Film Studies 120, Jewish Studies 120, Women’s Studies 160, 164
(d) Film/Video Production: Art Studio 116, 117, 150
(e) Popular and Visual Culture: American Studies 130, 132, 133, 139, Art Studio 150, Communication 140, Political Science 165, Textiles and Clothing 107, Women’s Studies 139

Minor Adviser. Information on the current Aca-
demic Adviser can be obtained by contacting the Arts Group Advising Center at 530.752.0890.

The Technocultural Studies Major Program

Major is closed to new students beginning 2015-2016.

Interested students are encouraged to explore the Cinema and Digital Media major which incorpo-
rates many of the courses previously offered through Technocultural Studies.

The Program

The Technocultural 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 sci-
ence. 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 commu-

12. Introduction to Media Computation (4)

Lecture—3 hours; discussion/laboratory—1 hour. Introduction to key computational ideas necessary to understand and produce digital media. Fundamen-
tals of programming are covered as well as analysis of how media are represented and transmitted in digital form. Aimed primarily at non-computer sci-
ence students. [Same course as Engineering: Com-
puter Science 012.] GE credit: ArtHum or SciEng | AH or SE, VL — W (W) Neff

20. Filmmaking Foundations (5)

Lecture—3 hours; laboratory—3 hours; film view-
ing—2 hours, project. Prerequisite: course 5/Technocultural Studies 5 and/or Film Stud-
ies 1. Introduction to filmmaking concepts, princi-
bles, and methods. Hands-on exercises build critical 
and creative capacities, and the historical dialectic between classical narra-
tive filmmaking conventions and artists’ challenges to these conventions. Weekly Lab, Lab Preparation, and Evening Screening. GE credit: ArtHum | AH, VL — F (F) Wyman

40A. Media History 1, Guttenberg to Oppenheimer (4)

Lecture—3 hours; discussion—1 hour; film view-
ing—2 hours, extended writing. History of Media to 1945, with particular focus on the development of mass media technologies including the print-
ing press, the newspaper, photography, cinema, radio and early computing technology. Analysis of inter-related cultural and political topics. [Same Course As: Science and Technology Studies 40A.] GE credit: ArtHum or SocSci | AH or SS, OL, VL, WE — F (F)

40B. Media History 2 1945-Present (4)

Lecture—3 hours; discussion—1 hour; film view-
ing—2 hours, extended writing. Prerequisite: course 40A. History of media from 1945 to present, with particu-
lar focus on the development of the computer, digital network and internet technologies in the context of other media infrastructures like radio, television and satellite networks. Analysis of inter-related cultural/ political topics. [Same course as Science & Technol-
ogy Studies 40B.] GE credit: ArtHum or SocSci | AH or SS, OL, VL, WE — F (F)

41A. History of Cinema from 1895 to 1945 (4)

Lecture—2 hours; discussion—1 hour; film view-
ing—3 hours; extensive writing. Examination of the cultural context of the emergence of cinema. Discus-
sion of cinema as a product of the age of industrial-
ization and conquest, and as an element of visual culture, and mass transportation. GE credit: ArtHum | AH, OL, VL, WE, WC

41B. History of Cinema from 1945 to the present (4)

Lecture—2 hours; discussion—1 hour; film view-
ing—3 hours; extensive writing. Examination of cin-
ema in the postwar period. Study of world cinema trends and the economic and socio-political condi-
tions enabling independent films in the film industry. GE credit: ArtHum | AH, OL, VL, WE, WC

Upper Division

116. Design on Screen (4)

Lecture/discussion—3 hours, film viewing—2 hours. Analysis of the contribution of outstanding designers for cinema, television and filmed entertainment. Study of diverse aesthetic theories of production design and art direction, costume design, or cinema-
tography. Introductory principles and practice, his-
tory. May be repeated twice for credit when topic differs. [Same course as Design 116.] Offered irregularly. GE credit: ArtHum | AH, VL, Lacovelli, Morgan

24E. Costume Design for Film (4)

Lecture/discussion—4 hours. Prerequisite: For Dra-
matic Art majors: Dramatic Art 24 or 1240 or con-
sent of instructor. Theory and practice of the art and business of film costume design. Script analysis, cos-
tume research, developing design concepts, budget-
ing, and current production methods. Execution of designs for period and contemporary films. Viewing of current films. [Same course as Dra-
matic Art 124E.] GE credit: ArtHum | AH, OL, VL — W (W) Morgan

Fall 2011 and on Revised General Education (GE) AH=Arts and Humanities; SS=Science and Engineering; SS=Social Sciences; ACGH=American Cultures; DD=Dominant Diversity; OL=Other Languages; VL=Visual; WC=World Cultures; WE=Writing Experience
Pre-Fall 2011 General Education (GE): ArtHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; DomDiv=Dominant Diversity; Writ=Writing Experience
Quarter Offered: F=Fall, W=Winter, S=Spring, Su=Summer; 2017-2018 offering in parentheses
146.A. Modern Iranian Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: upper-division standing, or consent of instructor. Iranian cinema of the 20th century in the context of profound cultural and social changes in Iran especially since the Iranian Revolution. Productions by representative directors such as Kiarostami, Makhmalbaf, Bahram Beizaie are included. Knowledge of Persian not required. (Same course as Middle East/South Asia Studies 131A.) Offered in alternate years. GE credit: ArtHum, Div, Writ | AH, OL, VL, WC, WE. —S. (S.) Fisher, Ravetto-Biagioloi, Smooldin

45. Vampires and Other Horrors in Film and Media (4)
Lecture—2 hours; discussion—1 hour; film viewing—3 hours. Prerequisite: lower-division standing and 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].—F. W. S. (F, W, S.)—Fisher, Lu, Ravetto-Biagioloi, Smooldin

147A. Chinese Film (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: History 9A or any course on traditional China; upper division standing. English language survey of Chinese film, from its inception to the end of the twentieth century. Chinese films as important texts for understanding national, transnational, racial, gender, and class politics of modern China. [Same course as Chinese 101.] GE credit: ArtHum, Div | AH, VL, WC, WE.—S. (S.) Chen

148B. Japanese Literature on Film (4)
Lecture/discussion—3 hours; film viewing—3 hours. Survey of films based on works of Japanese literature, emphasizing pre-modern and early modern texts. Introduction to major directors and themes of Japanese cinema, with a focus on cinematic adaptation. Lectures and readings in English. Films in Japanese with English subtitles. [Same course as Japanese 156.] Offered in alternate years. GE credit: ArtHum, Div | AH, VL, WC, WE.—S. (S.) Sorensen

150. Media Theory (5)
Lecture—2 hours; discussion—1 hour; film viewing—3 hours, extensive writing. Critical and theoretical approaches to the study of media with an emphasis on the emergence and influence of new technologies since the invention of photography. Examine various approaches to media (formalist, semiotic, structuralist, Frankfurt School, cybernetics, visual and games theory). [Same course as Science and Technology Studies 151.] GE credit: ArtHum, Div, Writ | AH, OL, VL, WE.—S. (S.) Moretti, Muccino are included. Knowledge of Italian is not required. May be repeated for credit with 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].

90X. Lower Division Seminar (4)
Seminar—4 hours. Prerequisite: lower division standing and 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].

98. Directed Group Study (1-5)
[P/NP grading only].

99. Special Study for Undergraduates (1-5)
[P/NP grading only].

Upper Division

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 studio and independently produced films, especially as they represent ethnic, gender, and social class of Italian Americans. Not open for credit to students who have completed Humanities 120. GE credit: ArtHum, Div | AH, OL, VL, WE.—S. (S.) Heyer-Caput, Schiesari

121. New Italian Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: Course 1 and upper-division standing, or consent of instructor. Italian cinema of the 21st century in the context of profound cultural and social changes in Italy since World War II. Productions by representative directors such as Amelio, Giordano, Muccino are included. Knowledge of Italian is not required. [Same course as Italian 121.] GE credit: ArtHum, Div, Writ | AH, OL, VL, WE.—S. Heyer-Caput

121S. New Italian Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 1 and upper-division standing, or consent of instructor. Italian cinema of the 21st century in the context of profound cultural and social changes in Italy since World War II. Productions by representative directors such as Amelio, Giordano, Muccino are included. Knowledge of Italian is not required. [Same course as Italian 121S.] GE credit: ArtHum, Div, Writ | AH, OL, VL, WE.—F. S. (F, W, S.) Heyer-Caput

124. Topics in U.S. Film History (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 1. Topics in American film history such as the silent era; the studio system; U.S. avant-garde cinema; including the influences of technological, economic, regulatory, cultural, and artistic forces. Not open for credit to students who have completed Humanities 124 unless topic differs. May be repeated two times for credit if topic differs. GE credit: ArtHum, Writ | AH, OL, VL, WE.—S. (S.) Smooldin

125. Topics in Film Genres (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 1. A study of one or more of the film genres (such as the documentary, the musical, the 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 two times for credit if topic differs. GE credit: ArtHum, Writ | AH, OL, VL, WE.—W. (W.) Smooldin

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, au

129. Russian Film (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: completion of Subject A requirement. History of Russian film; film and social revolution, the cult of the personality of Lenin, the rise of Stalin, the culture of the Soviet empire; gender and the nation in Russian film. Course taught in English; films are in Russian with English subtitles. [Same course as Russian 129.] Offered in alternate years. GE credit: ArtHum, Div, Writ | AH, VL, WE.—W.

142. New German Cinema (4)
Lecture/discussion—3 hours; extensive writing. German filmmakers of the 1960s-1980s such as Fass- binder, Herzog, Syberberg, Bruckner, Schöder, Kluge, Wenders. Knowledge of German not required. May be repeated for credit with consent of instructor. [Same course as German 142] GE credit: ArtHum, Writ | AH, OL, VL, W.—F. (F) 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 worldwide (e.g. Hollywood) film genres such as film noir, horror, sci- ence fiction, and melodrama. Not open for credit to students who have completed Humanities 176. [Same course as German 176A.] Offered in alternate years. GE credit: ArtHum, Writ | AH, OL, VL, WE.—F. Fisher

176B. Postwar German Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 1. Exploration of German cin- ema 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 Margarethe von Trotta, Kluge, Syberberg, and Herzog). Not open for credit to students who have completed Humanities 177. Offered in alternate years. GE credit: ArtHum, Writ | AH, OL, VL, WE.—W.

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 studies, focusing on a nation, national tradition, a major film maker, or a specific era. May be repeated three times for credit. GE credit: ArtHum, Writ | AH, OL, VL, WE.—F. S. (F, S.) Fisher, Smooldin

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].—F. W. S. (F, W, S.)—S.

192. Internship (1-12)
Supervised internship off and on campus in areas of Film Studies. May be repeated for credit. [P/NP grading only].

194A. Special Study for Honors Students (1-5)
Variable—1.5 hours; independent study—3.5 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 195 or the creation of...
an honors project in course 196H. May be repeated two times for credit. [P/NP grading only.—F, W, S. [F, W, S.]

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 two times for credit. [P/NP grading only.] GE credit: AH, VL, WE.—F, W, S. [F, W, S.]

196H. Honors Project (1-5)
Project—2–4 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 two times for credit. [P/NP grading only.] GE credit: AH, VL, WE.—F, W, S. [F, W, S.]

197T. Tutoring in Film Studies (1-5)
Tutorial—3–15 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 (S/U grading only.)

Courses in Technocultural Studies (TCS)

Lower Division

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; their relationship to technological and scientific practices. GE credit.

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 technological and scientific practices. Focus on the social and artistic possibilities of low and obsolete media technologies. GE credit. ArtProf | AH, VL, WE.—OsterTag

7. Technocultural Workshop: Digital Imaging (1)
Seminar—1 hour. Workshops in technocultural digital skills; Digital Imaging. Offered irregularly. GE credit: VL.—F, Su. [F, Su.]

7B. Technocultural Workshop: Digital Video (1)
Seminar—1 hour. Workshops in technocultural digital skills; Digital Video. Offered irregularly. GE credit: VL.—F, Su. [F, Su.]

7C. Technocultural Workshop: Digital Sound (1)
Seminar—1 hour. Workshops in technocultural digital skills; Digital Sound. Offered irregularly. GE credit: VL.—F, Su. [F, Su.]

7D. Technocultural Workshop: Web Design (1)
Seminar—1 hour. Workshops in technocultural digital skills; Web Design. GE credit: VL.—S.

7E. Technocultural Workshop: Topics in Digital Production (1)
Seminar—1 hour. Workshops in technocultural digital skills; Topics in Digital Production. May be repeated for credit. Offered irregularly. GE credit: VL.—S, Su. [S, Su.]

Upper Division

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 creative skills for taking a project from idea to fruition. GE credit: VL.—Ostertag

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. GE credit: VL.—Wyman

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, and audience involvement and participation. Use of digital production tools to produce class projects. GE credit: VL.—Wyman

104. Documentary Production (4)
Lecture/discussion—3 hours; project. Prerequisite: course 7B or equivalent proficiency, 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. GE credit: VL.—Wyman

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. GE credit: VL.—S. Ostertag

111. Community Media Production (4)
Lecture/discussion—3 hours; laboratory—3 hours. Use of video and other addressional issues among neighborhood and community groups. Students will use basic video, sound, and lighting techniques as they work with local groups in a group video project. GE credit: VL.—S. [S.]

112. New Radio Features and Documentary (4)
Lecture/discussion—3 hours; laboratory—3 hours. New feature and documentary production for radio and other audio formats including audio streaming Web sites and installation. Emphasis on new and experimental approaches to audio production for broadcast on community radio and in international arts programming. GE credit: VL.—S. [S.]

113. Community Networks (4)
Lecture/discussion—3 hours; laboratory—3 hours. Impact and implications of computer-based 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. GE credit: VL.—S. [S.]

115. Electronics for Artists (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 1. Creative application of electronic technology relevant to media and fine arts involving both electronic principles and hands-on application. GE credit: VL.—S. [S.]

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, from the late 19th Century to the present. Focus on the intersection of audio, audiophonic, and audiovisual technologies.—Kahn

121. Introduction to Sonic Arts (4)
Lecture/discussion—3 hours; lecture/laboratory—3 hours. Prerequisite: course 1C. Introduction to the use of sound within the audio, technocultural and aesthetic contexts of experimental contemporary practices. Creation of original sound works.—OsterTag

122. Intermediate Sonic Arts (4)
Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 121, 170C. Techniques of recording, editing, mixing, and synthesis to combine voice, field recordings, and electronic signals. Incorporating live, recorded, and found sounds to create multi-dimensional stories. Focus on live performance, 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 sound designs that enhance, alter or support action and movement.—OsterTag

125. Advanced Sound: Performance and Improvisation (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 121 and 122 or consent of instructor. Culmination of TCS sound courses. Class will focus on performance and improvisation, culminating in a final public performance. Students will be expected to do extensive reading and rehearsal outside of class time.—S. [S.] OsterTag

Lecture—3 hours; laboratory—3 hours. A foundation course that teaches students the theory of three dimensional computer graphics, including modeling, rendering and animation. Development of practical skills through the use of professional software to create computer graphics.—F. [F.] Neff

131. Character Animation (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 130 or consent of instructor. The art of character animation in three dimensional computer animation. Movement theory, principles of animation, animation timing. Development of technical and practical skills.—S. [S.] Neff

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: ArtProf | VL.—Dyson

151. Topics in Virtuality (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. GE credit: VL.—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 digital media. GE credit: VL.—Dyson

153. Concepts of Innovative Soundtracks (4)
Lecture/discussion—3 hours; term paper. Innovative and unconventional soundtracks 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, commonsense, and the possible. Topics
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-servers, Web sites, free radio, fan ‘zines, and hip-hop culture. GE credit: Div VI. (P/NP grading only.)

Lecture—3 hours; extensive writing or discussion—1 hour. Historical, aesthetic and critical approaches to how information technologies produced ghost effects or a sense of terror in response to new media like the photograph, gramophone, film, typewriter, computer, Turing Machine. Focus on technological media transforms sense perception. (Same course as Science and Technology Studies 160.) Offered in alternate years. GE credit: ArtHum or SciSoc |ACGH, AH or SS, VI, WE. —Ravetto-Biagoli

170A. Advanced Technocultural Workshop (1)
Seminar—1 hour. Prerequisite: course 7A or the equivalent. Workshop in advanced technocultural digital skills: Digital Imaging. GE credit: VL.

170B. Advanced Technocultural Workshop (1)
Seminar—1 hour. Prerequisite: course 7B. Workshop in advanced technocultural digital skills: Digital Video. GE credit: VL.

170C. Advanced Technocultural Workshop (1)
Seminar—1 hour. Prerequisite: course 7C. Workshop in advanced technocultural digital skills: Digital Sound. GE credit: VL.

170D. Advanced Technocultural Workshop (1)
Seminar—1 hour. Prerequisite: course 7D. Workshop in advanced technocultural digital skills: Web Design. GE credit: VL.

170E. Advanced Technocultural Workshop (1)
Seminar—1 hour. Prerequisite: consent of instructor. Workshop in advanced technocultural digital skills: Topics in Digital Production. GE credit: VL.

175. Small Scale Film Production (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: consent of instructor. Lecture and intensive workshop teaching small-scale film production. Appointments as a(n) director, director of photography, actor, writer, lighting designer, sound designer and other critical positions are used to produce and submit a short film to a film festival. (Same course as Dramatic Art 175.) May be repeated twice for credit. —S. Anderson, Drew

190. Research Methods in Technocultural Studies (4)
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. GE credit: VL, WE. —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. GE credit: WE. —Jones

192. Internship (1-4)
Internship—3–12 hours. Supervised internship on or off campus in area relevant to Technocultural Studies. May be repeated for two times for credit. (P/NP grading only.)

197. Tutoring in Technocultural Studies (1-5)
Tutorial—3-1.5 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.)—F, W, S, SS, F, W, S, S.

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.)

The Major Program
Classical Civilization is an interdisciplinary major that examines the ancient civilizations of Greece, Rome and the Near East, with courses offered on the languages, literature, history, religion, myths, 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 also offered.

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 or Greek, 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, art and 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 adviser 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 schools and nearly 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.
Classes 190 ............................................. 4
Two additional courses selected from any of the following groups: 8
(a) Literature and Rhetoric: Additional upper division courses in Latin or Greek; Classics 102, 110, 140, 141, 142, 143
(b) History and Religion: Classics 102A, 111A, 111B, 111C; Religious Studies 102, 125
(c) Art and Archaeology: Classics 171, 172A, 172B, 173, 174, 175
(d) Philosophy and Religion: Classics 141, 150; Philosophy 143, 160, 161, 162; Political Science 118A; Religious Studies 141A, 141B, 141C
Total Units for the Major ............................ 70

Major Advisers. E. Albu, V. Popescu, C. Seal, A. Utilig

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.

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 on 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.

Courses in Arabic, Classics, Greek, Hebrew, Hindi-Urdu, Latin, and Persian follow in alphabetical order.

Courses in Arabic (ARB)

Lower Division

1. Elementary Arabic 1 (5)
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 colloquial dialect. GE credit: ArtHum|AH, WC.—F. (F.) Hassouna

1A. Accelerated Intensive Elementary Arabic (15)
Lecture/discussion—15 hours. Special 12-week accelerated, intensive course that combines the work of courses ARB 1, 2, and 3. Introduction to Modern Standard Arabic through development of all language skills in a cultural context with emphasis on proficiency. Not open for credit to students who have completed course 1, 2, or 3. Offered irregularly. GE credit: ArtHum|AH, WC.—Su.

2. Elementary Arabic 2 (5)
Lecture/discussion—5 hours. Prerequisite: course 1 or consent of instructor. Continuation of basic Arabic from course 1. Interactive and integrated presentation of listening, speaking, reading, and writing skills, including syntax. Focus on standard Arabic with limited use of spoken Egyptian and/or one other colloquial dialect. GE credit: ArtHum|AH, WC.—W. (W.) Hassouna

3. Elementary Arabic 3 (5)
Lecture/discussion—5 hours. Prerequisite: course 2 or with consent of instructor. Continuation of introduction to basic Arabic from courses 1 and 2. Interactive and integrated presentation of listening, speaking, reading, and writing skills, including syntax. Focus on standard Arabic with limited use of spoken Egyptian and/or one other colloquial dialect. GE credit: ArtHum|AH, WC.—S. (S.) Hassouna

21. Intermediate Arabic 21 (5)
Lecture/discussion—5 hours. Prerequisite: course 3 or with consent of instructor. 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. GE credit: ArtHum|AH, WC.—F. (F.) Hassouna

21C. Colloquial Egyptian Arabic (4)
Lecture/discussion—3 hours; lecture/laboratory—1 hour. Prerequisite: course 3 or consent of instructor. Continuation of the Colloquial Egyptian Arabic covered in the first year of Arabic; courses 1, 2, and 3. May be repeated one time for credit if instruction material changes. GE credit: ArtHum|AH.—F. Su., F, W. Su./Hassouna, Radwan, Sharlet

22. Intermediate Arabic 22 (5)
Lecture/discussion—5 hours. Prerequisite: course 21 or with consent of instructor. Continuation of course 21. Continuation of 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. GE credit: ArtHum|AH, WC.—W. (W.) Hassouna

22C. Colloquial Egyptian Arabic (4)
Lecture/discussion—3 hours; lecture/laboratory—1 hour. Prerequisite: course 21C or consent of instructor. Continuation of the Colloquial Egyptian Arabic covered in first year of Arabic; courses 1, 2, and 3 and the first quarter of Colloquial Arabic course 21C. May be repeated one time for credit if instruction material changes. GE credit: ArtHum|AH.—W. Su., Su./Hassouna, Radwan, Sharlet

23. Intermediate Arabic 23 (5)
Lecture/discussion—5 hours. Prerequisite: course 22 or with consent of instructor. Continuation of courses 21 and 22. Interactive and integrated presentation of Arabic listening, speaking, reading, and writing skills, including syntactic expression. GE credit: ArtHum|AH, WC.—S. (S.) Hassouna

23C. Colloquial Egyptian Arabic (4)
Lecture/discussion—3 hours; lecture/laboratory—1 hour. Prerequisite: course 22C or consent of instructor. Continuation of the Colloquial Egyptian Arabic covered in the first year of Arabic; courses 1, 2, and 3 and the preceding colloquial Arabic courses 21C and 22C. May be repeated one time for credit if instruction material changes. GE credit: ArtHum|AH.—S., Su./Hassouna, Radwan, Sharlet

Upper Division

101A. Readings in Arabic: 600-1850 (3)
Discussion—3 hours; extensive writing. Prerequisite: course 123 or consent of instructor. Readings in Arabic. Poetry, prose literature, and selections from texts on religion, history, politics, science, philosophy and mysticism. Students can repeat the course one time if the instructor decides that they would benefit from additional practice working on the different selections from the same texts or if 50% or more of the texts are different. GE credit: ArtHum or SocSci, Div. Wrt|AH or SS, OL, WE.—Radwan, Sharlet

121. Advanced Arabic (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 23 or consent of instructor. Review, refinement, and development of skills learned in intermediate Arabic through work with texts, video, and audio on cultural and social issues. Integrated approach to reading, writing, listening, speaking primarily standard Arabic, with limited use of one colloquial dialect. May be repeated for credit based on different readings. GE credit: ArtHum|AH, WC.—F. (F.) Radwan

122. Advanced Arabic (4)
Lecture/discussion—3 hours. Prerequisite: course 121 or permission of instructor. Continuation of course 121. Further development of advanced skills in reading, listening, writing, and speaking standard Arabic through work with texts, video, and audio on cultural and social issues. Limited use of one colloquial dialect. GE credit: ArtHum|AH, WC.—W. (W.) Radwan

123. Advanced Arabic (4)
Lecture/discussion—3 hours. Prerequisite: course 122 or permission of instructor. Continuation of course 122. Further development of advanced skills in reading, listening, writing, and speaking standard Arabic through work with texts, video, and audio on cultural and social issues. Limited use of one colloquial dialect. GE credit: ArtHum|AH, WC.—S. (S.) Radwan

140. A Story for a Life: The Arabian Nights (4)
Lecture/discussion—3 hours; term paper. In-depth exploration of The Arabian Nights, the best-known work of pre-modern Arabic literature and a major work of world literature. Analysis of the work in its historical context and in comparison to other famous tales in world literature. (Same course as Comparative Literature 172 and Middle East/South Asia Studies 121C.) Offered in alternate years. GE credit: ArtHum, Div. Wrt|AH, WC, WE.—Radwan, Sharlet

141. Readings in Modern Arabic Literature (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 123 or consent of instructor. Readings of modern Arabic poetry and fiction in their original format, assisted by instructor-prepared glossaries and other supplementary material. Readings to be followed by class discussion and short writing assignments in Arabic. May be repeated for credit based on different readings. GE credit: ArtHum|AH, WC.—F. (F.) Radwan

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. Development of reading, writing, speaking, and listening skills in advanced Arabic. Materials may include Al-Kitaab Part Two or Three, news articles and broadcasts, short stories, poetry, novels, and other suitable material. (P/NP grading only.)—F, W, S. (F, W, S.)
15. Women in Classical Antiquity (4)
Lecture/discussion—3 hours, term paper. Lives and roles of women and men in ancient Greece and Rome. Emphasis on literature, medical and legal documents, culture, and the political and social context; concentration on the basic concepts of women in Greek and Latin literature and art. GE credit: ArtHum, Wrt| AH, VL, WC, WE. —Brelinski
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 selected readings from Pliny’s *Naturalis Historia* and other ancient authors. GE credit: ArtHum, Wrt| AH, VL, WC, WE. —Rundin
25. The Classical Heritage in America (4)
Lecture/discussion—3 hours, term paper. Classical heritage in the New World, with emphasis on the United States from its colonial past to the present day. The reception of Greco-Roman thought and values as expressed in art, architecture, education, law, government, literature, and film. Offered irregularly. GE credit: ArtHum, Wrt| AH, VL, WC, WE. —Uhlig
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 but other languages not neglected. Not open for credit to students who have completed course 30F. GE credit: ArtHum| AH, WRT| F, W, S, Su. Albu, Popescu, Rundin
30F. Greek and Latin Elements in English Vocabulary (3)
Lecture—3 hours. Restricted to incoming freshmen. 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 but other languages not neglected. Not open for credit to students who have completed course 30. GE credit: ArtHum| AH, WRT| F Albu, Brelinski, Popescu, Rundin
31. Greek and Latin Elements in Technical Vocabulary (3)
Lecture—3 hours. Knowledge of Greek and Latin not required. Elements of Greek and Latin word formation to increase understanding of English words in medical, scientific and technical terminology and improved ability to understand and retain unfamiliar terms. GE credit: ArtHum, WRT| F Albu, Brelinski, Popescu, Rundin
50. Ancient Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16A or the equivalent. Study of science in ancient Greece and Rome, considering its social context; concentration on the basic concepts of physics, the world of medicine and biology, the history of mathematics, and the practices of astronomy, astrology and meteorology. (Same course as Science & Technology Studies 50.) Offered in alternate years. GE credit: ArtHum, Wrt| AH, WC, WE. —Webster
51. Ancient Medicine (4)
Lecture—3 hours; discussion—1 hour. Medicine in ancient Greece and Rome, physical and medical conceptions of the body within scientific and social frameworks; exploration of the medical and cultural experiences of the ancient world. GE credit: ArtHum, Wrt| AH, WC, WE. —Webster
98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (F/Y/P grading only)
Upper Division
101A. Topics in Ancient Mediterranean Civilizations (4)
Lecture/discussion—3 hours, term paper. Prerequisite: a lower division Classics course or consent of instructor. Topics may be ordered by time or place (e.g. Hellenistic Egypt) or by theme or genre (e.g. slavery in the ancient world). May be repeated two times for credit when topic differs. GE credit: ArtHum| AH, WC, WE, —F, W, S, F, W, S. Albu
101B. Topics in Greek Civilization (4)
Lecture/discussion—3 hours, term paper. Prerequisite: a lower division Classics course or consent of instructor. Topics may be ordered by time or place (e.g. the world of Homer) or by theme or genre (e.g. the Greek art of war). May be repeated two times for credit when topic differs. GE credit: ArtHum| AH, WC, WE, —F, W, S, F, W, S. Albu, Webster
101C. Topics in Roman Civilization (4)
Lecture/discussion—3 hours, term paper. Prerequisite: a lower division Classics course or consent of instructor. Topics may be ordered by time or place (e.g. Julius Caesar and his age) or by theme or genre (e.g. gladiators: blood in the arena). May be repeated two times for credit when topic differs. GE credit: ArtHum| AH, WC, WE, —F, W, S, F, W, S. Albu, Webster
101D. Topics in Classical Receptions (4)
Lecture/discussion—3 hours, term paper. Prerequisite: a lower division Classics course or consent of instructor. Topics in classical reception from late antiquity to the present. Topics may be ordered by time or place (e.g. the classical tradition in Washington, D.C.) or by theme or genre (e.g. cinematic representations of the ancient world). May be repeated two times for credit when topic differs. Offered irregularly. GE credit: AH, WRT, WE. —Webster
102. Film and the Classical World (4)
Lecture—3 hours, film viewing—2.5 hours, term paper. Prerequisite: course 50 or 51, or by consent of instructor. Topics may be ordered by time or place (e.g. modern film versions of ancient epic and dramatic traditions, modern dramas or films imbued with classical themes and allusions). Offered irregularly. GE credit: ArtHum, Wrt| AH, WC, WE, —F, W, S, F, W, S. Albu
105. Theory and Practice of Greek and Roman Mythology (4)
Lecture/discussion—3 hours, term paper. Prerequisite: a lower division Classics course or consent of instructor. Theorically focused study of mythological narratives. Emphasis on the historical development of myths and the variety of theoretical approaches for the study of myths. GE credit: ArtHum, WRT| AH, WE, —F, W, S, F, W, S. Uhlig
110. Origins of Rhetoric (4)
Lecture—3 hours, term paper. Prerequisite: a lower division Classics course or consent of instructor. Issues in the development of rhetoric from its origins in ancient Greece to A.D. 430. Special attention to rhetorical theory and to works of Plato, Aristotle, Cicero, and Quintillian. Role of grammar and rhetoric in schools of Roman Emperors. The Christian rhetoric of Saint Augustine. Not open for credit to students who have completed Rhetoric and Communication 110 or Communication 110. (Former course Rhetoric and Communication 110) GE credit: ArtHum| WRT| AH, WE, —F, W, S, F, W, S. Albu
120. Greek and Roman Historiography (4)
Lecture/discussion—3 hours, term paper. Prerequisite: a lower division Classics course or consent of instructor. Survey of Greek and Roman historical writing in English translation. Authors to be read may include Herodotus, Thucydides, Sallust, Livy, and Tacitus. Focus on the development of historical writing as a literary genre. GE credit: ArtHum| AH, WC, WE, —F, W, S, F, W, S. Seale
125. Roman Political Thought (4)
Lecture—3 hours; term paper. Prerequisite: a lower division Classics course or consent of instructor. Survey of Roman thinking about politics, as expressed both in formal theorizing and in a variety of other contexts, including oratory, historiography, and epic literature. Special emphasis on the political reflection in its historical, cultural, and literary context. GE credit: Arthum | AH, WC, WE. —F, W, S. (F, W, S) Seal

140. Homer and Ancient Epic (4)
Lecture/discussion—3 hours; term paper. Prerequisite: a lower division Classics course or consent of instructor. Reading of classical epics of Homer (Iliad, Odyssey) and Virgil (Aeneid) in English. Discussion of techniques of composition, the beliefs and values of their respective societies, and the generic tradition of ancient epic. GE credit: Arthum, Wrtl | AH, WC, WE. —F, W, S. (F, W, S) Brelinski, Popescu

141. Greek and Roman Comedy (4)
Lecture—3 hours; conference—1 hour. Prerequisite: a lower division Classics course or consent of instructor. Readings in Aristophanes, Menander, Plautus, and Terence; lectures on the development of ancient comedy. GE credit: Arthum, Wrtl | AH, WE. —F, W, S. (F, W, S) Popescu

142. Greek and Roman Novel (4)
Lecture—3 hours; term paper. Prerequisite: a lower division Classics course or consent of instructor. Examination of the ancient Greek romances and their development into the grotesque realism of Petronius' Satyricon, and the religious mysticism of Apuleius' The Golden Ass. GE credit: Arthum, Wrtl | AH, WC, WE. —S. (S) Popescu

143. Greek Tragedy (4)
Lecture/discussion—3 hours; term paper. Prerequisite: a lower division Classics course or consent of instructor. Reading in English of selected plays of Aeschylus, Sophocles, and Euripides. Discussion of the development and influence of Athenian tragedy. GE credit: Arthum, Wrtl | AH, WE. —F, W, S. (F, W, S) Popescu

150. Socrates and Classical Athens (4)
Lecture/discussion—3 hours; term paper. Prerequisite: a lower division Classics course or consent of instructor. Study of the major sources of our knowledge of Socrates, assessment of his role in the politics and culture of ancient Athens, his method of teaching, and his place in Western thought. GE credit: Arthum | AH, WC, WE. —F, W, S. (F, W, S) Seal

171. Mediterranean Bronze Age Archaeology (5)
Lecture—3 hours; extensive writing. Prerequisite: a lower division Classics course or consent of instructor. Archaeological 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 co-existence and collapse of Bronze Age societies. GE credit: Arthum, Div, Wrtl | AH, WC. —F, W, S. (F, W, S) Roll

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 fifth century B.C. [Same course as Art History 172A.] GE credit: Arthum, Wrtl | AH, VL, WE. —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. [Same course as Art History 172B.] GE credit: Arthum, Wrtl | AH, VL, WE. —Roller

173. Greek Pottery and Architecture (4)
Lecture—3 hours; term paper. Art and architecture of Rome and the Roman Empire, from the founding of Rome through the fourth century C.E. [Same course as Art History 173.] GE credit: Arthum, Wrtl | AH, VL, WE. —Roller

174. Greek Religion and Society (4)
Lecture—3 hours; term paper. Prerequisite: a lower division Classics course or consent of instructor. Cults, festivals, and rituals of Greek religious practice and their relationship to Greek social and political institutions, and to Greek private life. Discussion of art at Olympia, Delphi, Athens, and others. GE credit: Arthum, Wrt | AH, WC. —F, W, S. (F, W, S) Roller

175. Architecture and Urbanism in Mediterranean Antiquity (4)
Lecture—3 hours; extensive writing. Prerequisite: a lower division Classics course or consent of instructor. Art History 1A recommended. Architecture and urban development in the ancient Near East, Greece, and Rome. Special emphasis on the social structures and 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.] GE credit: Arthum, Div, Wrtl | AH, VL, WC, WE. —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, Wrtl | AH, WE

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, Wrtl | AH, WE

194HA. Special Study for Honors Students (3)
Discussion—1 hour; independent study; term paper. Prerequisite: admission to the 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.) GE credit: AH. —F, W, S. (F, W, S)

194HB. Special Study for Honors Students (3)
Discussion—1 hour; independent study; term paper. Prerequisite: admission to the 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.) GE credit: AH. —F, S. (F, S)

197. Literature of the Ancient City (4)
Lecture—5 hours. Prerequisite: consent of instructor. Supervised instruction of Greek or Latin in New Testament Greek. GE credit: Arthum, Wrtl | AH, VL, WE. —Roller

198. Directed Group Study (1-5)
Prerequisite: upper division standing. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-4)
Prerequisite: upper division standing and consent of instructor. (P/NP grading only)

Graduate
200A. Approaches to the Classical Past (4)
Seminar—3 hours; term paper. Prerequisite: graduate student status or consent of instructor. Survey of major areas of classical scholarship, with special emphasis on the continuing impact of Mediterranean antiquity on later literature, history, art, and culture. —F, W, S. (F, W, S) Albu

200B. Approaches to the Classical Past (4)
Seminar—3 hours; term paper. Prerequisite: course 200A and graduate student status or consent of instructor. Restricted to graduate students. Research project on major area of Classical scholarship, with special emphasis on the continuing impact of Mediterranean antiquity on later literature, history, art, and culture. —F, W, S. (F, W, S) Albu

201. Introduction to Classical Philology (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

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 Aeneid, Georgics, and Aeneid. Emphasis will be placed on the study of Vergilian poetic language

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

206. Greek Historiography (4)
Seminar—3 hours; term paper. Development of historiography in Greece. May be repeated for credit

207. Greek Drama (4)
Seminar—3 hours; term paper. Literary and philological 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)

Professional
396. Teaching Assistant Training Practicum (1-6)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only) —F, W, S. (F, W, S)

Courses in Greek (GRK)
Lower Division
1. Elementary Greek (5)
Lecture—3 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 must 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.] GE credit: Arthum | AH. —F, W, S. (F, W, S) Popescu

2. Elementary Greek (5)
Lecture—3 hours. Prerequisite: course 1 or the equivalent. Continuation of course 1. GE credit: Arthum | AH. —F, W, S. (F, W, S) Popescu

2NT. Elementary New Testament Greek (1)
Lecture—1 hour. Prerequisite: course 2 (required concurrently) or consent of instructor. Supplementary study of New Testament Greek. GE credit: Arthum | AH. —F, W, S. (F, W, S) Popescu

3. Intermediate Greek (5)
Lecture—5 hours. Prerequisite: course 2 or the equivalent. Continuation of course 2. Selected readings from Greek authors. GE credit: Arthum | AH. —S. (S) Popescu
121. Greek Prose Composition (4) Lecture/discussion—4 hours. Prerequisite: course 3 or consent of instructor. Advanced grammar and vocabulary exercises in Greek prose composition. Offered in alternate years. GE credit: ArtHum | AH.—F. (F.) Franco

130. Readings in Later Greek (4) Lecture/discussion—3 hours, term paper. Prerequisite: course 100 or consent of instructor. Translation and discussion of selected readings from Hellenistic to Byzantine Greek literature. Offered in alternate years. GE credit: ArtHum | AH.—W, WE.—F, W, S. (F, W, S.)

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 Hebrew (HEB)

Lower Division

1. Elementary Hebrew (5) Lecture/discussion—4 hours; laboratory—1 hour. Speaking, listening, comprehension, reading and writing fundamentals of modern Hebrew. GE credit: ArtHum|AH.—AH, WC.—F (F.)

2. Elementary Hebrew II (5) Lecture/discussion—4 hours; laboratory—1 hour. Speaking, listening, comprehension, reading and writing fundamentals of modern Hebrew. GE credit: ArtHum|AH.—F, W, S. (F, W, S.)


Courses in Hindi (HIN)

Lower Division

1. Elementary Hindi/Urdu I (5) Lecture/discussion—5 hours. Introduction to Devanagari Script through development of all language skills in a cultural context with emphasis on communicative proficiency. GE credit: ArtHum|AH, WC.—F (F.) Chauhan

2. Elementary Hindi/Urdu II (5) Lecture/discussion—5 hours. Prerequisite: course 1. Continuation of course 1. Devanagari Script through development of all language skills in a cultural context with emphasis on communicative proficiency. GE credit: ArtHum|AH, WC.—F (F.) Chauhan

3. Elementary Hindi/Urdu III (5) Lecture/discussion—5 hours. Introduction to Devanagari Script through development of all language skills in a cultural context with emphasis on communicative proficiency. GE credit: ArtHum|AH, WC.—F (F.) Chauhan

21. Intermediate Modern Hebrew I (5) Lecture/discussion—5 hours. Prerequisite: course 2. Introduction to Devanagari Script through development of all language skills in a cultural context with emphasis on communicative proficiency. GE credit: ArtHum|AH, WC.—F (F.) Chauhan

23. Intermediate Hindi/Urdu III (5) Lecture/discussion—5 hours. Prerequisite: course 22. An intermediate level course where students will continue to practice their skills in listening, speaking, reading and writing in Hindi and Urdu. GE credit: ArtHum | AH, WE—S. (S.) Chauhan

Courses in Latin (LAT)

Lower Division

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.) GE credit: ArtHum | AH, WC, WE—Albu

2. Elementary Latin (5) Lecture—5 hours. Prerequisite: course 1 or equivalent. Introduction to basic grammar and vocabulary and development of translation skills with emphasis on Latin to English. GE credit: ArtHum | AH—W. (W.) Rundin

3. Intermediate Latin (5) Lecture—5 hours. Prerequisite: course 2 or equivalent. Continuation of course 2. GE credit: ArtHum | AH—S. (S.) Rundin

98. Directed Group Study (1-5) Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division

100. Readings in Latin Prose (4) Lecture/discussion—4 hours. Prerequisite: course 2 or equivalent. Review of Latin morphology, grammar, and vocabulary. Readings in prose authors, including Julius Caesar. GE credit: AH—F. (F.) Albu, Stem

101. Livy (4) Lecture—3 hours; term paper. Prerequisite: course 100 or consent of instructor. GE credit: ArtHum, Wrt | AH, WE—F. W. S. (F, W, S.) Seal, Stem

102. Roman Comedy (5) Lecture—4 hours; term paper. Prerequisite: course 100 or consent of instructor. GE credit: ArtHum, Wrt | AH, WE—F. W. S. (F, W, S.) Albu

103. Vergil: Aeneid (4) Lecture—3 hours; term paper. Prerequisite: course 100 or consent of instructor. GE credit: ArtHum, Wrt | AH, WE—F. W. S. (F, W, S.) Albu

104. Sallust (4) Lecture—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE—S. (S.) Stem

105. Catullus (4) Lecture—3 hours; term paper. Prerequisite: course 100 or consent of instructor. GE credit: ArtHum, Wrt | AH, WE—F. W. S. (F, W, S.) Seal

106. Horace: Odes and Epodes (4) Lecture—3 hours; term paper. Prerequisite: course 100 or consent of instructor. GE credit: ArtHum, Wrt | AH, WE—F. W. S. (F, W, S.) Albu

108. Horace: Satires and Epistles (4) Lecture—3 hours; term paper. Prerequisite: course 100 or consent of instructor. GE credit: ArtHum, Wrt | AH, WE—F. W. S. (F, W, S.) Albu

109. Roman Elegy (4) Lecture—3 hours; term paper. Prerequisite: course 100 or consent of instructor. GE credit: ArtHum, Wrt | AH, WE—S. (S.) Stem

110. Ovid (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or equivalent. Translation and discussion of selected readings from the works of Ovid. May be repeated one time for credit when topic differs and with consent of instructor. GE credit: ArtHum, Wrt | AH, WE—Albu

112. Cicero (4) Recitation—3 hours; term paper. Prerequisite: course 100 or equivalent. Translation and discussion of selected readings from the works of Cicero. May be repeated one time for credit if readings vary and with consent of instructor. GE credit: ArtHum, Wrt | AH, WE—Stem

115. Lucretius (4) Lecture—3 hours; term paper. Prerequisite: course 100 or consent of instructor. GE credit: ArtHum, Wrt | AH, WE, WE—F. W. S. (F, W, S.) Webster

116. Vergil: Eclogues and Georgics. (4) Lecture—3 hours; term paper. Prerequisite: course 100 or consent of instructor. GE credit: ArtHum, Wrt | AH, WE, WE—F. W. S. (F, W, S.) Albu

118. Roman Historians (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or equivalent. Readings in Latin from one or more of the major Roman historians and biographers. Authors may include Sallust, Nepos, Livy, Tacitus, Suetonius, and Ammianus Marcellinus. GE credit: ArtHum | AH, WC, WE—Seal

119. Readings in Republican Latin Literature (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or equivalent. Translation and discussion of selected readings from Republican Latin literature. May be repeated for credit when topics vary. GE credit: ArtHum | AH, WC, WE—Brelinski, Stem

120. Readings in Imperial Latin Literature (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or equivalent. Intensive grammar and vocabulary review through exercises in Latin prose composition. GE credit: ArtHum | AH

125. Medieval Latin (4) Lecture—3 hours; term paper. Prerequisite: course 100 or consent of instructor. GE credit: ArtHum, Wrt | AH, WE—F. W. S. (F, W, S.) Albu

130. Readings in Late Latin (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or equivalent. Translation and discussion of selected readings from late imperial/early medieval Christian and pagan literature. GE credit: ArtHum | AH, WE, WE—F. W. S. (F, W, S.) Seal

198. Directed Group Study (1-5) Prerequisite: consent of instructor. (P/NP grading only.)—F. W. S. (F, W, S.)

199. Special Study for Advanced Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only.)—F. W. S. (F, W, S.)

Courses in Persian (PER)

Lower Division

1. Elementary Persian (5) Lecture/discussion—5 hours. Introduction to listening, speaking, reading and writing skills in Persian. GE credit: ArtHum, Wrt | AH, WE—F. (F.) Sharlet

Clinical Nutrition

(College of Agricultural and Environmental Sciences) Faculty. See the Department of Nutrition, on page 492.

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 the equivalent, which must be completed before qualifying for registration as a dietitian.

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 Math Placement Exam with a minimum score of 25.

Career Alternatives.

The Clinical Nutrition major qualifies students to apply for a dietetic internship accredited by the Accreditation Council for Education in Nutrition and Dietetics 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 undergraduate 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:

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<tr>
<th>UNITS</th>
<th>Written/Oral Expression ................................................. 8</th>
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<tr>
<td></td>
<td>English 3 or University Writing Program 1 .................................. 4</td>
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<td>Communication 1 ........................................................................ 4</td>
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<td>Preparatory Subject Matter ............................................. 47-48</td>
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<tr>
<td></td>
<td>Biological Sciences 2A &amp; 2B ............................................. 10</td>
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<td></td>
<td>Chemistry 2A, 2B, 2C, 8A, 8B ........................................... 21</td>
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<td>Economics 1A or 1B ............................................................. 4</td>
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<td>Psychology 1 .......................................................................... 4</td>
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<td>Sociology 1 or 3 or Anthropology 2 ..................................... 4-5</td>
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<td>Statistics 13 ........................................................................ 4</td>
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Depth Subject Matter .................................................. 82

| Agricultural and Resource Economics 112 .............................................. 4 |
| Animal Biology 102 and 103 ................................................................. 10 |
| Biological Sciences 101 ................................................................. 4 |
| Food Science and Technology 100A, 100B, 101A, 101B ...................... 12 |
| Food Service Management 120, 120L ................................................. 12 |
| Microbiology 102 and 103 ................................................................. 9 |
| Neurobiology, Physiology, and Behavior 101, 101L ............................... 8 |
| Additional upper division electives ............................................... 4 |
Clinical Nutrition and Metabolism

See Internal Medicine (IMD), on page 439.

Clinical Psychology

See Medicine, School of, on page 428.

Clinical Research (A Graduate Group)

David M. Rocke, Ph.D., Chairperson of the Group
Group Office, CTSC, 2921 Stockton Blvd., Sacramento, CA 95817 916-703-9110

Faculty

Timothy Albertson, M.D., Ph.D. [Internal Medicine: Pulmonary and Critical Care Medicine]
Aaron Bair, M.D. [Emergency Medicine]
Laurel Beckett, Ph.D. (Public Health Sciences)
Lars Berglund, M.D., Ph.D. [Internal Medicine: Endocrinology, Clinical Nutrition, and Vascular Medicine]
Catherine Cansino, M.D., M.P.H. [Internal Medicine: Obstetrics and Gynecology]
Cameron Carter, MVABS [Psychiatry and Behavioral Sciences]
Fernando Fierro, Ph.D. [Cell Biology and Human Anatomy]
James F. Holmes, Jr., M.D. (Pediatrics)
Roslyn Rivkav Isseroff, M.D. [Dermatology]
Nicholas J. Kenyon, M.D. [Internal Medicine: Pulmonary and Critical Care Medicine]
Kyoungmi Kim, Ph.D. (Public Health Sciences)
Richard Kravit, M.D., M.SPH (Internal Med)
Kit S. Lam, M.D., Ph.D. [Biochemistry and Molecular Medicine, Internal Medicine: Hematology and Oncology]
Nancy Lane, M.D. (Internal Medicine: General Medicine)
Primo Nery Lara, Jr., M.D. [Internal Medicine: Hematology and Oncology]
Joy Melnikow, M.D., M.P.H. [Family and Community Medicine]
Fred Meyers, M.D. [Internal Medicine: Hematology and Oncology]
John M. Olichney, M.D. [Neurology]
Sally Ozonoff, Ph.D. [Psychiatry and Behavioral Sciences]
David Pleasure, M.D. [Neurology]
Richard Pollard, M.D. [Internal Medicine: Infectious and Immunologic Diseases]
David M. Rocke, Ph.D. (Public Health Sciences, Biomedical Engineering)
Michael A. Ragawski, M.D., Ph.D. [Neurology]
Patrick Romano, M.D., M.P.H. [Pediatrics, Internal Medicine]
Saul Schaefer, M.D. [Internal Medicine: Cardiovascular Medicine]
Julie Schweitzer, Ph.D. [Psychiatry and Behavioral Sciences]
Tony J. Simon, Ph.D. [Psychiatry and Behavioral Sciences]
Dan Tancredi, Ph.D. [Pediatrics]
A further sixteen units from two of groups

Group C: Neuroscience
Psychology 121, 135
Group D: Linguistics
Linguistics 103A, 103B, 131, 141, 173
Group E: Philosophy
Philosophy 103, 104, 136
Group F: Psychology
Psychology 100, 137, 130, 131, 132, 136, 140, 141

Twelve additional units from groups B-G. 12

Group G: Other

Total Units for the Major ........................................ 72

B.S. Major Requirements:

Students select to pursue either the Computational Emphasis [Emphasis 1] or the Neuroscience Emphasis [Emphasis 2].

Computational Emphasis

Preparatory Subject Matter ........................................ 60

Engineering Computer Science 20, 30, 40, 50, 60, 70 .... 20

Computer Science 120, 170, 171, Linguistics 177, Philosophy 133

One course from group C .............................. 4

Group C: Neuroscience

Linguistics 175, Psychology 101, 102

Three courses from group B .............................. 12

Group B: Computation

Eng. Computer Science 120, 170, 171

Mathematics 17AB or 21AB ................................ 8

Philosophy 186 .............................................. 4

Psychology 20 .............................................. 4

Psychology 202 ............................................ 4

Statistics 101 (or STA 102) .......................... 4

Depth Subject Matter ........................................ 48

All courses from group A .................................. 12

Group A: Core

One four-unit upper division course in language, communication, and society toward computer-mediated communication and public communication processes at several different levels of analysis. Courses dealing with communication at the individual, interpersonal, organizational and societal levels of analysis are offered.

The emphasis in the program reflects the changing contexts.

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 societal levels of analysis are offered. The emphasis in the program reflects the changing context.

Preparatory Subject Matter ................................. 62-65

Biological Science 2ABC .................................. 4

Linguistics 1 .............................................. 4

Mathematics 17ABC or 21ABC ......................... 12

Philosophy 10 .............................................. 4

Philosophy 13 ............................................. 4

Physics 7ABC (or 9ABC) ................................. 12

Psychology 101 ......................................... 4

Psychology 202 ............................................ 4

Statistics 13 (or STA 102) .......................... 4

Depth Subject Matter ................................. 45-47

All courses from group A .................................. 13

Group A: Core

Four-unit upper division course in language, communication, and society toward computer-mediated communication and public communication processes at several different levels of analysis. Courses dealing with communication at the individual, interpersonal, organizational and societal levels of analysis are offered.

The emphasis in the program reflects the changing context.
10Y. Introduction to Communication (4)
Web virtual lecture—3 hours; discussion—1 hour.
Basic principles of communication and communication processes; models of communication; foundations and practical research in communication; contexts of communication and communication research including interpersonal, intercultural, news, entertainment, mediated, and others. GE credit: SocSci | SS.—F, W, S, Su; Taylor
12Y. Data Visualization in the Social Sciences (4)
Lecture—2 hours; laboratory—1.5 hours; web virtual lecture—1.5 hours. Introduction to quantitative data across the social sciences (Communications, Political Science, Psychology, Sociology, and other disciplines). Transforming data, describing data, producing graphs, visual reasoning, and interpretation. (Students will take Sociology 12Y, Political Science 12Y, Psychological 12Y) GE credit: QL, VL.—F, W, S, F, W, S, J Cross

6Y. Video Games and Virtual Environments (4)
Lecture—2 hours; discussion—1 hour. Impact of video games on players and society. Topics include motivations for playing games; cognitive, emotional, and behavioral effects, including violence and addiction; interactive and group processes in online games; virtual communities; and video games for education. GE credit: SocSci | SS, VL.—F, S, F
99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (F/N grading only)

Upper Division
101. Communication Theories (4)
Lecture—3 hours; discussion—1 hour. Functions, forms, development, and testing of communication theory, with emphasis on social micro and macro models of face-to-face and mediated communication. Application of theories to real world problems. GE credit: SocSci | SS.—F, W, S, Su; F, W, S, Su, J Feng
102. Empirical Methods in Communication (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 13 or equivalent. Social scientific research methods commonly employed in Communication. Topics include research design, sampling, questionnaire construction, survey research, experimental design, evaluation research, content analysis and qualitative field methods. GE credit: SocSci | QL, SS.—F, W, S, F, W, S, Bell, Palomares, Yegiyan
110. Communication Networks (4)
Lecture/discussion—4 hours. Theoretical approaches to communication networks, practical applications of network analysis, and network analysis tools. Topics include friendship, political discussion, social support, organizational, social media, and disease transmission networks. Impact of emerging technologies on network creation, maintenance, and expansion. GE credit: SocSci | SS.—F, F (J) Barnett, Shen
111. Gender Differences in Communication (4)
Lecture—4 hours. Pass One open to Communication majors only. 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. Not open for credit to students who have taken Communication 103. GE credit: SocSci | DD, SS.—F, W, F, W, Palomares
112. Theories of Persuasion (4)
Lecture/discussion—4 hours. Pass One open to Communication majors only. Theories and models of persuasion that account for the effects of source, channel and audience factors on message recipients. Examination of strategies for altering attitudes and gaining compliance. Contexts of application include interpersonal relationships, advertising, politics, and health. Not open for credit to students who have taken Communication 152. GE credit: SocSci | SS.—F, W, F, W, Bell, Puckering
114. Communication and Cognition (4)
Lecture—4 hours. Pass One open to Communication majors only. Relationship between communication and cognition in face-to-face and mediated contexts. Models of discourse comprehension and production, the influence of language attitudes on social judgments, and the effects of information processing on decision making are explored. Not open to students who have completed course 138. GE credit: SocSci | SS.—S. (S.) Yegiyan
120. Interpersonal Communication (4)
Lecture—4 hours. Pass One open to Communication majors only. Theories of interpersonal communication related to perception, verbal and nonverbal channels, mutual understanding, and relationship development. Communication processes in face-to-face and mediated encounters. Consideration of different relationship contexts, including friendships, dating and family relationships, and the workplace. Not open for credit to students who have completed course 138. GE credit: SocSci | SS.—S. (S.) Yegiyan
121. Language Use in Conversation (4)
Lecture/discussion—4 hours. Pass One open to Communication majors only. Examination of how people use language in social interaction, how they exchange meaning during conversation, and how their use of language plays a central role in turn-taking, speech acts, attitude formation, figurative speech, politeness, and other aspects of conversational interaction. Not open for credit to students who have taken course 105. GE credit: SocSci | SS.—F, W, F, W, Palomares
122. Nonverbal Communication (4)
Lecture—4 hours. Pass One open to Communication majors only. Examination of the interaction between nonverbal communication and verbal communication channels in influencing outcomes in interpersonal relationships. Nonverbal behaviors served by nonverbal communication are considered. Not open for credit to students who have completed course 135. GE credit: SocSci | SS.—S. (S.) Feng, Puckering
123. Intercultural Communication (4)
Seminar—4 hours. Pass One open to Communication majors only. Major concepts and theories of intercultural communication. Topics include cultural similarities and differences in verbal and nonverbal communication, dimensions of cultural variations, barriers to intercultural communication, and intercultural communication competence. Not open for credit to students who have taken course 135. GE credit: SocSci | SS.—S. (S.) Feng
130. Group Communication (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 13 or equivalent. Communication processes in the development and maintenance of effective group processes in organizations. Examination of both face-to-face and computer-mediated group interaction. Topics include group development, power, norms, cohesion, decision making, problem solving, creativity, conflict management, working remotely, and leadership. GE credit: SocSci | SS.—F, F (J)
131. Strategic Communication in Public Relations (4)
Lecture/discussion—4 hours. Pass One open to Communication majors only. Principles, evolution, and professional practice of public relations. Planning and execution of effective, ethical communicative strategies and campaigns including use of effective communication strategies for achieving organizational goals. GE credit: SS.—F, W, S, Su; Barnett
136. Organizational Communication (4)
Lecture—4 hours. Pass One open to Communication majors only. Organizational communication theory and practice is examined with an emphasis on use of effective communication strategies for achieving organizational goals. GE credit: SS.—F, W, Su; Barnett
139. Advanced Organizational Communication (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 136. Pass One open to Communication majors only. Communication processes within and among social organizations. Examines formal organizations as information processing systems. Topics include general systems theory, input-output analysis, structural-functionalism, cybernetics, organizational network analysis, organizational environments, organizations as cultures, organizational learning, information technologies, and communication diagnosis/auditing strategies. GE credit: SocSci | SS, WE.—S. (S.) Barnett
141. Introduction to Mass Communication (4)
Lecture—4 hours. Prerequisite: course 102 (or equivalent course in research methods). Course is open to Communication majors only. Exploration of processes and constraints in the gathering, editing, and reporting of news. Examination of student and professional news reporting and the relationship of news to other social institutions. GE credit: SocSci | ACGH, SS.—F, W, F, W, S, Theobald
143. Analysis of Media Messages (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 102 (or equivalent course in research methods). Course 143 is open to Communication majors only. Examination of alternative approaches to the analysis, interpretation, and evaluation of media messages, including those disseminated through broadcasting, print, and new technologies. GE credit: SocSci | W, W, AC/AGH, SS, Wr.—F, W, F, W, F, W, S, Cho
144. Media Entertainment (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 102 (or equivalent course in research methods). Course 144 is open to Communication majors only. Effects and appeal of media entertainment, emphasizing emotional reactions. Topics include key concepts of entertainment research such as mood management, and the...
145. Political Communication (4)
Lecture/discussion—4 hours. Prerequisite: course 102 or equivalent course in research methods and course 140 or equivalent. Pass One open to Communication majors only. Discussion of theories and research on the relationships among the mass media, citizens, and politics, production of political news, campaign strategies, attitudes and behaviors. Provides frameworks for mediated politics, the news, and elite discourse and campaign messages. Offered irregularly. GE credit: SocSci|SS. —S. (S.) Taylor

146. Communication Campaigns (4)
Lecture/discussion—4 hours; term paper. Pass One open to Communication majors only. Strategic uses of media and interpersonal communication channels in health, environmental advocacy, and political campaigns. Emphasis on general principles relevant to most campaign types, including public information, social marketing, and media advocacy campaigns. GE credit: SocSci|SS. —S. (S.) Barnett, Theobald

148. Contemporary Trends In Media (4)

161. Health Communication (4)
Lecture/discussion—4 hours. Health communication theories and research, including a review of research on health literacy, social support and coping, doctor-patient interaction, health communication campaigns, and media influences on health. Application of new communication technologies in health promotion. GE credit: SocSci|SS. —S. (S.) Bell

165. Media and Health (4)
Lecture/discussion—4 hours. Prerequisite: course 102 or equivalent course in research methods. Content and effects of health 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|SS. —S. (S.) Bell

170. Digital Technology and Social Change (4)
Lecture/discussion—4 hours. Conceptual understanding of how digital communication technologies transform our lives, through social media, mobile connectivity, globalization, and big data. Contexts of application include education, health, entrepreneurship, democracy, and poverty. GE credit: SocSci|SS. —S. (S.) Hilbert, Theobald

170V. Digital Technology and Social Change (4)
Web virtual lecture—3 hours; web electronic discussion—1 hour. Conceptual understanding of how digital communication technologies transform our lives, through social media, mobile connectivity, globalization, and big data, and artificial intelligence. Context of course include education, health, entrepreneurship, democracy, among others. Prerequisite: credit for course to students who have completed course 170. GE credit: SocSci|SS. —F, W, S, Su. (F, W, S, Su.) Hilbert

172. Computer-Mediated Communication (4)
Lecture/discussion—4 hours. Pass One open to Communication majors only. Theories and research pertaining to how people use technologies for interpersonal purposes. Impression formation, self-presentation, long-distance romantic relationships, online dating, reception, anonymity, maintaining friendships, and transmitting emotions in online contexts. GE credit: SocSci|SS. —S. (S.) Peña

174. Social Media (4)
Lecture—4 hours. Application of theories of communication to the study and design of social media. Examination of various contexts such as health, political movements, and collaboration. Topics include motivations for membership, participatory, violence, privacy, and surveillance. GE credit: SocSci|SS. —F, S. (F, S.) Shen

176. Video Games Theory and Research (4)
Lecture/discussion—2 hours; laboratory/discuss—2 hours. Prerequisite: course 102 or an equivalent research methods course. Communication theory and research on the uses and effects of video games. Research methods available for investigating game use and the impact of games on behavior. Application of course in a research project. GE credit: SS. —W. (W.) Peña

180. Current Topics in Communication (4)
Lecture/discussion—4 hours. Prerequisite: course 101 and 102 (or equivalent research methods course). Pass One open to Communication majors only. Group study of a special topic in communication. May be repeated one time for credit when topic differs. Offered irregularly. GE credit: SocSci|SS. —S. (S.) Bell

189A. Proseminar in Social Interaction (4)
Seminar—3 hours; term paper. Prerequisite: course 101, 102, 136; consent of instructor. Open to Communication majors only. Reading, discussion, research, and writing on a selected topic in the specialty of social interaction. Potential topics include relationship initiation, maintenance, and deterioration; communication failure; nonverbal communication; conversational management; semantics and pragmatics of language and family/marital communication. May be repeated for credit when topic differs. Offered in alternate years. GE credit: SocSci|SS, Wrt|SS, WE. —S. Feng, Palomares

189B. Proseminar in Mass Communication (4)
Seminar—3 hours; term paper. Prerequisite: course 101, 102, 140; consent of instructor. 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|SS, Wrt|SS, WE. —S. Berger, Cho, Hwang, Taylor, Yegiyan

189C. Proseminar in Health Communication (4)
Seminar—3 hours; term paper. Prerequisite: course 101, 102, 161 or 165; consent of instructor. Open to Communication majors only. Reading, discussion, research, and writing on a selected topic in health communication. Potential topics include health communication design and evaluation, media advocacy, physician-patient communication, health communication technologies in health settings, and health-related advertising. May be repeated for credit when topic differs. Offered in alternate years. GE credit: SocSci|SS, Wrt|SS, WE. —S. Bell, Feng, Taylor

189D. Proseminar in Organizational Communication (4)
Seminar—3 hours; term paper. Prerequisite: course 101, 102, 136; consent of instructor. Open to Communication majors only. Reading, discussion, research, and writing on a selected topic in the specialty of organizational communication. Potential topics include organizational networks, 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|SS, WE. —S. Barnett

192. Internship in Communication (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Open to Communication majors only. Application of those methods in a research project. May be repeated for credit when topic differs. Research methods available for investigating game use and the impact of games on behavior. Application of course in a research project. GE credit: SocSci|SS, WE. —S. (S.) Taylor

194H. Senior Honors Thesis (4)
Seminar—1 hour; individual tutoring on research project—3 hours. Prerequisite: senior standing and approval by Honors Committee. Directed reading, research, and writing culminating in the preparation of honors thesis under direction of faculty advisor. GE credit: SocSci|SS, WE.

197T. Tutoring in Communication (2-4)
Seminar—1-2 hours; 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 to a total of 4 units. GE credit: SocSci|SS, WE. —S. (S.) Bell

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.) —S. (S.) Palomares, Yegiyan

Graduate

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. —F. (F)

202. Communication Theory Construction (4)
Seminar—4 hours. Prerequisite: consent of instructor; graduate standing. Alternative metatheoretical perspectives for theory generation in communication inquiry. Processes of construct explication, operationalization and theory construction. Emphasis on the critique of existing perspectives and the development of theory construction skills. Offered irregularly. —S. Barnett

203. Scientific Methods for Communication (4)
Seminar—3 hours; term paper. Prerequisite: 201, 202, Psychology 204A, 204B or equivalent. Social scientific research methods commonly employed in Communication. Topics include research design measurement sampling operations. Experimental survey research experimental design evaluation research content analysis and qualitative field methods. —S. (S.) Palomares, Yegiyan

210. Experimental Methods and Analysis in Communication
Lecture—4 hours. Prerequisite: graduate standing; one course in inferential statistics; consent of instructor. Experimental designs in communication. Topics include: experimental design, the use of randomization, operationalization, and measurement; hypothesis testing; ethics; data analysis software focusing on the analysis of variance and planned contrasts; and the practical and effective implementation and writing of experiments. —F. (F) Palomares

211. Survey Research Methods in Communication
Seminar—4 hours. Prerequisite: graduate standing; one course in inferential statistics; consent of instructor. Methods for designing personal interview, phone, mail, and web-based surveys in communication. Topics include: sampling strategies, sources of error and bias in survey designs, questionnaire construction, cognitive interviewing, interviewer behavior, and analysis of complex survey data using standard software packages. —W. (W.) Bell, Cho

Fall 2011 and on Revised General Education (GE) AH=Arts and Humanities; SE=Science and Engineering; SS=Social Sciences; ACGH=American Cultures; DD=Dominant Diversity; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Dominant Diversity; Wrt=Writing Experience
Pre-Fall 2011 General Education (GE) AH=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Dominant Diversity; Wrt=Writing Experience
Quarter Offered: F=Fall; W=Winter; S=Spring; Su=Summer; 2017-2018 offering in parentheses

Communication 221
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 persuasion theories and principles to persuasive message design in applied contexts. Offered irregularly.— S. (S.)

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. Offered in alternate years.— W. (W) Yeager

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. Offered irregularly.— S. (S.)

223. Tactics of Interpersonal Influence (4)
Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. Achievement of interpersonal goals in social interaction. Topics include message production; tactics, strategies and planning; anticipating potential obstacles; resisting and thwarting goals; plan recognition; and goal detection. Examined are the effects of compliance-gaining, attitude change, ingratiation, information seeking, comforting, and reassurance. Offered in alternate years.—W. (W) Peng, Palomares

231. Tactics of Interpersonal Influence (4)
Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. Achievement of interpersonal goals in social interaction. Topics include message production; tactics, strategies and planning; anticipating potential obstacles; resisting and thwarting goals; plan recognition; and goal detection. Examined are the effects of compliance-gaining, attitude change, ingratiation, information seeking, comforting, and reassurance. Offered in alternate years.—W. (W) Peng, Palomares

232. Health Communication (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing; consent of instructor. Achievement of interpersonal goals in social interaction. Topics include message production; tactics, strategies and planning; anticipating potential obstacles; resisting and thwarting goals; plan recognition; and goal detection. Examined are the effects of compliance-gaining, attitude change, ingratiation, information seeking, comforting, and reassurance. Offered in alternate years.—W. (W) Bell

233. Communication in Medicine (4)
Seminar—3 hours, term paper. Restricted to graduate standing. Survey of research on communication between patients and health care providers. Topics include verbal and nonverbal behavior, power and influence, empathy and support, and conflict management. Cultural, social, organizational and technological influences on communication are examined. Offered in alternate years.—W. (W) Bell

234. Intercultural Communication (4)
Seminar—3 hours, term paper. Restricted to graduate standing. Survey of research on intercultural communication. Topics include national, racial, and ethnic similarities and differences in communication practices, cultural beliefs and values, identity and conflict management. Cultural, social, organizational and technological influences on intercultural communication. Methodological issues in intercultural communication research are also examined. Offered in alternate years.—S. (S.) Peña

235. Digital Technologies and Social Change (4)
Seminar—3 hours, term paper. Prerequisite: graduate standing; consent of instructor. The effects of computer-mediated communication on the ways in which people express themselves, form impressions about strangers, develop and maintain relationships, collaborate on group work, and expand social networks, especially in comparison to face-to-face communication. Offered in alternate years.—W. (W) Hilbert

241. Computer-Mediated Communication (4)
Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. The effects of computer-mediated communication on the ways in which people express themselves, form impressions about strangers, develop and maintain relationships, collaborate on group work, and expand social networks, especially in comparison to face-to-face communication. Offered in alternate years.—W. (W) Hilbert

242. Communication Campaigns (4)
Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. Strategic uses of media and interpersonal channels to promote social change through social marketing, information, and media advocacy campaigns. Focus on theory-based interventions in a variety of applied contexts. Offered in alternate years.—W. (W) Barnett, Bell

245. Social Media (4)
Seminar—3 hours, term paper. Theoretical, conceptual and analytic issues pertaining to social media research. Topics include motivation, participation, virality, and social-technical capital. Examination of social media in various contexts. Introduction to online behavioral data collection and analysis methods. Offered in alternate years.—F. Shen

246. Communication Perspective on Video Games (4)
Seminar—3 hours; term paper. Review of theory and research on the uses and effects of video games and virtual environments developed for entertainment and education. Study of the research methods available for investigating and measuring game use and effects on behavior. Offered in alternate years.—S. Peña, Shen

249. Cognitive Approaches to Media (4)
Seminar—3 hours; term paper. Restricted to graduate standing. Interdisciplinary examination of cognitive approaches to mediated communication. Application of studies on mediated message processing, cognitive and emotional information processing, psychopathology, and neuroscience to mass communication. Review of media research and methods on attention, memory, motivation, and limited capacity. Offered in alternate years.—W. (W) Yegian

250. Mediated Communication Theory and Research (4)
Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. Theory and research on communication processes in organizations. Barnett

252. 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. Offered in alternate years.— W. (W) Yeager

254. Communication Campaigns (4)
Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. Strategic uses of media and interpersonal channels to promote social change through social marketing, information, and media advocacy campaigns. Focus on theory-based interventions in a variety of applied contexts. Offered in alternate years.—W. (W) Barnett, Bell

255. Social Media (4)
Seminar—3 hours, term paper. Theoretical, conceptual and analytic issues pertaining to social media research. Topics include motivation, participation, virality, and social-technical capital. Examination of social media in various contexts. Introduction to online behavioral data collection and analysis methods. Offered in alternate years.—F. Shen

256. Communication Perspective on Video Games (4)
Seminar—3 hours; term paper. Review of theory and research on the uses and effects of video games and virtual environments developed for entertainment and education. Study of the research methods available for investigating and measuring game use and effects on behavior. Offered in alternate years.—S. Peña, Shen

259. Cognitive Approaches to Media (4)
Seminar—3 hours; term paper. Restricted to graduate standing. Interdisciplinary examination of cognitive approaches to mediated communication. Application of studies on mediated message processing, cognitive and emotional information processing, psychopathology, and neuroscience to mass communication. Review of media research and methods on attention, memory, motivation, and limited capacity. Offered in alternate years.—W. (W) Yegian

260. Diffusion of Innovations (4)
Seminar—3 hours; term paper. Communication processes by which information and innovations spread through social systems. Models of diffusion, including spatial, network, time dependent, semantic and cognitive frameworks, Impact of communication technologies on diffusion. Practical application of diffusion models in a variety of contexts. Offered in alternate years.—W. Barnett, Hilbert

271. Communication Networks (4)
Seminar—3 hours; term paper. Theoretical, conceptual, and analytic issues pertaining to network perspectives on communicating and organizing. Consideration of both structural and dynamic features of communication networks. Examination of the impact of emerging technologies on communication networks. Introduction to network analysis soft- ware.—S. (S.) Barnett, Shen

280. Special Topics in Social Interaction (4)
Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. Reading, discussion, research, and writing on a selected topic in the specialty of social interaction. May be repeated for credit when topic differs. Offered irregularly.—S. Feng, Palomares

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 specialty of mediated communication. May be repeated for credit when topic differs. Offered irregularly.—S. Feng, Palomares

282. Special Topics in Health Communication (4)
Seminar—4 hours. Prerequisite: graduate standing; consent of instructor. Reading, discussion, research, and writing on a selected topic in the specialty of health communication. May be repeated for credit when topic differs. Offered irregularly.—S. Feng, Palomares

298. Group Study (1-5)
Lecture.—S. (S/U grading only.)

299. Individual Study (1-12)
(S/U grading only.)

299R. Thesis Research (1-12)
Independent study.—S. (S/U grading only.)

309. Teaching Assistant Training Practicum (1)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—Theobald

Community and Regional Development

[College of Agricultural and Environmental Sciences]
[Department of Human Ecology]

Faculty
See Human Ecology, on page 374.

The Major Program

The Community and Regional Development major (formerly Rural and Developmental Behavioral Sciences) aims to provide a broad comparative understanding of theories, methodologies, and issues 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.
B.S. Major Requirements:

and technology on community development, and the effects of social, economic and political systems on communities. The major 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, businesses, and education programs. Community and Regional Development 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.

UC Davis students who wish to change their major to Community and Regional Development must be in good academic standing. Students must have achieved a 2.00 GPA in any required upper-division course taken prior to declaring the major.

All courses satisfying the Preparatory Subject Matter, Department Subject Matter, Area of Specialization options and English requirement must be taken for a letter grade.

B.S. Major Requirements:

**UNITS**

Preparatory Subject Matter..............22-26

Community and Regional Development 1, 2 ............................................ 8

Planning Science 211 or Computer Science Engineering 15 .......................... 3.4

Economics 1A or 18 .............................. 4

Anthropology 2 or Sociology 1 ............. 4.5

Statistics 12 or Sociology 468 ............. 3.5

**Depth Subject Matter..........................40-43**

Care Issues in Community Development: Three courses from: Community and Regional Development 142, 152, 153A or 153B or 153C, 164, 172, 176, or 180 ........ 12-13

Economics of Community Change: Two courses from: Community and Regional Development 157, 158, 194A and 194B, Agricultural and Resource Economics 100A, 171A, Economics 100, 105, 142A, 142B, 142C, 155, 183

Communication: Communication 134, 136, 140, 152, Community and Regional Development 147, 176, Education 120

Human Resources: Community and Regional Development 151, 172, 176

Communication 2, Economics 151B, Sociology 119 ............................... 3.6

Management: Community and Regional Development 118, 140, 141, 154, 156, 159, 164, Agricultural and Resource Economics 112, 113, Human Development 100A, 100B, Sociology 138, 139, 158, 159, 180A, 180B

Policy, Planning, and Social Services Option........................................ 40

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, 194A and 194B, Agricultural and Resource Economics 100A, 171A, Economics 100, 105, Political Science 100, 105, 142A, 142B, 142C, 155, 183 Communication: Communication 134, 136, 140, 152, Community and Regional Development 147, 176, Education 120

Human Resources: Community and Regional Development 151, 172, 176

Communication 2, Economics 151B, Sociology 119 ............................... 3.6

Management: Community and Regional Development 118, 140, 141, 154, 156, 159, 164, Agricultural and Resource Economics 112, 113, Human Development 100A, 100B, Sociology 138, 139, 158, 159, 180A, 180B

Policy, Planning, and Social Services Option........................................ 40

Students must consult with a faculty adviser to identify an emphasis within the option and to select suitable courses.


Community Health and Counseling: Community and Regional Development 120, 122, 125, Community and Regional Development 164, Education 160A, 160B, Public Health Sciences 101, Human Development 120, 130, Psychology 123, 126, 151, 154, 162, 169, Sociology 154

Education and Agriculture: Agricultural Education 100, 110, Communication 101, 146, Education 100, 110, 120, 151, 152, 153, Psychology 100, 132, Sociology 154


Three courses in English Composition from the following list:


At least one course must be selected from: University Writing Program 101, 102 and 104 series.

The Upper Division Composition Exam does not satisfy the requirement.

Advanced Placement English score of 4 or 5 which satisfies English 3 and/or University Writing Program 1 will satisfy one of the three required courses.

Total Units for Major ............... 106-113

Major Adviser. M. Kenney, mfkenney@ucdavis.edu

Advising Center for the major is located in 1303 Hurt Hall 530-752-2244

Honors Program. An Honors Program available to Human and Community Development majors who have demonstrated excellence in their field of study. Entrance into the honors program requires that a student have completed at least 30 units with a minimum grade point average of 3.500 in upper division courses counted toward the major. The program consists of a project whose specific nature is determined by consultation with the student's Honors Adviser. It may involve completion of a research project, a scholarly paper, a senior thesis, or some comparable assignment. 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 eight (8) units be earned in course work for the project. It is expected that a student participating in the Honors Program of the Community Studies and Development will participate in the Undergraduate Research, Scholarship and Creative Activities Conference. Additionally, students participating in the Honors Program will be required to give a public presentation of their work in a departmental seminar.

Honors Program Adviser. M. Kenney, mfkenney@ucdavis.edu

Minor Program Requirements:

The Community and Regional Development Program (Department of Human Ecology) offers the following minor:

**UNITS**

Community Development ..................... 24

Five courses selected and will be noted on the student's record by a variable unit course number or special honors course designation. Successful completion of the minor requires that at least eight (8) units be earned in course work for the project. It is expected that a student participating in the Honors Program of the Community Studies and Development will participate in the Undergraduate Research, Scholarship and Creative Activities Conference.

Honors Program Adviser. M. Kenney, mfkenney@ucdavis.edu

Graduate Study. See Graduate Studies, on page 121.

Courses in Community and Regional Development (CRD) Lower Division

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

Fall 2011 and on Revised General Education (GE) ART=Arts and Humanities; SCE=Science and Engineering; SS=Social Sciences;

AGH=American Cultures; D=Domestic Diversity; DL=Oral Skills; DLQ=Quantitative; DLSC=Scientific; V=Visual; WC=World Cultures; WE=Writing Experience

Pre-Fall 2011 General Education (GE) Arthum=Arts and Humanities; Scieng=Science and Engineering; Socsci=Social Sciences; Div=Domestic Diversity; Writ=Writing Experience

Quarter Offered: F=Fall, W=Winter, S=Spring, Su=Summer; 2017-2018 offering in parentheses
147. Community Youth Development (4)
Lecture—3 hours; discussion—1 hour; extensive writing; term paper. Historical and cultural survey of the role of youth in 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 | ACGH. DD, OL, SS, VI, WE.—F, W. (F, W) Tarallo

2. Ethnicity and American Communities (4)
Lecture—3 hours; discussion—1 hour; extensive writing; term paper. Historical and cultural survey of the role of ethnic minorities 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 | ACGH. DD, SS, WE.—F, S. (F, S)

20. Food Systems (4)
Lecture—3 hours; laboratory—3 hours. Social aspects of agri-food systems. Social science perspectives applied to food and agricultural sustainability in relation to ecology, knowledge, technology, power, governance, labor, social difference, and social movements. Social and environmental effects of commodity chains in comparative global context. GE credit: SocSci, Wtr | VI, VI, SS, WE.—F, F (F) Galt

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).

98. Directed Group Study for Undergraduates (1-5)
Prerequisite: consent of instructor: (P/NP grading only).

99. Special Study for Undergraduates (1-5)
(P/NP grading only)

Upper Division

118. Technology and Society (4)
Lecture—3 hours; discussion—1 hour; extensive writing; term paper. Prerequisite: course 1 or 2 or Sociology 1 or Anthropology 2. Industrial cluster formation and around the globe. GE credit: SocSci, Div, Wtr | ACGH, DD, OL, SS, VI, WE.—F, W. (F, W) Kenney

140. Dynamics of Regional Development (4)
Lecture—4 hours; extensive writing; term paper; project. Prerequisite: course 1 or 2 or Sociology 1 or Anthropology 2. Globalization and technological restructuring of economic activity focusing on new spatial patterns of production and circulation and their implications for workers and communities, both in the U.S. and around the globe. GE credit: SocSci | SS, WC, WE.—F, W. (F) Kenney

141. Organization of Economic Space (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or 2 or Anthropology 2. Globalization and technological restructuring of economic activity focusing on new spatial patterns of production and circulation and their implications for workers and communities, both in the U.S. and around the globe. GE credit: SocSci | SS, WC, WE.—F, W. (F)

142. Rural Change in the Industrialized World (4)
Lecture—3 hours; discussion—1 hour; extensive writing; term paper. Prerequisite: course 1 or 2 or Sociology 1 or Anthropology 2. Geography of rural environment with emphasis on rural restructuring. Demographic, economic, political, and sociocultural changes in rural areas of industrialized world. Case studies from and comparisons drawn between North America, Europe, Australia, New Zealand, and Japan. GE credit: SocSci | SS, WE.—W. (W) Galt

147. Community Youth Development (4)
Lecture/discussion—4 hours; project; extensive writing or discussion; term paper. Community influences on youth wellbeing, youth as agents of community change, and policies to support healthy communities for young people. Special emphasis on disparities in youth wellbeing related to race, class, immigration status, gender, sexual-orientation. Offered in alternate years. GE credit: SocSci, Div, Wtr | DD, OL, SS, VI, WE.—F, W. (F, W) Tarallo

149. Community Development Perspectives on Environmental Justice (4)
Lecture/discussion—4 hours; extensive writing or discussion; project; term paper. Environmental justice social movements and their available distribution of social justice on low-income communities of color; histories, policies, and innovations associated environmental justice movements in the United States and around the world. Offered alternate years. GE credit: SocSci, Div, Wtr | DD, OL, SS, VI, WE.—S. (S) London

151. Community Field Research: Theory and Analysis (4)
Lecture—4 hours; extensive writing; project. Prerequisite: course 1; any upper division Community and Regional Development course is recommended. Emphasis on the design and analysis of community research in theory, methodology, policy, and practice. Study of community research methods, including structural analysis, elite interviewing, and ethnographic approaches. Course requires design and completion of field research project. GE credit: SocSci, Div, Wtr | ACGH, DD, OL, SS, VI, WE.—S. (S) London

152. Community Development (4)
Lecture—4 hours. Prerequisite: course 1 or 151 or Sociology 1 or Anthropology 2 or 101. Introduction to principles and strategies of community organizing and development. Examination of nonprofit organizational, citizen participation, approaches to reducing poverty, community needs assessment, and regional development strategies. GE credit: SocSci, Div, Wtr | ACGH, DD, OL, SS, WE.—F, W. (F) Brinkley

153A. International Community Development I: Asia (4)
Lecture—4 hours. Prerequisite: course 1 or Anthropology 2 or International Agricultural Development 10 or Sociology 1 or Political Science 1. 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. GE credit: SocSci, Div | OL, SS, VI, WC, WE.—Su. (Su.) Fujimoto, Wiener

153B. International Community Development II: Africa (4)
Lecture—4 hours. Prerequisite: course 1 or Anthropology 2 or International Agricultural Development 10 or Sociology 1 or Political Science 1. Examination and analysis of community development efforts in Africa 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 | SS, WC, WE.—Su. (Su.)

153C. International Community Development: Africa (4)
Lecture—2 hours; fieldwork—2 hours. Prerequisite: course 1 or Anthropology 2 or International Agricultural Development 10 or Sociology 1 or Political Science 1. Examination and analysis of community development efforts in Europe and the impact of global forces in urban and rural settings. Focus on strategies that promote self-reliance and locally controlled development. Course based in South Africa, includes field trips. GE credit: SocSci, Div | SS, WC, WE.—Su. (Su.)

154. Social Theory and Community Change (4)
Lecture/discussion—4 hours; course 1 or Sociology 1 or Anthropology 2. Comparative overview of the dominant social science paradigms for the study of community development and change. Among the paradigms discussed are functionalism, conflict theory/Maxwellian, postmodernism, methodological individualism, reflexive modernity, GE credit: SocSci, Div, Wtr | ACGH, DD, OL, SS, VI, WE.—F, W. (F, W) Tarallo

156. Community Economic Development (5)
Lecture—4 hours; laboratory—2 hours. Prerequisite: course 152 or Plant Sciences 21 or Engineering Computer Sciences 15; consent of instructor. How local communities can contribute to their economic well-being, increase their control over their economic lives, and build community power and decision-making. Includes techniques to analyze community economic potential and identification of appropriate intervention tools. Group project. GE credit: SocSci | OL, SS, WE.—W. (W)

157. Politics and Community Development (4)
Lecture—4 hours. Analyzes political, economic and sociocultural forces 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 policy implementation and practice. GE credit: SocSci, Div | ACGH, DD, SS, WE.—F (F)

158. Small Community Governance (4)
Lecture/discussion—3 hours; fieldwork—3 hours. Prerequisite: course 1 or Sociology 1 or Political Science 1. Governing institutions and political processes in rural and small urban places. Local government organization, community autonomy, leadership, political change and community organization and the impact of global forces in different settings. Alternative strategies with emphasis on self-reliance and locally controlled development. GE credit: SocSci, Div, Wtr | ACGH, DD, OL, SS, WE.—F (F)

162. People, Work and Technology (4)
Lecture—4 hours. Prerequisite: course 1 or Sociology 1 or Anthropology 2; upper division standing recommended. Restricted to upper division standing. Analysis of the relationship between work, technology, and human experience. Theories of the causes and consequences of labor process change; impacts of race/ethnicity, class, gender, and citizenship status on work, responses of workers, communities, and policy-makers to workplace changes.—F, W. (F, W) Visser

164. Theories of Organizations and Their Roles in Community Change (5)
Lecture—4 hours; term paper. Social impact, economics, and politics of housing in the United States. Special attention given to federal, state, and local policy and program strategies to produce and preserve affordable housing and inclusive neighborhoods.—F, S

172. Social Inequality: Issues and Innovations (4)
Lecture/discussion—4 hours; extensive writing; term paper; project. Prerequisite: course 1 or Sociology 1 or Anthropology 2; upper division standing recommended. Focus on the dimensions, causes, and means of alleviating social inequality in the U.S. Examination and analysis of major theories and trends [class, race/ethnicity, gender, and citizenship status] of inequality. Policy-based and grassroots approaches to change.—S. (S) Visser

176. Comparative Ethnicity (4)
Lecture—4 hours; term paper. Prerequisite: course 1 or Sociology 1 or Anthropology 2; upper division standing recommended. Role of ethnicity in shaping social systems and interaction. Analytical approaches to and issues arising from the study of
180. Transnational Community Development (4)
Lecture/discussion—4 hours; extensive writing; project; term paper. Prerequisite: course 1, or Anthropology 2. 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|SS, WC, WE. —S. (S.) 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.)

194HA. Special Study for Honors Students (4)
Independent study—3 hours; seminar—1 hour; project; term paper. Prerequisite: completion of 135 units at the time of enrollment; GPA 3.500 in the major; GPA 3.300 in overall standing; completion of at least four upper division courses; agreement of a faculty member to serve as thesis adviser; consent of instructor. Community and Regional Development Honors is a program of directed reading, research and writing culminating in the preparation of a Senior Honors Thesis under the direction of a faculty adviser. (Deferred grading only, pending completion of sequence.)—F. W. F. W. Kenney

194HB. Special Study for Honors Students (4)
Independent study—3 hours; seminar—1 hour; project; term paper. Prerequisite: completion of 135 units at the time of enrollment; GPA 3.500 in the major; GPA 3.300 in overall standing; completion of at least four upper division courses; agreement of a faculty member to serve as thesis adviser; consent of instructor. Community and Regional Development Honors is a program of directed reading, research and writing culminating in the preparation of a Senior Honors Thesis under the direction of a faculty adviser. (Deferred grading only, pending completion of sequence.)—F. W. F. W. Kenney

197T. Tutoring in Community and Regional Development (1-5)
Tutorial—3-15 hours. Prerequisite: upper division standing; completion of course to be tutored; consent of instructor. Assisting tutor in one of the Community and Regional Development’s regular courses by tutoring individual students or small groups of students in a laboratory, linking applied development techniques to theory, examining case studies of community development, and examining case studies of community development organizations and projects. (Same course as Geography 241.)—F. W. F. W. Kenney

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 a theoretical, linking applied development techniques to theory, evaluating development policy, and examining case studies of community development organizations and projects. (Same course as Geography 240.)—F. W. F. W. Kenney

241. The Economics of Community Development (4)
Seminar—4 hours. Prerequisite: graduate standing. Economic theories and methods of planning for communities; community services and infrastructure, industrialization and technological change, and regional growth. The community’s role in the greater economy. (Same course as Geography 241.)—F. W. F. W. Kenney

242. Community Development Organizations (4)
Seminar—4 hours. Prerequisite: course 240. Class size limited to 15 students. Theory and praxis of organizations with social change agendas at the community level. Emphasis on non-profit organizations and philanthropic foundations. —S. (S.) 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. (Same course as Geography 245.)—S. (S.) Hirtz

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, ethnicity, citizenship, and the ethnic economy. (Same course as Geography 246.)—W. (W.) Guarnizo

258. 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. and other developed countries. (Same course as Geography 258.)—F. (F.) Visser

258. 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. and other developed countries. (Same course as Geography 258.)—F. (F.) Visser

258. 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. and other developed countries. (Same course as Geography 258.)—F. (F.) Visser
Community Nutrition

David de la Pena, Ph.D., Assistant Professor [Human Ecology]
Adela De Ta Tho, Ph.D., Ph.D., Professor [Chicana/o Studies]
Jesse Drew, Ph.D., Associate Professor [Techno-Cultural Studies]
Paty Eubanks, M.A., Professor [Human Ecology]
Yvette Flores-Ortiz, Ph.D., Professor [Chicana/o Studies]
Ryan E. Galt, Ph.D., Associate Professor [Human Ecology]
Liza Grandia, Ph.D., Associate Professor [Native American Studies]
Luis Guzman, Ph.D., Professor [Human Ecology]
Susan Hardy, Ph.D., Professor [Environmental Science and Policy]
Bruce Haynes, Ph.D., Associate Professor [Sociology]
Paul Heckman, Ph.D., Professor [School of Education]
Robin Hill, Ph.D., Professor [Art, Art History]
Carlos Jackson, M.F.A., Associate Professor and Chair [Chicana/o Studies]
Susan B. Kaiser, Ph.D., Professor [Women’s Studies, Textiles and Clothing]
Martin Kenney, Ph.D., Professor [Human Ecology]
David Kyle, Ph.D., Associate Professor [Sociology]
William Lacy, Ph.D., Professor, Vice Provost [Human Ecology, Outreach and International Programs]
Jonathan London, Ph.D., Associate Professor [Human Ecology]
Mark Lubell, Ph.D., Professor [Environmental Sciences and Policy]
Beth Rose-Maddela, Ph.D., Assistant Professor [Native American Studies]
Breit Milligan, M.L.A., Assistant Professor [Human Ecology]
N. Claire Napolitano, M.L.A., Assistant Professor [Human Ecology]
Belinda Ng’weno, Ph.D., Associate Professor [African American African Studies]
Deb Niemeier, Ph.D., Professor [Civil and Environmental Engineering]
Michael Rios, Ph.D., Associate Professor [Human Ecology]
Sheryl-Ann Simpson, Ph.D., Assistant Professor [Human Ecology]
Julie Sze, Ph.D., Associate Professor [American Studies]
Tom Tomich, Ph.D., Professor [Human Ecology]
M. Anne Visser, Ph.D., Assistant Professor [Human Ecology]
Karen Watson-Gegeo, Ph.D., Professor [School of Education] Distinguished Graduate Mentoring Award
Stephen Wheeler, Ph.D., Professor [Human Ecology]
Diane Wolf, Ph.D., Professor (Sociology)

Affiliated Faculty
David Campbell, Ph.D., Specialist in Cooperative Extension [Human Ecology]
Gail Feenstra, Ph.D., Food Systems Analyst (SAKEP)
Sherman Hardesty, Ph.D., Specialist in Cooperative Extension [Agricultural and Resource Economics]
Jeff Loux, Ph.D., Director [Land Use and Natural Resources, UC Davis Extension]
Deborah Parentini, Ph.D., Associate Adjunct Professor (UCDHS: Center for Healthcare Policy and Research)
Carolyn Penny Prizer, Director [Chancellor and Provost Office]
Bernadette Tarollo, Ph.D., Continuing Lecturer [Human Ecology]
Mark Van Horn, Director (PSTC/SCF)

Emeriti Faculty
Stephen Brush, Ph.D., Professor Emeritus [Human Ecology]
Deborah Elliott-Fisk, Ph.D., Sr. Lecturer SOE, Emeritus [Wildlife, Fish, and Conservation Biology]
Mark Francis, M.L.A., Professor Emeritus [Human Ecology]
Isoo Fujimoto, Ph.D., Lecturer SOE Emeritus [Human Ecology]
James I. Grieshop, Ph.D., Specialist in Cooperative Extension Emeritus [Human Ecology]
Joyce Gutstein, Director (Public Service Research Program)
Frank Hirtz, Ph.D., Sr. Lecturer SOE [Human Ecology]
Janet D. moment, Ph.D., Professor Emerita [Human Ecology]
Ben Orlove, Ph.D., Professor Emeritus [Environmental Sciences and Policy]
Dennis Pendlebury, Ph.D., Dean [UC Davis Extension]
Michael F. Smith, Ph.D., Distinguished Professor Emeritus [Human Ecology]
Alvin D. Sokolow, Ph.D., Extension Specialist Emeritus [Human Ecology]
Geoffrey A. Wandesforde-Smith, Ph.D., Associate Professor Emeritus [Political Science, Environmental Science and Policy]
Miriam J. Wells, Ph.D., Professor Emerita [Human Ecology]

Graduate Study. The Graduate Group in Community Development offers a multidisciplinary program of study which leads to the M.S. degree. The program helps students link conceptual knowledge with cutting edge practical experience so they can influence the social, economic, cultural and political forces that affect the well being of people living in community settings whether small towns or large cities; whether in the Unites States or elsewhere in the world. Graduate study in community development also prepares individuals to work within government or non-profit organizations in the realm of social and economic change, or to prepare them for further doctoral studies in related programs. Particular strengths of the program include: urban political development and change; sustainable agriculture and food systems; community organizing and organizations in underserved communities; community economic development; environmental conservation and planning; local impacts of globalization and trans-nationalism.

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, geography, urban studies or political science, and courses in community studies.

Graduate Advisers. Contact the Group office.

Community Nutrition

See Nutrition Science, on page 496.

Comparative Literature

[College of Letters and Science]
Juliana Schiesari, Chairperson of the Department
Department Office. 213 Sprool Hall; 530-752-1219; http://complit.ucdavis.edu

Faculty
Joshua Clover, Ph.D., Professor [Comparative Literature, English]
Gail Finney, Ph.D., Professor [Comparative Literature, German and Russian]
Ralph Hexter, Ph.D., Professor [Comparative Literature, French and Italian]
Neil Larsen, Ph.D., Professor [Classics, and Comparative Literature]
Kari Lokke, Ph.D., Professor

Sheldon Lu, Ph.D., Professor
Noha Radwan, Ph.D., Assistant Professor [Comparative Literature, French and Italian]
Brenda Schildgen, Ph.D., Professor [Comparative Literature, French and Italian]
Scott McLean, Ph.D., Lecturer
Seth L. Schein, Ph.D., Professor Emeritus
Robert M. Torrance, Ph.D., Professor Emeritus

The Major Program

Comparative Literature is a dynamic major whose own self-definition is constantly shifting. Once mostly limited to the study of western European literature and its Greco-Roman classical past, today Comparative Literature has become a global interdisciplinary study of literature in original languages and other media (including cinema, television, fine arts, and opera, for example). Thus, we can define Comparative Literature as the study of literature and culture across national boundaries and throughout historical time.

The Program. Both the major and the minor programs in Comparative Literature allow students to combine courses in one or more national literature departments with courses in Comparative Literature. The introductory course sequence (COM 1 through 4) provides both an overview of an ancient to contemporary literature and film and offers intensive practice in analytical thought. In addition, any one of the courses in the sequence satisfies the university composition requirement. All readings in undergraduate Comparative Literature courses are in English, but majors take upper division courses in at least one foreign literature in the original language.

Students majoring in Comparative Literature choose a first and second literature of concentration, one of which may be English. After the introductory sequence, each student’s major course work is divided between courses in the two literatures of concentration and Comparative Literature courses. These Comparative Literature courses encourage students to take a broad view of a historical period, a theme, a genre, or a literary movement. The wide variety of options in the program permits great flexibility and encourages interdisciplinary connections among literature and philosophy, psychology, history, and the arts. Each student’s plan of study must be approved by the major adviser at the beginning and end of each calendar year.

Career Alternatives. A Comparative Literature major offers an excellent enhancement to pre-professional training, preparing students for graduate study in medicine, dentistry, veterinary medicine, and other science fields as well as law and business, besides of course journalism and publishing, teaching, or graduate study in literature.

A.B. Major Requirements:

Preparatory Subject Matter ............... 16-46
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).
It is recommended that students who do not use a European language toward the major take one of the remaining required lower division courses in the 53 series, preferably the 53 course that relates to the region of the language the student is using to satisfy the upper division language requirement in the major.

Fall 2011 and on Revised General Education (GE) Arts and Humanities; Scientific and Engineering; Social Sciences; Cultural and Environmental Studies; World Cultures; Writing Experience
Pre-Fall 2011 General Education (GE); Arts and Humanities; Scientific and Engineering; Social Sciences; Cultural and Environmental Studies; World Cultures; Writing Experience
Quarter Offered: Fall, Winter, Spring, Summer; 2017-2018 offering in parentheses
Comparative Literature

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Foreign language: sufficient preparation to ensure satisfactory performance at the upper division level.

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 the following required courses:

Comparative Literature 141 (recommended for the junior year)...

Comparative Literature 195 (to be taken in the spring quarter before graduation)...

Three upper division literature courses in a language other than English...

Two additional upper division literature courses in Comparative Literature or in any other program including English or literature in translation...

Total Units for the Major: 56-86

Major Adviser: Consult the Department office.

Minor Program Requirements:

The minor in Comparative Literature allows students to complete courses in Comparative Literature with courses in a national literature, including English or foreign literature in translation. There is no foreign language requirement for the minor.

Comparative Literature Literature 24

Comparative Literature 1, 2, 3, or 4...

At least five upper division literature courses, at least four of which are in Comparative Literature; Comparative Literature 141 and 195 recommended...

Courses should be chosen in consultation with, and with the approval of, the adviser. Minor Adviser: Consult the Department office.

Advising: All Comparative Literature majors and minors must consult with their adviser, individually, at least once at the beginning and once at the end of each academic year.

Honors and Honors Program:

Students who meet the grade point requirement for graduation with honors and complete the requirements established by the College of Letters and Science, may be recommended by the department for graduation with high honors or highest honors on the basis of an evaluation of their academic achievements in the major, as well as in a minor project in particular. 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 counting toward the major.

Candidates must write a senior thesis under the direction of a faculty member approved by the major adviser. For this purpose, in addition to fulfilling all other major requirements, honors candidates must enroll in 6 units of Comparative Literature 194H during the first two quarters of the senior year.

Teaching Credential Subject Representative:

See the Teaching Credential/M.A. Program on page 125.

Education Abroad Options:

The department of Comparative Literature encourages students to study abroad during the quarter abroad program, the Quarter Abroad Program, or the Education Abroad Program. With the approval of a major adviser, applicable courses taken abroad may be accepted in the major or minor.

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 the 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 one. 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 the student’s background 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 three foreign languages. The Group requires three letters of recommendation and a sample of recent written work; it is recommended that students submit their GRE scores.

Graduate Adviser: S. Lu

Courses in Comparative Literature (COM)

Note: Many courses in Comparative Literature require that students have met the Entry Level Writing Requirement (ELWR) for the University of California.

Lower Division

Major Books of Western Culture: The Ancient World (4)

Lecture/discussion—4 hours. Prerequisite: completion of Entry Level Writing Requirement. Introduction, through class discussion and frequent written assignments, to some of the major works of western civilization such as The Odyssey, Aeneid, Bible, and Augustine’s Confessions. GE credit: ArtHum, Wrt|AH, WC, WE.

Major Books of Western Culture: From the Middle Ages to the Enlightenment (4)

Lecture/discussion—4 hours. Prerequisite: completion of Entry Level Writing Requirement. Introduction to the methods of inquiry applied to critical reading and the practice of writing. Focus on texts from the European Middle Ages to the eighteenth century; critical analysis of the historical-cultural developments in this period. GE credit: ArtHum, Wrt|AH, WC, WE.

Major Books of Western Culture: The Modern World (4)

Lecture/discussion—4 hours. Prerequisite: completion of Entry Level Writing Requirement. Introduction, through class discussion and frequent written assignments, to the major literature and thought of the late eighteenth to mid-nineteenth century. GE credit: ArtHum, Wrt|AH, WC, WE.

Major Books of the Contemporary World (4)

Lecture/discussion—4 hours. Prerequisite: completion of Entry Level Writing 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|AH, VL, WE.

The Short Story and the Novella (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, P’u-Sung-Ling, Kafka, Kawabata, Fuentes, and Morrisson. GE credit: ArtHum, Div|Wrt|AH, WE.

Utopias and their Transformations (4)

Lecture/discussion—3 hours; term paper. Prerequisites: completion of entry level writing 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 pervisions of the utopian dream of perfection. GE credit: ArtHum, Div|Wrt|AH, WC, WE.

The Short Story and Novella (4)

Lecture/discussion—3 hours; term paper. An introduction to shorter forms of prose fiction by major authors of different countries, with special emphasis on the modern period. GE credit: ArtHum, Div|Wrt|AH, WC, WE.

Major Authors in World Literature: Gilgamesh, Ramayana, Beowulf, Nibelungenlied (2)

Lecture/discussion—1 hour. Limited enrollment. 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: Gilgamesh, Ramayana, Beowulf, Nibelungenlied. May be repeated for credit in different subject area. (P/NP grading only.)

Major Authors in World Literature: Metamorphoses, Decameron, Arabian Nights, Canterbury Tales (2)

Lecture/discussion—1 hour. Limited enrollment. 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: Metamorphoses, Decameron, Arabian Nights, Canterbury Tales. (P/NP grading only.)

Major Authors in World Literature: Chanson de Roland, El Cid, Igor’s Campaign, Morte D’Arthur (2)

Lecture/discussion—1 hour. Limited enrollment. 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: Chanson de Roland, El Cid, Igor’s Campaign, Morte D’Arthur. May be repeated for credit in different subject area. (P/NP grading only.)

Major Authors in World Literature: Sakuntala, Tristan and Isolde, Aucassin and Nicolette, Gawain and the Green Knight (2)

Lecture/discussion—1 hour. Limited enrollment. 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: Sakuntala, Tristan and Isolde, Aucassin and Nicolette, Gawain and the Green Knight. May be repeated for credit in different subject area. (P/NP grading only.)

Major Authors in World Literature: Swift, Rabelais, La Celestina, Simplissimus (2)

Lecture/discussion—1 hour. Limited enrollment. 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: Swift, Rabelais, La Celestina, Simplissimus. May be repeated for credit in different subject area. (P/NP grading only.)

Major Authors in World Literature: Cervantes, Saikaku, Voltaire (2)

Lecture/discussion—1 hour. Limited enrollment. 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: Cervantes, Saikaku, Fielding, Voltaire. May be repeated for credit in different subject area. (P/NP grading only.)
10G. Master Authors in World Literature; Machiavelli, Shakespeare, Lope de Vega/Calderón, Molière/Racine, Lessing/Sciller (2)
Lecture/discussion—1 hour. Limited enrollment. 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: Machiavelli, Shakespeare, Lope de Vega/Calderón, Molière/Racine, Lessing/Sciller. May be repeated for credit in different subject area. [P/NP grading only.]

10H. Master Authors in World Literature; Goethe, Byron, Stendhal, Pushkin, Lermontov (2)
Lecture/discussion—1 hour. Limited enrollment. 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: Goethe, Byron, Stendhal, Pushkin, Lermontov. May be repeated for credit in different subject area. [P/NP grading only.]

10I. Master Authors in World Literature; Hoffmann, Gogol, Poe, Hawthorne, Maupassant, Chekhov, Melville (2)
Lecture/discussion—1 hour. Limited enrollment. 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: Hoffmann, Gogol, Poe, Hawthorne, Maupassant, Chekhov, Melville. May be repeated for credit in different subject area. [P/NP grading only.]

10J. Master Authors in World Literature; Flaubert, Twain, Turgenev, Galdós, Ibsen (2)
Lecture/discussion—1 hour. Limited enrollment. 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: Flaubert, Twain, Turgenev, Galdós, Ibsen. May be repeated for credit in different subject area. [P/NP grading only.]

10K. Master Authors in World Literature; Balzac, Dostoevski/Tolstoi, Hardy, Shaw, Strindberg (2)
Lecture/discussion—1 hour. Limited enrollment. 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: Balzac, Dostoevski/Tolstoi, Hardy, Shaw, Strindberg. May be repeated for credit in different subject area. [P/NP grading only.]

10L. Master Authors in World Literature; Unamuno, Svevo, Conrad, Gide, Kafka, Faulkner (2)
Lecture/discussion—1 hour. Limited enrollment. 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: Unamuno, Svevo, Conrad, Gide, Kafka, Faulkner. May be repeated for credit in different subject area. [P/NP grading only.]

10M. Master Authors in World Literature; Rilke/Yeats, Joyce/Woolf, Mann/Céline, Bulgakov/Tanizaki, O’Neill/Brecht, Lorca/Pirandello (2)
Lecture/discussion—1 hour. Limited enrollment. 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: Rilke/Yeats, Joyce/Woolf, Mann/Céline, Bulgakov/Tanizaki, O’Neill/Brecht, Lorca/Pirandello. May be repeated for credit in different subject area. [P/NP grading only.]

10N. Master Authors in World Literature; Camus/Sartre, García Márquez/Grass, Borges/Sarras, Beckett/Pinter, Genet/Dürrenmatt (2)
Lecture/discussion—1 hour. Limited enrollment. 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: Camus/Sartre, García Márquez/Grass, Borges/Sarras, Beckett/Pinter, Genet/Dürrenmatt. May be repeated for credit in different subject area. [P/NP grading only.]

11. Travel and the Modern World (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: completion of Entry Level Writing requirement. Examination of travel as a quintessential human activity and experience of global modernity and cross-cultural encounters from the 18th to the 21st century with an emphasis on German-speaking culture. Travelogues, literature, art, memoirs, and films in English translation. [Same course as German 11.] GE credit: ArtHum, Div, Writ | AH, VL, WC, WE.—F, W, S. [F. S. J. Zhang]

13. Dramatic Literature (3)
Lecture/discussion—3 hours. Prerequisite: completion of entry level writing requirement. Introduction, through careful reading of selected plays, to some of the major forms of Western drama, from the Greek tragedies of ancient Greece to the contemporary American theater. GE credit: ArtHum, Writ | AH, WC, WE.

14. Introduction to Poetry (3)
Lecture/discussion—3 hours. Prerequisite: completion of entry level writing 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. GE credit: ArtHum, Writ | AH, WC, WE.

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, Darwin, and Thoreau. GE credit: ArtHum, Writ | AH, WC, WE.

24. Animals in Literature (4)
Lecture—3 hours; term paper or discussion. Prerequisite: completion of Entry Level Writing Requirement. Study of literary texts from various periods and cultures whose themes are based on animal forms and the present. GE credit: ArtHum, Writ | AH, WC, WE.—Schiesari

25. Ethnic Minority Writers in World Literature (4)
Lecture/discussion—3 hours; discussion. Prerequisite: EWRK (Entry Level Writing Requirement). Consideration of a broad range of writers who speak from an ethnic perspective different from the nominally or politically dominant culture of their respective countries and who are challenged by characters significantly affected by their ethnic minority status. GE credit: ArtHum, Div, Writ | AH, WC, WE.

33A. Literature of East Asia (4)
Lecture—3 hours; term paper. Introduction to representative masterpieces of East Asia with readings from such works as The Story of the Stone, The Peach Blossom Fan, T'ang and Sung poetry, classical Japanese poetry, drama, and travel diaries, and The Tale of Genji. GE credit: ArtHum, Div, Writ | OH, WLC, WC, WE.

33B. Literature of South Asia (4)
Lecture—3 hours; term paper. Introduction to representative masterpieces of South Asia with readings from such works as the Mahabharata and Ramayana, The Cloud Messenger, Shakuntala, The Little Clay Cart, and the stories and poems of both ancient and modern India and Southeast Asia. GE credit: ArtHum, Div, Writ | AH, OL, WC, WE.—Schil- dgen

53C. Literatures of the Islamic World (4)
Lecture—3 hours; term paper. Introduction to classical Islamic culture through translations of literature primarily from Arabic and Persian, as well as other languages. Topics include the concept of the self, society and power, spirituality, the natural world, the cosmos, and the supernatural. GE credit: ArtHum, Div, Writ | AH, OL, WC, WE.—Sharlet

90X. Lower Division Seminar (1-2)
Seminar—1-4 hours. Prerequisite: consent of instructor. Examination of a special topic in a small group seminar. Restricted to lower division students. [P/NP grading only.]

99. Special Study for Undergraduates (1-5)
[P/NP grading only.]

Upper Division

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 “pastsocialist cinemas in East Europe and Asia,” “cinema and globalization,” or “popular Asian cinemas.” May be repeated three times for credit when topic differs. GE credit: ArtHum, Div, Writ | AH, VL, WC, WE.—Lu

110. Hong Kong Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: upper-division standing, or consent of instructor. Hong Kong cinema, its history, industry, styles, genres, directors, and stars. Special attention to its polyglot, multicultural, transnational, colonial, and postcolonial environment. GE credit: ArtHum, Div, Writ | AH, VL, WC, WE.—Lo

120. Writing Nature: 1750 to the Present (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of entry level writing requirement. Study of representations, descriptions, and discussions of humankind’s problematical relationship with the non-human world in texts written in a variety of European and American traditions between 1750 and the present. GE credit: ArtHum, Writ | AH, WC, WE.—[S].

131. Women Writers (4)
Lecture/discussion—3 hours; term paper. An exploration of women’s differing views of self and society as revealed in major works by female authors of various times and cultures. Readings, principally of fiction, will include such writers as Lady Murasaki, Mme de Lafayette, and Charlotte Bronte. GE credit: ArtHum, Div, Writ | AH, WC, WE.—Lokke, Schiesari

138. Gender and Interpretation in the Renaissance (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of entry level writing requirement. Critical analysis of Renaissance texts with primary focus on issues such as human dignity, education and gender politics; “high” and “low” culture and its relation to literary practices. [Same course as Italian 141.] GE credit: ArtHum, Div, Writ | AH, WC, WE.—Schiesari

139. Shakespeare and the Classical World (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of entry level writing requirement. Shakespeare’s representations of the classical world in the light of selected ancient texts and Renaissance conceptions of Antiquity, with special attention to the depictions of politics and history. GE credit: ArtHum, AH, WC, WE.—Schein
140. Thematic and Structural Study of Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of entry level writing requirement. Introduction to thematic and structural study of literature and its use for interpreting literary texts, film, and media forms in global culture. Same course as Critical Theory 101. GE credit: ArtHum, Wrt|AH, WC, WE. —S. Larsen

141. Introduction to Comparative Critical Theory (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of entry level writing requirement. Introduces students to comparative critical theory and its use for interpreting literary texts, film, and media forms in global culture. GE credit: ArtHum, Wrt|AH, WC, WE. —S. Larsen

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 | AH, WC, WE.

143. The Grotesque (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of entry level writing requirement. Study of the aesthetic image of the “grotesque” from Renaissance to contemporary literature. GE credit: ArtHum, Wrt|AH, WC, WE. —S. Larsen

145. Representations of the City (4)
Lecture—2 hours; discussion—1 hour; writing. Exploration of the representation of the city in major transnational texts and an examination of the diversity of urban experience in literature. GE credit: ArtHum, Div, Wrt|AH, WC, WE. —Radwan, Sharlet

146. Myth in Literature (4)
Lecture—3 hours; term paper. Prerequisite: course 6 recommended. Comparative study of different versions of one or more central myths, with attention to their place in the cultural settings, artistic and literary forms of representation, as well as to their psychological dimensions. GE credit: ArtHum, Wrt|AH, WC, WE.

147. Modern Jewish Writers (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of entry level writing requirement. Problems of the modern Jewish experience from the perspective of the writer’s construction of the self in relation to the future and to the non-Jew. Works by Kafka, Staring, Benjamins, and American traditions. GE credit: ArtHum, Div, Wrt|AH, WC, WE.

148. Mystical Literatures of South Asia and the Middle East (4)
Lecture/discussion—3 hours; term paper. Exploration of the comparative mystical literatures of major religious traditions, with a focus on those produced in South Asia and the Middle East, although including other traditions. GE credit: ArtHum, Div, Wrt|AH, WC, WE. —Venkatesan

151. Colonial and Postcolonial Experience in Literature (4)
Lecture—3 hours; term paper. Prerequisite: completion of entry level writing requirement. Study of the various stylistic, historical, social and cultural factors that serve to create a hemispheric vision of American literature, encompassing works by Canadian, United States, Caribbean, Brazilian, and Spanish-American writers. GE credit: ArtHum, Div, Wrt|AH, WC, WE.

152. Literature of the Americas (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of entry level writing requirement. Study of the various stylistic, historical, social and cultural factors that serve to create a hemispheric vision of American literature, encompassing works by Canadian, United States, Caribbean, Brazilian, and Spanish-American writers. GE credit: ArtHum, Div, Wrt|AH, WC, WE.

152S. Literature of the Americas (Taught in Latin America) (4)
Lecture/discussion—3 hours; term paper; field work—6 hours. Prerequisite: completion of entry level writing requirement. Various stylistic, historical, social, and cultural factors that contribute to a hemispheric vision of American literature, encompassing works by Canadian, United States, Caribbean, Brazilian, and Spanish-American writers. Course taught abroad. May be repeated one time for credit. GE credit: ArtHum, Div, Wrt|AH, VL, WC, WE. —Larsen

153. The Forms of Asian Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of entry level writing requirement. Introductions to distinctive literary forms, such as haiku, noh, the Chinese novel and tale, through reading of major works. Comparison with Western genres and study of native and Western critical traditions. GE credit: ArtHum, Div, Wrt|AH, WC, WE.

154. African Literature (4)
Lecture—3 hours; term paper. Prerequisite: completion of Entry Level Writing Requirement (ELWR). Colonial and post-colonial sub-Saharan African literature and the African oral traditions from which it emerged. Genres and themes of African literature from the nineteenth century to the present. GE credit: ArtHum | AH, OL, WC, WE. —Adejumobi

155. Classical Literatures of the Islamic World (4)
Lecture—3 hours; term paper. Major texts from Arabic, Persian, Ottoman Turkish and Urdu literature with attention to historical and cross-cultural context. Includes epic, romance, various genres of lyric poetry, fairy tales, religious stories, mystical and philosophical narratives, and essays. GE credit: ArtHum, Div, Wrt|AH, OL, WC, WE. —Sharlet

156. The Ramayana (4)
Lecture—3 hours; term paper. Exploration of the Indian epic, Ramayana, through the lens of literature, performance, and visual art. Emphasis on the text’s diversity and its contemporary global relevance. Topics include Ramayanas in Southeast Asia, and in various South Asian diaspora communities. (Same course as Religious Studies 158.) GE credit: ArtHum, Div, Wrt|AH, WC, WE. —Venkatesan

157. War and Peace in Literature (4)
Lecture/discussion—3 hours; term papers. Prerequisite: 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 illuminate the way in which the tension between the expansive energies of the “baroque” and the constraints of dogma and reason. GE credit: ArtHum, Wrt|AH, WC, WE.

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 comparative context. GE credit: ArtHum, Wrt|AH, WC, WE.

159. Women in Literature (4)
Lecture—3 hours; term paper. Prerequisite: course 1, 2, 3, or 4 or the equivalent recommended. Portrayals of women in literature, comparing selected heroines who represent a particular theme, period, or genre. Texts range around the globe and from ancient to modern works, such as Lysistrata, Emma, Hedda Gabler, The Makioka Sisters, and Top Girls. GE credit: ArtHum, Wrt|AH, WC, WE. —Venkatesan

160A. The Modern Novel (4)
Lecture/discussion—3 hours; term paper. The changing image of man and his world as seen in novels by such writers as Joyce, Proust, and Mann. GE credit: ArtHum, Wrt|AH, WC, WE. —Vorhees

160B. The Modern Drama (4)
Lecture/discussion—3 hours; term paper. Readings in representative authors such as Ibsen, Strindberg, Chekhov, Franędela and Brecht. GE credit: ArtHum, Wrt|AH, WC, WE. —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|AH, WC, WE.

161B. Comedy (4)
Lecture/discussion—3 hours; term paper. Comic attitudes towards life in literature in different ages. GE credit: ArtHum, Wrt|AH, WC, WE.

162. Writing Love and War in South Asia (4)
Lecture—3 hours; term paper. Comparative study of the themes and motifs of love and war in the literature of South Asia. Includes a discussion of Sanskrit epics, classical erotic court poetry, medieval heroic poetry, mystical compositions and colonial and post-colonial fiction. GE credit: ArtHum | AH, OL, WC, WE. —Venkatesan

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. GE credit: ArtHum, Wrt|AH, WC, WE.

164A. The European Middle Ages (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of entry level writing requirement. Medieval literary genres as the foundation for modern literary forms. Topics include Latin, the Bible, Good, inart, nature, history and politics, and sign theory. GE credit: ArtHum, Wrt|AH, WC, WE. —Schildgen

164B. The Renaissance (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of entry level writing requirement. Renaissance writers such as Swift, Voltaire, Sterne, Rousseau, Wollstonecraft, and Kant. Emphasis on the revolutionary impact of eighteenth-century philosophical ideas and literary forms on modern political, social, and aesthetic culture. GE credit: ArtHum, Wrt|AH, WC, WE. —Venkatesan

165. Caroube and Neoclassicism (4)
Lecture/discussion—3 hours; term paper. Readings in major authors such as Calderón, Corneille, Pascal, Racine, Milton, and Swift, including consideration of the tension between the expansive energies of the “baroque” and the restraints of dogma and reason. GE credit: ArtHum, Wrt|AH, WC, WE.

164D. The Enlightenment (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of entry level writing requirement. Enlightenment writers such as Swift, Voltaire, Sterne, Rousseau, Wollstonecraft, and Kant. Emphasis on the revolutionary impact of eighteenth-century philosophical ideas and literary forms on modern political, social, and aesthetic culture. GE credit: ArtHum, Wrt|AH, WC, WE. —Venkatesan

165B. Caribbean Literatures (4)
Lecture/discussion—4 hours. Prerequisite: completion of entry level writing requirement. Comparative approach to the multi-lingual, multi-cultural literatures of the Caribbean, 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|AH, WC, WE.

165S. 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|AH, WC, WE.

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,
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 | AH, WC, WE.

166B. The Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: consent of instructor. Pivotal works of artists in the Western mainstream, such as Dante, Shakespeare, Cervantes, Goethe, Tolstoy, Proust, and Joyce. GE credit: ArtHum, Wrt | AH, WC, WE.

168A. Romanticism (4)
Discussion—3 hours; term paper. Prerequisite: completion of entry level writing requirement. Introduction to Romantics 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 | AH, WC, WE.

168B. Realism and Naturalism (4)
Discussion—3 hours; term paper. Prerequisite: consent of instructor. Novels and plays by Dickens, Zola, Flaubert, Dreiser, Ibsen, and Strindberg investigate modern life and its hardships of industrialization, the war between the sexes, the New Woman, and other 19th-century themes. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE.

169. The Avant-Garde (4)
Lecture/discussion—3 hours; term paper. Studies in movements such as surrealism, expressionism and the absurd. GE credit: ArtHum, Wrt | AH, WE.

170. The Contemporary Novel (4)
Lecture/discussion—3 hours; term paper. Analysis of important 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 | AH, WC, WE.

172. A Story for a Life: The Arabian Nights (4)
Lecture/discussion—3 hours; term paper. In-depth exploration of The Arabian Nights, the best-known work of pre-modern Arabic literature and a major work of world literature. Analysis of the work in its historical context and in comparison to other folk tales in world literature. [Same course as Arabic 140 and Middle East/South Asian Studies 121C.] Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE — Radwan, Sharlet

175. Shahnameh: The Persian Book of Kings (4)
Lecture/discussion—3 hours; term paper. In-depth analysis of the Persian Book of Kings (Shahnameh) by Abu al-Qasim Ferdowsi (d. 1020 CE) in its historical context with a comparative perspective on the role of this work in Persian and world literature. [Same course as Middle East/South Asian Studies 121A.] GE credit: ArtHum, Div, Wrt | AH, WC, WE — Anoooshahr, Sharlet

180S. Selected Topics in Comparative Literature (Taught Abroad) (4)
Lecture/discussion—6 hours; term paper; writing; fieldwork—days. 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 | AH, WC, WE.

180T. Selected Topics in Comparative Literature (4)
Lecture/discussion—6 hours; term paper; writing; fieldwork—days. 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. Offered irregularly. GE credit: ArtHum, Wrt | AH, WC, WE.

192. Internship in Comparative Literature (1-3)
Internship—1-12 hours. Prerequisite: completion of 84 units; consent of instructor. Restricted to Comparative Literature majors. Internships in fields where students can practice their skills. May be repeated up to 12 units for credit. [P/NP grading only]

194H. Special Study for Honors Students (1-5)
Independent study—1-5 hours. Prerequisite: open only to majors of senior standing, who must consult with the director 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] GE credit: ArtHum, AH, WE.

195. Seminar in Comparative Literature (4)
Seminar—3 hours; term paper. Prerequisite: senior standing as a Comparative Literature major or minor or consent of instructor. Open only to Comparative Literature majors or minors or consent of instructor. Advanced study of selected topics and texts in Comparative Literature, with explicit emphasis on the theoretical and interpretive approaches that define Comparative Literature as an academic discipline and distinguish it from other literary disciplines. Required for the major. GE credit: ArtHum | AH, WE.

197T. Tutoring in Comparative Literature (1-3)
Discussion—2-4 hours. Prerequisite: upper division standing with emphasis upon comparative literature, and understanding of poetic discourse. Offered irregularly.

210. Topics and Themes in Comparative Literature (4)
Discussion—3 hours; term paper. Prerequisite: graduate standing in Comparative Literature. May be repeated for credit. GE credit: ArtHum, Div, Wrt | AH, WC, WE — Radwan, Sharlet

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. Offered irregularly.

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 study of major works in a particular genre from various linguistic, national, and cultural traditions, with particular attention to historical developments within the genre and to genre theory. May be repeated for credit when topic differs. Offered irregularly.

228. 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 anthropological literature, psychology, and women’s studies. Offered irregularly.

250A. Research in Primary Literature (4)
Project. Individually guided research in the primary literature of concentration, under the supervision of a faculty member culminating in a conference paper. Required of M.A. and Ph.D. candidates.

250B. Research in Second Literature (4)
Project. Individually guided research in the second literature of concentration, under the supervision of a faculty member, culminating in a paper. Required of Ph.D. candidates.

250C. Research in Third Literature or Special Topic (4)
Conference—1 hour; term paper; independent study—8 hours. Individually guided research, under the supervision of a faculty member, in the third literature of concentration or on a special topic culminating in a paper. Required of Ph.D. candidates.

250D. Dissertation Prospectus (4)
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. Offered irregularly.

255. Proseminar: Comparative Literature: Past, Present, Future (4)
Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing. Restricted to graduate students. History, theory, and methodology of comparative literature. Issues of national literature, world literature, and comparative literature. Relations of comparative literature to other disciplines and diverse expressions. Discussion of current problems in teaching and research in comparative literature. Required for MA/Ph.D. — F. S. (F, S)

260. Contexts of the 19th-Century Novel (4)
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 irregularly.

297. Directed Independent Study in Primary, Secondary, or Third Literature (1-5)
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 irregularly.

298. Directed Independent Study in Primary, Secondary, or Third Literature (4)
Conference—1 hour; term paper; independent study—8 hours. Prerequisite: consent of instructor. Restricted to graduate students. Directed independent study in Primary, Secondary, or Third Literature culminating in term paper. Only for languages with no graduate course offerings. May be repeated for credit when no seminars are available and topic differs. — F. W. S. (F, W, S)

299. Directed Study in Primary, Secondary, or Third Literature (1-5)
Independent study. — S/U grading only

299D. Special Study for the Doctoral Dissertation (1-12)
Independent study. — S/U grading only
Prerequisite: graduate standing. May be repeated (F, W, S.) specifically designed for first-time TAs in regular consultations between the student instructor.

Discussion—2 hours. Restricted to graduate students.

390. Teaching Comparative Literature in College (4)

Lecture—2 hours; discussion—2 hours. Prerequisite: appointment as a Comparative Literature Associate Instructor or consent of instructor. Restricted to graduate students. Discussion of the theory and practice of teaching composition at the college level in a department of comparative literature in relation to the major cultural and social developments and with specific application to the introductory courses 1, 2, 3, 4. (S/U grading only.)—F, W, S. [F, W, S.]

392. Teaching Internship in Comparative Literature (2)

Discussion—2 hours. Restricted to graduate students. Regular consultations between the student instructor teaching Comparative Literature courses and a supervisor. Specifically designed for first-time TAs in the fundamentals of computer languages, operating systems, computer architecture, and the mathematical abstractions underlying computer science. Students are prepared for both industry and postgraduate study.

B.S. Major Requirements:

**UNITS**

**Preparatory Subject Matter**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics 21A</td>
<td>16</td>
</tr>
<tr>
<td>Mathematics 135A or Statistics 131A</td>
<td>4</td>
</tr>
<tr>
<td>Computer Science Engineering 20</td>
<td>4</td>
</tr>
<tr>
<td>Computer Science Engineering 122A, 120 or 122B, 140A, 150, 154A</td>
<td>15</td>
</tr>
<tr>
<td>Computer Science Engineering 132 or Mathematics 135A or Statistics 131A</td>
<td>4</td>
</tr>
<tr>
<td>Computer Science electives</td>
<td>27</td>
</tr>
</tbody>
</table>

Minimum of 7 courses, including at least one mathematics or statistics course, from: Computer Science Engineering courses numbered between 120 and 189 inclusive; Computer Science and Engineering 192B (counts as one); one approved course of 3 or 4 units from Computer Science and Engineering 192 or 199; Electrical and Computer Engineering 171, 172, 180A, 180B, 1808; Linguistics 117; Mathematics courses numbered between 100 and 189, excluding Mathematics 111; Statistics 131A, 131B, 131E. No course can count as both a required course and a Computer Science elective.

**Total Units for the Major**

101-109

**Major Advisers:** M. Farrens, V. Flikov, D. Ghoal, P. Koelt, N. Matoff, M. Neff, P. Koehl, P. Ragoway

**Minor Program Requirements:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Science Engineering</td>
<td>24</td>
</tr>
<tr>
<td>Computer Science Engineering 60</td>
<td>4</td>
</tr>
<tr>
<td>Upper division Computer Science Engineering courses</td>
<td>20</td>
</tr>
<tr>
<td>Select any upper-division Computer Science Engineering courses. A single approved course of 3 or 4 units from Computer Science and Engineering 192 or 199 is allowed. Note. Computer Science Engineering 60 has a prerequisite chain of 20, 30, 40, and Mathematics 16A or 21A.</td>
<td></td>
</tr>
</tbody>
</table>

Graduate Study. See Graduate Studies, on page 121.

**Computer Science (A Graduate Group)**

Kwan-Liu Ma, Ph.D., Chairperson of the Group

Group Office, 2063 Kemper Hall
330-752-7004; http://www.cs.ucdavis.edu

Faculty

- Venkatesh Akella, Ph.D., Professor
  (Electrical and Computer Engineering)
- Nina Amenta, Ph.D., Professor, Chair
  (Computer Science)
- Zhaojun Bai, Ph.D., Professor (Computer Science)
- Matthew Bishop, Ph.D., Professor
  (Computer Science)
- Hemant Bhardwaj, Ph.D., Professor
  (Graduate School of Management)

Hao Chen, Ph.D., Associate Professor
(Computer Science)

Harry Cheng, Ph.D., Professor
(Mechanical and Aerospace Engineering)

R. Holland Cheng, Ph.D., Professor
(Molecular and Cellular Biology)

Chen-Nee Chua, Ph.D., Assistant Professor
(Electrical and Computer Engineering)

James P. Clutchfield, Ph.D., Professor (Physics)

Ian Davidson, Ph.D., Professor

Jesus M. D’Souza, Ph.D., Professor
(Mechanical and Aerospace Engineering)

Raisa M. D’Souza, Ph.D., Assistant Professor
(Mechanical and Aerospace Engineering)

Jesus DeLoera, Ph.D., Professor
(Mathematics)

Prem Devanbu, Ph.D., Professor

Matthew Farrens, Ph.D., Professor

Robert Faris, Ph.D., Associate Professor (Sociology)

Vladimir Filkov, Ph.D., Associate Professor
(Computer Science)

Matthew Franklin, Ph.D., Professor
(Computer Science)

Todd J. Green, Ph.D., Assistant Professor
(Computer Science)

Daniel Gutfield, Ph.D., Professor (Computer Science)

Francois Gygi, Ph.D., Professor (Computer Science)

Bernd Hamann, Ph.D., Professor (Computer Science)

Michael Hagan, Ph.D., Professor
(School of Medicine)

Greta Hsu, Ph.D., Associate Professor
(Graduate School of Management)

Sanjay Joshi, Ph.D., Associate Professor
(Mechanical and Aerospace Engineering)

Louise Kellogg, Ph.D., Professor (Geology)

Patrice Koehl, Ph.D., Professor (Computer Science)

Mathias Koepp, Ph.D., Professor (Mathematics)

Karl Levitt, Ph.D., Professor (Computer Science)

Xin Liu, Ph.D., Associate Professor
(Computer Science)

Kwan-Liu Ma, Ph.D., Professor
(Computer Science)

Norman Matoff, Ph.D., Professor
(Computer Science)

Nelson Max, Ph.D., Professor (Computer Science)

Deb Niemeier, Ph.D., Professor
(Civil and Environmental Engineering)

Prafull Mohapatra, Ph.D., Professor
(Computer Science)

Biswa Nath Mukherjee, Ph.D., Professor (Computer Science) Distinguished Graduate Mentoring Award

Michael Neff, Ph.D., Associate Professor
(Computer Science)

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)

Sean Peisert, Ph.D., Assistant Adjunct Professor
(Computer Science)

Bahram Ravani, Ph.D., Professor
(Mechanical and Aerospace Engineering)

Robert Redinbo, Ph.D., Professor
(Electrical and Computer Engineering)

David Rocke, Ph.D., Professor (Applied Science)

Garry Rodrique, Ph.D., Professor (Applied Science)

Phillip Ragoavay, Ph.D., Professor
(Computer Science)

Kenneth Shackle, Ph.D., Professor (Plant Sciences)

David Slaughter, Ph.D., Professor
(Biological and Agricultural Engineering)

Zhendong Su, Ph.D., Associate Professor
(Computer Science)

Ilias Tagkopoulos, Ph.D., Associate Professor
(Computer Science)

Suzan Ustin, Ph.D., Professor
(Land, Air and Water Resources)

S. Felix Wu, Ph.D., Professor (Computer Science)

Rao Vemuri, Ph.D., Professor (Applied Science)
Conservation Biology

See Ecology (A Graduate Group), on page 251; and Wildlife, Fish, and Conservation Biology, on page 588.

Consumer Science

[College of Agricultural and Environmental Sciences]

Faculty. See under the Division of Textiles and Clothing, on page 568.

Major Programs. The Consumer Food Science option under the Food Science major is a related program. See also Food Science and Technology, on page 341, Nutrition, on page 492, and Textiles and Clothing, on page 568.

Graduate Study. For graduate study, see Graduate Studies, on page 121.

Courses in Consumer Science (CNS)

Questions pertaining to the following courses should be directed to the Division of Textiles and Clothing Advising Office in 1204 RMI south or 129 Everson Hall.

Lower Division

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

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, Wrt| SS, WE.

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.)

Graduate

299. Research (1-12)
(S/U grading only.)

Professional

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)

Contemporary Leadership

[College of Agricultural and Environmental Sciences]
The Science and Society Program offers a minor in Contemporary Leadership, open to all undergraduates 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.

Consult advisers often to insure timely enrollment in Science and Society 190 and 190X as courses with fewer than ten students will not be taught.

Minor Program Requirements:

UNITS

Contemporary Leadership ............................ 24

Core Leadership Courses

Science and Society 130 .................................. 4
Science and Society 192 [must be taken concurrently with an approved internship] .......................... 2
Science and Society 190X .............................. 2

Preparatory Subject Matter

Students are required to complete four units from each of the following four categories. All courses are four units unless specified in parentheses:

Communication, Interpersonal Relationships and Human Dynamic: Anthropology 139AN, Communication 134, 135, 136, Community and Regional Development 172, 174, Linguistics 163, Psychology 151, Sociology 126, 127, University Writing Program 104 (AF) ................................ 4

Organization Structure and Cultures: American Studies 125, Anthropology 105, 123BN, Community and Regional Development 152, 154, 158, 164, Sociology 30A (3), 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, 179A, 179B, Native American Studies 134, Political Science 124, 125, 130, Textiles and Clothing 174 .......................... 4

Minor Adviser. The list of appropriate courses changes over time. Consult Elvira Galvan Hack in Science and Society (Plant Pathology) to request an advising appointment at egahack@ucdavis.edu.

Critical Theory

Jeff Fort, Ph.D., Chairperson of the Program
Program Office. 216 Sproul Hall
530-752-5799; http://crittheory.ucdavis.edu

Committee in Charge

Jeff Fort, Ph.D. (French)
Kathleen Frederickson, Ph.D. (English)
Neil Larsen, Ph.D. (Comparative Literature)
Kriss Ravetto-Biagioli, Ph.D.
(Cinema and Technocultural Studies)
Sven-Erik Rose, Ph.D. (German)
Scott Shershow, Ph.D. (English)
David Simpson, Ph.D. (English)

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 14 participating graduate programs (Anthropology, Comparative Literature, Cultural Studies, Education, English, French, German, History, Music, Psychology, Sociology, Spanish, Study of Religion, and Performance Studies). 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 are taught by affiliated faculty, while 200A normally being taken first. 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

101. Introduction to Critical Theoretical Approaches to Literature and Culture (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of entry level writing requirement. 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| AH, WC, WE.—S. (S.)

Graduate

200A. Approaches to Critical Theory (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing in a participating program. Restricted to Graduate students. Critical overview of modern theoretical texts; e.g., semiotics, hermeneutics, deconstruction, social and cultural theories. Feminist theory, psychoanalysis.—F, W, S. (F, W, S.)

200B. Problems in Critical Theory (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Restricted to Graduate students. 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 literature, culture, film, historiography, visual culture, the body, and aesthetics. May be repeated for credit when topics differ and with consent of instructor. —F, W, S. (F, W, S.)

200C. History of Critical Theory (4) Seminar—3 hours; term paper. Prerequisite: graduate student standing. Restricted to Graduate students. Critical analysis and discussion of pre-twentieth century theories of literary and cultural criticism. Topics may include but are not limited to: antiquity and early modern philosophy; nature and culture in the Renaissance; theories of Mimesis from antiquity to the Renaissance. May be repeated for credit when topics differ and with consent of instruc- tor. —F, W, S. (F, W, S.)

201. Critical Theory Special Topics (4) Seminar—3 hours; term paper. Prerequisite: graduate student standing. Application of theoretical principles to one specific research topic. May be repeated for credit with consent of instructor when topics differ. —F, W, S. (F, W, S.)

202. Visual Culture (4) Lecture/discussion—4 hours. Restricted to Graduate student standing. Analysis of image production in the contemporary world (photography, film, television, advertising, etc.) and their effects on individual subjectivities and collective social identities. Offered irregularly. —W (W)

298. Directed Group Study (1-5) Prerequisite: consent of instructor. Restricted to Graduate student standing. —F, W, S. (F, W, S.)

299. Individual Study (1-12) Prerequisite: graduate student standing. (S/U grading only.)—F, W, S. (F, W, S.)

Crop Science and Management
(College of Agricultural and Environmental Sciences)
This major was discontinued as of Fall 2008; see Plant Sciences, on page 516.

Cultural Studies
(A Graduate Group)

Robert Irwin, Ph.D., Director of the Group
Graduate Office: 402-610
530-752-2069, http://culturalstudies.ucdavis.edu

Committee in Charge
Marisol de la Cadena, Ph.D. (Anthropology)
Maxine Craig, Ph.D. (Gender, Sexuality, and Women’s Studies)
Omnia El Shakry, Ph.D. (History)
Kathleen Fredrickson, Ph.D. (English)
Robert M. Irwin, Ph.D. (Spanish and Portuguese)
Caren Kaplan, Ph.D. (American Studies, Science and Technology Studies)
Suzette Min, Ph.D. (American Studies, Art History)
Elisa White, Ph.D. (African American and African Studies)

Affiliated Faculty
Moradewun Adejumobi, Ph.D., Professor
(African American and African Studies)
Ali Arasah, Associate Professor (History)
Michael Ban, Ph.D., Associate Professor
(School of Law: Science and Technology Studies)
Charlotte Bilkoff, Ph.D., Assistant Professor
(American Studies, Food Science and Technology Studies)
Lawrence Bogad, Ph.D., Associate Professor (Theatre and Dance)

Ryan Carwith, Assistant Professor
(American Studies)
Angie Choe, Ph.D., Associate Professor
(Chicana/o Studies)
Christina Cogdell, Ph.D., Associate Professor
(Design)
Elizabeth Constantable, Ph.D., Associate Professor
(Women and Gender Studies)
Allison Coudert, Ph.D., Professor (Religious Studies)
Xiaomei Chen, Ph.D., Professor
(East Asian Languages and Cultures)
Maxine Craig, Ph.D., Associate Professor
(Women and Gender Studies)
Diana K. Davis, Ph.D., Associate Professor (History)
Marisol de la Cadena, Ph.D., Associate Professor
(Anthropology, Science and Technology Studies)
Sergio de la Mora, Ph.D., Associate Professor
(Chicana/o Studies)
David de la Pena, Assistant Professor
(Environmental Design)
Gregory Dobbins, Ph.D., Associate Professor
(English)
Joseph Dumit, Ph.D., Associate Professor
(Anthropology, Science and Technology Studies)
Tarek Elhaik, Assistant Professor (Anthropology)
Omnia El Shakry, Ph.D., Associate Professor (History)
Kris Fallon, Assistant Professor
(Cinema and Digital Media)
Gail Finney, Ph.D., Professor
(Comparative Studies, German and Russian)
Jaimey Fisher, Ph.D., Associate Professor (Cinema and Technocultural Studies, German and Russian)
Kathleen Fredrickson, Ph.D., Assistant Professor (English)
Elizabeth Freeman, Ph.D., Professor (English)
Cristiana Giordano, Ph.D., Assistant Professor
(Anthropology)
Laura Grindstaff, Ph.D., Professor (Sociology)
James Griesemer, Ph.D., Professor
(Philosophy, Science and Technology Studies)
Angela Harris, J.D., Ph.D. (School of Law)
Danielle Heard, Ph.D., Assistant Professor (English)
Wendy Ho, Ph.D., Associate Professor (Asian American Studies, Women and Gender Studies)
Hsuan Hsu, Ph.D., Associate Professor (English)
Lynette Hunter, Ph.D., Professor (Theatre and Dance)
Robert Irwin, Ph.D., Professor
(Spanish and Portuguese)
Carlos Jackson, Ph.D., Assistant Professor
(Chicana/o Studies)
Rana Jaleel, Assistant Professor
(Gender, Sexuality and Women’s Studies)
Mark Jergey, Ph.D., Associate Professor (English)
Sudipta Sen, Ph.D., Professor
(Anthropology, Women and Gender Studies)
Susan Kaiser, Ph.D., Professor (Textiles and Clothing, Women and Gender Studies)
Caren Kaplan, Ph.D. (American Studies, Science and Technology Studies)
Richard Kim, Ph.D., Associate Professor
(Asian American Studies)
Elizabeth Kurzweil, Ph.D., Quantitative Professor
(German and Russian)
Patrick LaMieux, Assistant Professor
(Cinema and Digital Media)
Neil Larsen, Ph.D., Professor
(Comparative Literature, Critical Theory)
Michael Lazzara, Ph.D., Associate Professor
(Spanish and Portuguese)
Tim Lenoir, Professor
(Cinema and Digital Media)
Sheldon Lu, Ph.D., Professor (Comparative Literature)
Sunairah Mairaj, Ph.D., Professor
(Asian American Studies)
Amina Mama, Ph.D., Professor
(Women and Gender Studies)
Desiree Martin, Ph.D., Assistant Professor (English)
Collin Milburn, Ph.D., Professor
(English) Flagg Miller, Professor (Religious Studies)
Suzette Min, Ph.D., Associate Professor
(Asian American Studies)
Frimma Muserheke, Associate Professor
(Chicana/o Studies)
Maeva Montoya, Assistant Professor
(Chicana/o Studies)

Bettina Ng’weno, Ph.D., Associate Professor
(African American and African Studies)
Halifu Osumare, Ph.D., Associate Professor
(African American and African Studies)
Ana Peluffo, Ph.D., Associate Professor
(Spanish and Portuguese)
Sarah Perrault, Ph.D., Assistant Professor
(University Writing Program)
Jessica Bissett Pereira, Assistant Professor
(Native American Studies)
Carolyn Thomas, Ph.D., Professor
(American Studies)
Vaidhe Ramathanan, Ph.D., Professor (Linguistics)
Krisa Ravetto-Biagioli, Ph.D., Associate Professor
(Anthropology, Science and Technology Studies)
Michael Riós, Ph.D., Associate Professor
(Environmental Design)
Robyn Rodriguez, Ph.D., Associate Professor
(American Studies)
Clarissa Rojas, Assistant Professor
(Chicana/o Studies)
Jon Rossini, Ph.D., Associate Professor
(Theatre and Dance)
Parama Roy, Ph.D., Associate Professor (English)
Margaret Rucker, Ph.D., Professor
(Textiles and Clothing)
Simon Sadler, Ph.D., Professor (Design)
Suzana Sawyer, Ph.D., Associate Professor
(Anthropology)
Sudipta Sen, Ph.D., Professor (History)
Scott Simon, Ph.D., Professor (English)
Julia Simo, Ph.D., Professor (French and Italian)
Eric Smoaldin, Ph.D., Professor (American Studies)
Maurice Stierl, Assistant Professor (Cultural Studies)
Madhavi Sunder, J.D., Professor (School of Law, Science and Technology Studies)
Julie Sze, Ph.D., Associate Professor (American Studies)
Grace Wang, Ph.D., Assistant Professor (American Studies)
Heigharin Watawa, Ph.D., Associate Professor (Art History)
Keith Watawa, Ph.D., Associate Professor (Religious Studies)
Evan Watkins, Ph.D., Professor (English)
Karen Wattson-Green, Ph.D., Professor (Education)
Elisa White, Associate Professor, African (American and African Studies)
Carl Whitman, Ph.D., Associate Professor
(Anthropology)
Diane Wolf, Ph.D., Professor
(Sociology, Jewish Studies)
Julie Wyman, Ph.D., Assistant Professor
(Cinema and Technology Studies)
Sussy J Zepeda, Assistant Professor
(Chicana/o Studies)
Chunmei Zhang, Assistant Professor
(German and Russian)
Li Zhang, Ph.D., Professor (Anthropology)
Michael Ziser, Ph.D., Associate Professor (English)

Graduate Study. The Graduate Group in Cultural Studies at UC Davis offers an interdisciplinary approach to the study of culture and society that highlights how sexuality, race, ability, citizenship, gender, nationality, class and language organize embodied identities, social relations and cultural objects. With the close guidance and supervision of a faculty committee, students in the program pursue interdisciplinary research in areas including studies of comparative and critical race, ecocriticism, fashion, queer theory, media and popular culture representation, science and technology, Marxist theory, travel and tourism, food, physical and cognitive abilities, cultural geography, transnational culture and politics, globalization, race, rhetoric, performance, and critical theory. Although both the Ph.D. and M.A. are offered, the majority of students are admitted to the Ph.D. program.

Preparation. Normal preparation for the program is a bachelor’s degree in a related field. M.A. 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

Crop Science and Management 233

Fall 2011 and on Revised General Education (GE) AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; ACH—American Cultures; DD—Domestic Diversity; SL—Scientific; VL—Visual; WC—World Cultures; WE—Writing Experience

Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; DivD—Domestic Diversity; Wrt—Writing Experience

Quarter Offered: F—Fall, W—Winter, S—Spring, Su—Summer; 2017-2018 offering in parentheses
208. 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 analysis has emerged worldwide. Both mainstream and alternative theoretical traditions, such as those developed by people of color and by other minoritized groups. —F, W, S. (S/U grading only.) —S. (S.)

208C. Practices of Cultural Studies (4)
Lecture/discussion—4 hours. Prerequisite: courses 200A and 200B or consent of instructor. Methodological and practical applications of cultural studies research. Critical analyses of ethnography, textual analysis, social theory, community development, and identity formation. Emphasis given to students’ unique versions of cultural studies practices. —S. (S.)

204. History and Theory of Sexualities (4)
Lecture/discussion—4 hours. Prerequisite: course 200A or may be taken concurrently) or consent of instructor. Studies of sexuality 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. May be repeated two times for credit. Offered irregularly. —F (F.)

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 on contemporary cultural studies and positivist scholarship in order to understand the social production of “race” as a category for organizing social groups and determining group processes. Offered irregularly. —W. (W.)

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, postnationalism, 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. Offered irregularly. —S. (S.)

210. Memory, Culture, and Human Rights (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Restricted to graduate students. Explores the multiple convergences among memory, culture, and human rights. Discusses diverse approaches to how societal actors in different historical, cultural, and national settings, construct meanings of past political violence, intergroup conflicts, and human rights struggles. (Same course as Human Rights 2008.) Offered in alternate years. —F. Lazzeri

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 analytical approaches to the study of texts. Examination of multi-mediated objects to understand their cultural import by focusing on discursive production, dispersion, and reception processes, and related shifts in power relations. Offered irregularly. —F (F.)

214. Studies in Political and Cultural Representations (4)
Lecture/discussion—4 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. Offered irregularly. —W. (W.)

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 for credit. —F, W, S. (S/U grading only.) —F. (F.)

270A. Individually Guided Research in Cultural Studies (4)
Discussion—1 hour; independent study—2 hours; extensive writing. Prerequisite: course 200C, 250, consent of instructor. Individually guided 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. —F, W, S. (F, W, S.)

270B. Individually Guided Research in Cultural Studies (4)
Discussion—1 hour; independent study—2 hours; extensive writing. Prerequisite: course 200C, 250, consent of instructor. Individually guided 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. —F, W, S. (F, W, S.)

270C. Individually Guided Research in Cultural Studies (4)
Discussion—1 hour; independent study—2 hours; extensive writing. Prerequisite: course 200C, 250, consent of instructor. Individually guided 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. —F, W, S. (F, W, S.)

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.] —F, W, S. (F, W, S.)

295. Special Topics (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing or consent of instructor. Special topics courses offered according to faculty and student interests and demands. May be repeated for credit with consent of advisor. —F, W, S. (F, W, S.)

298. Group Research (1)-5
[S/U grading only.] —F, W, S. (F, W, S.)

299. Directed Research (1)-5
[S/U grading only.] —F, W, S. (F, W, S.)

299D. Dissertation Research (1-12)
Independent study—3-36 hours. Prerequisite: advancement to doctoral candidacy. [S/U grading only.] —F, W, S. (F, W, S.)

Professional
396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. [S/U grading only.] —F, W, S. (F, W, S.)

Dermatology
See Medicine, School of, on page 428.

Design
[College of Letters and Science]
Susan Avila, M.F.A., Chairperson of the Department
Department Office. 101 Art Building 350-732-0890; http://design.ucdavis.edu

Faculty
Susan Avila, M.F.A., Professor
Christina Coggell, Ph.D., Associate Professor
Glenda Drew, M.A., Professor
James Housefield, Ph.D., Associate Professor
Mark Kessler, M.Arch., Associate Professor
Karen Koo, Ph.D., Assistant Professor
Timothy McNiel, M.A., Professor
Konstantinos Papamichael, Ph.D., Professor
Simon Sadler, Ph.D., Professor
Michael Siminovitch, Ph.D., Professor
Brenn Willard, M.Arch., Assistant Professor
Susan Verba, M.F.A., Associate Professor
Jaiyi Young, M.F.A., Assistant Professor

Emeriti Faculty
Richard Berteaux, B.Arch., M.S., Professor Emeritus
Frances Butler, M.F.A., Professor Emerita
Dolph Gotelli, M.A., Professor Emeritus
Patricia Harrison, M.Arch., Professor Emerita
Gyorgy Laky, M.A., Professor Emerita
Helge B. Olsen, Senior Lecturer Emeritus
Victoria Z. Rivers, M.A.C.T., S.C.T., Professor Emerita
Katherine W. Rossbach, M.A., Professor Emerita
Ann Savageau, M.F.A., Professor Emerita
Barbara Shawcroft, M.F.A., Professor Emerita
JaAnn C. Stabb, M.A., Senior Lecturer Emerita
Kathryn Sylva, M.F.A., Professor Emerita

Affiliated Faculty
John Driscoll, M.F.A., Lecturer
Barbara Malloy, M.F.A., Lecturer
Gale Okumura, B.A., Lecturer
Adelle Zhang, M.F.A., Lecturer and Design Collection Curator

The Major Program
The Department of Design offers a creative, challenging, and flexible approach to the study of design with emphasis on socially responsible, human centered, and sustainable practice.

The Program. Foundation courses: Design and Visual Culture; Design Drawing, Form and Color, and Graphic Design and Computer Technology; are required of all design majors. One additional course in the student’s area of interest is required for Preparatory Subject Matter. Depth Subject Matter courses provide: [1] further exploration of design principles and conceptual, formal and technical issues; [2] conceptual and critical development through a series of history and theory classes; [3] in-depth studio experience with projects that demonstrate a research-based, iterative design process. Optional capstone class. A more detailed explanation is available through the Design Advising office in 107 Art Building; 530-752-6244.

Portfolios. Portfolios are not required for admission to the major. However, it is highly recommended that design students maintain an updated portfolio of visual work for faculty and professional evaluation and consideration for enrollment in spe-
A.B. Major Requirements:

Preparatory Subject Matter

- Design 1 ................. 4
- Art 2 or Design 14 .......... 4
- Design 16 .................. 4
- University Writing Program 11, 18 or 19 .......... 4
- Design 40A, 40B, or 40C .......... 4
- Course from the following: Design 21, 31, 37, 50, 60, 70, 77; Art 9 ................. 4

Depth Subject Matter

- Two courses, at least one of which must be a Design course, from the following: Art 110A, 110B, Design 107, 115, 117, 127B, 150A; Dramatic Art 128; Technological Studies 100.
- Three courses, at least two of which must be Design courses, from the following: Art History 168, 184, 187, 188A, 188B, 189; Design 127A, 138, 142A, 142B, 143, 144, 145, 149; Dramatic Art 114, 150, 155; Technological Studies 150, 152, 153, 155, 159.
- Choose six courses from the lists below:...

Total Units for the Major

- 72

Honors Program

A senior honors program is available to design majors, requiring preparation of an independent design research project in their final year. The honors program consists of 6 units of DES 194 (Fall, Winter, Summer) normally taking during the final two quarters of the senior year. Completion of the program is a prerequisite for High or Highest Honors at graduation. See the Design Department website for current honors application procedures.

Major Adviser

Information on the current Academic Advisers can be obtained by contacting the Undergraduate Adviser at designmasteradviser@ucdavis.edu.

Graduate Study

The graduate program in Design through the Fine Arts

The UC Davis Master of Fine Arts (M.F.A.) in Design unites theory and practice, offering graduate students a unique opportunity to work with a dedicated and renowned design faculty within one of the nation’s top public research universities. This two-year program encourages an interdisciplinary approach. Design faculty expertise includes design theory, exhibition design, architectural history, design and building materials, and vernacular. Students are encouraged to explore their own work and the work of their peers in a variety of design projects.

Graduate Adviser

Please contact the Program at 530.752.8710.

Courses in Design (DES)

Questions pertaining to the following courses should be directed to the instructor or to the Design Advising office in 107 Alt 530.752.6244. Scheduling of classes is subject to change; please contact the Advising office to confirm when a course is offered.

Lower Division

1. Introduction to Design (4)

   Lecture—3 hours; discussion—1 hour. Priority given to Design majors. Introduction to design discipline through readings, writing, visual problem solving, and critical analysis. Topics: design principles and elements, vocabulary, color theory. Design principles and strategies. Role of designer and products in contemporary culture including social responsibility and sustainability. GE credit: ArtHum | AH, VL, F, W, Su.

2. Understanding Color, Form and Composition (4)

   Studio—4 hours; lecture/discussion—2 hours. Prior...
99. Special Study for Undergraduates (1-5)  
Prerequisite: consent of instructor. (P/NF grading only.)

Upper Division

107. Advanced Structural Design for Fashion  
Studio—4 hours; lecture/discussion—2 hours.  
Prerequisite: course 1, 14 or 21, 15, 16 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. GE credit: ArtHum|AH, VL.—Avila, Koo

115. Letterforms and Typography (4)  
Studio—4 hours; lecture/discussion—2 hours.  
Prerequisite: course 1, 14 or 21, 15, 16 or consent of instructor. Priority given to Design majors. Fundamentals of letterforms and typography. Characteristics and properties of type, principles of legibility, visual hierarchy, grid systems, and the integration of type and image. Not available for credit to students who have completed course 22. GE credit: ArtHum|AH, VL.—F, W, S, Su (F, W, S, Su.) Verba

116. Visual Communication: Graphic Design (4)  
Studio—4 hours; lecture/discussion—2 hours.  
Prerequisite: course 1, 14 or 21, 15, 16, or consent of instructor. Priority to Design majors. Practice of creating interactive visual media for network-based applications and principles of human computer interaction. Responsive design. Use of centered research, information architecture, interface and interaction. Analysis of usability. Development and presentation of design production materials and completed interactive projects. GE credit: ArtHum|AH, VL.—W, V, S, Su (W, S, Su.) Verba

127A. Sustainable Design (4)  
Lecture/discussion—4 hours.  
Prerequisite: course 1.  
Priority to Design majors. Principles, practice and materials of sustainable design in the context of environmental crisis. History of sustainable design in relation to the fields of textiles, visual communication, interior architecture, exhibition design and lighting. GE credit: ArtHum|AH, VL.—F (F).

127B. Studio Practice in Sustainable Design (4)  
Studio—4 hours; lecture/discussion—2 hours.  
Prerequisite: course 1, 127A or consent of instructor. Priority to Design majors. Analysis and practice of sustainable design within studio context. Design project that incorporates the reuse of post consumer waste; standard materials vs. sustainable materials. Cradle to Cradle philosophy and practice. Field trips required. GE credit: ArtHum|AH, VL.—S (S).

131. Global Fashion and Product Design (4)  
Studio—4 hours; lecture/discussion—2 hours.  
Prerequisite: course 1, 14 or 21, 15, 16 or consent of instructor. Priority given to Design majors. Exploration of materials, embellishments, and structural techniques derived from historic and contemporary world cultures to create unique qualities of individual expression applied to hand made textiles, fashion and textile products. Offered irregularly. GE credit: ArtHum|AH, VL.—Avila

132A. Textile Design: Woven Structures (4)  
Studio—4 hours; lecture/discussion—2 hours.  
Prerequisite: course 1, 14 or 21, 15, 16 or consent of instructor. Priority given to Design majors. Fundamenta- tion course in handwoven textile structure and design, emphasizing yarn identification, basic drafting, basic weaving, and the exploration of the context of original color effects and yarn combinations. May be repeated one time for credit with consent of instructor. Offered irregularly. GE credit: ArtHum|AH, VL.—Papamichael

132B. Loom-Constructed Textile Design (4)  
Studio—4 hours; lecture/discussion—2 hours.  
Prerequisite: course 1, 14 or 21, 15, 16, 132A or consent of instructor. Priority to Design majors. Introduction to the theory and practice of interior design with focus on residential spaces. Basic methods of design conception, development, and presentation. GE credit: ArtHum|AH, VL.—Avila

134A. Introduction to Interior Design—Residential (4)  
Studio—4 hours; lecture/discussion—2 hours.  
Prerequisite: course 1, 21 or 150A or consent of instructor. Priority to Design majors. Introduction to the theory and practice of interior design with focus on residential spaces. Basic methods of design conception, development, and presentation. GE credit: ArtHum|AH, VL.—F, W, S, F (W, S, F, W.) Kessler

134B. Introduction to Interior Design—Commercial and Technical Spaces (4)  
Studio—4 hours; lecture/discussion—2 hours.  
Prerequisite: course 1, 21 or 150A or consent of instructor. Pass One priority given to Design majors. 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. GE credit: ArtHum|AH, VL.—F, W, S (F, W, S.) Verba

135A. Furniture Design and Detailing (4)  
Studio—4 hours; lecture/discussion—2 hours.  
Prerequisite: course 1, 14 or 21, 15, 16 or consent of instructor. Priority given to Design majors. Development of furniture for approval with consent of instructor. Offered irregularly. GE credit: ArtHum|AH, VL.—W (W)

135B. Furniture Design and Prototyping (4)  
Studio—4 hours; lecture/discussion—2 hours.  
Prerequisite: course 1, 14 or 21, 15, 16 or consent of instructor. Priority given to Design majors. Design and construction of full size prototype furniture based on preliminary work completed in course 135A. Material technology, conceptual design methods, and finishes discussed. Development of shop drawings and furniture construction. Required field trip. Offered irregularly. GE credit: ArtHum|AH, VL.—W (W)

138. Materials and Methods in Interior Design (4)  
Studio—4 hours, lecture/discussion—2 hours.  
Prerequisite: course 1, 14 or 21, 15, 16 or consent of instructor. Priority given to Design majors. Introduction to the use of materials and methods significant in western hemispheric textiles. Emphasis on the Middle East, Europe and the Americas up to contemporary times. Two required field trips. GE credit: ArtHum|Div|AH, VL—Avila

142A. World Textiles: Eastern Hemisphere (4)  
Lecture—4 hours.  
Prerequisite: course 1; Art History 1A, 1B, 1C, or 1D recommended. Social contexts, aesthetics, stylistic developments. Textile methods significant in eastern hemisphere textiles. Emphasis on Japan, China, Indonesia, Oceania, Southern and Central Asia, Africa. GE credit: ArtHum|AH, VL—Avila

142B. World Textiles: Western Hemisphere (4)  
Lecture—4 hours.  
Prerequisite: course 1, Art History 1A, 1B, or 1C recommended. Social context, aesthetics, stylistic developments. Textile methods significant in western hemisphere textiles. Emphasis on the Middle East, Europe, and the Americas up to contemporary times. Two required field trips. GE credit: ArtHum|Div|AH, VL—Avila

143. History of Fashion (4)  
Lecture—3 hours, discussion—1 hour.  
Priority to Design majors. History of fashion design from the earliest times to the present focusing on the ancient Middle East and Comparative fashion design in Europe. Emphasis on aesthetic, functional, social, economic, political and cultural aspects of clothing and personal adorning. GE credit: ArtHum|AH, VL—W (W)

144. History of Interior Architecture (4)  
Lecture—3 hours, discussion—1 hour.  
Priority to Design majors. History of fashion design from the earliest times to the present focusing on the ancient Middle East and Comparative fashion design in Europe. Emphasis on aesthetic, functional, social, economic, political and cultural aspects of clothing and personal adorning. GE credit: ArtHum|AH, VL—Avila

137A. Daylighting and Interior Design (4)  
Studio—4 hours; lecture/discussion—2 hours.  
Prerequisite: course 1, 14 or 21, 15, 16 or consent of instructor. Priority given to Design majors. Understanding the effect of daylight on the perception of interior designs as well as on vision, luminous and thermal comfort, health and energy efficiency. GE credit: ArtHum|AH, VL.—F (F) Papamichael

137B. Daylighting Design Studio (4)  
Studio—4 hours; lecture/discussion—2 hours.  
Prerequisite: course 1, 14 or 21, 15, 16 or consent of instructor. Priority to Design majors. Introduction to daylighting through observation and its effects on interior designs using scale models of interior designs of choice and photographing them outdoors and in CIE’s Heliodon to understand year-round performance. GE credit: ArtHum|AH, VL—S (S) Papamichael

138. Materials and Methods in Interior Design (4)  
Lecture/discussion—3 hours; project—1 hour.  
Priority to Design majors. Introduction to the finish materials used for interior design with special emphasis on sustainable and recycled products. Performance factors, relative costs and energy impact; installation conditions and construction details, and design potential for a full range of interior materials. Offered in alternate years. GE credit: ArtHum|AH, VL—WE—Kessler

142A. World Textiles: Eastern Hemisphere (4)
160. Textile Surface Design: Patterns and Resists (4)
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14 or 21, 15, 16 or consent of instructor. Use of traditional and contemporary processes to create images and patterns on fabrics using a variety of dyeing techniques. Emphasis on social and political messages. GE credit: ArtHum | AH, VL—S. (S.) Verba

165. Exhibition Design (4)
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14 or 21, 15, 16 or consent of instructor. Design of cultural and commercial exhibition environments, including exhibition development and object selection, exhibition planning and layout, technical considerations, finishes, object placement and staging, interpretive strategies and visual communication. GE credit: ArtHum | AH, VL—F. (F.) McNeil

170. Experimental Fashion & Textile Design (4)
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14 or 21, 15, 16 or consent of instructor. Prior to Design majors. Exploration of fashion design processes allowing industry and personal expression with emphasis on computer-assisted design applications. Field trip required. GE credit: ArtHum | AH, VL—F. (F.) Koo

179. Fashion Design: Signature Collection (4)
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14 or 21, 15, 16, 77, [107 or 177] or consent of instructor. Prior to Design majors. Exploration of fashion design process within the social and physical context. Emphasis on two-dimensional conceptualization of ideas, garment construction, and social activism. Manipulation of objects and the communication of complex ideas in the exhibition environment. GE credit: ArtHum | AH, VL—S. (S.) Koo

180. Advanced Interior Design: Institutional Spaces (4)
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1 and (21 or 150A) or consent of instructor. Prior to Design majors. Advanced interior design problems focused on complex institutional spaces. Introduction to building codes related to interior design. Integration of building systems with interior design. GE credit: ArtHum | AH, VL—F. (F.) W. (F.) Kessler

181. Environmental Graphic Design (4)
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14 or 21, 15, 16 or consent of instructor; course 115 required. Priority to Design majors. Design of informational and directional graphics for the built environment. GE credit: ArtHum | AH, VL—F. (F.) W. (F.) McNeil

185. Exhibition Design (4)
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1, 14 or 21, 15, 16 or consent of instructor. Prior to Design majors. Exploration of fashion design processes allowing industry and personal expression with emphasis on computer-assisted design applications. Field trip required. GE credit: ArtHum | AH, VL—S. (S.) Verba

191A. 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: Costume. Letter grading by contract. Field trips included. Credit limited to 12 units in one section or a combination of sections. —F, W, S. (F, W, S)

191B. 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: Graphics. Letter grading by contract. Field trips included. Credit limited to 12 units in one section or a combination of sections. —F, W, S. (F, W, S)

191C. 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: Graphics. Letter grading by contract. Field trips included. Credit limited to 12 units in one section or a combination of sections. —F, W, S. (F, W, S)

Fall 2011 and on Revised General Education (GE) AH=Arts and Humanities; SE=Science and Engineering; SS=Social Sciences; AG=American Cultures; DD=Dominion Diversity; VL=Visual, World Cultures; WE=Writing Experience
of design including environmental, costume, textile, museum, display and interior design. (P/N grading only.)

194HA. Special Study for Honors Students (3) Independent study—9 hours. Prerequisite: qualification for Letters and Science Honors Program; senior standing; consent of instructor. Limited enrollment. Preparation and presentation of a culminating project. Supervised by a faculty in one of the creative or scholarly areas of Design. (Deferred grading only, pending completion of sequence.)—W. (W.)

194HB. Special Study for Honors Students (3) Independent study—9 hours. Prerequisite: course 194HA; qualification for Letters and Science Honors Program; senior standing; consent of instructor. Limited enrollment. Preparation and presentation of a culminating project. Supervised by a faculty in one of the creative or scholarly areas of Design. (Deferred grading only, pending completion of sequence.)—S. (S.)

197T. Tutoring in Design (1-5) Discussion—5 hours. Prerequisite: upper division standing and consent of instructor. Limited discussion groups or study sessions affiliated with one of the department's regular courses. (P/N grading only.)—F, W, S.

198. Directed Group Study (1-5) Prerequisite: upper division standing and consent of instructor. (P/N grading only.)—S. (S.)

199. Special Study of Advanced Undergraduates (1-5) (P/N grading only.)—W. (W.)

Graduate

221. Theory and Issues in Design (4) Seminar—3 hours; independent study. Prerequisite: graduate standing in Design or consent of instructor. Perspectives on theoretical and aesthetic issues related to the design professions such as methodology in historical and contemporary contexts, implications of technological change in design theory and practice, and design relationships to environmental sustainability, recycling, and other social issues. May be repeated one time for credit.—F. (F.)

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. Focus 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 one time for credit.—W. (W.)

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. Introduction 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.—S. (S.)

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. Students will work closely with a faculty instructor on research and writing projects related to subject matter of under-graduate history courses noted above with the goal of introducing students to advanced historical research processes and development of writing skills. May be repeated twice for credit.—F, W, S. (F, W, S.)

225. Studio Practice in Design (4) Studio—3 hours. Prerequisite: course 221. Restricted to graduate standing in Design or consent of instructor. Students work together on a collective project to experience the multiple phases of design through an iterative process. Design projects will be geared towards relevance in contemporary social, cultural and political contexts. May be repeated two times for credit.—W. (W.)

290. Seminar in Design (4) Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Selected topics in design methodology, research, communication, and education. May be repeated for credit. —S. (S.)

292. Practicum in Design (1-12) Prerequisite: graduate standing in Design or consent of instructor. Interaction with a working professional in the student's field of interest to apply theories and concepts to working practice. (S/U grading only.)—P.

298. Directed Group Study for Graduate Students (1-5) Studio. Prerequisite: consent of instructor. (S/U grading only.)—S. (S.)

299. Individual Focused Study (1-12) Prerequisite: graduate standing in Design or consent of instructor. Advanced study in studio practice on independent projects with faculty consultation. May be repeated for credit. —W, S. (W, S.)

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 must have a working knowledge of their discipline at an advanced level, including written and visual documentation of process and concepts underlying the project, culminating in public presentation. (S/U grading only.)—S. (S.)

Professional

396. Teaching Assistant Training Practicum (1-4) Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)

Dietetics

See Clinical Nutrition, on page 217.

Dramatic Art

See Theatre and Dance, on page 570.

Earth and Planetary Sciences

[College of Letters and Science]
Dawn Y. Sumner, Ph.D., Chairperson of the Department
David A. Osleger, Ph.D., Vice-Chairperson of the Department
Department Office. 2119 Earth and Physical Sciences Building 530-543-3060; http://www.geology.ucdavis.edu

Faculty
Maggie I. Billen, Ph.D., Professor
Sandra J. Carlson, Ph.D., Professor
William H. Casey, Ph.D., Professor [Chemistry]
Kari M. Cooper, Ph.D., Professor
Eric S. Cowgill, Ph.D., Professor
Graham E. Fogg, Ph.D., Professor
[Land, Air and Water Resources]
Tessa M. Hill, Ph.D., Associate Professor
Louise H. Kellogg, Ph.D., Professor
Charles E. Lesher, Ph.D., Professor
James S. McClain, Ph.D., Professor
Ryszard D. M. Matzka, Ph.D., Professor
Sujoy Mukhopadhyaya, Ph.D., Professor
Alexandra Navorotsky, Ph.D., Professor [Chemistry]
Michael E. Oskin, Ph.D., Professor
David A. Osleger, Ph.D., Lecturer SOE
Academic Senate Distinguished Teaching Award Nicholas Finter, Ph.D., Professor
John B. Bunde, Ph.D., Professor [Physics, Earth and Planetary Sciences]
Howard J. Spero, Ph.D., Professor
Sarah T. Stewart, Ph.D., Professor
Dawn Y. Sumner, Ph.D., Professor
Geeta J. Vermeij, Ph.D., Professor
Kenneth L. Verosub, Ph.D., Professor
Academic Senate Distinguished Teaching Award Jingqiu Yin, Ph.D., Professor
Robert A. Zierenberg, Ph.D., Professor
Emeriti Faculty
Cathy J. Busby, Ph.D., Professor Emerita
Richard Cowen, Ph.D., Senior Lecturer Emeritus
Academic Senate Distinguished Teaching Award Howard W. Day, Ph.D., Professor Emeritus
John E. Dewey, Ph.D., Professor Emeritus James A. Doyle, Ph.D., Professor Emeritus [Evolution and Ecology]
Charles G. Higgins, Ph.D., Professor Emeritus
Eldridge M. Moores, Ph.D., Professor Emeritus
Jeffrey F. Mount, Ph.D., Professor Emeritus
James R. Rustad, Ph.D., Professor Emeritus
Peter Schiffman, Ph.D., Professor Emeritus
Donald L. Turcotte, Ph.D., Professor Emeritus
Robert J. Twiss, Ph.D., Professor Emeritus
Major Programs. See Geology, Marine and Coastal Science, and Natural Sciences.

Courses. See courses listed under Geology.

Geology Major Programs
“Civilization exists by geological consent—subject to change without notice.” —Will Durant
Geology is the study of the Earth, and in particular its history, structure, and the processes that have molded our planet and its biosphere. Geology involves the origin of continents and ocean basins, earthquakes and volcanoes, variations in global climate, and how these physical changes impact the evolution of life. All of these planetary processes are viewed through the prism of “deep time,” a perspective unique to geologists and one that distinguishes geology from most of the other physical sciences.

A significant component of geology is oriented toward the interaction between the processes of the Earth. This aspect includes the study of resources such as minerals, oil, and water; identification and mitigation of Earth hazards such as earthquakes, landslides, floods, and volcanic eruptions; identification and mitigation of polluted ground water; land use planning; and the study of ancient and modern climate change.

The Program. Students interested in becoming professional geologists or continuing their geological studies at the graduate level should choose the Bachelor of Science degree program. The Bachelor of Arts program is for students interested in an interdisciplinary program of study who plan to go into pre-college teaching. Both programs allow students to emphasize an aspect of the field of particular interest to them. The upper division electives are not restricted to geology courses but must be chosen to provide a relevant, coherent, and in-depth program of study. Transfer students should have completed as much as possible of the preparatory subject matter listed below.

Internships and Career Alternatives. In recent years in California, the largest employers of geologists have been environmental and geotechnical consulting firms, with oil companies, research laboratories, and government agencies providing opportunities. Students graduating with a Bachelor’s degree may get entry-level positions in the private
sector or they may go on to attain their teaching credential to fill the growing need for science teachers at all pre-college levels. A Master's degree is the most versatile professional level degree, and a Ph.D. is generally required for research and academic positions. Internships are strongly encouraged for undergraduates and are a means of exploring potential career opportunities that can lead to positions after graduation. UC Davis students have interned at the California Division of Mines and Geology, the US Department of Water Resources, CAL-EPA, and various consulting firms.

Education Abroad Options. The department strongly encourages interested students to pursue a portion of their studies abroad. Within the constraints of the Geology major at an international institution provided that the student consults with one of the undergraduate advisers and carefully plans a course of study abroad that will complement their coursework at Davis. In recent years, UC Davis Geology majors have spent their junior or senior years completing upper division coursework at EAP partner institutions in New Zealand, Ghana, Chile, and the United Kingdom.

A.B. Major Requirements:

Preparatory Subject Matter:

| Geology 3, 3L, 50L, 60L, 60...... | 13 |
| Mathematics 16A-16B or 21A-21B...... | 6-8 |
| Chemistry 2A-2B-2C or 10...... | 10 |
| Physics 7A-7B...... | 8 |
| Statistics 13 or 13V or 100 or 100...... | 3-4 |

Depth Subject Matter:

| Additional upper division electives chosen from Geology 130-194 courses (only one of GEL/EDU 181 or GEL/EDU 183 may be applied toward elective credit), Hydrologic Science 144, 146 and related fields approved in advance by major adviser. No more than three units upper division elective credit for Geology 115-120 courses. Maximum of six units upper division elective credit for Geology 192 or 194A-194B or 194H-194HB...... | 16 |

Total Units for the Major: 76-79

Recommended. Chemistry 100 or Hydrologic Science 134, Physics 7C.

B.S. Major Requirements:

Preparatory Subject Matter:

| Geology 3, 3L, 50L, 60L, 60...... | 15 |
| Mathematics 21A-21B-21C...... | 12 |
| Chemistry 2A-2B...... | 10 |

Select one of the following three options:

- General Geology option:
  - Geology 2 or Geology 120
- Chemistry 2C or Geology 123
- Hydrologic Science 134
- Mathematics 21D
- Physics 9A-9B
- Geology/Petroleum option:
  - Chemistry 2C or Geology 123 or Hydrologic Science 134
- Mathematics 21D
- Physics 9A-9B
- Geology option:
  - Geology 120
- Mathematics 21D
- Physics 9A-9B-9C

Depth Subject Matter:

| Additional upper division electives chosen from Geology 101-111 courses (only one of GEL/EDU 181 or GEL/EDU 183 may be applied toward elective credit), Hydrologic Science 144, 146 and related fields approved in advance by major adviser. No more than three units upper division elective credit for Geology 115-120 courses. Maximum of six units upper division elective credit for Geology 192 or 194A-194B or 194H-194HB...... | 16 |

Total Units for the Major: 134

Recommended. Mathematics 21A-21B-21C..... 12 |

English Composition Requirement. It is recommended that all majors complete the English composition requirement with Program 101 or 102 or the equivalent before or concurrently with the following courses: Geology 101, 105, 106, 108, 109L, 110.

Recommended. For the B.S. degree, one or more of the following courses are recommended for one of the options or to supplement the options as listed:


Graduate Geology/Petroleum option: Mathematics 22A, Physics 9C, Hydrologic Science 134 or Chemistry 2C or Chemistry 100 or Chemistry 110A or Chemistry 132.

Quantitative/Geophysics option:
- Mathematics 22B, Statistics 32 or 100, Hydrologic Science 103 or Chemistry 101 or Geology 130.

Major Advisers.

Minor Program Requirements. Students majoring in Geology can acquire a minor in one of the related fields: Geophysics, Geomorphology, Environmental Geology. The requirements for those minors are listed alphabetically in this Catalog.

Geology 101-111............. 19-24

Select one of the four emphases below:

- General Geology emphasis............ 19-20
- Geology 50 or 101 and 109L............. 5
- Geology 50 or 101 and 109L............. 11
- Geology 116 or 134............. 3

Minor Advisers. Geology major advising within the College of Letters & Science.

Teaching Credential Subject Representative. S. J. Carlson. See also the Teaching Credential/M.A. Program on page 125.

Related Major Programs. See also Marine and Coastal Science, on page 417.

Graduate Study. The department offers programs of study and research leading to the M.S. and Ph.D. degrees in Geology. For more information, see http://geology.ucdavis.edu/students/grad.

Graduate Advisers. M.L. Billen, E.S. Cowgill, S. Mukhopadhyay

Natural Sciences Major Program

Committee in Charge

Tessa Hill, Ph.D. (Earth and Planetary Sciences)
Susan Keen, Ph.D. (Evolution and Ecology)
J. Richard Pomeroy, Ph.D. (Education)
Neil Schore, Ph.D. (Evolution and Ecology)
David Webb, Ph.D. (Physics)

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 Earth and Planetary Sciences.

The Program. The Natural Sciences curriculum offers an unusually broad training in science and mathematics. All students must complete one year sequence in calculus, a course in statistics and one year sequences 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 science teaching credentials in science. Students who might wish to prepare for a teaching credential program should consult an adviser at their first opportunity in order 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 science also prepares a student to meet the subject matter requirements for special and supplementary science teaching credentials in California. Students who might wish to become a teacher should consult an adviser in the CalTeach/Mathematics and Science Teaching Program (CalTeach/MAST, http://mast.ucdavis.edu) at their first opportunity. CalTeach/MAST advisers can help students combine the prerequisites for a credential program with General Education requirements. The program also offers seminars that give participants experience in elementary, middle school, and high school classrooms.

B.S. Major Requirements:

Preparatory Subject Matter............. 68-74

Chemistry 2A-2B-2C...... 15
Earth and Planetary Sciences

Chemistry 107A.............................. 7
Geology 161, 162, 163.......................... 9
Approved electives.......................... 9

Other Physics or related science courses may be substituted with the prior approval of the major adviser.

*Note: Students pursuing a concentration in earth science or physics may not have had the necessary prerequisites in organic chemistry.

Major Advisers. T.M. Hill, R. Motani

Related Major Program. See also Marine and Coastal Science, on page 417.

Courses in Geology (GEl)

Lower Division

1. The Earth (4)

Letter—3 hours; discussion—1 hour. Introduction to the study of the Earth. Earth's physical and chemical structure; interpretation of data that tell 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 2. GE credit: SciEng| SE, SL, WE, F, W, S, F, W, S, J Hill, Spero

2. The Blue Planet: Introduction to Earth Science (3)

Letter—3 hours. Study of the solid and fluid earth and its place in the universe. Holistic examination of how the solid earth interacts with the atmosphere, hydrosphere, biosphere, and extraterrestrial 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| SE, SL, W, (W.) Montañez

26. The Blue Planet: Introduction to Earth Science Dissection (1)

Discussion—1 hour. Prerequisite: course 2 concurrently. Small group discussion and preparation of short papers for course 2. GE credit: SciEng.| WRT| SL, WE, W, (W.) Montañez

3. History of Life (3)

Letter—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 living organisms from their fossil remains. GE credit: SciEng| SE—W, (W.) Motani

30. 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: SciEng, WRT| SL, WE, W, (W.) Motani

31. History of Life Laboratory (1)

Laboratory—3 hours. Prerequisite: course 3 concurrently. Exercises in understanding fossils as clues to interpreting ancient life, including their functional morphology, paleoecology, and evolution. GE credit: SciEng| SE—W, (W.) Motani

4. Evolution: Science and World View (3)

Lecture—3 hours. 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 evolution on the natural environment. GE credit: SciEng| SE, SL, WE, W, (W.) Vermeij

10. Modern and Ancient Global Environmental Change (3)

Letter—3 hours. Fundamental scientific concepts underlying issues such as global warming, pollution, and the future of nonrenewable resources presented in the context of anthropogenic processes as well as natural forcing of these processes throughout Earth's history. GE credit: SciEng| SE, SL, VL, F, (F.) Montañez

12. Evolution and Paleobiology of Dinosaurs (2)

Letter—3 hours. Introduction to evolutionary biology, paleobiology, ecology and paleoecology, using dinosaurs as case studies. GE credit: SciEng| SE, F, W, (F, W.) Carlson

16. The Oceans (3)

Letter—3 hours. Introductory survey of the marine environment. Oceanic physical phenomena, chemical constituents and chemistry of water, geological history, the seas and human utilization of marine resources. Not open for credit to students who have taken course 16G. GE credit: SciEng| SE, SL, W, S, F, W, S, J Hill, Spero

16G. The Oceans: Discussion (2)

Discussion/laboratory—2 hours; term paper or discussion. Prerequisite: course 16 concurrently. Scientific method applied to the processes which mold the Earth; geophysical hazards and resources. Not open for credit to students who have taken course 16G. GE credit: SciEng| WRT| SL, WE—W, (W.) Hill

17. Earthquakes and Other Earth Hazards (2)


18. Energy and the Environment (3)


18V. Energy and the Environment (3)

Web virtual lecture—1.5 hours; web electronic discussion—1.5 hours. Conventional and alternative energy resources and their environmental impacts. Basic principles, historical development, current advantages and disadvantages, future prospects. Oil, natural gas, coal, nuclear, wind, geothermal, water, tidal, solar, hydrogen, and other sources of energy for the 21st century. GE credit: SciEng| SE, SL, WE—W, (W.) Verasus

20. Geology of California (2)

Letter—2 hours. The geologic history of California, the origin of the 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. Offered in alternate years. GE credit: SciEng| SE, SL, VL—W, (W.) Verasus

25. Geology of National Parks (3)

Letter—3 hours. Appreciation of the geologic framework underlying the inherent beauty of U.S. National Parks. Relationship of individual parks to geologic processes such as mountain building, volcanism, stream erosion, glacial action and landscape evolution. GE credit: SciEng| SE, SL, VL, W, (W.) Osleger

25V. Geology of National Parks (3)

Web virtual lecture—1 hour; web electronic discussion—2 hours. Appreciation of the geologic framework underlying the inherent beauty of U.S. National Parks. Relationship of individual parks to geologic processes such as mountain building, volcanism, stream erosion, glacial action and landscape evolution. No credit for students who have completed course 25. GE credit: SciEng| SE, S, SL, VL, W, (W.) Osleger

28. Astrobiology (3)

Letter—3 hours. Origin, evolution and distribution of life in our solar system and the Universe. Detecting habitable worlds, Drake equations, necessitates
130. Non-Renewable Natural Resources (3)
Lecture—3 hours. Prerequisite: course 1 or 50. Origin, occurrence, and distribution of nonrenewable resources, including metallic, nonmetallic, and energy-producing materials. Problems of discovery, production, and management. Estimations and limitations in the use of nonrenewable resources. GE credit: SciEng—SE, SL —F, (F) Veroush

131. Risk: Natural Hazards and Related Phenomena (3)

132. Introductory Inorganic Geochemistry (3)
Lecture—3 hours. Prerequisite: course 60 can be concurrent); Chemistry 2B. Nucleosynthesis of chemical elements, physical and chemical properties of elements, isotope substitution, elemental partition, distribution and transport among planetary materials, basic thermodynamics and phase diagrams, isotopic geochronometers, stable isotope fractionation, mixing and diffusion, advection and diffusion, geochemical cycles. GE credit: SciEng—SE, W —W, (W) Pinter

134. Environmental Geology and Land Use Planning (3)
Lecture—3 hours. Prerequisite: one course in Geology or course 1 or course 50; consent of instructor. Geologic aspects of development and land use planning. Geologic problems concerning volcanic and earthquake hazards, land stability, floods, erosion, coastal hazards, nonrenewable resource extraction, waste disposal facilities. GE credit: SciEng, Wrt—SE, WE —W, (W) Pinter

136. Ecoregion Morphometry of Rivers and Streams (5)
Lecture—1 hour; discussion/laboratory—2 hours; fieldwork—paper or discussion. Prerequisite: upper division or graduate standing in any physical science, biological science, or engineering, and consent of instructor. Restricted to advanced students in the physical sciences, biological sciences, or engineering. Integrative multidisciplinary field analysis of streams. Class project examines hydrology, geomorphology, water quality and aquatic and riparian ecology of degraded and pristine stream systems. Includes cooperative two-week field survey in remote wilderness settings with students from diverse scientific backgrounds. GE credit: SciEng—SE, WE —S —(S) J. Lorenzen

139. Rivers: Form, Function and Management (4)
Lecture—3 hours; fieldwork—3 hours. Prerequisite: course 50 or 50L; Mathematics 168 or 218 recommended. Analysis of river form and processes, emphasis on fluvial geomorphology, and river and stream designories to illustrate concepts and applications. Two weekend field trips required. Offered in alternate years. GE credit: SciEng—SE —F, (F) Pinter

140. Introduction to Process Geomorphology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 1 or 50; Mathematics 168 or 218. Quantitative description and interpretation of landscapes with emphasis on relationships between physical processes, mass conservation, and landform evolution. Topics covered include physical and chemical weathering, hillslopes, debris flows, fluvial systems, alluvial processes, fluvial transport, alluviation and Quaternary geochronology. Offered in alternate years.—(F) Oskin, Pinter

141. Evolutionary History of Vertebrates (3)
Lecture—3 hours. Prerequisite: course 3 or Biological Sciences 2A. Evolutionary history of vertebrates; fossil record and phylogeny; timing of major evolutionary events; appearance of major vertebrate groups; phylogenetic rate evolution; paleobiogeography of vertebrates; effect of continental movement on vertebrate evolution; dinosaurs and other strange vertebrates. Offered in alternate years. GE credit: SciEng—SE, WE —W, (W) Motani

141L. Evolutionary History of Vertebrates Laboratory (1)
Laboratory—3 hours. Prerequisite: course 141 (can be concurrent). Augments lecture course 141 through handling and in-person examination of three dimensional features observed in vertebrate skeletons, both fossil and living. Offered in alternate years. GE credit: SciEng—SE —W, (W) Motani

142. Basin Analysis (3)
Laboratory—3 hours; lecture—2 hours. Prerequisite: courses 50, 50L, and 109. Analysis of sedimentary basins from initiation to maturity, including controls on sedimentary filling, subsidence analysis, sequence stratigraphy, core logs, and applications to petroleum exploration and hydrology. One two-day field trip. Offered in alternate years. GE credit: SciEng—SE, W —W, (W) Motani

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 focusing on experimental igneous rocks. Offered in alternate years. GE credit: SciEng, Wrt—SE —S —(S) J. 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 variation in resource supply, and extinction provide historical perspective on the biosphere of future. GE credit: SciEng—SE, WE —W, (W) Vermeij

145. Advanced Metamorphic Petrology (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: course 106; Hydrogeology Science 134 or Chemistry 2C, Mathematics 16C or 21C. Metamorphic processes and the origin of metamorphic rocks. Laboratory study of representative areas and rocks. Offered in alternate years. GE credit: SciEng, Wrt—W —(W) Lesher

146. Radiogenic Isotope Geochemistry and Cosmochemistry (3)
Lecture—3 hours. Prerequisite: Chemistry 2C, Physics 7C, and Mathematics 16C. Basic principles of nuclear chemistry and physics applied to geology to determine the ages of terrestrial rocks, meteorites, archeological objects, age of the Earth, to trace geological/environmental processes, and explain formation of the chemical elements in the Universe. Offered in alternate years. GE credit: SciEng—QL, SE —F, (F) Lakey

147. Geology of Ore Deposits (4)
Lecture—3 hours; laboratory—3 hours; optional one-weekend field trip. Prerequisite: Chemistry 2C or Hydrogeology Science 134, courses 60, 62, and 105. Tectonic, lithologic and geochemical setting of major metallic ore deposit types emphasizing ore deposit genesis, water/rock interaction and the environmental effects of mining. Offered in alternate years. GE credit: SciEng —QL, SE —S —Zierenberg

148. Stable Isotopes and Geochemical Tracers (3)
Lecture—3 hours. Prerequisite: Chemistry 2C or Hydrogeology Science 134; courses 50, 50L, and 60. Use of oxygen and hydrogen isotopes in defining hydrological processes; carbon, nitrogen, and sulfur isotopes as indicators of exchange between the lithosphere, hydrosphere, atmosphere and biosphere. Radiogenic, cosmomonic, and noble gas isotope tracers. Offered in alternate years. GE credit: SciEng—QL, SE —S —Zierenberg

149. Geothermal Systems (3)
Lecture—3 hours; fieldwork. Prerequisite: courses 50 and 50L; Chemistry 2B. Geology, geochemistry, and geophysics of geothermal systems, including electrical power generation and water heating. Includes one day field trip on a weekend during the quarter. GE credit: SciEng—SE —W, (W) Zierenberg

150A. Physical and Chemical Oceanography (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 116N or Environmental Science and Policy 116N; Physics 98, Mathematics 21D, Chemistry 2C; consent of instructor. Physical and chemical properties of seawater, fluid dynamics, air-sea interaction, currents, waves, tides, mixing, major oceanic geophysical cycles. (Same course as Environmental Science and Policy 150A.) GE credit: SciEng—QL, SE, SS —F, (F) McClain, Spero

150B. Geologic Oceanography (3)
Lecture—3 hours. Prerequisite: course 50 or course 116N or Environmental Science and Policy. 116N. Introduction to the origin and geologic history of ocean basins. Composition and structure of ocean crust; marine volcanism; and deposition of marine sediments. Interpretation of geologic history of the ocean floor in terms of sea-floor spreading theory. (Same course as Environmental Science and Policy 150B.) GE credit: SciEng—SE —W, (W) McClain

150C. Biological Oceanography (4)
Lecture—3 hours; discussion—1 hour; fieldwork. Prerequisite: Biological Sciences 2A; course in general ecology. Ecology of major marine habitats, including intertidal, shelf benthic, deep-sea and planktonic communities. Existing knowledge and contemporary issues in research. Segment devoted to human use. Offered in alternate years. GE credit: SciEng—SE —Hill

156. Hydrogeology and Contaminant Transport (5)
Lecture—3 hours; laboratory—3 hours; term paper. Prerequisite: Hydrogeology Science 144 or Environmental Engineering 144 or the equivalent. Physical and chemical processes affecting groundwater flow and contaminant transport, with emphasis on real hydrogeological problems. Groundwater geochemistry and chemistry. Fundamentals of groundwater flow and transport analysis. Laboratory includes field pumping tests and work with physical and computer models. (Same course as Hydrologic Science 146.) GE credit: SciEng—SE —W, (W) Fogg

160. Geologic Data Analysis (3)
Lecture/discussion—3 hours. Prerequisite: Mathematics 211A. Introduction to quantitative methods in analyzing geological data. Topics include principles of statistics and probability, error analysis, hypothesis testing, inverse theory, time series analysis and directional data analyses. Use of computer in lectures and homework. GE credit: SciEng—QL, SE —W, (W) Rundle

161. Geophysical Field Methods (3)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1 or 50; Mathematics 21C, Physics 7C or Earth Science 116N. Geophysical methods applied to determining subsurface structure in tectonics, hydrogeology, geotechnical engineering, hydrocarbon and mineral exploration. Theory, survey design and interpretation of gravity, electrical resistivity, electromagnetic, reflection and refraction methods, and geophysical tools for penetrating radar measurements. GE credit: SciEng—QL, SE —F, (F) Billen
162. Geophysics of the Solid Earth (3)
Lecture—3 hours. Prerequisite: Mathematics 21C; Physics 7C or Physics 9C; consent of instructor. Theoretical use of physics in the study of the solid Earth, gravity, magnetism, paleomagnetism, and heat flow. Application to the interpretation of the regional and tectonically dynamic of the Earth and to plate tectonics. Offered in alternate years. GE credit: SciEng |QL, SE. —(W) Kellogg

163. Planetary Geology and Geophysics (3)
Lecture—3 hours. Prerequisite: Mathematics 21C; Physics 7C or Physics 9C; course 50 or course 26 or Astronomy 10G or Astronomy 10L or Astronomy 10S; consent of instructor. Principles of planetary science, including orbital mechanics, tidal interactions, and ring dynamics. Physics of planetary atmospheres. Geochemical processes, landforms, and their modification. Theory of planetary interiors, gravitational fields, rotational dynamics. Physics of planetary atmospheres. Geophysical processes, landforms, and their modification. Methods of analysis from Earth-based observations and spacecraft. Offered in alternate years. GE credit: SciEng |QL, SE. —(W) Yin

175. Advanced Field Geology (3)
Discussion—3 hours; fieldwork—6 hours. Prerequisite: consent of instructor. Advanced field studies of selected geologic terrains, interpretation and discussion of field observations. May be repeated two times but no more than when instructor varies. (P/N grading only.) GE credit: SE—Cooper, Roese

181. Teaching in Science and Mathematics (2)
Lecture/discussion—2 hours; fieldwork—2 hours. Prerequisite: major in mathematics, science, or engineering; or consent of instructor. A year sequence in science or calculus and consent of the instructor. Class size limited to 40 students per section. Exploration of effective teaching practices based on examination of how middle school teachers learn math and science. Selected readings, discussion and field experience in middle school classrooms. (Same course as Education 181.) (P/N grading only.) GE credit: SS, WE—F, W, S; F, W, S; F, W; S; S. Horn

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 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 analysis. Analysis of data/samples collected. GE credit: SciEng |SE—Hill

183. Teaching High School Mathematics and Science (3)
Lecture—2 hours; fieldwork—2 hours; fieldwork—4–60 hours. Prerequisite: major in mathematics, science, or engineering, or consent of instructor. A year sequence in science or calculus and consent of the instructor. Limited to 40 students per section. Creation of effective teaching practices based on examination of how high school students learn math and science. Field experience in high school classrooms. (Same course as Education 183.) GE credit: SocSci |OL, SS, WE—F, W, S; F, W; F, S; S. Fintzer, Stevenson

190. Seminar in Geology (1)
Discussion—1 hour. Seminar—1 hour. Presentation and discussion of current topics in geology by visiting lecturers, staff, and students. Written abstracts. May be repeated for credit. (P/N grading only.) GE credit: SE

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/N grading only.) GE credit: SE—F, W, S; F, W; S

194A. Senior Thesis (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 course sequence.) GE credit: SciEng |SE, WE—F, W, S; F, W, S

194B. Senior Honors Thesis (3)
Independent study—9 hours. Prerequisite: open to Geology majors who have completed 135 units and who 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 course sequence.) GE credit: SciEng |SE, WE—F, W, S; F, W, S, F; S, F, W

194HA. Senior Honors Project (3)
Independent study—9 hours. Prerequisite: open to Geology majors who have completed 135 units and who qualify for the honors program. Guided independent study of a selected topic, leading to the writing of an honors thesis. (Deferred grading only, pending completion of sequence.) GE credit: SciEng |SE, WE—F, W, S; F, W, S

194HB. Senior Honors Project (3)
Independent study—9 hours. Prerequisite: open to Geology majors who have completed 135 units and who qualify for the honors program. Guided independent study of a selected topic, leading to the writing of an honors thesis. (Deferred grading only, pending completion of sequence.) GE credit: SciEng |SE, WE—F, W, S; F, W, S

198. Directed Group Study (1-5)
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 an honors thesis. (Deferred grading only, pending completion of sequence.) GE credit: SciEng |SE, WE—F, W, S; F, W, S

205. Advanced Field Stratigraphy (3)
Lecture—1 hour; field work—2 hours. Prerequisite: courses 109 or 109L consent of instructor; course 206 recommended. Fieldwork over spring break. Application of stratigraphic techniques to research problems. Collection, compilation, and interpretation of correlation data with models for deposition and interpretations of Earth history. Topics will vary. May be repeated for credit. Offered in alternate years. —S. (J.) Sumner

206. Stratigraphic Analysis (3)
Lecture—3 hours. Prerequisite: courses 109, 109L or consent of instructor; course 144 recommended. Topics in advanced methods of stratigraphic analysis, regional stratigraphy and sedimentation, and sedimentary basin analysis. Focus on techniques used to interpret stratigraphic record and on current issues in stratigraphy and sedimentation. May be repeated for credit when topic differs. Offered in alternate years. —W. (W.) Higginbotham, D. (M.) Monteleoni

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 deformation. Offered in alternate years. —S. (J.) Oskin

216. Tectonics (3)
Lecture/discussion—3 hours. Prerequisite: course 101 or consent of instructor. Nature and evolution of tectonic features of the Earth. Causes, consequences, and evolution of plate motion, with selected examples from the Earth’s deformed belts. Offered in alternate years. —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. Topics will change from year to year. May be repeated for credit. Offered in alternate years. —F, S; F, S, F; J. Billen, Kellogg, McClain

218. Analysis of Structures in Deformed Rocks (3)
Seminar—3 hours. Prerequisite: courses 100, 100L, 101, 101L, 170; or consent of instructor. Recent advances in the understanding and analysis of structures in brittle and ductilely deformed rocks. Detailed investigations of the mechanical and kinematical characteristics of the structures, models for their formation, and applications to inferring the kinematics of larger scale tectonics. Offered in alternate years. —Cowgill

219. Fracture and Flow of Rocks (3)
Lecture—3 hours. Prerequisite: courses 100, 100L, 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 experimental evidence for the origin of the structures with emphasis on deformational processes in the earth. Offered in alternate years. —S. (J.) Billen

220. Mechanics of Geologic Structures (3)
Lecture—3 hours. Prerequisite: course 170, Mathematics 21C, Physics 9A or 5A, or consent of instructor. 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 fractures, faults, dikes, folds, fissions, and fold formation. Offered in alternate years. —Cowgill, Oskin

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. Geochronology and mineralogical evolution of sedimentary rocks reflecting depositional or burial processes. Laboratory work emphasizes thin section study of rocks. May be repeated for credit when topic differs. Offered in alternate years. —W. (W.) Sumner

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 in cryogenic gas extraction and specific techniques for individual research using stable isotopes. Offered in alternate years. —Spero

228. Topics in Paleoceanography (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 throughout Earth history. Topics vary. May be repeated for credit. Offered in alternate years. —W. (W.) Spero

230. Geomorphology and River Management (3)
Seminar—3 hours. Prerequisite: graduate standing, course 139 or equivalent. Impacts of management and land use activities on the geomorphology of rivers and streams. Evaluation and use of analytical tools for river assessment of river and stream restoration strategies and emerging issues in river management. May be repeated for credit when topic differs. Offered in alternate years. —Pinter

232. The Oceans and Climate (3)
Lecture/discussion—3 hours. Prerequisite: graduate standing or consent of instructor. Modern climate change and linkages between the ocean-atmosphere- cryosphere-terrestrial climate system. Importance of the ocean in forcing climate change, and the impacts of anthropogenic processes on the ocean. Topics vary. May be repeated three times for credit. Offered in alternate years. —W. (W.) Hill

235. Surface Processes (3)
Seminar—3 hours. Prerequisite: courses 50, 50L, 139; Mathematics 218 or 168 recommended. Recent advances in the analysis of landscapes 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 topics differ. Offered in alternate years. —S. (S.) Oskin

236. Inverse Theory in Geology and Geophysics (3)

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, surface waves, and conditions. Elastic wave propagation in stratified media. Offered in alternate years. [F/np grading only.] —S. (S.) McClain

240. Geophysics of the Earth (3)
Lecture—3 hours. Prerequisite: Earth Sciences and Resources 201, Physics 98, Chemistry 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 geophysical media. Recent and ancient seismic waves. Equations of state, thermal structure of the earth. Offered in alternate years. —S. (S.) Kellogg

241. Geomagnetism (3)

242. Paleomagnetism (3)

246. Physical Chemistry of Metamorphic Processes (3)
Lecture—3 hours. Prerequisite: course 145, Chemistry 110A, or consent of instructor. Physicochemical principles of metamorphic mineral assemblages and methods of interpreting the paragenesis of metamorphic rocks. Offered in alternate years.

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, tectonic settings, geothermometry, tectonics, metamorphic belts, regional studies). May be repeated for credit when topics differ. (S/U grading only.) Offered in alternate years.

250. Advanced Geochemistry Seminar (3)
Seminar—3 hours. Prerequisite: course 144 or consent of instructor. Critical review of selected topics in geochemistry including: ore genesis, hydrothermal and geothermal fluids, recent and ancient sediments, isotopic chronology, thermodynamic properties of the oceans. Subject varies yearly depending on student interest. May be repeated for credit. Offered in alternate years. —W. (W.) Yin

253. Current Topics in Igneous Petrology (3)
Seminar—3 hours. Prerequisite: graduate standing in Geology; course 142 or consent of instructor. Topical seminar designed to help graduate students develop and maintain familiarity with current and past literature related to igneous rock petrogenesis. May be repeated for credit when topics differ. (S/U grading only.) —F. (F.) Cooper, Lesher

254. Physical Chemistry of Igneous Processes (3)
Lecture—3 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 experimental studies on igneous minerals and rocks. Problems and examples from igneous and metamorphic petrology will be utilized. Offered in alternate years.

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 topics differ. Offered in alternate years. —F. (F.) S. Vermeij

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 evo-lution, building the tree of life, extinction and phylogeny, phylogeny of major phyla, and the rela-tionship between taxonomy and phylogeny. May be repeated for credit when topics vary. Offered in alternate years. —F. (F.) S. Vermeij

262. Paleobiology Graduate Seminar 2:
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 for credit when topics vary. Offered in alternate years. —S. (S.) Matani

281N. 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 research techniques for new graduate students in Geology. Demonstration of and exposure to appropriate techniques and their research. Offered in alternate years. —S. (S.) Spero, Yin

285. 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 the opportunity of going to sea or into the field on land. Techniques of sea-floor mapping using bottom photography, marine geochemical sampling, and methods of data reduc-tion and sample analysis. Analysis of data/samples collected. —Hill

290. Seminar in Geology (1)
Seminar—1 hour; discussion—1 hour. Presentation and discussion of topical problems in geology by visiting lecturers, staff, and students. (S/U grading only.) —F. W. S. (F. W. S.)

291. Geology of the Sierra Nevada (1)
Seminar. 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 fol-lowing the format required at professional meetings. —S. (S.)

292. River Forum (1)
Seminar—1 hour. Prerequisite: graduate standing. Review and discussion of latest research and funda-mental issues surrounding riverine systems. May be repeated for credit when topics differ. (S/U grading only.) Offered in alternate years. —F. W. S. (F. W. S.)

293. Geologic Event of the Week (1)
Seminar—1 hour; laboratory—0.5 hours. Prerequi-site: 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 observa-tions, 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.) Offered in alternate years. —F. W. S. (F. W. S.) 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 latest 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 topics differ. (S/U grading only.) Offered in alternate years. —F. W. S. (F. W. S.) Roelse

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 tec-tonics, mantle convection). Emphasis on recent litera-ture. May be repeated for credit when topics differ. —F. W. S. (F. W. S.)

296. Advanced Problems in Tectonics (3)
Seminar—3 hours. Prerequisite: course 101 or consent of instructor. Seminar dealing with current prob-lems in tectonics of selected regions. Topics will change from year to year. Emphasis on study of recent literature. May be repeated for credit. (S/U grading only.) Offered in alternate years. —F. (F.) Cowgill

297. Geophysics Forum (1)
Seminar—0.5 hours; discussion—0.5 hours. Prerequi-site: graduate student status in the Geology Depart-ment, or consent of instructor. Seminar/discussion group to review and discuss latest research in geo-physics, and on-going research of participants. Top-ics will change each quarter depending on the interests of the group. May be repeated three times for credit. (S/U grading only.) Offered in alternate years. —F. W. S. (F. W. S.)

298. Group Study (1-5)
Prerequisite: graduate standing or consent of instruc-tor. May be repeated up to 10 units for credit. (S/U grading only.) Offered in alternate years. —F. W. S. (F. W. S.)

299. Research (1-12)
(F., W., S.) (S/U grading only.) —F. W. S. (F. W. S.)

Professional

300. Methods of Teaching Geology (2)
Extensive writing or discussion—2 hours. Prerequi-site: graduate student standing in Geology. Introduc-tion to graduate-level writing and undergraduate-level teaching skills in geology. Persuasive (proposal) writing workshop; discussions on campus teaching resources, presenting information, managing class-room dynamics, evaluating student performance. Participation in teaching program required for Ph.D. in Geology. (S/U grading only.) —F. (F.) Billen
East Asian Languages and Cultures

(Committee on Educational Policy)
Michelle Yeh, Ph.D., Chairperson of the Department

Department Office: 211 Sproul Hall 530-752-4999

Faculty
Chia-ni Chiang, Ph.D., Professor (Japanese)
Xiaomei Chen, Ph.D., Professor (Chinese)
Chengzhi Chu, Ph.D., Associate Professor (Chinese)
Michael Foster, Ph.D., Assistant Professor (Japanese)
David Gundry, Ph.D., Assistant Professor (Japanese)
Mark Halperin, Ph.D., Associate Professor (Chinese)
Yuming He, Ph.D., Associate Professor (Chinese)
Nobuko Koyama, Ph.D., Assistant Professor (Japanese)
Joseph Sorensen, Ph.D., Associate Professor (Japanese)
Sayumi Suzuki, Ph.D., Assistant Professor (Japanese)
Mickey Yeh, Ph.D., Professor (Chinese)

Emeriti Faculty
Robert Borgen, Ph.D., Professor Emeritus
Donald A. Gibbs, Ph.D., Professor Emeritus

Affiliated Faculty
Junko Ito, Lecturer (Japanese)
Yoko Kato, Lecturer (Japanese)
Ichia Lee, Lecturer (Chinese)
Jiao Li, Lecturer (Chinese)
Ling-Yu Lu, Lecturer (Chinese)
Nanako McHale, Lecturer (Japanese)
Mayumi Saito, Lecturer (Japanese)
Haruko Sakakibara, Lecturer (Japanese)
Miyo Uchida, Lecturer (Japanese)
Mokoto Watanabe, Lecturer (Japanese)
Miki Wheeler, Lecturer (Japanese)
Binbin Yang, Lecturer (Chinese)

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 knowledge or proficiency in Chinese. The core language program in Japanese has two tracks: one for students with some knowledge but wish to improve their skills and another for students with substantial prof..
completed a language course cannot go back and take its prerequisites. If the prerequisite courses are required, however, students may substitute other courses. Students who are not sure how this requirement applies to them should speak to the undergraduate adviser.

Waived Language Courses. Students with exceptional ability may waive required language courses. If waiver courses have been waived, students will not have to take courses in their place. If upper division courses have been waived, students must take 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

1. Elementary Chinese (5)
Lecture/discussion—5 hours. Prerequisite: no background in Chinese or placement exam or consent of instructor. Developing elementary level skills of listening, speaking, reading and writing in Mandarin Chinese in everyday communication settings. Introduction of fundamentals of pronunciation, grammar, and Chinese characters will be introduced. GE credit: ArtHum | AH, OL, WC. — F, W, S. (F, W, S.)

2B. Accelerated Written Chinese II (5)
Lecture—5 hours. Prerequisite: course 2BL or placement exam or consent of instructor. Continuation of course 2BL with further trainings on all the communicative skills of listening, speaking, reading, and writing with emphases on standard Mandarin pronunciation, Chinese characters and discourse level conversations. Not open for credit to students who have completed course 1, 2, or 3. GE credit: ArtHum | AH, OL, WC. — F. (F)

3CN. Mandarin for Cantonese Speakers III (5)
Lecture—5 hours. Prerequisite: course 2CN or placement exam or consent of instructor. Continuation of course 2CN. Prerequisite for entering upper division courses in Chinese. Not open for credit to students who have completed course 28. GE credit: ArtHum | AH, OL, WC. — S. (S)

4. Intermediate Chinese (5)
Lecture/discussion—5 hours. Prerequisite: course 3; or placement exam or consent of instructor. Continuation of intermediate-level communication skills in spoken and written Mandarin, based on language skills developed in course 3. GE credit: ArtHum | AH, OL, WC. — F, W, S. (F, W, S.)

4A. Accelerated Intermediate Chinese (15)
Prerequisite: course 3 or 1A; or placement exam or consent of instructor. Special nine-week accelerated, intensive summer session course that combines the work of courses 4, 5, and 6. Intermediate-level training in spoken and written Chinese in cultural and communicative contexts. Emphases on standard pronunciation, characters, and discourse level conversations. Not open for credit to students who have completed course 7. GE credit: ArtHum | AH, OL, WC. — S. (S)

5. Intermediate Chinese (5)
Lecture/discussion—5 hours. Prerequisite: course 4; or placement exam or consent of instructor. Continuation at intermediate-level in spoken and written Chinese in cultural contexts, based on language skills developed in course 3 or 1A. Not open to students who have completed course 4, 5, or 6. GE credit: ArtHum | AH, OL, WC. — F, W, S. (F, W, S.)

6. Intermediate Chinese (5)
Lecture/discussion—5 hours. Prerequisite: course 5; or placement exam or consent of instructor. Intermediate-level training in spoken and written Chinese in cultural contexts, based on language skills developed in course 5. GE credit: ArtHum | AH, OL, WC. — S. (S)

7. Chinese Business Culture (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Open to non-heritage students who have no prior knowledge of, or background in, the Chinese language; anyone who has taken Chinese language or culture courses at UC Davis, or anyone who is currently enrolled in a Chinese language class, or who speaks any Mandarin or Chinese dialect (e.g., Cantonese), cannot take the course for credit without the instructor’s permission. Introduction to business culture of China. Basic concepts of business culture are introduced, including the role of family and individual in Chinese business culture. GE credit: ArtHum | AH, OL, W. — W, S.

10. Modern Chinese Literature (In English) (4)
Lecture—3 hours; term paper or discussion—1 hour. Introductory course requiring no knowledge of Chinese language or history. Reading and discussion of short stories and novels and viewing of two films. Designed to convey a feeling for what China has experienced in the twentieth century. Not open for credit to students who have already taken, or are taking concurrently, course 104. GE credit: ArtHum, Div, Wrt | AH, WC. — Chen

11. Great Books of China (in English) (4)
Lecture—3 hours; discussion—1 hour. Selected readings in English recommended. Designed as a survey of background information on periods, authors and the interrelationships of culture, literature and social change. Methods of analysis are introduced and applied in class discussions. GE credit: ArtHum, Div, Wrt | AH, WC. — Halperin

50. Introduction to the Literature of China and Japan (4)
Lecture/discussion—4 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 Japanese 50.] GE credit: ArtHum, Div, Wrt | AH, WC. — Chen

98. Directed Group Study (1-5)
(F/NP grading only.)

99. Special Study for Undergraduates (1-5)
(F/NP grading only.)

Upper Division

100A. Chinese Intellectual Traditions: Daoist Traditions (4)
Lecture/discussion—4 hours. Key aspects of the Daoist tradition in Chinese history recommended. English-language survey of key Daoist texts and scholarship. Topics include Daoist conceptions of the cosmos, the natural world, spirit, body, and immortality; Daoist divinities; Daoism and Chinese culture. (Same course as Religious Studies 175A) GE credit: ArtHum, Div, Wrt | AH, WC. — Chen

100B. Confucian Traditions (4)
Lecture/discussion—4 hours. Key aspects of the Confucian tradition in dynamic modern China. Major themes addressed include ritual, classical studies, and Confucian influences on the Chinese family and state. GE credit: ArtHum | AH, WC. — Chen

101. Chinese Film (4)
Lecture/discussion—3 hours; film viewing—3 hours. English language survey of Chinese film, from its inception to the end of the twentieth century. Chinese films as important texts for understanding national, transnational, racial, gender, and class politics in modern China. (Same course as Cinema & Techno-cultural Studies 147A) GE credit: ArtHum, Div, Wrt | AH, WC. — Chen

102. Chinese American Literature (in English) (4)
Lecture—3 hours; term paper or discussion—1 hour. English language survey of Chinese American literature which reflects cultural roots in China before immigration and the diaspora experience in the United States after immigration. Memory, nostalgia, national identities, cross-cultural communication, globalization, and trans-national politics. GE credit: ArtHum, Div, Wrt | AH, WC. — Chen

103. Modern Chinese Drama (4)
Lecture—3 hours; term paper or discussion—1 hour. English language survey of modern Chinese spoken drama in the twentieth century and its major playwrights, in the context of Chinese history and the interaction of Chinese culture with other cultures. GE credit: ArtHum, Div, Wrt | AH, VL, WC. — Chen
104. Modern Chinese Fiction (in English) (4)
Lecture—3 hours; term paper or discussion—1 hour. English language survey of Chinese fiction as it evolved amidst the great historical, social and cultural changes of the twentieth century. Thorough study of the most influential writers and genres. GE credit: ArtHum|AH, OL, WC.—Chen, Halperin, Yeh.

105. Western Influences on Twentieth-Century Chinese Literature (in English) (4)
Lecture—3 hours; discussion—1 hour. Introduction of Western literary thought into modern China, the experimentation with Western literary forms and techniques, and the development of Marxism in contemporary literary writing. Offered in alternate years. GE credit: ArtHum, Div, Wrt|AH, WC.—Yeh.

106. Chinese Poetry (in English) (4)
Lecture—3 hours; discussion—1 hour. Organized topically and chronologically, the lyric tradition is explored from the dawn of folk songs down to modern expressions of social protest. Topics include friendship, love, oppression, war, parting, death, ecstasy and beauty. All readings are in English. GE credit: ArtHum, Div, Wrt|AH, WC.—Yeh.

109A. Topics in Chinese Literature; Crime and Punishment (in English) (4)
Lecture—3 hours; discussion—1 hour. Topics in Chinese literature: crime and punishment. GE credit: ArtHum, Div, Wrt|AH, WC.—Chen, Halperin, Yeh.

109C. Topics in Chinese Literature; Women Writers (in English) (4)
Lecture—3 hours; discussion—1 hour. Topics in Chinese literature: women writers. GE credit: ArtHum, Div, Wrt|AH, WC.—Chen, Halperin, Yeh.

109D. Topics in Chinese Literature: The Knight-Erarrant (in English) (4)
Lecture—3 hours; discussion—1 hour. Topics in Chinese literature: the knight-errant. GE credit: ArtHum, Div, Wrt|AH, WC.—Chen, Halperin, Yeh.

109E. Topics in Chinese Literature: The City in Fiction (in English) (4)
Lecture—3 hours; discussion—1 hour. Topics in Chinese literature: the city in fiction. GE credit: ArtHum, Div, Wrt|AH, WC.—Chen, Halperin, Yeh.

109G. Topics in Chinese Literature: The Literature of Twentieth-Century Taiwan (in English) (4)
Lecture—3 hours; discussion—1 hour. Topics in Chinese literature: the literature of twentieth-century Taiwan. GE credit: ArtHum, Div, Wrt|AH, WC.—Chen, Halperin, Yeh.

109H. Topics in Chinese Literature; Popular Literature (in English) (4)

109I. Topics in Chinese Literature: Scholar & The Courtesan (in English) (4)
Lecture—3 hours; discussion—1 hour. Topics in Chinese literature: the scholar and the courtesan. GE credit: ArtHum, Div, Wrt|AH, WC.—Chen, Halperin, Yeh.

110. Great Writers of China: Texts and Contexts (in English) (4)
Lecture—3 hours; discussion—1 hour. Great writers in modern Chinese literature; development of major theoretical concepts and interpretive methods in the study of literature by using examples from the Chinese tradition; discussions of classical and modern works with an emphasis on the relationships between literature, author, society, and culture. GE credit: ArtHum, Div, Wrt|AH, WC.—Yeh, He.

111. Modern Chinese: Reading and Discussion (12)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 6 or placement exam or consent of instructor. Building on Chinese 6/3BL, further development of communication skills in Modern Standard Mandarin-speaking environments. Reading of dialogues/articles pertaining to contemporary China. GE credit: ArtHum|AH, OL, WC.—F. (F.)

111A. Intensive Third-Year Chinese (12)
Lecture/discussion—13.3 hours. Prerequisite: Not open to students who have completed course 111, 112, or 113. A one-year summer course combines courses 111, 112, and 113. Training at intermediate-high and advanced-low level in spoken and written Chinese. Communication based on language skills developed in course 6. GE credit: ArtHum|AH, OL, WC.—Su. (So.)

112. Modern Chinese: Reading and Discussion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 112 or placement exam or consent of instructor. Course 112 further develops communication skills in Modern Standard Mandarin-speaking environments. Reading dialogues/articles pertaining to contemporary China issues and discuss ethical, moral, aesthetic, social, and cultural concerns. Strategies for moving between simplified and traditional Chinese characters. GE credit: ArtHum|AH, OL, WC.—W. (W.)

113. Modern Chinese: Reading and Discussion (4)
Lecture—3 course 112 or placement exam or consent of instructor. Continuation of course 112, further developing communication skills in Modern Standard Mandarin-speaking environments. Reading dialogues/articles pertaining to contemporary China issues and discuss ethical, moral, aesthetic, social, and cultural concerns. GE credit: ArtHum|AH, OL, WC.—S. (S.)

114. Introduction to Classical Chinese (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 112 or equivalent language proficiency; consent of instructor. Introduction to the language in which, until the twentieth century, most official, documentary, scholarly, and belle-lettristic Chinese literature was written. GE credit: ArtHum|AH, WC.—F., S. (S.), F. Halperin, He.

115. Introduction to Classical Chinese II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 114 or consent of instructor. Continuation of enhancing classical Chinese reading skills with literature ranging from the prose found in Han dynasty historical works, Six Dynasties anecdotal literature, and Tang occasional texts, as well as the poetic shi and fu genres. GE credit: ArtHum|AH, WC.—Halperin, He.

116. Introduction to Classical Chinese III (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 115 or consent of instructor. Translations of extended readings in the original sources and brief analyses of syntax. These sources will include texts written by well-known figures in the eighteenth and nineteenth centuries, composing in a wide variety of genres. GE credit: ArtHum|AH, WC.—Halperin, He.

120. Advanced Chinese (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 113 or placement exam or consent of instructor. Reading of evaluations from various genres (literature, newspapers, TV and movies, etc.) developed advanced reading, writing, aural comprehension, and formal/professional speech skills in Mandarin Chinese. Chinese society/cultural studies, especially those sociocultural issues reflected in the language used in and around the Chinese society. GE credit: ArtHum|AH, OL, WC.—F., W, S. (F.), W, S. (S.)

130. Readings in Traditional Chinese Fiction (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 111 or equivalent language proficiency. Examination of representative works of traditional Chinese fiction popular from the 12th Century until the 17th and 18th centuries. Translations in English of the Chinese texts will be available to students as reference. May be repeated one time for credit. GE credit: ArtHum|AH, VL, WC.—He.

131. Readings in Traditional Chinese Poetry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 111 or equivalent language proficiency; consent of instructor. Traditional Chinese poetry from its beginnings to the golden ages of Tang and Song, surveying forms and poets that best reveal the Chinese poetic sensibility and the genius of the language of Chinese poetry. GE credit: ArtHum|AH.—Yeh.

132. Readings in Modern Chinese Poetry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 111 or equivalent language proficiency; consent of instructor. Traditional Chinese poetry from its beginnings to the golden ages of Tang and Song, surveying forms and poets that best reveal the Chinese poetic sensibility and the genius of the language of Chinese poetry. GE credit: ArtHum|AH,—Yeh.

133. Readings in Modern Chinese Prose and Drama (4)
Lecture—4 hours. Prerequisite: course 111 or equivalent language proficiency. Literary works and scholarly essays on selected topics of Chinese prose and drama, development of a deep understanding of Chinese culture and society through reading of primary texts and research reading of materials of these two important genres of the modern period. Conducted in Chinese. May be repeated two times for credit when topic differs. GE credit: ArtHum|AH, WC.—He.

134. Chinese Film in Chinese Language (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 111 or equivalent language proficiency. Chinese placement exam. Chinese film and scholarly essays on Chinese cinema and film history. Developing a deep understanding of Chinese culture and society through viewing and studying Chinese films in the Chinese language. GE credit: ArtHum or SocSci|AH or SS; OL, VL, WC.—Chen.

140. Readings in Classical Chinese (4)
Lecture/discussion—3 hours; term paper. Prerequisite: consent of instructor. Study and philosophical analysis of selected texts from the first millennium of Imperial China. May be repeated two times for credit. GE credit: ArtHum|AH.—He.

150. Fifth-Year Chinese: Selected Topics in Chinese Literature, Language, and Culture (4)
Lecture/discussion—4 hours. Prerequisite: course 120 or placement exam or consent of instructor. Examination of literary works and scholarly essays on selected topics of Chinese culture and society. Development of a deep understanding of Chinese culture and society through sophisticated Chinese speaking and writing exercises. May be repeated three times for credit when topic differs. Offered irregularly. GE credit: ArtHum, Div, Wrt|AH, OL, VL, WE.—Chu, He, Yeh.

160. The Chinese Language (4)
Lecture/discussion—4 hours. Prerequisite: course 6 or 38L or 3CN or 4A (can be concurrent) or placement exam or consent of instructor. Linguistics recommended. Examination of the Chinese language viewed in its linguistic context, synchronically and diachronically. Historical phonology, classical and literary Chinese culture and art, written vernacular, descriptive grammar of modern standard Chinese, dialectal variation, and sociolinguistic factors. GE credit: ArtHum|AH, WC.—Chu.

192. Chinese Internship (1-12)
Internship—3.5-36 hours to be arranged. Prerequisite: upper division standing and consent of instructor. Work experience in the Chinese language, with analytical term paper on a topic approved by instructor. (P/NP grading only.)
194H. Special Study for Honors Students (1-5)
Independent study—3-15 hours. Prerequisite: senior standing and qualification for the Chinese honors program; consent of instructor. Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in Chinese literature, civilization, or language studies. May be repeated up to eight units for credit. (P/NP grading only.) GE credit: ArtHum | AH, OL, WC — F, W, S. (F, W, S.)
197T. Tutoring in Chinese (1-4)
Tutoring—1-4 hours. Prerequisite: consent of Department. Leading of small voluntary discussion groups affiliated with one of the Department’s regular courses. May be repeated up to four units for credit. (P/NP grading only.) — Chu
198. Directed Group Study (1-5) (P/NP grading only)
199. Special Study for Advanced Undergraduates (1-5) (P/NP grading only)
Graduate
Graduate Research (1-12) (S/U grading only)
Professional
396. Teaching Assistant Training Practicum (1-4)
Prerequisite: consent of instructor; graduate standing. Any student assigned by a graduate student under the direction of the Director. May be repeated for credit. (S/U grading only) — F, W, S. (F, W, S.) Chu
Courses in Japanese (JPN)
Lower Division
1. Elementary Japanese (5)
Lecture/discussion—5 hours. Introduction to spoken and written Japanese in cultural contexts, with emphasis on communication. GE credit: ArtHum | AH, OL, WC — F. (F)
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. GE credit: ArtHum | AH, OL, WC — Su. (Su.)
1AS. Intensive Elementary Japanese (15)
Lecture/discussion—15 hours. Intensive course taught combining 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. Offered in Japan. Not open for credit to students who have taken course 1, 2, or 3. GE credit: ArtHum | AH, OL, WC — Su. (Su.)
2. Elementary Japanese (5)
Lecture/discussion—5 hours. Prerequisite: successful completion (C- or better) of course 1 or the equivalent language proficiency. Continuation of training in basic Japanese spoken and written skills. GE credit: ArtHum | AH, OL, WC — W. (W)
3. Elementary Japanese (5)
Lecture/discussion—5 hours. Prerequisite: successful completion (C- or better) of course 2 or equivalent language proficiency. Continuation of training in basic spoken and written skills in Japanese language. GE credit: ArtHum | AH, OL, WC — S. (S)
4. Intermediate Japanese (5)
Lecture/discussion—5 hours. Prerequisite: successful completion (C- or better) of course 3 or the equivalent language proficiency. Intermediate-level training in spoken and written Japanese in cultural context, based on language skills developed in course 3. GE credit: ArtHum | AH, OL, WC — F. (F)
5. Intermediate Japanese (5)
Lecture/discussion—5 hours. Prerequisite: successful completion (C- or better) of course 4 or the equivalent language proficiency. Intermediate-level training in spoken and written Japanese in cultural context, based on language skills developed in course 4. GE credit: ArtHum | AH, OL, WC — W. (W)
6. Intermediate Japanese (5)
Lecture/discussion—5 hours. Prerequisite: successful completion (C- or better) of course 5 or the equivalent language proficiency. Intermediate-level training in speaking and listening skills in Japanese in cultural context, based on language skills developed in course 5. GE credit: ArtHum | AH, OL, WC — S. (S)
7.5. Intensive Intermediate Japanese (20)
Lecture/discussion—20 hours. Prerequisite: course 2. Not open for students who have taken course 3, 4, 5, or 6; an exception can be made for students who have taken course 3 or its equivalent, provided that those five units are deducted from the 20 total unit load. Special intensive course that combines the work of courses 3, 4, 5, and 6. Introduction to Japa-
7. Introduction to Japanese Language and Culture (in English) (4)
Lecture—3 hours; discussion—1 hour. Introduction to Japanese language: readings and discussion in English of important works from earliest times to the present. GE credit: ArtHum | Div, Writ | AH, WC, WE — Sorensen
155. Introduction to Japanese Culture (2)
Lecture/discussion—2 hours; fieldwork. Restricted to students enrolled in units for the Kyoto Quarterly Abroad program. Aspects of Japanese culture: literature, history, religion, art, language, and society. Conducted in English; taught in Japan. (P/NP grading only) GE credit: ArtHum | AH, OL, WC — S. (S) — Sorensen
25. Japanese Language and Culture (in English) (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Linguistics 1 or Anthropology 4 recom-
Adv. Japanese courses for students who have completed schooling up to the 6th grade in the Japanese education system or equivalent proficiency of basic writing system (Hiragana and Katakana) or consent of instructor. — Koyama
31. Basic Kanji (4)
Lecture—3 hours; practice—1 hour. Prerequisite: successful completion (C- or better) of course 1 or equivalent proficiency of basic writing system (Hiragana and Katakana) or consent of instructor. Restricted to students who have never been exposed to any form of Kanji or Chinese characters before. — Koyama
50. Introduction to the Literature of China and Japan (4)
Lecture/discussion—4 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 50.) GE credit: ArtHum | Div, Writ | AH, WC — Sorensen
98. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: AH — F, W, S. (F, W, S.)
99. Special Study for Undergraduates (1-5) (P/NP grading only)
Upper Division
101. Japanese Literature in Translation: The Early Period (4)
Lecture—3 hours; discussion—1 hour. Study of early Japanese literature from the Nara to the end of the Heian period through a broad survey of the major lit-
guren’s subjects. The course will examine the trajectory of modern Japanese literature through the second half of the nineteenth century including poetry, linked-verse, military chronicles, no drama, Buddhist literature, haiku, haibun, kabuki, bunraku, pöaböö, and Edo prose narratives. GE credit: ArtHum | Div, Writ | AH, WC, WE — F. (F) Gundy
102. Japanese Literature in Translation: The Middle Period (4)
Lecture—3 hours; discussion—1 hour. Study of the major literary genres from the 19th century to the second half of the nineteenth century including poetry, linked-verse, military chronicles, no drama, Buddhist literature, haiku, haibun, kabuki, bunraku, pöaböö, and Edo prose narratives. GE credit: ArtHum | Div, Writ | AH, WC, WE — F. (F) Gundy
Lecture—3 hours; discussion—1 hour. Modern Japa-
104. Modern Japanese Literature: War and Revolution (3)
Lecture/discussion—3 hours. Perspectives and sensi-
bilities with which major modern Japanese writers have interpreted the traumatic and often poignant experiences of war and socio-political upheavals from the late nineteenth century to the 1970s. Lect-
105. Modern Japanese Literature: Hero and Anti-hero (4)
Lecture/discussion—4 hours. The ways in which rep-
106. Japanese Culture Through Film (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: consent of instructor. Aspects of Japa-
107. Modern Japanese Autobiographies (in English) (4)
Lecture—3 hours; term paper/discussion—1 hour. Exploring the modern and contemporary Japanese social and cultural landscape through critical analy-
sis of modern Japanese autobiographies by promi-
108. Poetry of China and Japan (in English) (4)
Lecture—3 hours; discussion—1 hour. A compara-
tive approach to Chinese and Japanese poetry, examining poetic practice in the two cultures; includes a general overview of the two traditions, plus study of poetic forms, techniques, and distinct treat-
netwishes: love, nature, war. (Same course as Chinese 108.) GE credit: ArtHum | Div, Writ | AH, WC — F. (F) Chang
Lecture—3 hours; discussion—1 hour; film view-
ing—3 hours. Japanese popular culture and its influence in the early/modern periods to contemporary incarnations. Emphasis on the major forms of twenti-
eight-century popular culture, including genre films,
111. Modern Japanese: Reading and Discussion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: successful completion (C- or better) of course 6 or the equivalent language proficiency. Reading in modern Japanese short stories, newspaper articles, and essays; conversation practice based on these readings. GE credit: ArtHum | AH, OL, WC. —W. (W.)

112. Modern Japanese: Reading and Discussion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: successful completion (C- or better) of course 111 or equivalent language proficiency. Continuation of course 111. GE credit: ArtHum | AH, OL, WC. —W. (W.)

113. Modern Japanese: Reading and Discussion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: successful completion (C- or better) of course 121 or equivalent language proficiency. Continuation of course 112. GE credit: ArtHum | AH, OL, WC. —S. (S.)

114A. Spoken Japanese (3)
Discussion—2 hours. Prerequisite: successful completion (C- or better) of course 6 or equivalent language proficiency. Training in spoken Japanese for students with a basic working knowledge of the language. (P/NP grading only) GE credit: OL.

114B. Spoken Japanese (2)
Discussion—2 hours. Prerequisite: successful completion (C- or better) of course 114A or equivalent language proficiency 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) GE credit: OL.

115. Japanese Composition (2)
Lecture—2 hours. Prerequisite: successful completion (C- or better) of 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 syntax of written Japanese.

1175. Intensive Modern Japanese: Reading and Discussion (17)
Lecture/discussion—17 hours. Prerequisite: course 5. Introduction to basic Japanese grammar and development of more advanced reading, writing, and conversational skills in the modern language. Continued study of the series of 4th year Advanced Japanese which focuses on fourth year Advanced Japanese which focuses on the levels of formality or politeness in conversation as well as sociocultural aspects and topics in the Japanese society. GE credit: ArtHum | AH, OL, WC. —W. (W.)

121. Advanced Japanese I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: successful completion (C- or better) of course 114 or consent of instructor. First of three courses in a series of fourth-year Advanced Japanese which focuses on the levels of formality or politeness in conversation as well as sociocultural aspects and topics in the Japanese society. GE credit: ArtHum | AH, OL, WC. —W. (W.)

122. Advanced Japanese II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: successful completion (C- or better) of course 121 or consent of instructor. Second of three courses in a series of fourth-year Advanced Japanese which focuses on the levels of formality or politeness in conversation as well as sociocultural aspects and topics in the Japanese society. GE credit: ArtHum | AH, OL, WC. —W. (W.)

123. Advanced Japanese III (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: successful completion of course 122 or consent of instructor. Third of three courses in a series of fourth-year Advanced Japanese which focuses on the levels of formality or politeness in conversation as well as sociocultural aspects and topics in the Japanese society. GE credit: ArtHum | AH, OL, WC. —W. (W.)

130. Readings in Modern Japanese Literature to 1926 (4)
Lecture/discussion—4 hours. Prerequisite: course 113. Restricted to completion of course 113 or equivalent as determined by taking a placement exam or consent of instructor. Topics focused on contemporary Japan. Themes centering on defining Japan today in its future and past such as through its urban society, trends in architecture, “soft power” industries, and “traditional” elements as mainstays of Japan’s cultural currency. GE credit: ArtHum | AH, WC. —Sorensen

131. Readings in Modern Japanese Literature: 1920-1945 (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 113 or equivalent language proficiency. Four-year level reading of representative works of modern Japanese literature including short stories, novels, diaries, memoirs, poetry and excerpts from novels and plays written through the militaristic era, to the end of the war years in 1945. GE credit: ArtHum | AH, WC. —Sorensen

Lecture—3 hours; discussion—1 hour. Prerequisite: course 113 or equivalent language proficiency. 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. GE credit: ArtHum | AH. —Chang, Gundry

133. Readings in Modern Japanese Literature: 1970 to Present (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 113 or equivalent language proficiency. Continuation of course 132, but may be taken independently. Covers selected texts from 1970 to the present. Offered in alternate years. GE credit: ArtHum | AH, WC. —Chang

134. Readings in the Humanities: Traditional Culture (4)
Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: completion of course 133 or equivalent language proficiency. Four-year level reading of modern works by major specialists on traditional Japanese culture: history, religion, thought, art, international relations, and the development of Japan’s politics. Focus is equally on developing reading skills and learning about Japanese culture. GE credit: ArtHum | AH, WC. —Sorensen

135. Readings in the Humanities: The Modern Period (4)
Lecture—3 hours; term paper. Prerequisite: course 113 or equivalent language proficiency. Four-year level reading of authentic modern writings on Japanese culture, history, society, religion, law, politics, international relations, aesthetics, and comparative culture by prominent critics, commentators, and scholars. GE credit: AH, WC. —Chang

136. Readings in Newspapers and Magazines (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 113 or equivalent language proficiency. Four-year level reading of newspaper and magazine reports, articles on domestic and international affairs relating to contemporary Japan. GE credit: ArtHum | AH, WC. —Chang

137. Readings in Contemporary Japanese Literature (4)
Lecture/discussion—4 hours. Prerequisite: course 113 or equivalent language proficiency. Readings of short stories and essays by contemporary writers. Representative writers include Yoshimoto Banana, Otsuichi, Suzuki Koj, Kyōgoku Takahisa, Ogawa Yoko, and Murakami Haruki. Readings and discussions in Japanese with some emphasis on translation into English. GE credit: AH, WC. —Sorensen

138. Readings in the Humanities: Japan Today (4)
Lecture/discussion—4 hours. Prerequisite: course 113. Restricted to completion of course 113 or equivalent as determined by taking a placement exam or consent of instructor. Topics focused on contemporary Japan. Themes centering on defining Japan today in its future and past such as through its urban society, trends in architecture, “soft power” industries, and “traditional” elements as mainstays of Japan’s cultural currency. GE credit: ArtHum | AH, WC. —Sorensen

141. Introduction to Classical Japanese (4)
Lecture/discussion—4 hours. Prerequisite: course 113 or equivalent language proficiency. The basic features of classical Japanese grammar through careful reading of selected literary texts such as Hojoki or Tsurezuregusa. —Sorensen

151. Japanese Linguistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 3 or equivalent language proficiency. Introduction to Japanese linguistics, featuring key aspects of the Japanese language. Analysis of Japanese from the perspectives of phonology, syntax, discourse analysis, sociolinguistics, and psycholinguistics. GE credit: ArtHum, Div, Wrt | AH, WC, WE. —Koyama

152. Traditional Japanese Drama (4)
Lecture—3 hours; discussion—1 hour. Survey in English of Japanese dramatic forms: nō, kyōgen, 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, Wrt | AH, WC, WE. —Koyama

153. Love, Sexuality and the Family in Modern Japanese Literature (4)
Lecture—3 hours; discussion—1 hour. Modern Japanese literature from the late 19th century to the present with a focus on love and sexuality in various forms, particularly as understood through the evolving institution of the Japanese family. Lectures, readings, and discussions in English. GE credit: AH, WC, WE. —W. (W.)

154. Tourism and Heritage in Japan (4)
Lecture—3 hours; discussion—1 hour. Focus on related concepts of tourism and cultural heritage within Japan, with attention to questions of tradition, authenticity and nostalgia. Examination of cultural heritage sites on various scales, including built environment, national cultural forms, and local performances such as festivals. GE credit: AH, WC, WE. —S. (S.)

155. Introduction to Japanese Folklore (4)
Lecture—3 hours; discussion—1 hour. Focus on narrative genres of myth, legend, and folklore, with additional attention paid to folk tales, folk art, belief systems, and the development of folklore studies (minzokugaku) as an academic discipline. Examination of the relationship of folklore to ethnic and national identity. GE credit: AH, WC, WE. —W. (W.)

156. Japanese Literature on Film (4)
Lecture/discussion—3 hours; film viewing—3 hours. Survey of films based on works of Japanese literature, emphasis on pre-modern and early modern texts. Introduction to major directors of Japanese film with a focus on cinematic adaptation. Lectures and readings in English. Films in Japanese with English subtitles. (Same course as Cinema and Technocultural Studies 148B) Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE. —S. (S.)

Sorensen
157. Japanese Women Writers (4)
Lecture/discussion—4 hours. Survey of women writers from earliest times to the present. Genres include poetry, prose, fiction, short stories, novels, and film. Representative authors include Murasaki Shikibu, Sei Shōnagon, Higuchi Ichiyō, Enchi Fumiko, Ogawa Yūko. Readings and discussion in English. GE credit: ArtHum | AH, WC, WE — F. W. Sorensen

158. The Supernatural in Japan (4)
Lecture—3 hours; Film Viewing—3 hours. Depictions of the supernatural in Japanese history through contemporary. Overview of Japanese literary and visual arts and the socio-historical contexts of the supernatural. Lectures and readings in English with English subtitles. Offered irregularly. GE credit: ArtHum | AH, VL, WC — Sorensen

192. Japanese Internship (1-12)
Internship—3-36 hours to be arranged. Work experience in Japanese language, with analytical term paper on a topic approved by instructor. (P/NP grading only.) — F. W. S. (F. W. S.)

194H, Special Study for Honors Students (1-5)
Independent Study—3-15 hours. Prerequisite: senior standing and qualification for the Japanese honors program; consent of instructor. Guided research, under the direction of a faculty member, leading to a senior honors thesis on a topic in Japanese literature, civilization, or philosophy. May be repeated up to eight units for credit. (P/NP grading only.) GE credit: ArtHum | AH, WC, WE — F, W. S. (F, W. S.)

197. Tutoring in Japanese (1-5)
Tutoring—1.5 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)
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: AH, WC, F. W. S. (F, W. S.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only) GE credit: AH, WC

Graduate

291. Seminar in Modern Japanese Literature: Major Writers (4)
Seminar—4 hours. Prerequisite: one of courses 130, 131, 132, 133, 134, 135, 136, 137, 138 or equivalent language proficiency. In-depth reading and discussion of major works by and critical literature on one or two prominent modern or contemporary writers such as Natsume Soseki, Mori Ogi, Shimazaki Toson, Akutagawa Ryunosuke, Tanizaki Junichiro, Kusama Yayoi, and Oe Kenzaburo. Offered in alternate years. — S. Chang

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only)

East Asian Studies

[College of Letters and Science]
Katharine Burnett, Ph.D., Program Director
Program Office, 1277 Social Science and Humanities Building; 530-752-3406; http://eastasian.ucdavis.edu

Committee in Charge
Katharine Burnett, Ph.D., Associate Professor (History)
Beverly Bossler, Ph.D., Professor (History)
David Gundry, Ph.D., Assistant Professor (East Asian Languages & Cultures)
Kyu Hyun Kim, Ph.D., Associate Professor (History)
Sheldon Lu, Ph.D., Professor (Comparative Literature)
Elhanen Schneir, Ph.D., Professor (Political Science)
Xiaoliang Shu, Ph.D., Professor (Sociology)

Eddy U, Ph.D., Associate Professor (Sociology)
Li Zhang, Ph.D., Professor (Anthropology)

The Major Program

The East Asian Studies major gives the student an understanding of East Asia and Southeast Asia through the study of East Asian or Southeast Asian civilization. The Program offers core courses in East Asian humanities and social sciences, including history, comparative literature, languages, philosophy and religion, political science, sociology, as well as courses on Southeast Asia. Science courses that closely engage the student of East and/or Southeast Asia are also eligible to count towards the major.

Along with taking the lower division and upper division subject depth courses, the student may choose additional courses that concentrate on a special field of interest, such as anthropology or history, or special courses such as honor thesis, independent study, internships, and study abroad.

Programs, Internship, and Career Alternatives. To enhance the student’s understanding of East and Southeast Asia, our majors are strongly encouraged to participate in UC Davis’s Study Abroad Program, which gives students the opportunity to live and experience a culture within East or Southeast Asia. Our majors are also encouraged to work with UC Davis’s Internship and Career Center, which provides customized assistance for EAS students to obtain legal, governmental, or business internships and careers. Likewise, the UC Davis Sacramento and Washington Centers arrange internships and run full credit academic programs in Sacramento and Washington D.C., with a wide range of opportunities for our majors. Graduating EAS majors are prepared for employment in government agencies such as Foreign Service, state agencies, international or non-governmental organizations (NGO, such as the United Nations), foundations, journalism, teaching, counseling, and compensation with interest in political, social, or economic studies.

194. Special Study for Honors Students (1-5)
Choose any five upper division courses from the Depth Subject list for the major, or from the following list: Any Chinese or Japanese upper division course; Any Asian Studies special course (Approved: East Asian Studies 190, 192, 194H, 196A/B, 198); Study Abroad Upper Division courses focusing on East or Southeast Asia

Courses in East Asian Studies (EAS) Lower Division

88. Korean Society: Late 19th Century to the Present (4)
Lecture/discussion—4 hours. Modern Korean society and culture from 19th to 20th century and on, emphasizing the perseverance and transformations of traditional social and cultural patterns. GE credit: ArtHum, Div. Wrt. — W. Kim

Upper Division

113. Cinema and Society in China (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course from History 190C, 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. Film topics from 1930s to today. Not open for credit to students who have completed Chinese 113. GE credit: ArtHum, Div. Wrt. — S. (S.)

190. East Asian Studies Seminar (4)
Seminar—3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Allied courses in Political, social, and cultural issues in East Asia. Topic varies each year. May be repeated for credit if topics differ. Offered: Odd years.

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.)

194H. 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. Honors Seminar (4)
Seminar—2 hours; conference—2 hours. Prerequisite: GPA of 3.500 in the major; senior standing; 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.) — F. (F)

196B. Honors Seminar (4)
Seminar—2 hours; conference—2 hours. Prerequisite: GPA of 3.500 in the major; senior standing; consent of instructor. A two-quarter research project culminating in an Honors thesis. A grade of B or
Ecological Management and Restoration

(Doctor of Environmental Science and Policy)

The major is designed for students who are interested in understanding how to manage and restore natural environments. It is a terminal degree program for students who aspire to careers in ecological restoration, environmental consulting, or policy. The program provides depth in the ecological and biological sciences directed toward an integrated understanding of how natural systems and ecosystems function and how this knowledge can help in their management and restoration. Coursework in environmental policy and law exposes students to the social drivers and constraints of ecosystem management. All students gain practical experience through practical field courses and an internship. Students may also pursue an Honors thesis in their senior year.

Workbook Subject Matter..................................................49-58
Biological Sciences 2A, 2B, 2C ................................. 15
Chemistry 2A, 2B .................................................. 10
Physics 1A, 1B, or Physics 7A, 7B .......................... 7
Mathematics 16A, 16B, 17A, 17B ........................... 6-12
Plant Sciences 100 .................................................. 4
Plant Sciences 101 .................................................. 5
Soil Science 120 .................................................. 3-4

Depth Subject Matter.....................................................54-69
Environmental Horticulture 160, 160L ...................... 10
Soil Science 102 or 111 or 118 or 120 .......................... 3-5
Two ecology courses chosen from:
Environmental Science and Policy 155, Plant Biology 17, Plant Sciences 131, 144, 147
Wildlife, Fish, and Conservation Biology 156, 157 .................................................. 5-8
Evolution and Ecology 100 or Plant Biology 102 or 116 .................................................. 4-5
Plant Sciences 152 or Environmental Horticulture 150 .................................................. 3-4
Four restoration/conservation courses chosen from:
Plant Sciences 130, 135, 150, Environmental Science and Management 141,
Affiliated Faculty

William Bennett, Ph.D., Associate Research Ecologist (John Muir Institute of the Environment)
Richard E. Cannon, Ph.D., Assistant Adjunct Professor (Met Met)
Edwin DeHaven Grosholz, Ph.D., Professor, Cooperative Extension Specialist (Environmental Science and Policy)
Richard Y. Evans, Ph.D., Extension Specialist (Plant Sciences)
Erika Fleshman, Ph.D., Researcher (Environmental Science and Policy)
Elise Gornish, Ph.D., Assistant Adjunct Professor, Cooperative Extension (Plant Sciences)
Joshua M. Hall, Ph.D., Assistant Adjunct Professor (Animal Science)
Peter Klimley, Ph.D., Adjunct Professor, Associate Research Biologist (Biogeo Marine Laboratory)
Beverly May, Ph.D., Adjunct Professor (Animal Science)
A. Keith Miller, Ph.D., Adjunct Professor (Wildlife, Fish, and Conservation Biology)
Malcolm North, Ph.D., Research Associate (Plant Sciences)
Lorentz Oki, Ph.D., Assistant Specialist in Cooperative Extension (Plant Sciences)
Leslie Roche, Ph.D., Assistant Specialist in Cooperative Extension (Plant Sciences)
Ben Sacks, Ph.D., Associate Adjunct Professor (Vegetation, Health, and Reproduction)
Hugh Safford, Ph.D., Associate-in-Residence (Environment and Policy)
Samuel Sandoval, Ph.D., Assistant Specialist in Cooperative Extension (Land and Water Resources)
Andrea Schreier, Ph.D., Adjunct Assistant Professor (Animal Science)
Kenneth W. Tate, Ph.D., Cooperative Extension Specialist (Plant Sciences)
Swee Teh, Ph.D., Associate Research Toxicologist/Pathologist (Anatomy, Physiology and Cell Biology)
Lisa C. Thompson, Ph.D., Assistant Specialist in Cooperative Extension (Wildlife, Fish, and Conservation Biology)
Minghua Zhang, Ph.D., Associate Adjunct Professor (Land, Air and Water Resources)

Graduate Study. The Graduate Group in Ecology offers the M.S. and Ph.D. degrees. Ecology is a science that integrates numerous fields of study to attain deep understanding of natural and societal influences on the distribution, abundances, behaviors, traits, and ecosystem functions of organisms. In order to accommodate varied student interests, the Group has developed several ‘areas of emphasis’ with specialized programs of study: agricultural ecology, conservation biology, ecosystems and land-scape ecology, environmental policy and human ecology, integrative ecology, marine ecology, physiological ecology and restoration ecology. For further details, contact the Group office.

Preparation. Appropriate preparation is under-graduate work in any of the biological, social or behavioral, and physical sciences, mathematics or engineering. Applicants will normally be expected to have completed the following courses during the undergraduate years or shortly after matriculating: two courses each in introductory biology, general chemistry and physical science; one course each in calculus, an upper division introduction to ecology course and introductory statistics. Students that choose the environmental policy and human ecology area of emphasis are only required to complete one course in general chemistry. They may also substitute one quantitative course in social science such as micro- or macro-economics for one chemistry or physics requirement.


Courses in Ecology (ECL)

Graduate

203. Physiological Ecology (3) Lecture—3 hours. Prerequisite: Evolution and Ecology 101, Mathematics 21A-21B or consent of instructor; Mathematics 228 recommended. Review of major concepts of population ecology and community ecology, with emphasis on the rationale of theory and use of theory as applied in the ecology of natural and managed systems. Offered in alternate years.—F. (F.)

204. Population and Community Ecology (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Evolution and Ecology 101, Mathematics 21A-21B or consent of instructor; Mathematics 228 recommended. Review of major concepts of population ecology and community ecology, with emphasis on the rationale of theory and use of theory as applied in the ecology of natural and managed systems. Offered in alternate years.—F. (F.)

205. Community Ecology (4) Lecture—2 hours, discussion—2 hours. Prerequisite: an upper-division course in population ecology. Introduction to literature and contemporary research into processes structuring ecological communities. —W. (W.) Kar, Lavelle

206. Concepts and Methods in Plant Community Ecology (4) Lecture—3 hours, laboratory—4 hours. Prerequisite: introductory courses in statistics and plant ecology; consent of instructor. Principles and techniques of vegetation analysis, including structure, composition, and dynamics. Emphasis given to sampling procedures, association analysis, ordination, processes and mechanisms of succession, and classification. Most techniques are demonstrated or conducted during field trips and laboratories. Offered in alternate years.—F. (F.) Rejmank

207. Plant Population Biology (3) Lecture—2 hours, laboratory/discussion—1 hour. Prerequisite: an upper-division course in population ecology. Course will emphasize reading and discussing primary literature. Specific topics will reflect the research interests of UC Davis conservation biology. Offered in alternate years.—W. (W.)

208. Issues in Conservation Biology (4) Lecture—3 hours, discussion—1 hour. Prerequisite: introductory biology (e.g., Biological Sciences 2B) and an upper division organismal biology class. Graduate-level introduction to current research in conservation biology. Course will emphasize reading and discussing primary literature. Specific topics will reflect the research interests of UC Davis conservation biology. Offered in alternate years.—W. (W.)

210N. Environmental Policy and Human Ecology (4) Lecture—3 hours; term paper. Prerequisite: graduate standing in Anthropology, Ecology, Political Science, Sociology Graduate Groups, or consent of instructor. Principles drawn from social science, ecology and evolution to study of human populations and behavior, emphasizing environmental/resource issues. These principles form a synthetic framework that articulates elements drawn from the social sciences as well as biology. Offered in alternate years.—W. (W.) Lubell, M. McElreath

211. Advanced Topics in Cultural Ecology (4) Lecture/discussion—3 hours; term paper. Prerequisite: Environmental Science and Policy 133/Anthro-pology 133 and graduate standing in Ecology or
Anthropology. Topics of current analytical and methodological importance in cultural ecology. Examination of current cultural ecological theory and study of human response to and influences on climate. (Same course as Anthropology 211.) Offered in alternate years. —F. McElreath

212A. Environmental Policy Process (4) Lecture—1 hour; 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 161]; course in statistics [e.g., Sociology 106 or Agricultural and Resource Economics 106]. Introduction to selected topics in the policy process, applications to the California environmental policy. Development of critical reading skills, understanding of frameworks of the policy process and political behavior, and an ability to apply multiple frameworks to the same phenomena. (Same course as Environmental Science and Policy 212A.) Offered in alternate years. —(F, S) Lubell

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]; Agricutural and Resource Economics 176. Methods of evaluation and analysis of environmental policy. Introduction to chosen policy area and selected topics in the policy process. Methods of policy analysis; 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. —(W, S) Springborn

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 scarcity and 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. —S

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 population ecology. Experiences in evolution and genetics, and consent of instructor; survey course in marine ecology recommended. Critical review and analysis of concepts and practices in modern marine ecology. Topics will be from several fields of study including oceanography, evolution, behavior, and physiology. Emphasis on critical thinking, problem solving, and hands-on study. Field trips required. —(F, S) Morgan, Williams

216. Ecology and Agriculture (4) Lecture—3 hours; term paper. Prerequisite: Evolution and Ecology 110 or consent of instructor. Ecological principles as relevant to agriculture. Integration of ecological approaches into agricultural research to increase ecosystem function and services. Topics include crop autecology, biotic interactions among crops and pests, ecosystem and landscape ecology. Not open to students who have completed Vegetable Crops 216 (Former course Vegetable Crops 216). Offered in alternate years. —F Jackson

219. Ecosystem Biogeochemistry (4) Lecture—3 hours; laboratory/discussion—2 hours. Prerequisite: introductory courses in ecology, biology, and soils are recommended; undergraduates accepted with consent of instructor. Multidisciplinary analysis of energy and nutrient transfers within terrestrial ecosystems. Examination of processes and interaction in and between different ecosystems. (Same course as Soil Science 219.) Offered in alternate years. —S. Houlton

225. Terrestrial Field Ecology (4) Seminar—1 hour; field work—12 hours. Prerequisite: introductory ecology. Field collection and analysis of data from field sites conducted over spring break and four weekends at Bodega Bay, emphasizing student projects. Ecological hypothesis testing through analysis, and written and oral presentation of results will be stressed. (Same course as Entomology 225/Population Biology 225.) —S. Karban

231. Mathematical Methods in Population Biology (3) Lecture—3 hours. Prerequisite: Mathematics 160C 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 models are stressed. (Same course as Population Biology 231.) —F. Hastings

232. Theoretical Ecology (3) Lecture—3 hours. Prerequisite: course 204 or the equivalent, and Mathematics 160C or 21C, or one of courses 100 or 121 or Evolution and Ecology 101, and strong mathematics background (Mathematics 22A-22B-22C or the equivalent). Examination of major conceptual and methodological issues in theoretical ecology. Current models of ecological development will be emphasized. Topics will vary from year to year. May be repeated for credit. Offered in alternate years. —(W) Hastings

233. Computational Methods in Population Biology (4) Lecture—laboratory—2 hours; discussion/laboratory—1 hour. Prerequisite: A course in theoretical ecology (e.g., course 231) or an equivalent to Environmental Science and Policy 121 from your under-graduate institution) or consent of instructor; no programming experience required. Numerical methods for simulating population dynamics using the computational software package R. Emphasis placed on model formulation and development, theoretical concepts and philosophical principles to guide simulation efforts, model parameterization, and implementation. (Same course as Population Biology 233.) Offered in alternate years. (S/U grading only.) —W. Baskett, Schreiber

242. Ecological Genetics: Applied Genetics for Ecology, Health, and Conservation of Natural Populations (3) Lecture—2 hours; discussion—0.5 hours; laboratory—0.5 hours. Prerequisite: undergraduate genetics and ecology/conervation biology courses recommended. Introduction to the field of applied ecological genetics and the applications in conservation ecology, population genetics, population biology, wildlife health and disease ecology. (Same course as Population Health and Reproduction 242.) —F.

243. Ecological Genomics (4) Lecture/discussion—3 hours; term paper or discussion. Prerequisite: course 242, or equivalent training in ecology and genetics according to the discretion of the instructors. Genomics concepts, technologies, and analyses for ecology research. Mixure of lecture, discussion of recent literature, hands-on training in data analysis and experimental research proposal preparation and evaluation. One all-day field trip is required. —W. (W) Miller, Ross-Whitehead

245. Climate Change, Water and Society (4) Lecture—3 hours. Class limited to 25 students. Integration of climate science and hydrology with policy to understand hydroclimatology and its impact upon natural and human systems. Assignments include readings, take-home examination on climate and hydrologic science, paper that integrates course concepts into a research prospectus or review article. (Same course as Hydrologic Science 245 and Atmospheric Science 245.) —F (F) Fogg, Lubell, Ullrich

262. Advanced Population Dynamics (3) Lecture—3 hours. Prerequisite: graduate standing; advanced course in ecology [e.g., Evolution and Ecology 101], population dynamics [e.g., Wildlife, Fish, and Conservation Biology 122], and one year of calculus; familiarity with matrix algebra and partial differential equations recommended. Logical basis for population models, evaluation of simple 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. (Same course as Wildlife, Fish, and Conservation Biology 262.) Offered irregularly. —W. (W) Botsford

271. Research Conference in Ecology (1) Seminar—1 hour; Prerequisite: consent of instructor. Critical presentation and evaluation of current literature and ongoing research in ecology. Requirements include active participation in weekly discussions and the presentation of a paper or chapter once per quarter. May be repeated for credit. (Same course as Population Biology 271.) (S/U grading only.) —F, W, S, (F, W, S) Schoener, Schreiber

280. Current Anthropology Journal Editorial Workshop (4) Workshop—1 hour; independent study—3 hours. Prerequisite: consent of instructor. 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 in anthropology and human ecology. Track and edit published comments and authors’ replies that accompany manuscripts. Participation 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 Anthropology 280.) May be repeated for 12 units of credit with consent of instructor. (S/U grading only.) —F, W, S, (F, W, S)

290. Seminar in Ecology (1-4) Seminar—1 hour; Prerequisite: consent of instructor. Topics in ecology. Students are expected to attend an oral seminar on a particular aspect of the general topic under consideration. (S/U grading only.) —F, W, S, (F, W, S)

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 296.) (S/U grading only.) —F, W, S, (F, W, S)

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, and 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

In 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 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:

Preparatory Subject Matter.................. 17-20
Economics 1A-B.............................. 8
Statistics 13, 32, or 102................... 3-4
Mathematics 18, 21A-21B.................. 6-8

Depth Subject Matter........................... 44
Economics 100, 101.......................... 8
Economics 102............................... 4

Choose one specialization below:

General
One course from: Economics 110A, 110B, 111A, 111B........ 4
Select 4 courses from:
Additional upper division Economics courses........................... 12

Policy
One course from: Economics 110A, 110B, 111A, 111B........ 4
Economics 121A or 122.......................... 4
Select 2 courses from:
Additional upper division Economics courses........................... 12
Specialization: Behavior and Strategy
One course from:
Economics 110A, 110B, 111A, 111B........ 4
Economics 121A or 122.......................... 4
Select 2 courses from:
Additional upper division Economics courses........................... 12
Specialization: Data Analytics and Economics Analysis
One course from:
Economics 110A, 110B, 111A, 111B........ 4
Economics 140............................... 4
Select 2 courses from:
Economics 103, 106, 122, and either 132 or 145............... 8
Select 1 course from:
Additional upper division Economics courses........................... 12
Specialization: International Macro-Finance
One course from:
Economics 110A, 110B, 111A, 111B........ 4
Select 3 courses from:
Select 3 courses from:
Additional upper division Economics courses........................... 12
Specialization: Policy
One course from:
Economics 110A, 110B, 111A, 111B........ 4
Select 3 courses from:
Economics 125, 130, 131, 145, 151A, 151B, 160A.......................... 12
Select 1 course from:
Select 4 units from upper division Economics courses.................... 4

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

Preparation:

Economics 100, 101.......................... 8
Select 4 units from upper division Economics courses.................... 4

Minor Program Requirements:

Economics.............................................20
Economics 100, 101.......................... 8
Select 4 units from upper division Economics courses.................... 4

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 before taking Economics 100 and 101. Students need to complete Economics 100 and 101 before the advanced courses.

Course Limits. Except under extraordinary circumstances, not more than two economics courses should be taken in any one quarter. In special cases, the department will accept a limited number of related upper division courses, if these courses, and department 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 3.50 grade point average in these courses, and attain at least eight units of work that in the submission of an Honors project. Consult 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 a department of economics (including Economics 100 and 101) may be used towards the completion of the degree. To ensure that foreign courses will apply towards the economics degree, students need to select courses from the pre-approved list at the UC Davis Study Abroad office or seek pre-approval in the economics department for the foreign courses they wish to complete.


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

1A. Principles of Microeconomics (4)
Lecture—3 hours; discussion—1 hour. Course 1A and 1B may be taken in either order. Analysis of the allocation of resources and the distribution of income through a price system; competition and monopoly; the distribution of income and the allocation of factors of production. GE credit: SocSci|ACGH, QL, SS.—F, W, S. (F, W, S) 1B. Principles of Macroeconomics (4)
Lecture—3 hours; discussion—1 hour. Course 1A and 1B may be taken in either order. Analysis of the economy as a whole; determinants of the level of income, employment and prices; money and banking, economic fluctuations, international trade, economic development: the role of public policy. GE credit: GE credit: SocSci|ACGH, QL, SS.—F, W, S. (F, W, S) 90X. Lower Division Seminar (1-2)
Seminar—1-2 hours. Prerequisite: lower division standing and consent of instructor. Limited enrollment. Examination of a special topic in Economics through shared readings, discussions, and written assignments. May not be repeated for credit.

92. Internship and Field Work (1-12)
Internship—3-36 hours; term paper. Prerequisite: junior or senior standing; availability of internship position or approved field work project; stock-broker internships have must completed Management

11A-11B, consent of instructor. Intensive study of practical application of selected concepts in economics, stressing research methods and empirical analysis. (P/NP grading only.)

98. Group Study for Undergraduates (1-5)
Prerequisite: consent of instructor. Primarily for lower division students. (P/NP grading only.)

99. Individual Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division

100. Intermediate Micro Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A-1B and Mathematics 16A-16B or Mathematics 17A-17B or Mathematics 21A-21B, with a grade of C- or better in each course. Price and distribution theory under conditions of perfect and imperfect competition. General equilibrium and welfare economics. Not open for credit to students who have completed course 110A or 100B. —F, W, S. (F, W, S) 101. Intermediate Macro Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A-1B and Mathematics 16A-16B or Mathematics 17A-17B or Mathematics 21A-21B, with a grade of C- or better in each course. Theory of income, employment and prices under static and dynamic conditions, and long term growth. —F, W, S. (F, W, S)

102. Analysis of Economic Data (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A, 1B, Statistics 13 or 32, Mathematics 16A-16B or 21A-21B, with grade of C- or better in each, or consent of instructor. Analysis of economic data to investigate key relationships emphasized in introductory microeconomics and macroeconomics. Obtaining, transforming, and displaying data; statistical analysis of economic data; and basic univariate and multivariate regression analysis. Only 2 units of credit allowed to students who have completed course 140A or 106. GE credit: VL.—F, W, S. (F, W, S)

103. Economics of Uncertainty and Information (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Agricultural and Resource Economics 100A and 100B; Mathematics 16A or 16B or Mathematics 17A and 17B or Mathematics 21A and 21B. Optimal decisions under uncertainty, expected utility theory, economics of insurance, asymmetric information in the job market, incentives and Principal-Agent theory, optimal search strategies and the reservation price principle. —F, W, S. (F, W, S) 106. Decision Making (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 1A-1B or 10. 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, Polynesia, and Pre-Columbian America. GE credit: SocSci| SS.—F, W, S. (F, W, S) 110A. World Economic History Before the Industrial Revolution (4)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 1A and 1B, or consent of instructor. 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, Polynesia, and Pre-Columbian America. GE credit: SocSci| SS.—F, W, S. (F, W, S) 110B. World Economic History Since the Industrial Revolution (4)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 1A and 1B, or consent of instructor. 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| SS.—F, W, S. (F, W, S) 111A. Economic History (4)
Lecture—3 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; references to economic trends in the Western Hemisphere. GE credit: SocSci| SS.—F, W, S. (F, W, S) 111B. Economic History (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A-1B, or consent of instructor. Survey of economic change in the United States from 1865 to the post World War II era. GE credit: SocSci| SS.—F, W, S. 115A. Economic Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A and 1B. Major issues encountered in emerging from international poverty, including problems of growth and structural change, human welfare, population growth and health, labor markets and international migration. Important issues of policy concern international trade and industrialization. (Same course as Agricultural and Resource Economics 115A.) GE credit: SocSci, Div| SS, WC. 115B. Economic Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A and 1B. Major issues and policy issues of developing countries. Issues include problems in generating capital, conduct of monetary and fiscal policies, foreign aid and investment. Important issues of policy concern international capital flows and external debt of developing countries. (Same course as Agricultural and Resource Economics 115B.) GE credit: SocSci| SS, WC.—F, W, S. 116. Comparative Economic Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Agricultural and Resource Economics 100A and 100B; Mathematics 16A or 16B or Mathematics 17A and 17B or Mathematics 21A and 21B. Optimization solutions to uncertainty, expected utility theory, economics of insurance, asymmetric information in the job market, incentives and Principal-Agent theory, optimal search strategies and the reservation price principle. —F, W, S. (F, W, S) 121A. Industrial Organization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A-1B; 100 or Agricultural and Resource Economics 100A-100B, or consent of the 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: Econ.—F, W, S. (F, W, S) 121B. Industrial Organization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A, 1B, 100 or Agricultural and Resource Economics 100A and 100B, or consent of instructor. Theory of antitrust and government regulation. Emphasis on applying theoretical models to U.S. industries and case studies, including telecommunications, software, and electricity markets. Topics include natural monopoly and the actual regulatory mechanisms, deregulation, mergers, predatory pricing, and monopolization. GE credit: Econ.—F, W, S. (F, W, S) 122. Theory of Games and Strategic Behavior (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16A and 16B or 17A and 17B or 21A and 21B or consent of instructor. Introduction to game theory. Explanation of the behavior of rational individuals in interacting situations, conflict and actual conflict. Examples include non-cooperative and cooperative theory. Applications to economics, political science and other fields.

125. Efficiency in Energy Markets (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A-1B; 100 or Agricultural and Resource Economics 100A and 100B, or consent of instructor; intended for advanced economics undergraduates. Pass One or Economics, and Graduate School of Management majors. Application of theoretical and empirical models to examine efficiency in energy
140. Econometrics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or (Agricultural and Resource Economics 100A and 100B), or consent of instructor. Linear models, including econometric inference; classical hypothesis testing, linear regression models, and instrumental variables regression, as applied to economic data and real-world applications; e.g., California electricity crisis.

130. Public Microeconomics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Agricultural and Resource Economics 100A and 100B; or consent of instructor. Public expenditures; theory and applications. Efficiency and equity of competitive markets; externalities, public goods, and market failures; positive and normative aspects of government expenditure, including benefit-cost analysis. Topics include consumer protection, pollution, education, poverty and crime.

131. Public Finance (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Agricultural and Resource Economics 100A and 100B. Economic burden of taxation; equity and efficiency considerations in tax design; structure of the federal and state tax systems including personal income tax, corporation income tax, and property tax; tax loopholes; recent developments, tax reform proposals. Offered irregularly.

132. Health Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Agricultural and Resource Economics 100A and 100B; one course from list: course 102, course 140, Agricultural and Resource Economics 106 or 108; 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, the role of government access to health care. W. (W/ H) Cameron

133Y. Poverty, Inequality and Public Policy (4)
Web virtual lecture—2 hours; discussion—2 hours. Prerequisite: course 1A or 1B. Class size limited to 99; 3 sections of 33 each. Examination of the economics of poverty and inequality in the United States, including measurement, trends, and related policies. — Stevens

134. Financial Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A, 1B, and (100 or Agricultural and Resource Economics 100A and 100B); Mathematics 16A or 17A or 21A; Statistics 13. General background and rationale of corporation; finance as resource allocation over time; decision making under uncertainty and the role of information; capital market and structure; financial decisions. Students who have completed Agricultural and Resource Economics 171A may not receive credit for this course.

135. Money, Banks and Financial Institutions (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or (Agricultural and Resource Economics 100A and 100B), course 101; Statistics 13. Banks and the banking system, monetary policy and the money supply, liquidity; the role and responsibility of government in the economy.

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 macroeconomics. Possible topics include, business cycle theories, growth theory, monetary economics, political economics and theories of unemployment and inflation.

137. Macroeconomic Policy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or (Agricultural and Resource Economics 100A and 100B), course 101; Statistics 13. Theory and practice of macroeconomic policy, both monetary and fiscal.

140. Econometrics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 102, or consent of instructor. Mathematics 16A or 16B or Mathematics 21A and 21B; Statistics 13, or any upper division Statistics course. Topics in statistical evidence, estimation and hypothesis testing in economic theory, study of the theory and application of linear regression models. Critical evaluation of selected examples of empirical research. Exercises in applied econometrics. Not open for credit to students who have completed Agricultural and Resource Economics 106.

145. Transportation Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or (Agricultural and Resource Economics 100A, 100B); Mathematics 16A or 16B or (170A, 178B). Statistics 13, course 102, 140, Agricultural and Resource Economics 106 or Statistics 108, or consent of instructor. Intended for advanced Economists undergraduates. Examination of fundamental problems of planning and financing transportation "infrastructure." regulated public goods, including natural monopolies such as roads, ports, airports. The economics of the automobile industry, as well as the impact of government regulation and deregulation in the air and trucking industries. Offered irregularly.

151A. Economics of the Labor Market (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Agricultural and Resource Economics 100A and 100B. Theory and empirical analysis of the labor market. Real wages and demand; determination of wages and employment in the labor market. Policy issues: labor force participation by married women; minimum wages and youth unemployment; effect of unions on wages.

151B. Economics of Human Resources (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Agricultural and Resource Economics 100A and 100B. Human resource analysis; introduction to human resources economics of education; the basic theory of wage differentials, including theories of labor market discrimination; income distribution; poverty; Policy issues; negative income tax; manpower training programs; income policy.

152. Economics of Education (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or (Agricultural and Resource Economics 100A and 100B), course 102; Mathematics 16B or 17B or 21B; Statistics 13 or 32, with grade of C- or better in each course, or consent of the instructor. Application of theoretical and empirical tools of economics to the education sector. Demand for Education; Education Financing; Market Structures in Education. Policy applications: class size reduction, school finance equalization, accountability, and school choice.

160A. International Microeconomics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Agricultural and Resource Economics 100A and 100B, or consent of instructor. International grade theory: impact of trade on the domestic and world prices. Special emphasis on international trade and external trade. Only two units of credit allowed to students who have completed course 162.

160B. International Macroeconomics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or (Agricultural and Resource Economics 100A and 100B), course 101, or consent of instructor. Balance of payments adjustment policy. Role of macroeconomic conditions in the balance of payments; exchange rate. Policy toward international capital migration and investment. Emphasis on current policy issues. Credit will not be given for both courses 160A and 160B; one course may be repeated for credit.

162. International Economic Relations (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A, 1B, 100 or Agricultural and Resource Economics 100A and 100B, or consent of instructor. International trade and monetary relations, trade policy, exchange rate policy, policies toward international capital migration and investment. Emphasis on current policy issues. Credit will not be given for both courses 162 and 160A; one course may be repeated for credit.

171. Economy of East Asia (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 1A-1B or consent of instructor. Intensive reading, discussion and research. Selected topics from the economies of the countries of East Asia. Consult department for course scheduling.

190. Topics in Economics (4)
Lecture/discussion—3 hours; discussion—1 hour. Prerequisite: consent of instructor. Selected topics in economic analysis and political analysis. Public variable. May be repeated for credit.

190X. Upper Division Seminar (1-4)
Seminar—1-4 hours. Prerequisite: courses 100 and 101, and consent of the instructor. Independent examination of an advanced level seminar in economics. Emphasis on focused analytical work.

192. Internship (1-6)
Internship—3-18 hours. Prerequisite: upper division standing; consent of instructor. Internship experience off and on campus in all subject areas offered in the Department of Economics. Supervised by a member of the staff. May be repeated for credit. (P/NP grading only.) GE credit: SE.

194HA. Special Study for Honors Students (4)
Independent study—3 hours; seminar—1 hour. Prerequisite: 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 culminating in the writing of a senior honors thesis under the direction of a faculty advisor. (Deferred grading only, pending completion of course.)

194HB. Special Study for Honors Students (4)
Independent study—3 hours; seminar—1 hour. Prerequisite: 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 culminating in the writing of a senior honors thesis under the direction of a faculty advisor. Offered only, pending completion of course.

197T. Tutoring in Economics (1-5)
Tutorial—3-15 hours. Prerequisite: consent of instructor and consent of the department chair. Undergraduate internship in the writing of a senior honors thesis under the direction of a faculty advisor. Offered only, pending completion of course.

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

200A. Microeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: graduate standing. Linear and non-linear optimization theory applied to develop the theory of the profit-maximizing firm and the utility-maximizing consumer. (Same course as Agricultural and Resource Economics 200A.)

200B. Microeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: consent of instructor. Characteristics of market equilibrium under perfect competition, social monopoly and monopolopoly. Emphasis on general equilibrium and welfare economics; the sources of market success and market failure. (Same course as Agricultural and Resource Economics 200B.)

200C. Microeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: consent of instructor. Characteristics of market equilibrium under perfect competition, social monopoly and monopolopoly. Emphasis on general equilibrium and welfare economics; the sources of market success and market failure. (Same course as Agricultural and Resource Economics 200B.)

200D. Microeconomic Theory (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: consent of instructor. Characteristics of market equilibrium under perfect competition, social monopoly and monopolopoly. Emphasis on general equilibrium and welfare economics; the sources of market success and market failure. (Same course as Agricultural and Resource Economics 200B.)
21A. History of Economic Thought (4) Lecture—3 hours; discussion—1 hour. Economic thought from the classical Greek era to modern times. Offered in alternate years.

21B. 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. Advanced topics in general equilibrium, welfare economics: existence, determinacy, and efficiency; intertemporal economics; uncertainty.—W. (W.) 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. Main topics are: refinements of Nash equilibrium, repeated games, evolution and social situations, bounded rationality, and bargaining theory.—S. (S.) Schipper

203C. Topics in Economic Theory (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A or 204; course 214. Seminar topics in contemporary microeconomic theory. May be repeated for credit with the consent of the Graduate Studies Committee.

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.

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.

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.)—W. (W.) Meissner

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-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 Agricultural and Resource Economics 214.)

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. Agricultural 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.)

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 financial flows, capital flows and debts are discussed in the macroeconomic framework of an open developing country. The basic analytical focus is real exchange rate and its impact on sectoral allocations. Race course as Agricultural and Resource Economics 215B.)

216C. Microdevelopment Theory and Methods II (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 215A. Extension of microeconomic theory and microeconomic methods. Agricultural growth and technological change; poverty and income inequality; multi-sectoral, including village and regional models. Computable general equilibrium methods and applications. (Same course as Agricultural and Resource Economics 216C.)

215D. Environment and Economic Development (4) Lecture—3 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 environmental and economic development processes. Analysis of issues emerging at the interface of environmental and development economics. (Same course as Agricultural and Resource Economics 215D.) Offered irregularly.

211A. The Theory of Industrial Organization (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A, 200B, 200C. Game theory is used to analyze strategic interactions of firms in industries. Topics include models of competition, product differentiation, entry-deterring strategies, contractual arrangements, vertical control and antitrust issues. Offered irregularly.

211B. Empirical Analysis in Industrial Organization (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 221A and 240B. Recent empirical work in industrial organization. Topics include empirical analysis of cartels, product differentiation, innovation and technological change, and imperfect competition in international markets. Offered irregularly.

211C. 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 multiple output firms under symmetric and asymmetric information, competition without regulation, the economic theory of regulation, and empirical studies of regulation and deregulation.

230A. Public Economics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 200C. Measures 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 social programs and tax rates.

230B. Public Economics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 240A, 240B. Effects of government policies on economic behavior; labor supply; program participation; investment, consumption and savings. Offered irregularly.

230C. Public Economics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 200C and 240C. Advanced topics in economic policy analysis and its applicability to current research. Topics may vary from year to year.

235A. Macroeconomics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 200D or consent of instructor. Frontiers of applied/empirical macroeconomics. Economic and lessons from macroeconomic history for the Great Depression, financial crises, efficient markets, parity conditions, capital flows, financial crises, exchange rates, growth, and other current empirical research topics. —F. (F.) Taylor

235B. Macroeconomics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 200D or consent of instructor. Search theory, theory of real-world markets characterized by search frictions, with applications: labor economics; models of unemployment and wages differentials; Financial economics: determination of asset prices in OTC financial markets; Monetary Economics: foundations for money as a medium of exchange. —W. (W.) Geromichalos

235C. Macroeconomics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 200D or consent of instructor. Basic numerical methods for analytically tractable problems in economics. Techniques presented applicable in a wide range of fields including macroeconomics, resource economics, labor economics, economic theory, international trade, finance, game theory, public finance, contract theory, and others.—S. (S.) Herrekind

239. Econometric Foundations (4) Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing or consent of instructor. The course will prepare students for econometric theory and empirical work by providing 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 Agricultural & Resource Economics 239.)

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 model; linear restrictions; heteroskedasticity; autocorrelation; lagged dependent variables. (Same course as Agricultural and Resource Economics 240A.)

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 limited dependent variable models. (Same course as Agricultural and Resource Economics 240B.)

240C. Time Series Econometrics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: courses 240B or consent of instructor. Probability theory; estimation, inference and forecasting of time series models; trends and non-standard asymptotic theory; vector time series models and cointegration; time series models of higher order moments and transition data; state-space modeling and the Kalman filter. (Same course as Agricultural and Resource Economics 240C.)

240D. Cross Section Econometrics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 240B or consent of instructor. Estimation and inference for nonlinear regression models for cross-section data; models for discrete data and for limited dependent variables; maximum likelihood; additional topics such as bootstrap and semiparametric regression. (Same course as Agricultural and Resource Economics 240D.)

240E. Topics in Time Series Econometrics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 240C. Topics may vary from year to year. (Same course as Agricultural and Resource Economics 240E.) Offered irregularly.
250A. Labor Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A or 204. Theory of labor markets; union structure, organization and collective bargaining; theories of labor market formation and labor supply and demand; institutional and human capital theory; labor market analysis. — W. (WJ) Page

260A. International Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200A or 204. Theory of trade determinants; gains from trade; tariffs and effective protection; economic unions.

260B. International Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200D and 200E. Balance of payments and adjustment mechanisms; foreign exchange markets; theories of balance of payments policy and international monetary mechanisms. Offered irregularly.

260CN. International Investment and Trade (4)
Seminar—4 hours. Prerequisite: course 200A. Analysis of foreign investment and its link 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.

260D. Topics in International Macroeconomics (4)
Seminar—4 hours. Prerequisite: course 200B or consent of instructor. Survey of current literature in international macroeconomics. Offered irregularly.

260E. Topics in International Trade (4)
Seminar—4 hours. Prerequisite: course 200A, 200B. Current literature in international trade theory.

260F. International Macroeconomic Policy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200B. Theory and practice of international macroeconomic policy. Topics include exchange rate regimes, international financial institutions, crises and current topics.

270A. Economics of Growth (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200D. Modern theories and empirics of economic growth beginning with the neoclassical theories up to current endogenous growth models. Emphasis on the analysis of human capital and growth, technological innovation, its diffusion and empirical evidence on growth.

270B. Economics of Growth (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 200E. Empirical analysis of growth patterns and growth models. Emphasis on the relationship between macroeconomic management and economic growth; the use of foreign capital in accelerating growth and its occasional missteps; 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.

270C. Economics of Growth (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 200D and 200E. Institutional bases: politics, contracts and commitment; money and finance; matthysian dynamics; modern economic growth; transition of industrialization; dual economies, core and periphery; sources of convergence and divergence; openness and growth; resources, demography, and geography; institutions, imperialism, and class conflicts.

280. Orientation to Economic Research (2)
Discussion—2 hours. Course tries to bridge the gap between students' classroom work and their subsequent research. It deals with topics such as the origin 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: consent of instructor. Selected topics in economic analysis and public policy, focusing on current research. May be repeated for credit.

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.

296. Group Study (1-5)
Discussion—1-5 hours. Prerequisite: graduate standing in Economics. (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

390. Topics in Economics (4)
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.)

397. Teaching of Economics (2)
Discussion—1 hour. Prerequisite: consent of instructor. Teaching of economics: the teaching of economics, classroom management, classroom discipline, student evaluation, and the use of teaching and learning technologies. (S/U grading only.)

298. Group Study (1-5)
Prerequisite: graduate standing in Economics. (S/U grading only.)
Master of Arts in Education
Cynthia Carter Ching, Program Chair
Program Coordinator: 530-752-7259

Teacher Education-Credential
Cynthia Carter Ching, Program Chair
Rebecca Ambrose, Co-Director of Teacher Education
Christian Fallis, Co-Director of Teacher Education,
Associate Director of Teacher Education
Program Coordinator: 530-752-0758

Minor Program Requirements:
The UC Davis School of Education is committed to developing informed citizens and advocates for proactive educational environments in a democratic society. Education courses are designed for undergraduate students from all majors.

A Minor in Education will help students:
- Develop an understanding of the issues and concerns of public and private education
- Complete prerequisites for the teaching credential program
- Work towards a master’s degree or doctoral degree in education or related field
- Seek employment in policy, advocacy, or other education related careers

Courses. Students must complete 20 units the Minor program in Education. At least 12 units of the 20-unit minimum for the minor must be in Education. The remaining units for the minor may be in education or a related field as approved on the electives list.

Minor Program Requirements:

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<th>UNITS</th>
<th>Upper Division Required Courses</th>
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<td>Education 100, 110, 120………</td>
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<td>Elective Courses ………………..</td>
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The remaining eight units may be taken from the following courses:

Educational Agriculture 100…………….. 3
Chicana Studies 192…………….………… 1.3
Mathematics 197C……………….………… 1.5
University Writing Program 197C………… 2.4
American American and African Studies 130;
American Studies 152; Asian American Studies 101;
Biological Sciences 155A or B; Chicano Studies 132;
Economics 152; Human Development 100A, 108, 101;
Linguistics 173, 180; Psychology 130, 132, 141;
Sociology 124; Spanish 116, 117;
University Writing Program 10A………… 4
  * Internship (192, 195A or B, 195CTC, 197C, 198) and Independent Study 
  (199), or a combination of both, may not exceed a total of four units. Elective courses may include only one internship.

Minor Advisers. A designated faculty member in the School of Education may advise students and give final approval on the minor. For additional information contact the Student Services office in School of Education Building.

Courses in Education (EDU)

Lower Division

81. Learning in Science and Mathematics (2)
Lecture/discussion—2 hours; field work—2 hours. Limited to 26 students per section. Exploration of how students learn and develop understanding in science and mathematics classrooms. Introduction to case studies, development of teaching techniques and the use in K-6 classrooms to illuminate factors that affect student learning. (Same course as Geology 81.) (P/NP grading only.) GE credit: SS, VL, WE—F, W, S, (F, W, S) Latimer, Mendle, Stevenson

92. Internship (1-3)
Internship—3-9 hours. Prerequisite: consent of instructor. Enrollment dependent on availability of intern placements. Internship as a teacher’s aide 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. Primary: For lower division students. (P/NP grading only.)

Upper Division

100. Introduction to Schools (4)
Lecture—3 hours; field work—3 hours. Study of occupational concerns of teachers; skills for observing classroom activities; school organization and function; school reform movement; observing, aiding, and tutoring in schools. GE credit: ACGH, DD, OL, SS—F, W, S, (F, W, S) Ambrose, Fallis, Marti,
nez, Patterson, Tressler, Tonkovich

110. Educational Psychology: General (4)

114. Quantitative Methods in Educational Research (4)
Lecture/discussion—4 hours. Problems and methods in data analysis. Design of research projects. Some consideration of procedures suited to digital computers. GE credit: QL—F, (F) Martin

115. Educating Children with Disabilities (2)
Lecture—2 hours. Educational issues and processes involved in teaching children with disabilities. The course will focus on the structure of special education, with an emphasis on the educational needs of children who are mainstreamed in regular classes. GE credit: SocSci | SS—F, S, (F, S) Mundy, Solari

119. The Use and Misuse of Standardized Tests (4)

120. Philosophical and Social Foundations of Education (4)

121. Introduction to Education Policy Analysis: Tools, Methods and Frameworks (4)
Lecture—3 hours; discussion—1 hours. Introduces students to the field of education policy analysis with a specific emphasis on the quantitative frameworks and analytical tools drawn primarily from economics and statistics used to guide educational policymaking. GE credit: SocSci | QL, SS—F, W, S, (F, W, S)

122. Children, Learning and Material Culture (4)
Lecture/discussion—3 hours; extensive writing or discussion—1 hour; fieldwork. Prerequisite: consent of instructor. How material artifacts shape what and how children learn in school, at home, and in the community. Analyzes reading and writing texts, video games, 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, Wrt|DL|SS, VL, WE—F, S, (F, S) Watson-Gegeo, White

130. Issues in Higher Education (4)
Discussion—3 hours; field work—3 hours. Prerequisite: consent of instructor. Analysis of current issues in higher education and of some practical implications of varying philosophies to the role of the university. GE credit: SocSci | SS, WE—F, S, (F, S) Cuellar, Gonzalez

142. Introduction to Environmental Education (4)
Lecture—3 hours; field work. Study of history, philosophy, principles and approaches to environmental education (EE) and outreach; learning theories, teaching strategies and techniques in EE and outreach; evaluation of EE programs in informal and in-school contexts; observing, aiding and facilitating local environmental education programs. GE credit: SocSci | OL, SS—S—S, (S) Ballard

147. Anglos, Latinos and the Spanish Black Legend: The Origins and Educational Implications of Anti-Hispanic Prejudice (4)
Lecture/discussion—3 hours; field work; term paper. Examination of anti-Hispanic prejudice in the United States focusing on the “Black Legend,” a 16th Century anti-Spanish myth underpinning the doctrine of “Manifest Destiny.” Exploration of the legend’s presence in contemporary American society through interviews and analysis of film (same course as Spanish 147.) Offered in alternate years. GE credit: ArtHum, Div, Wrt|ACGH, AH, DD, WE—F, (F) Gonzalez

150. Cultural Diversity and Education in a Sociopolitical Context (4)
Lecture/discussion—4 hours, extensive writing. Introduction to cultural diversity and education in a sociopolitical context. Interactive course. Small and large group discussions explore, extend, and apply readings; range of writing genres for responses to assignments and course themes; lectures, slide shows, speakers, brief fieldwork, and presentations. GE credit: SocSci | SS, DD, WE—F, W, S, (F, W, S) Alhanases, Enright, Martinez

151. Language Development in the Chicano Child (3)
Lecture/discussion—3 hours. 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. Offered irregularly.

151T. Language Development in the Chicano Child (3)
Lecture/discussion—3 hours. Prerequisite: acceptance in Teaching Credential Program. Open to UC Davis Teacher Credential candidates only. Open to UC Davis Teacher Credential candidates only. 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. —F (F)

152. Academic Spanish for Bilingual Teachers (3)
Lecture/discussion—3 hours; field work. Prerequisite: acceptance in Teaching Credential Program or consent of instructor. Communicative class taught in Spanish focused on the development of Spanish communication skills for current and/or future bilingual teachers. Main topics are related to school content areas in bilingual settings, with an emphasis on standard and Southwest Spanish dialects. Restricted to Spanish speaking students. GE credit: ArtHum or SocSci | AH or SS, OL, WE—W, (W)

153. Diversity in the K-12 Classroom (2)
Lecture/discussion—2 hours. Prerequisite: acceptance in Teaching Credential Program. 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. —F (F) Fortes, Rosa

Education, School of 259
160A. Introduction to Peer Counseling (2) Lecture/discussion—2 hours. Prerequisite: consent of instructor. Introduction to peer counseling techniques and development of classroom counseling skills. Offered irregularly. (P/NP grading only.)

160B. Issues in Peer Counseling (2) Lecture/discussion—2 hours. Prerequisite: consent of instructor. In-depth review and development of skills for specific counseling topics. May be repeated up to 8 hours for credit when topics differ. Offered irregularly. (P/NP grading only.)

163. Guidance and Counseling (4) Lecture—4 hours. Nature and scope of pupil personel services; basic tools and techniques of guidance; theory and practice of counseling psychology, with emphasis on educational and vocational adjustment. Offered irregularly.

173. Language Development (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Linguistics 1 or consent of instructor; Linguistics 103A, 103B. Theory and research on children’s language acquisition. (Deferred grading only.) GE credit: SocSci|SS. —F. (F.)

180A. Computers in Education (3) Lecture/discussion—1 hour; laboratory—2 hours; project—3 hours. Prerequisite: acceptance in Teacher Credential Program; successful completion of course 180A. Restricted to Teaching Credential Majors. Applications of computers in education as instructional, intellectual, and communication tools. (Deferred grading only, pending completion of sequence.)—F. (F.)

180B. Computers in Education (3) Lecture/discussion—1 hour; laboratory—2 hours; project—3 hours. Prerequisite: acceptance in Teacher Credential Program; successful completion of course 180B. Restricted to Teaching Credential Majors. Applications of computers in education as instructional, intellectual, and communication tools. (Deferred grading only, pending completion of sequence.)—W. (W.)

180C. Computers in Education (3) Lecture/discussion—1 hour; laboratory—2 hours; project—3 hours. Prerequisite: acceptance in Teacher Credential Program; successful completion of course 180C. Restricted to Teaching Credential Majors. Applications of computers in education as instructional, intellectual, and communication tools. (Deferred grading only, pending completion of sequence.)—S. (S.)

181. Teaching in Science and Mathematics (2) Lecture/discussion—2 hours; field work—2 hours. Prerequisite: major in mathematics, science, or engineering; completion of a one-year sequence of science or calculus and consent of the instructor. Course limited to 40 students per section. 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 Geology 181.] (P/NP grading only.) GE credit: SS, WE.—W. (W.), S. (F., W., S.)

182. Computer Project for Curricular Integration (1) Seminar—1 hour. Prerequisite: 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 selected computer-related technologies. Not open for credit to students who have completed course 180 or 181. Offered irregularly.

183. Teaching High School Mathematics and Science (3) Lecture/discussion—2 hours; field work. Prerequisite: course 81/Geology 81 or course 181/Geology 181 and major in mathematics science or engineering; or completion of a one-year sequence of science or calculus and consent of the instructor. Limited to 40 students per section. Exploration and creation of effective teaching practices based on examination of how high school students learn mathematics and science. [Same course as Geology 183.] GE credit: SocSci|OL, SS, WE.—F. (F.)

185. Learning in a Digital Age: Information, Schooling, and Society (4) Lecture/discussion—2 hours; lecture/laboratory—2 hours. Focus on the changing nature of learning in a digital age: social media, ubiquitous connectivity, online education and information, writing, gaming, and youth culture. Readings will be drawn from recent major works detailing fundamental shifts in information, schooling, and society. Offered in alternate years. GE credit: SocSci|OL, SS, WE.—S. (S.)

192. Internship (1-3) Internship—2-8 hours; discussion—1 hour. Prerequisite: 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.)—F. (F.), S. (F., W., S.)

197. Tutoring in Education (1-2) Tutoring—1-2 hours. Prerequisite: 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. Tutoring may involve a written evaluation of the student’s work. May be repeated one time for credit for a total of 4 units. (P/NP grading only.) Offered irregularly.

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. Offered irregu- larly. (P/NP grading only.)

Graduate

200. Educational Research (4) Lecture—2 hours; discussion—2 hours. Prerequisite: introductory statistics or consent of instructor. Designing educational research questions, reviewing relevant literature, developing research designs, developing research instruments, selecting appropriate data analysis procedures, and writing research projects. A case project will provide practice in designing and reporting research. —F. (F.)

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, artifact). Focuses on issues (e.g., validity, reliability, generalizability, ethics) and reporting genres (e.g., narrative accounts, case studies, and arguments).—W. (W.)

202. Computer Analysis of Qualitative Data (4) Seminar—3 hours; laboratory—2 hours. Critical and practical understanding of how to use computer programs to analyze qualitative data (text, images, and video), employing social research. Offered irregularly.

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 introduces the debates surrounding the uses of different kinds of tests and evaluation tools.—F. (F., S. (F., S.)

204A. Quantitative Methods in Educational Research: Analysis of Correlational Designs (4) Discussion—2 hours; laboratory/discussion—2 hours. Prerequisite: introductory statistics or consent of instructor. Topics include multiple correlation and regression, discriminant analysis, logistic regression, and canonical correlation. Emphasis on conceptual understanding of the techniques and use of statistical software. —W. (W.)

204B. Quantitative Methods in Educational Research: Experimental Designs (4) Discussion—2 hours; laboratory/discussion—2 hours. Prerequisite: introductory statistics or consent of instructor. Methods for analysis of experimental data in educational research. Topics include ANOVA, fixed vs. random effects models, repeated measures ANOVA, analysis of co-variance, MANOVA, chi square tests, small sample solutions to ANOVA.—F. (F., S.)


205B. Ethnographic Research in Schools II: Field-Based Research Projects (4) Discussion—4 hours. Prerequisite: course 205A. Students research projects in specific schools with cooperative critical analysis of the design, data collection, and interpreting by researchers. Students will continue to meet with instructor as a group throughout the quarter to discuss specific projects.—W. (W.)

206A. Inquiry into Classroom Practice: Traditions and Approaches (2) Lecture/discussion—2 hours; fieldwork. Prerequisite: acceptance in Teacher Credential Program. 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. —W. (W.)

206B. Inquiry into Classroom Practice: Application of Teacher 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 projects in specific schools with cooperative critical analysis of the design, data collection, and interpreting by researchers. Students will continue to meet with instructor as a group throughout the quarter to discuss specific projects.—W. (W.)

206C. Inquiry into Classroom Practice: Study Design (4) Seminar—3 hours; fieldwork—1 hour. Prerequisite: satisfactory completion of course 206B or consent of instructor. Open to Graduate MA Credential students only. Proposal development for classroom-based inquiry designed to meet specific learning needs. Mixed methods research design and preliminary data collection approaches. Design and application of baseline student assessment for proposal
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. Open to Graduate MA Candident students. Support of the inquiry begun in course 206C through continuous collaborative critique and feedback resulting in the development of a research project. Open to Graduate MA Candident students. —W. (W.) Ambrose, Fallis, Martinez, Wallace

207. Concepts of the Curriculum (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: consent of instructor. Development of the skills of philosophical analysis and argument for the establishment of a point of view, in the consideration of curriculum theory and practice. Classical and contemporary approaches to subject matter and activity emphases, hidden curriculum, and moral education. Offered irregularly.

208. Presenting Educational Research in Written Reports (4)
Seminar—3 hours; extensive writing. Prerequisite: consent of instructor. Rhetorical and substantive challenges of presenting educational research through written reports, research rhetoric and genres; competition of conventions of educational research, policy, and practice; the social organization of publishing educational research. May be repeated one time for credit. Offered irregularly.

209. Image-based Field Research (4)
Lecture/discussion—3 hours; fieldwork—2 hours. Critical and practical understanding of video tape and still photography as resources for enhancing field research in schools and other social settings. Offered irregularly.

210. The Psychology of School Learning (4)

211. Sociocultural and Situative Perspectives on Learning and Cognition (4)
Lecture/discussion—3 hours; extensive writing —1 hour. Sociocultural and situative theories of cognition and instruction as illustrated by the work of L.S. Vygotsky, followed by modern perspectives: situated cognition, cognitive apprenticeship, situated learning, communities of practice, cultural-historical activity theory, and distributed intelligence. Each theoretical perspective for educational practice. Offered in alternate years. —(S.) Ching, White

213. Individual Assessment (4)
Lecture—4 hours. Prerequisite: introductory statistics or consent of instructor. 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 in grades K-12. The WECHS, the WAIS-R, the Stanford Binet, the McCarthy Scales of Children’s Ability. Offered in alternate years. —W. (W.) Mundy

215. Research on Achievement Motivation in Education (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor. Analysis and critique of recent research on cognitive processes related to achievement motivation in school settings. Topics include self-determination, goal theory, goal theory and intrinsic and extrinsic motivation, learned helplessness, psychological reactance, gender and culture, and research design. Offered irregularly.

220. Concepts and Methods of Policy Analysis (4)
Seminar—3 hours; fieldwork; term paper. Introduction to concepts and methods of policy analysis. Emphasis on the relationship between educational issues and problems; policy development; constructing persuasive policy analyses; issues related to policy process. Offered irregularly.

221. Culture and Social Organization of Schools (4)
Seminar—4 hours. Prerequisite: consent of instructor. Culture and social organization of schools. Examines perspectives of educational researchers, educational policy-makers, and school members and their implications for educational research, policy and practice. Offered irregularly.

222. School Change and Educational Reform (4)
Lecture/discussion—2 hours; seminar—2 hours. Analysis of models, processes, and case studies of school change and educational reform with respect to variable characteristics of schools and schooling, planned and unplanned change, the moral evaluation of school change, and the role of educational research. Offered irregularly.

223. Education and Social Policy (4)
Seminar—4 hours. Prerequisite: 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.) —Hart

225. Education Policy and Law (4)
Lecture/discussion—4 hours. Examination of law as an instrument of social policy. Specific focus on the legalization of smoking, its causes, dimensions, and effects on administrative and teacher authority. Offered irregularly.

226. Culture and Social Organization of Higher Education (4)
Seminar—3 hours; field work—1 hour. Prerequisite: 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. Offered irregularly. —Cuellar, Gonzalez

228. Politics and Governance of Education (4)
Seminar—3 hours, term paper. Examination of political power, representation and influence, decision-making and inter-governmental relations in the public schools. Offered irregularly.

229. Education Finance Policy (4)
Seminar—3 hours, term paper. Examination of (1) United States educational finance; (2) the relationship between school finance and education policy; and (3) the relationship between education finance and education practice. Offered irregularly.

230. Special Topics in Education Policy (4)
Seminar—3 hours, term paper. Selected topics in education policy design. Designed to facilitate preparation for the qualifying examination or dissertation. Students will critically analyze scholarly work including their own work in progress. May be repeated for credit when topic differs. —F. W. S. (F, W, S.) Cuelar, Goo, Hart, Kurlaender, Martorell, Quijada

235. Critical Pedagogy (4)
Seminar—4 hours. Prerequisite: scholarly 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. Offered irregularly.

236. Application of Hierarchical Linear Models in Education Research (4)
Lecture—2 hours; lecture/discussion—2 hours; term paper. Prerequisite: course 204A or similar course with permission. Application of hierarchical linear models in education research across multiple areas, such as policy, curriculum, and assessment. Develop working knowledge of hierarchical linear modeling and an understanding of its use in existing research and student’s work. Offered in alternate years. —(F.) Gee

237. Survey Research Methods (4)
Lecture/discussion—3 hours; field work —1 hour. Term paper. Theories, principles and application of survey research methods, survey design, validation, and administer survey instruments; select representative samples; conduct focus groups; and collect, organize, and analyze survey data. Familiarity with introductory concepts in inferential statistics is assumed. Offered irregularly. —(F. S, (F) Abedi, Welsh

238. Participatory Action Research (PAR) (4)
Lecture/discussion—3 hours; fieldwork—1 hour. Introductory research methods course recommended. Principles and strategies of PAR and related methodologies that emphasize collaborating with people affected by the issue being researched in order to educate, take action or effect social change. Conduct interviews with potential collaborators, case analyses and research proposals. —(W.) Ballard

239. Interview Methods (4)
Lecture/discussion—3 hours, term paper. Prerequisite: course 201 or equivalent course recommended. Introduction to qualitative interviewing, focused in particular on an narrative and self-study as both practical method and theoretical stance. Students complete a case-focused interview project during the course: designing an interview protocol, conducting the interview, transcribing, analyzing, and presenting their research. Offered in alternate years. —Ching

242. Research on Text Comprehension (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor. Analysis of recent research related to cognitive processing of written texts. Topics include word decoding, schema theory, background knowledge, assimilation, accommodation, working memory, processing depth, vocabulary acquisition, sentence-level processes, text-level processes, text structure, implications for curriculum and instruction. Offered irregularly. —Salaris

243. Research on the Teaching and Learning of Writing (4)
Seminar—4 hours. Prerequisite: consent of instructor. Study of issues in research on composition; history of composition studies; data analysis techniques; product and process approaches to subjective and social perspectives. Offered irregularly.

246. Reading as a Social and Cultural Process (4)
Seminar—3 hours; field work —1 hour. Analysis of children’s initial processes in learning to read extending from the preschool years into second grade. Topics include cognitive, sociolinguistic, metalinguistic awareness, word recognition, decoding, spelling, vocabulary, comprehension, second language reading, assessment, instruction, and methodology. Offered irregularly. —Tompkins

261. Reading as a Social and Cultural Process (4)
Lecture—3 hours; field work —1 hour. Prerequisite: course 211 recommended. Recent theoretical and empirical work on reading in social contexts. Topics include reading as an individual interactive process; reading as a social and cultural process; critical perspectives on reading; implications of contrastive theoretical perspectives for curriculum and instruction in reading. Offered irregularly.
247. Research on Response to Culturally Diverse Literature, K-12 (4) Lecture—3 hours; field work—1 hour. 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, and teaching strategies that address multicultural issues. Field-based and general quantitative research methods in education will focus this course. Students choose from research studies to collect, organize, analyze, and interpret univariate and multivariate quantitative data in educational research, dissertation projects, and field-based projects.—W. (W.) Hart

248. Academic Language and Literacies (4) Seminar—3 hours; field work, project. Prerequisite: graduate standing. Exploration of theories and research on academic language and literacies for the schooling of first and second language learners. Use basic qualitative methods to collect and analyze classroom language and literacy data. Offered in alternate years.—Enright

249. Discourse Analysis in Educational Settings (4) Seminar—3 hours; term paper. Prerequisite: an introductory linguistics or sociolinguistics course 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 interactional sequences). Term final paper is an analysis of an episode of classroom interaction in a student in a field setting.—W. (W.) Watson-Gegge

251. Research in Bilingual and Second Language Education (3) Seminar—3 hours. 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, and discourse in bilingual/second language classrooms. Use of the vernacular in classroom. Offered irregularly.—Torkovich

253. Language and Literacy in Linguistic Minorities (3) Seminar—2 hours; field work—2 hours. Prerequisite: acceptance in Teacher Credential Program. Analysis and application of research on oral language development and literacy in language minority students, through the development, implementation, and evaluation of research-based language arts curriculums.—S. (S.) Fortes, Holmes

255. Curriculum Development and Evaluation in Mathematics (4) Seminar—4 hours. Prerequisite: consent of instructor. Analysis of current issues and goals in mathematics education, including long-term trends, current status and influences, proposed changes, and evaluation issues. Selected curriculum projects will be evaluated. Offered irregularly.—Ambrose, White

256A. Research in Mathematics Education (4) Seminar—4 hours. Prerequisite: consent of instructor. Examination of research process in mathematics education; review of productive problems identified by researchers; evolution of trends, issues, theories and hypotheses in various areas of mathematics education research. Course emphasizes foundations of research.—Athanases

256B. Research in Mathematics Education (4) Seminar—4 hours. Prerequisite: consent of instructor. History of curricular issues and goals in science education from the late 19th century forward, including long-term trends, current status and influences, proposed changes, and evaluation issues. National science standards and curriculum projects. Offered irregularly.—Passmore

262A. Research Topics in Science Education I (4) Seminar—4 hours. Prerequisite: consent of instructor. Review of topics in science education research. Offered in alternate years.—S. (S.) Fortes, Holmes

262B. Research Topics in Science Education II (4) Seminar—4 hours. Current research issues and activities in science education: status, trends, theories and hypotheses. Offered irregularly.—Ambrose

264. Scientific Literacy and Science Education Reform (4) Seminar—4 hours. Prerequisite: consent of instructor. Current trends in science education reform locally, regionally, and nationally focusing on scientific literacy. Equity, access and “science for all.” Offered irregularly.—Ballard, Patterson, Trexler

270. Research on Teacher Education and Development (4) Seminar—3 hours; project. Experience with formal or informal teaching recommended. Research on teacher preparation in university credential programs and on professional development of in-service teachers, with special attention to teacher preparation and the role of work with culturally and linguistically diverse youth. Offered irregularly.—Athanases

271. Supervision of Student Teachers: Research, Theory & Practice (4) Lecture/discussion—3 hour; field work—1 hour. Research, theory and practice in the preparation and supervision of teachers. Issues such as the supervision of candidates in university teaching credential programs and the student teacher field placement and the mentoring of novice teachers by expert teachers. Offered irregularly

275A. Effective Instruction: Curriculum and Assessment-Theory, Research, and Practice (2) Lecture/discussion—4 hours. Prerequisite: acceptance in Teacher Credential Program. Restriction to Teaching Credential majors. Examination of contemporary theories of curriculum development, research on the relationship among instructional planning, classroom assessment, and student learning to guide teaching practice.—F. (W.) Holmes

275B. Effective Instruction: English Language Development and Instruction (2) Lecture/discussion—4 hours. Prerequisite: acceptance in Teacher Credential Program. Examination of contemporary theories of curriculum development and research on the relationship among instructional planning, classroom assessment, and student learning to guide teaching practice.—F. (W.) Holmes

275C. Effective Instruction: English Language Development and Instruction (2) Lecture/discussion—4 hours. Prerequisite: acceptance in Teacher Credential Program. Examination of contemporary theories of curriculum development and research on the relationship among instructional planning, classroom assessment, and student learning to guide teaching practice.—F. (W.) Holmes

280A. Inquiry and Practice: Qualitative Research for Educational Leaders (4) Lecture/discussion—4 hours; field work; project. Prerequisite: admission into the CANDEL EdD program or consent of instructor. Students explore the history and emergent relationships among leadership theories/practice and their application to current educational settings. Students will reflect on and refine their personal theory of leadership.—F. (F.) Rodriguez

280B. Inquiry and Practice: Quantitative Research for Educational Leaders (4) Lecture/discussion—4 hours; field work; project. Prerequisite: admission into the CANDEL EdD program or consent of instructor. Students explore the history and emergent relationships among leadership theories/practice and their application to current educational settings. Students will reflect on and refine their personal theory of leadership.—F. (F.) Heckman

281A. Problem-Based Learning Courses: Part 1 (4) Lecture/discussion—4 hours; extensive writing or discussion; field work. Prerequisite: admission into the CANDEL EdD program or consent of instructor. Students explore the history and emergent relationships among leadership theories/practice and their application to current educational settings. Students will reflect on and refine their personal theory of leadership.—F. (F.) Heckman

281B. Problem-Based Learning Courses: Part 2 (4) Lecture/discussion—4 hours; extensive writing or discussion; field work. Prerequisite: admission into the CANDEL EdD program or consent of instructor. Students explore the history and emergent relationships among leadership theories/practice and their application to current educational settings. Students will reflect on and refine their personal theory of leadership.—F. (F.) Heckman

281C. Problem-Based Learning Courses: Part 3 (4) Lecture/discussion—4 hours; extensive writing or discussion; field work. Prerequisite: admission into the CANDEL EdD program or consent of instructor. Students explore the history and emergent relationships among leadership theories/practice and their application to current educational settings. Students will reflect on and refine their personal theory of leadership.—F. (F.) Heckman

282A. Beginning Issues and Practices: Contemporary Educational Leadership (4) Lecture/discussion—4 hours; field work; project. Prerequisite: admission into the CANDEL EdD program or consent of instructor. Students explore the history and emergent relationships among leadership theories/practice and their application to current educational settings. Students will reflect on and refine their personal theory of leadership.—F. (F.) Rodriguez

282B. Beginning Issues and Practices: Diversity Issues for Educational Leaders (4) Lecture/discussion—4 hours; field work; project. Prerequisite: admission into the CANDEL EdD program or consent of instructor. Students explore the history and emergent relationships among leadership theories/practice and their application to current educational settings. Students will reflect on and refine their personal theory of leadership.—F. (F.) Rodriguez
spectives for building a sense of vision to lead the profession of student affairs and to meet the needs of the whole student. Prerequisite: consent of instructor. —F, (F., W., S.)

284A. Policy: History and Theory of Educational Policy (4)
Lecture/discussion—4 hours; fieldwork; project. Prerequisite: admission to the CANDEL EdD program or consent of instructor. Students will conduct critical analyses of policy at the federal, state, regional, and local levels. Specific California and national, state and local level. —W. (W.) Martorell

284B. Policy: Formulating and Influencing Policy (4)
Lecture/discussion—4 hours; fieldwork; project. Prerequisite: admission to the CANDEL EdD program or consent of instructor. Students will conduct critical analyses of policy at the federal, judicial, state, regional, and local levels. Specific California and regional federal policy environment structures, processes and people will be examined for intended consequences, ethical dilemmas, social justice and equity issues. —W. (W.) Martorell

284C. Policy: Possibilities and Limitations of Educational Policy in a Democracy (4)
Lecture/discussion—4 hours; fieldwork; project. Prerequisite: admission to the CANDEL EdD program or consent of instructor. Students will critically examine the democratic purposes of education in light of existing National, State, and local policy reform efforts. Questions like, In what ways are these reforms driven by democratic ideas and challenged by those ideals. —W. (W.)

Lecture/discussion—4 hours; fieldwork; project. Prerequisite: admission to the CANDEL EdD program or consent of instructor. Topics include: education finance theory and practice, financial and legal issues and intergovernmental relations, effective resource management, budget analysis and preparation. —S. (S.) Rose

Lecture/discussion—4 hours; fieldwork; project. Prerequisite: admission to the CANDEL EdD program or consent of instructor. Human resource management research and theory for applying human resource techniques in the educational setting. —S. (S.)

286A. Organizational Structures and Change: Data-Driven Decision-Making for Change (4)
Lecture/discussion—4 hours; fieldwork; project. Prerequisite: admission to the CANDEL EdD program or consent of instructor. Students use and examine multiple sources of information and data and trends found in academic journals, conference proceedings, and policy research to make strategic decisions aimed at improving the quality of student life and programming. Prerequisite: Consent of instructor. —F, (F.) Heckman

286B. Organizational Structures and Change: Curriculum & Instruction Issues in Education (4)
Lecture/discussion—4 hours; fieldwork; project. Prerequisite: admission to the CANDEL EdD program or consent of instructor. This course addresses the historical development of various curriculum and instructional methodologies found in public and private schools, and their impact on current curriculum development and reform efforts at the national, state and local level. —W. (W.)

287. CANDEL Dissertation Seminars (6-12)
Prerequisite: admission to the CANDEL EdD program or consent of instructor. Third year seminars encourage students to complete dissertations within the year. Cohort members meet together in every three-week meetings with faculty members and share their writing, reflection, analysis, discussion of results, development of conclusions/implications. May be repeated nine times for credit until completion of dissertation. (S/U grading only.)—F, W., S. (W., S., S.)

287D. CANDEL Dissertation (6-12)
Prerequisite: passing of qualifying exams in CANDEL program and advancement to candidacy; consent of instructor. Cohort members continue to meet with faculty members for major research project, analysis, development of conclusions/implications. May be repeated nine times for credit until completion of dissertation. (S/U grading only.)—F, W., S. (W.)

291. Prosemirine in Education (4)
Seminar—3 hours; fieldwork—3 hours. Prerequisite: admission to the M.A. or Ph.D. graduate program in Education. Professional induction into educational research and Graduate Group in Education at UC Davis. Introduction to landscape of educational research methodologies, purposes and theories. Analysis of debates within field. Investigation of K-12 educational experiences. May be repeated twice for credit. May take the course one time as MA student and one time as a PhD student. —F, W. (F.) Ambrose, Martinez, Solari, Welsh

292. Special Topics in Education (2-4)
Variable—2.4 hours. Prerequisite: consent of instructor. Selected topics in education. Designed to facilitate preparation for the qualifying examination or dissertation. Students will critically analyze scholarly work including their own works in progress. May be repeated for credit. —F, W., S. (F., W., S.)

294. Special Topics in Science, Agriculture and Mathematics Education (4)
Seminar—3 hours, term paper, project. Critical study of special topics of research relevant to science, agricultural and mathematics education. Students and faculty present work-in-progress on a major research project. Students will analyze and discuss one another’s developing scholarly work. May be repeated for credit when topic differs. —W, S. (W, S.) Ambrose, Ballard, Martin, Patterson, White

295. Special Topics in Learning and Mind Science (4)
Seminar—3 hours, term paper. Critical study of selected issues in the learning sciences, neurodevelopmental disorders, and cognitive and measurement, as they relate to education. May be repeated for credit when topic differs. Offered irregularly. —Abdi, Ching, Martin, Mundy, Solary, White

298. Group Study (1-5)
Prerequisite: Consent of instructor. (S/U grading only.)—F, W., S. (W.)

299. Individual Study (1-6)
Independent study—3-18 hours. Prerequisite: consent of instructor. Individual study under the direction of a faculty member. (S/U grading only.)—F, W. (S., W., S.)

299D. Research (1-12)
Independent study—3-36 hours. Prerequisite: consent of instructor. Research for individual graduate students. (S/U grading only.)—F, W. (S., W., S.)

Professional

300. Reading in the Elementary School (4)
Lecture—3 hours; fieldwork—3 hours. Prerequisite: acceptance in Teacher Credential Program, Principles, procedures, and materials for teaching reading. Includes decoding skills with a special emphasis on phonics, comprehension skills, study skills, and reading strategies. —F, (F.)

301. Reading in the Secondary School (4)
Discussion—4 hours. Prerequisite: graduate standing, enrollment in the secondary credential program, or consent of instructor. Principles, procedures, and materials to help secondary school teachers improve the reading competence of students. Strategies for enhancing learning through reading and writing in all disciplines, with special attention to linguistically diverse populations. —F, (W., W.) Falls, Martinez

301A. Teaching Literacy in High School Contexts (2)
Lecture/discussion—2 hours. Prerequisite: acceptance in Teacher Credential Program; consent of instructor. Restriction to students enrolled in the secondary credential program. Focuses on secondary school literacy practices and strategies for engaging English-speaking and bilingual students with textual, imaginative, and challenging writing. Covers reading and writing, the Common Core and Language Proficiency standards. —F, W., (F.) Falls, Martinez

301B. Teaching Literacy in High School Contexts (2)
Lecture/discussion—2 hours. Prerequisite: acceptance in Teacher Credential Program. Understanding the principles of education in the arts through participation. Development of concepts, introduction to media, and techniques suitable for the elementary school. Curriculum, pedagogy, and materials for teaching the visual and performing arts curriculum in elementary schools. —S. (S.)

304A. Teaching in the Elementary Schools (2-18)
Lecture/discussion—2 hours; fieldwork—9-48 hours. Prerequisite: acceptance in Teacher Credential Program. Supervised teaching in regular classrooms in elementary schools. Selection and organization of teaching materials. Introduction to techniques of diagnosing school achievement of children. —F, (F.)

304B. Teaching in the Elementary Schools (2-18)
Lecture/discussion—2 hours; fieldwork—9-48 hours. Prerequisite: acceptance in Teacher Credential Program. Supervised teaching in regular classrooms in elementary schools. Current conceptions of elementary school curriculum, emphasis on contributions from the social, biological, and physical sciences. Emphasis on effective teaching methods. —W. (W.)

304C. Teaching in the Elementary Schools (2-18)
Lecture/discussion—2 hours; fieldwork—9-48 hours. Prerequisite: acceptance in Teacher Credential Program. Supervised teaching in regular classrooms in elementary schools. Evaluation of teaching materials including instructional technology. Current elementary school curriculum with emphasis on contributions from fine arts and humanities. —S. (S.)

304A. Teaching in the Middle Grades (5-8)
Lecture—2 hours; seminar—2 hours; student teaching—1-30 hours. Prerequisite: acceptance in Teacher Credential Program. Supervised teaching in regular classrooms in elementary schools. Evaluation of teaching materials including instructional technology. Current elementary school curriculum with emphasis on contributions from fine arts and humanities. —S. (S.)
regular or special education classrooms in middle grades. Current conceptions of the middle-grades curriculum within a context of social, biological, and physical sciences. Effective teaching methods. Offered irregularly.

306A. Teaching in the Secondary Schools (2-18)
Lecture/discussion—2 hours; fieldwork—9-48 hours. Prerequisite: acceptance in Teacher Credential Program. Supervised teaching in regular secondary classrooms. Techniques for classroom communications; constructing goals and objectives; assessment of learning; special problems of adolescents; instructional technology. —F (F)

306B. Teaching in the Secondary Schools (2-18)
Lecture/discussion—2 hours; fieldwork—9-48 hours. Prerequisite: acceptance in Teacher Credential Program. Supervised teaching in regular secondary classrooms. Techniques for classroom communications; constructing goals and objectives; assessment of learning; special problems of adolescents; instructional technology. —W (W)

306C. Teaching in the Secondary Schools (2-18)
Lecture/discussion—2 hours; fieldwork—9-48 hours. Prerequisite: acceptance in Teacher Credential Program. Supervised teaching in regular secondary classrooms. Techniques for classroom communications; constructing goals and objectives; assessment of learning; special problems of adolescents; instructional technology. —S (S)

307. Methods in Elementary Science (2)
Discussion—4 hours. Prerequisite: acceptance in Teacher Credential Program; consent of instructor. Introduction to methods and curriculum for teaching mathematics at the secondary level. Introduction to applications of computational technology as instructional, intellectual, and communication tools for mathematics teachers. —F (F) Wallace

308. Methods in Elementary Social Studies (2)
Lecture/discussion—2 hours; fieldwork—9-48 hours. Prerequisite: acceptance in Teacher Credential Program. Supervised teaching in regular secondary classrooms. Techniques for classroom communications; constructing goals and objectives; assessment of learning; special problems of adolescents; instructional technology. —W (W)

309. The Teaching of Mathematics, K-9 (3)
Lecture/discussion—3 hours. Prerequisite: acceptance in Teacher Credential Program. Mathematics curriculum and teaching methods for K-9 reflecting the needs of California’s diverse student population. —W (W) Mendle

322A. Pedagogical Preparation for Secondary Social Science I (3)
Lecture—3 hours. Discussion—1 hour. Prerequisite: acceptance in Teacher Credential Program. Introduction to teaching methods and curricular approaches for secondary social science teaching. State and national curriculum standards; application of learning theory to effective instruction; interdisciplinary teaching and active learning approaches; effective teaching strategies for English Learners. —F (F) Rosa

322B. Pedagogical Preparation for Secondary Social Science II (3)
Lecture—1 hour; discussion—2 hours. Prerequisite: acceptance in Teacher Credential Program. Pedagogical approaches and teaching methods for secondary social science teaching. Effective teaching approaches to teaching major themes across social science content areas; teaching potentially controversial social science topics; teaching democratic civic values; student assessment and evaluation. —W (W) Rosa

323A. Physical Science in the Secondary School (3)
Laboratory/discussion—2 hours; discussion/lab—1 hour. Prerequisite: acceptance in Teacher Credential Program. Activity-based overview of concepts and processes in secondary school physical sciences. Emphasis upon philosophy, appropriate teaching methods, materials, assessment and evaluation of learning. —F (F) Passmore, Pomeroy

323B. Life Sciences in the Secondary School (3)
Lecture/discussion—2 hours; discussion/lab—1 hour. Prerequisite: acceptance in Teacher Credential Program. Activity-based overview of concepts and processes in secondary school biology and life sciences. Emphasis upon philosophy, appropriate teaching methods, materials, assessment and evaluation of learning. —W (W) Passmore, Pomeroy

324A. Methods and Technology in Secondary Mathematics I (4)
Lecture/discussion—4 hours. Prerequisite: acceptance in Teacher Credential Program; consent of instructor. Introduction to methods and curriculum for teaching mathematics at the secondary level. Introduction to applications of computer technology as instructional, intellectual, and communication tools for mathematics teachers. —F (F) Wallace

324B. Methods in Secondary Mathematics II (3)
Lecture/discussion—3 hours. Prerequisite: acceptance in Teacher Credential Program; consent of instructor. Expansion of methods and curriculum for teaching mathematics at the secondary level. Intermediate applications of computer technology as instructional, intellectual, and communication tools in mathematics teaching. —W (W) Wallace

325. Research and Methods in Secondary English Language Arts (4)
Discussion—4 hours. Prerequisite: acceptance in Teacher Credential Program; consent of instructor. Research on learning and teaching in the language arts. Principles, procedures and materials for improving the writing, reading and oral language of secondary students, with special attention to students from culturally and linguistically diverse populations. —F (F) Holmes

326. Teaching Language Minority Students in Secondary Schools: Methods and Research (4)
Seminar—3 hours; field work—3 hours. Prerequisite: acceptance in Teacher Credential Program; consent of instructor. Research on teaching and learning in the language arts. Principles, procedures and materials for improving the writing, reading and oral language of secondary students, with special attention to students from culturally and linguistically diverse populations. —W (W) Wallace

327A. Teaching Methods for Secondary Foreign Language/Spanish, Part I (3)
Lecture—3 hours. Prerequisite: acceptance in Teacher Credential Program. 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. Introduction to teaching Spanish to creditable students. Offered irregularly.

327B. Teaching Methods for Secondary Foreign Language/Spanish, Part II (3)
Lecture—3 hours. Prerequisite: acceptance in Teacher Credential Program. Continuation to methods for teaching Spanish as a foreign and a heritage language in secondary schools. Research and practice on foreign and heritage language teaching. Expansion of effective teaching strategies and class management. Open to Graduate Teaching Credential students. Offered irregularly.

398. Group Study (1-5)
(S/U grading only)

399. Individual Study (1-5)
(S/U grading only)

Education (A Graduate Group)

Michal Kurlaender, Chairperson of the Group
Group Office, 106 School of Education Building 530-752-7259; Fax 530-752-6672; pheduadvising@ucdavis.edu

Faculty
Leonard Abbeduto, Ph.D., Professor; Director of UC Davis MIND Institute and Tsakopoulos-Vismara Endowed Chair (Psychiatry and Behavioral Sciences)
Jamal Abdedi, Ph.D., Professor (Education)
Rebecca C. Ambrose, Ph.D., Associate Professor (Education)
Sharon Anderson, Ph.D., Professor (Graduate School of Management)
Steven Z. Athanasos, Ph.D., Professor (Education)
Heidi Ballard, Ph.D., Associate Professor (Education)
Bob Bayley, Ph.D., Professor (Linguistics)
Robert Blake, Ph.D., Professor (Spanish & Portuguese)
Scott E. Carrell, Ph.D., Associate Professor (Education)
Cynthia Carter Ching, Ph.D., Associate Professor (Education)
Harry Cheng, Ph.D., Professor; Director of UC Davis K-14 Outreach Center for Computing and STEM Education (C-STEM) (Mechanical and Aerospace Engineering)
Cecilia Colombi, Ph.D., Professor (Spanish)
Marcela Cuellar, Ph.D., Assistant Professor (Education)
Adela de la Torre, Ph.D., Professor (Chicana/o Studies)
Kerry Enright, Ph.D., Associate Professor (Education)
Nancy Erbstein, Ph.D., Assistant Research Scientist (Human and Community Development)
Christian Falls, Ph.D., Professor, Director of Teacher Education (Education)
Dana Ferris, Ph.D., Professor, Associate Director for Lower-Division Writing (University Writing Project)
Kevin Gee, Ed.D., Assistant Professor (Education)
Cristina Gonzalez, Professor (Spanish and Education)
Randi Hagerman, M.D., Professor, Medical Director (M.I.N.D. Institute)
Cassandra Hart, Ph.D., Assistant Professor (Education)
Paul Heckman, Ph.D., Professor and Associate Dean (Education)
Jacqueline Heibel, Ph.D., Assistant Professor (Sociology)
Michal Kurlaender, Ed.D., Associate Professor (Education)
Harold Levine, Ph.D., Professor and Dean (Education)
Lee Martin, Ph.D., Assistant Professor (Education)
Danny Martinez, Ph.D., Assistant Professor (Education)
Paco Martorell, Ph.D., Assistant Professor (Education)
Julia Menard-Warwick, Ph.D., Associate Professor (Linguistics)
Barbara J. Merino, Ph.D., Professor Emeritus (Education)
Lisa M. Soederberg Miller, Ph.D., Associate Professor; Director, Adult Development Lab (Human and Community Development)
Marco Molinaro, Ph.D., Chief Education Officer, Center for Biophotonics Science and Technology
Peter C. Mundy, Ph.D., Professor (Education)
Debbie Niemeyer, Ph.D., Professor (Civil & Environmental Engineering)
Adrienne Nishina, Ph.D., Associate Professor (Human and Community Development)
Patty Eubanks Owens, Professor, Chair of Landscape Architecture (Environmental Design)
Marianne Page, Ph.D., Associate Professor (Economics)
Cynthia Passmore, Ph.D., Associate Professor (Education)
Sarah Perrault, Ph.D., Assistant Professor (University Writing Program)

Fall 2011 and on Revised General Education GE: AH=Arts and Humanities; SE=Science and Engineering; SS=Social Sciences; AGC=American Culture; DD=Diversity; W=World Cultures; WE=Writing Experience
Pre-Fall 2011 General Education GE: ArHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Diversity; Wrt=Writing Experience
Quarter Offered: Fe=Fall, W=Winter, S=Spring, Su=Summer; 2017-2018 offering in parentheses
Endocrinology and Metabolism

See Internal Medicine (IMD), on page 439.

Engineering

(College of Engineering)
Jennifer Sinclair Curtis, Ph.D., Dean
S. Felix Wu, Ph.D., Associate Dean—Academic Personnel and Planning
Jean S. VanderGheynst, Ph.D., Associate Dean—Research and Graduate Studies
James A. Schaad Ph.D., Associate Dean—Undergraduate Studies
C.P. [Case] van Dam, D. Engr., Associate Dean—Facilities and Capital Planning
Bruce White, Ph.D., Executive Associate Dean

College Office. 1042 Kemper Hall
530-752-7642; http://engineering.ucdavis.edu
http://www.facebook.com/UCDEngineering

Undergraduate Study
The college has eight departments:
Biological and Agricultural Engineering
Biomedical Engineering
Chemical Engineering
Civil and Environmental Engineering
Computer Science Engineering
Electrical and Computer Engineering
Materials Science and Engineering
Mechanical and Aerospace Engineering

Graduate Study
Graduate degrees (M.S. and Ph.D.) are offered in the following engineering disciplines:
Biological Systems Engineering
Biomedical Engineering
Chemical Engineering
Civil and Environmental Engineering
Computer Science
Electrical and Computer Engineering
Materials Science and Engineering
Mechanical and Aerospace Engineering
Transportation Technology and Policy

The Major Programs
Eleven majors, leading to the B.S. degree, are open to students.
Aerospace Science & Engineering
Biochemical Engineering
Biological Systems Engineering
Biomedical Engineering
Chemical Engineering
Civil Engineering
Computer Engineering
Computer Science and Engineering
Electrical Engineering
Materials Science and Engineering
Mechanical Engineering

Minor Programs
The College of Engineering offers nine undergraduate minors:
Biomedical Engineering (Department of Biomedical Engineering)
Computational Biology (Department of Computer Science)
Construction Engineering and Management (Department of Civil and Environmental Engineering)
Electrical Engineering (Department of Electrical and Computer Engineering)
Energy Science and Technology (Department of Biological and Agricultural Engineering)
Energy Policy (Department of Biological and Agricultural Engineering)
Energy Efficiency (Department of Biological and Agricultural Engineering)
Materials Science (Department of Materials Science and Engineering)
Sustainability in the Built Environment (Department of Civil and Environmental Engineering)

Courses in Engineering (ENG)
Students are encouraged to carefully adhere to all prerequisite requirements. The instructor is autho-
rized to drop students from a course for which stated prerequisites have not been completed.

Lower Division
1. Introduction to Engineering (1)
Lecture—1 hour. Open to first year students only.
Introduction to the role of engineers in the acquisition and development of engineering knowledge, the differences and similarities among engineering fields, and the work ethic and skills required for engineering. (P/NP grading only.) GE credit: SE—F. (F, J) Schaad

2. Creativity and Entrepreneurship for Engineers (3)
Discussion—3 hours. Introduction to entrepreneurial thinking from an engineer's perspective. Focus on identifying entrepreneurial opportunities, developing prototypes, and generating business models. Emphasis on developing a creative and entrepreneurial mindset. GE credit: SciEng, SocSci or SS.

4. Engineering Graphics in Design (3)
Lecture—2 hours; laboratory—3 hours. Engineering design, descriptive geometry, pictorial drawing, computer-aided graphics, and their application in the solution of engineering problems. GE credit: SciEng | QL, SE—f, W, S, F, W, J Schaad, Ashi

6. Engineering Problem Solving (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16A, 17A or 21A; C- or above; Mathematics 168, 178 or 218, C or above (may be taken concurrently). Methodology for solving engineering problems. Engineering computing and visualization based on MATLAB. Engineering examples and applications. GE credit: SciEng | QL, SE—f, W, S, F, W, W

7. Technology and Culture of the Internet (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: high school algebra. Understanding of how the technology in our lives works using only basic concepts and rudimentary mathematics. GE credit: SciEng or SocSci, Wrt | SE or SS—f, W, F, W, J. Schaad, Parish

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. Offered irregularly. GE credit: SciEng | SE.

12. Introduction to Space Exploration: Understanding the Technological and Environmental Challenges to Our Exploration of the Solar System (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: high school level Algebra, Geometry, General Science (Physics and Chemistry). Introductory overview of the space environment. Discussion of space exploration technology including propulsion, orbital mechanics, and spacecraft engineering. Offered irregularly. GE credit: SciEng | QL, SE, SL.

Fall 2011 and on Revised General Education (GE): AH=Arts and Humanities; SE=Science and Engineering; SS=Social Sciences; ACH=American Cultures; DD=Domestic Diversity; OL=Other Skills; QL=Quantitative; SL=Scientific; V=Visual; WC=World Cultures; WE=Writing Experience
Pre-Fall 2011 General Education (GE): AH=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Domestic Diversity; Wrt=Writing Experience
Quarter Offered: F=Fall, W=Winter, S=Spring, Su=Summer; 2017-2018 offering in parentheses
35. Statics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16A or 21 and Physics 11A or better. General concepts of statics: equilibrium of particles and systems under external forces and conditions with emphasis on engineering problems. GE credit: SciEng | SE.—F, W, S (F, W, S.)

45. Properties of Materials (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: C- or better in Mathematics 16C or 21C, Chemistry 2A, and Physics 9A. Introductory course on the properties of engineering materials and their relation to the internal structure of materials. GE credit: SciEng. W(1) {Q, SL, SE}.—F, W, S (F, W, S.)

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.—W. (W.)

45Y. Properties of Materials (4)
Web virtual lecture; laboratory. Prerequisite: C- or better in Mathematics 16C or 21C, Chemistry 2A and Physics 9A. Introductory course on the properties of engineering materials and their relation to the internal structure of materials. Not open for credit to students who have taken course 45. GE credit: SciEng | QL, SE, SL.—Su. (Su.)

98. Directed Group Study (1-4)
Restricted to College of Engineering students only. Lab/prac grading only. May be repeated for credit up to 3 times when content differs.

Upper Division

100. Electronic Circuits and Systems (3)
Lecture—3 hours; laboratory—2 hours. Prerequisite: course 17 (C- or better is recommended). 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. GE credit: SciEng | QL, SE, VE.—F, W, S (F, W, S.)

102. Dynamics (4)
Lecture—4 hours. Prerequisite: grade of C- or better in Engineering 35; grade of C- or better in Mathematics 22B. Open to College of Engineering students only. Theoretical analysis of kinematics and dynamics of particles, systems of particles, and rigid bodies; applications of these topics are applied to engineering problems. Only two units of credit allowed to students who have previously taken course 36. GE credit: SciEng | QL, SE, VE.—F, W, S (F, W, S.) Cheng, Eke, Hess, Joshi

103. Fluid Mechanics (4)
Lecture—4 hours. Prerequisite: C- or better in each of the following: Mathematics 35 and Mathematics 22B and Physics 9B. Open to students in the College of Engineering and the College of Letters and Science. Fluid properties, fluid statics, fluid mechanics, thermodynamics, and heat exchangers. GE credit: SciEng | QL, SE, VE.—F, W, S (F, W, S.)

104. Mechanics of Materials (4)

104L. Mechanics of Materials Laboratory (1)
Laboratory—3 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 analysis. GE credit: SciEng | SE.—W, S, W, S (W, S.)

105. Thermodynamics (4)
Lecture—4 hours. Prerequisite: grade of C- or better in Mathematics 22B and Physics 9B. Open to College of Engineering students only. Fundamentals of thermodynamics: energy and work, properties of pure substances, First and Second Law for closed and open systems, reversibility, entropy, thermodynamic temperature scales. Application of thermodynamics to engineering systems. GE credit: SciEng | QL, SE, VL.—F, W, S, F. (F, W, S.) Aldridge, D’Souza, Erickson

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, and cost of capital, economic life, and risk and uncertainty are applied to methods of selecting most economic alternatives. GE credit: SciEng or SocSci | QL, SE, SI, SS, VL.—W (W.) Hartough, Slaughter

111. Electric Power Equipment (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: grade of C- or better in 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. Offered irregularly. GE credit: SciEng | QL, SE, VE, WE, —Delwiche, Harrison

121. Fluid Power Actuators and Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: grade of C- or better in Engineering 100 and Engineering 102. Hydraulic and pneumatic systems with emphasis on analysis and control of actuators. Design of hydraulic and pneumatic systems, specification and sizing of components, and selection of electro-hydraulics/electro-pneumatics, servo valves, and closed loop systems to solve basic control problems. Offered in alternate years. GE credit: SciEng | QL, SE, VL, WE, —(S.) Rosa

122. Introduction to Mechanical Vibrations (4)
Lecture—4 hours. Prerequisite: C- or better in Engineering 102; C- or better in Engineering 6 or University of California, San Diego Computer Science Engineering 30; ability to program in MATLAB. Free and forced vibrations in lumped-parameter systems with and without damping; vibrations in electrical systems, electromechanical analogs; use of energy conservation principles. GE credit: SciEng | QL, SE.—F. (F.)

160. Environmental Physics and Society (3)
Lecture—3 hours. Prerequisite: Physics 9D, SC, or 10 1B and 20. The 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 social and policy implications will be considered. In the College of Engineering, students may receive only one unit of credit towards the Technical Electives requirement. (Same course as Physics 160.) GE credit: SciEng or SocSci | QL, SE, SL, S.—(S.) Craig, Jungeman

180. Engineering Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in Mathematics 21D and 22B, C- or better in Engineering 63 or University of California, San Diego Computer Science Engineering 30. Solutions of systems of linear and nonlinear algebraic equations; approximation methods; solutions of ordinary differential equations; boundary and initial value problems; solutions of partial differential equations of elliptic, parabolic, and hyperbolic types; Eigen value problems. GE credit: SciEng | SE.—F. (F.) Halez

188. Science and Technology of Sustainable Power Generation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing. Physics 7C or 9C. Focus on scientific understanding and development of power generation that is the basis of modern society. Concentration on power generation technologies that are sustainable, in particular, discussion of the most recent innovations. GE credit: SocSci | SS.—W. (W.) Hwang

190. Professional Responsibilities of Engineers (3)
Lecture—3 hours. Restricted to upper division students in the College of Engineering. Organization of the engineering profession; introduction to contracts, specifications, business law, patents, and liability; discussion of professional, ethical, societal, and political issues related to engineering. GE credit: SocSci | SS.—W. (W.) Jeregonis

198. Directed Group Study (1-5)
May be repeated for credit up to 3 times. (P/NP grading only.) GE credit: SE.

Graduate

250. Technology Management (3)
Lecture—3 hours. Prerequisite: consent of instructor. Management of the engineering and technology activity. Functions of design, planning, production, marketing, sales, and maintenance. Technological product life cycle. Research and development activity. Project planning and organization. Manufactur- ing issues. Case studies.—F. (S.)

Engineering: Applied Science

(College of Engineering)

The Graduate Program in Applied Science

The Department of Applied Science is not accepting new graduate students.

Courses in Engineering: Applied Science—Davis (EAD)

Graduate

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.—W. (W.) Max

225. Biophotonics in Medicine and the Life Sciences (3)
Lecture/discussion—3 hours. Prerequisite: Physics 108 and Biology 110-105; course 202 highly recommended; graduate standing. Introduction to the science and technology of biomedical optics and photonics, with an overview of applications in medicine and the life sciences. Emphasis on research supported by the NSF Center for Biophotonics at UC Davis Medical Center. (Same course as Biological Engineering 255 and Biophysics 255)—W. (W.) Chuang, Matthews

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-upwind differencing to Godunov methods.—S. (S.) Miller

285D. Physics and Technology of Microwave Vacuum Electron Beam Devices IV (4)
Lecture—4 hours. Prerequisite: 285C. Computational modeling of vacuum electron beam devices. Offered in alternate years.—(S.) Luhmann
Biotechnology involves the handling and manipulation of living organisms or their components to produce useful products. Students specializing in biotechnology engineering integrate courses in applied biology to solve problems in renewable energy production, large-scale biotechnical production, control of biological systems, and bio-based materials production. Students may focus on the mechanisms and processes for the sustainable production and use of energy from renewable biological sources. Students may also focus on the challenges in scaling up laboratory developments to the industrial production, including production, packaging, and application of biocontrol agents for plant pests and diseases; genetically altered plants; plant materials and food products, and microbial production of biological products, tissue culture, and bioremediation. Students may also focus on the development of biosensors to detect microorganisms and specific substances, useful in the development of products based on biological processes and materials.

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 161
- Chemical Engineering 161B, 161C, 161L
- Civil and Environmental Engineering 143, 148A, 149, 150, 153
- Engineering 180
- Mechanical Engineering 161, 162, 163


### Agricultural and Natural Resources Engineering

With the world population expected to grow over the next several decades, major concerns lie with meeting meeting the global food and agriculture and with the sustainable use of limited natural resources. Students specializing in agricultural and natural resources engineering combine analysis and design with applied biology to solve problems in producing, transporting, and processing biological products leading to food, fiber, energy, pharmaceuticals, and other human needs.

Students may focus on automation and control of field operations and engineered systems, robotics, and on the biomechanics of humans and animals. They may also focus on engineering issues related to the sustainable use of natural resources, particularly energy and water, but also land and air. Agricultural and natural resources engineers design machinery, processes, and systems for productive plant and animal culture, while improving overall sustainability.

Agricultural and natural resources engineers are employed as practicing professionals and managers with agricultural producers, equipment manufacturers, irrigation districts, food processors, consulting engineering firms, startup companies, and government agencies. Graduates with interest in biomechanics work in industry on the design, evaluation, and application of human-centered devices and systems, as well as on improving worker health and safety.

Recommended biological science electives:
- Animal Emphasis
- Avian Sciences 100
- Animal Science 143, 144, 146
- Neurobiology, Physiology, and Behavior 101
- Soil Science 100
- Aquaculture Emphasis
- Animal Science 118, 131, 136A
- Applied Biological Systems Technology 163
- Wildlife, Fish, and Conservation Biology 120, 121
- Biomechanics Emphasis
- Biological Sciences 102
- Neurobiology, Physiology and Behavior 101
- Exercise Biology 103
- Cell Biology and Human Anatomy 101
- Plant Emphasis
- Entomology 100
- Environmental Horticulture 102
- Environmental, Resource, and Policy 100
- Environmental Toxicology 101
- Hydrologic Sciences 124
- Microbiology 123
- Soil Science 111

### Recommended engineering electives:
- Biological Systems Engineering 128, 145
- Biomedical Engineering 140, 145, 147
- Civil and Environmental Engineering 140, 141, 142, 144, 145, 148A, 171
- Engineering 111, 121, 180

Additional recommended electives:
- Applied Biological Systems Technology 150, 161, 165

### Suggested Advisers

### Food Engineering

Producing the food we eat every day constitutes the largest industrial sector of the U.S. economy, and this production involves the work of engineers in a wide variety of food industries, both at home and around the world. Students specializing in food engineering design food processes and operate equipment and facilities for production of high quality, safe, and nutritious food with minimal impact of these operations on the environment.

Students learn to apply engineering principles and concepts to handle, store, process, package, and distribute food and related products. In addition to engineering principles, the food engineering specialization provides an understanding of the chemical, biochemical, microbiological, and physical characteristics of food. Students study concepts of food refrigeration, freezing, thermal processing, drying, and other food operations, food digestion, and health and nutrition in food system design.

Food engineers work as practicing engineers, scientists, and managers in the food industry.

Recommended biological science electives:
- Biological Sciences 101, 102, 103
- Environmental Science and Policy 110
- Environmental Toxicology 101
- Food Science and Technology 104, 104L, 119, 128
- Plant Sciences 172

### Recommended engineering electives:
- Biological Systems Engineering 161
- Chemical Engineering 157
- Mechanical Engineering 171, 172

### Suggested Advisers
- Gar Bahorot, J. de Moura Bell, J. Jeoh, M. McCarthy, N. Nitin, Z. Pan, D. Slaughter

### Upper Division Required Courses

<table>
<thead>
<tr>
<th>COURSE</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering 100, 102, 104, 105, 106, 107</td>
<td>18</td>
</tr>
<tr>
<td>Biological Systems Engineering 103, 125, 127, 130, 165, 170A, 170B, 170C, 170CL</td>
<td>29</td>
</tr>
<tr>
<td>Biological Systems Engineering—Select a minimum of 4 units from all upper division Biological Systems Engineering courses not otherwise required, with the exception of Biological Systems Engineering courses 189-199</td>
<td>4</td>
</tr>
<tr>
<td>Statistics 100</td>
<td>4</td>
</tr>
<tr>
<td>Engineering electives—Select a minimum of three 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)</td>
<td>3</td>
</tr>
<tr>
<td>Biological science electives—All upper-division courses in the College of Biological Sciences (with the exception of Biological Sciences 132, Evolution and Ecology 175, Fall 2011 and on Revised General Education (GE)</td>
<td>2017-2018 offering in parentheses</td>
</tr>
</tbody>
</table>
Exercise Biology 102, 112, 115, 118 through 149L, 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 113, 143, 144, 146; Agricultural Management and Rangeland Resources 110A; Atmospheric Science 133; Avian Sciences 100; Cell Biology and Human Anatomy 101, 101L; 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 110, 112A, 131; Food Science and Technology 102A, 104L, 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. 3 Upper Division Composition Requirement* one course from the following: University Writing Program 101, 102B, 102E, 102F, 102G, 104E, 104F, 104T (grade of C- or better is required) 4

*The Upper-Division composition exam administered by the College of Letters and Sciences cannot be used to satisfy the upper-division composition requirement for students in the Biotechnological Systems Engineering program.

Master Undergraduate Adviser. T. Jeoh

Energy Minor Programs
There is an urgent need to develop and commercialize technologies for the sustainable conversion and use of energy. The goal of these minors is to prepare students for careers that require training in energy science and technology, efficiency, and policy. Clean technologies and green technologies including energy are some of the fastest growing markets for new investments. Well trained individuals in all related fields are needed to provide the level of expertise required to advance technology and policy and to satisfy national and global objectives for greater energy sustainability. The minors are designed to accommodate persons of diverse backgrounds with educational interests in areas that may include engineering, science, policy, economics, planning, and management.

Energy Science and Technology Minor
All courses must be taken for a letter grade. A grade of C- or better is required for all courses used to satisfy minor requirements with an overall GPA in the required minor courses of 2.00 or better.

Minor Requirements: UNITS

Energy Science and Technology .......................... 20
Engineering 105 or Chemical Engineering 152B ........................................... 4
Engineering 188 ........................................... 4
Select 12 units from: Biological Systems Engineering 161; Chemical Engineering 146, 158C, 161A, 161B, 161L, 166; Civil and Environmental Engineering 125, 143, 162, 163; Mechanical Engineering 161; Agricultural and Resource Economics 175; Food Science and Technology 123; Applied Biological Systems Technology 182; Atmospheric Science 116; Plant Science 101; Environmental Science and Policy 167 ... 12

Minor Advisers. B. Jenkins (Department of Biological and Agricultural Engineering), K. McDonald (Department of Chemical Engineering), C. van Dam (Department of Mechanical and Aerospace Engineering)

Energy Policy Minor
All courses must be taken for a letter grade. A grade of C- or better is required for all courses used to satisfy the minor requirements with an overall GPA in the required minor courses of 2.00 or better.

Minor Requirements: UNITS

Energy Policy ........................................... 18
Engineering 188 and Environmental Science and Policy 167 ............................... 8
Select 10 units from: Civil Engineering 125; Environmental Science and Policy 171, 163, 168A, 169B; Political Science 105, 109, 122, 164 143, 162, 164 .................................. 10
Minor Advisers. D. Niemier (Department of Civil and Environmental Engineering), J. Ogden (Environmental Science and Policy)

Energy Efficiency Minor
All courses must be taken for a letter grade. A grade of C- or better is required for all courses used to satisfy the minor requirements with overall GPA in the required minor courses of 2.00 or better.

Minor Requirements: UNITS

Energy Efficiency ...................................... 20
Engineering 188 and Civil Engineering 125 .................................................. 8
Select 12 units from: Civil Engineering 126, 127, 128, 143; Environmental Science and Policy 167; Design 136A, 136B, 137A .......................... 12

Minor Advisers. F. Lege (Civil and Environmental Engineering), D. Sperling (Institute of Transportation Studies), M. Modera (Western Cooling Efficiency Center)

The Graduate Program in Biological Systems Engineering
Integrated B.S./M.S., M.S., Ph.D., and Ph.D. in Biological Systems Engineering Designated Ph.D. emphasis available in Biotechnology
http://bae.engineering.ucdavis.edu

Graduate students in Biological Systems Engineering focus on finding economically and environmentally sustainable solutions to many of the most important global issues of our time—the safety, security and abundance of our food, detection of pathogens, development of bioenergy and other sustainable energy systems, control of insect-borne disease and damage, as well as the preservation of our land, air and water resources.

We enjoy the strategic advantage of being located in California, the national leader in agricultural production and crop diversity, and a major center for biotechnology. With the unique status of belonging to both the College of Engineering and the College of Agricultural and Environmental Sciences, the program benefits from a wide diversity of collaborations across multiple disciplines. We interact with colleagues in both engineering and the life sciences to create multidisciplinary approaches to our teaching and research needs. We benefit from the dynamic environment that combines the strengths of nationally ranked engineering, agricultural and environmental programs.

Financial support is available in the form of teaching assistantships, research assistantships, fellowships and financial aid. 

Research Highlights:
- Automation and Control
- Bioenvironmental engineering
- Renewable energy

- Industrial biotechnology
- Food safety
- Biosensors
- Bioprocess engineering
- Bioinstrumentation
- Ergonomics, health and safety
- Aquacultural engineering
- Ecological systems engineering
- Food engineering
- Forest and fiber engineering
- Postharvest engineering
- Remote sensing
- Robotics and autonomous systems
- Soil and water engineering
- Machine systems and precision agriculture

Research Facilities and Partnerships:
- Agricultural Ergonomics Research Center
- Fish Conservation and Culture Laboratory
- GIS Visualization Lab
- Energy Institute
- Bodega Marine Lab
- Western Center for Agricultural Equipment

Complete information is available on the departmental website.

Courses in Engineering: Biological Systems (EBS)

Lower Division
1. Foundations of Biological Systems Engineering (4)
Lecture—2 hours, laboratory—3 hours; project—3 hours. Restricted to students in Biological Systems Engineering. Introduction to engineering and the engineering design process with examples drawn from the field of biological systems engineering. Introduction to computer-aided design and mechanical fabrication of designs. Students work on a quarter-long design project. GE credit: SciEng | OL, QL, SL, VL. F—(F) Barnhurst, Fathalalah, Jenkins

75. Properties of Materials in Biological Systems (4)
Lecture—3 hours, laboratory—3 hours. Prerequisite: Biological Sciences 2A; Physics PC (may be taken concurrently). Properties of typical biological materials; composition and structure with emphasis on the effects of physical and biochemical properties on the design of engineered systems; interactions of biological materials with typical engineering materials. GE credit: SciEng | OL, QL, SL, VL, WE. W—(W) Slaughter, Zicari

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.) GE credit: SE. F, W, S. F, W, S.

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.) GE credit: SE.

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Group study of selected topics; restricted to lower division students. (P/NP grading only.) GE credit: SE.

99. Special Study for Lower Division Students (1-5)
(P/NP grading only.) GE credit: SE.
Upper Division


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. GE credit: SciEng|QI, SE, VL, VE.—S. (S.) Hartough

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 combustion, turbines, generators, motors, fluid power systems, fuels, and emerging technologies. Selection of units for power matching and optimum performance. GE credit: SciEng|QI, SE, SL, VL, VE.—F. (F.)


130. Modeling and Dynamic Processes in Biological Systems (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 75; Engineering 6 or Computer Science & Engineering 30; grade of C- or better in Mathematics 22B or equivalent eligibility. Techniques for modeling processes through mass and energy balance, rate equations, and equations of state. Computer problem solution of models. Example models include evaporation, respiration heating, thermal processing of foods, and plant growth. GE credit: SciEng|OL, QI, QI, SE, VL, VE.—W. (W.) Fan, Upadhyaya


145. Irrigation and Drainage Systems (4) Lecture—4 hours. Prerequisite: course 103 or Hydrologic Science 103N. Engineering and scientific principles applied to irrigation engineering, drainage and micro irrigation systems and drainage systems within economic, biological, and environmental constraints. Interaction between irrigation and drainage. GE credit: SciEng|QI, SE, SL, VL, VE.—W. (W.) Grissmer, Wallender

147. Runoff, Erosion and Water Quality Management in the Tahoe Basin (3) Lecture/laboratory—30 hours; fieldwork—15 hours; discussion—1 hour. Prerequisite: Physics 78b or 98, Mathematics 16C or 21C, Civil and Environmental Engineering 142 or Hydrologic Science 141 or Environmental and Resource Sciences 100. Practice on 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 relationships, sediment transport, and detention ponds. Five days of instruction in Tahoe City. (Same course as Hydrologic Science 147.) GE credit: SciEng|QI, SE, SL, VL, VE.—W. (W.) Giles, Zhang

161. Kinetics and Bio reactor Design (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 127. Provide the basic principles of reactor design for bioprocess applications. This course emphasizes the following topics: 1) kinetics and reactor engineering principles; 2) bio-reaction kinetics; and 3) bioreactor design. GE credit: SciEng|QI, SE, SL, VL, VE.—F. (F.) Jeon

165. Bioinstrumentation and Control (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100. Principles of instrumentation and control for biological production systems. Measurement system concepts, instrumentation and transducers for sensing physical and biological parameters, data acquisition and control. GE credit: SciEng|QI, SE, SL, VL, VE.—F. (F.) Slaughter, Voygoukas

170A. Engineering Design and Professional Responsibilities (3) Lecture—3 hours; laboratory—3 hours. Prerequisite: course 1, Engineering 102, 104. Engineering design including professional responsibilities. Emphasis on project selection, data sources, specifications, human factors, biological materials, safety systems, and professionalism. Detailed design proposal will be developed for courses 170B and 170BL. GE credit: SciEng|QI, QI, SE, SL, VL, VE.—F. (F.) Giles, Zhang

170B. Engineering Projects: Design (2) Discussion—2 hours. Prerequisite: course 170A; course 170BL 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. GE credit: SciEng|QI, QI, SE, SL, VL, VE.—W. (W.) Giles, Zhang

170BL. Engineering Projects: Design Laboratory (1) Laboratory—2 hours. Prerequisite: course 170B required concurrently. Individual or group projects involving the design of devices, structures, or systems to solve specific engineering problems in biological systems. GE credit: SciEng|OL, QI, SE, SL, VL, VE.—W. (W.)

170C. Engineering Projects: Design Evaluation (1) Discussion—a hour. Prerequisite: course 170B; required to enroll in course 170CL 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. GE credit: SciEng|OL, QI, SE, SL, VL, VE.—S. (S.) Giles, Zhang

170CL. Engineering Projects: Design Evaluation 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. GE credit: SciEng|OL, QI, SE, SL, VL, VE.—S. (S.) Giles, Zhang

175. Rheology of Biological Materials (3) Lecture—3 hours. Prerequisite: course 103 or Engineering 103. Fluid and solid behavior of biological materials, and application of rheological properties to food and biological systems (e.g., pipeline design, aerosolization, mixing, coating). GE credit: SciEng|QI, SE, SL, VL, VE.—W. (W.) K. McCarthy
190C. Research Group Conference in Biological Systems Engineering (1) Discussion—2 hours. 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.) GE credit: SS. —F, W, S. (W, S.)

197T. Tutoring in Biological Systems Engineering (1-5) Tutoring—variable 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.) GE credit: SS.

198. Directed Group Study (1-5) Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SS.

199. Special Study for Advanced Undergraduates (1-5) (P/NP grading only.) GE credit: SS.

Graduate


205. Continuum Mechanics of Natural Systems (4) Lecture/discussion—4 hours. Prerequisite: Math 212 and 228, Physics 9B. 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.) —S.

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 soil; analyses of stress and strains in soil due to machine-applied loads; experiments and methods for synthesizing characteristic properties of soil. Offered in alternate years. —W. Upadhyaya


220. Pilot Plant Operations in Aquacultural Engineering (3) Lecture—2 hours; 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 operations in aquaculture. Offered in alternate years. —F. Hung

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 back and upper extremities; MSDs risk factors assessment and control; research opportunities related to MSDs. —S. 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 coating and packaging foods and controlling release of biologically active compounds. Offered in alternate years. —W.

233. Analysis of Processing Operations: Drying and Freezing (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 modeling of drying processes in various evaporators: multiple effects, mechanical and thermal recombination, control systems. Offered in alternate years. —(W.)

235. Advanced 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 applications in food and fermentation systems. —S.

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. —F. M. McCarthy

239. Magnetic Resonance Imaging in Biological Systems (3) Lecture—3 hours. Prerequisite: graduate standing. Theory and applications of magnetic resonance imaging in biological systems. Classical Bloch model of magnetic resonance. Applications to be studied are drying of foods, flow of food suspensions, diffusion of moisture, and structure of foods. Offered in alternate years. —S. Fathallah

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. —W. Grismer

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 distribution functions and water yield functions. Offered in alternate years. —S.

242. Hydraulics of Surface Irrigation (3) Lecture—3 hours. Prerequisite: course 145, Hydrologic Science 115. Mathematical models of surface-irrigation systems for prediction of the ultimate disposition of water flowing onto a field. Quantity of run-off and distribution of infiltrated water over field length as a function of soil properties, irrigation and inflow rates. Offered in alternate years. —S.

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. Water allocation, capacity expansion, and reservoir simulation. Use of surface water and groundwater. Water quality management. Irrigation planning and operation models. (Same course as Hydrologic Science 243.) Offered in alternate years. —F.

245. Waste Management for Biological Production Systems (3) Lecture—3 hours. Prerequisite: graduate standing or consent of instructor. Characterization of solid and liquid wastes from animals and plant food production systems. Study of methods and system design for handling, treatment, and disposal/utilization of these materials. —W. (W.) Zhang


262. Computer Interfacing and Control (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100, or an introductory course in statistics. Simple linear, multiple, and polynomial regression, correlation, residuals, model selection, one-way ANOVA, and random effect models, sample size, multiple comparisons, randomized block, repeated measures, and Latin square designs, factorial experiments, nested design and subsampling, split-plot design, statistical software packages. —S. (S) Slaughter, Upadhyaya

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 biochemicals. Design and modeling of microbial- and plant-based production systems including associated fermentation, extraction, and purification processes. Offered in alternate years. —F. VanderGheynst

268. Polysaccharides Surface Interactions (3) Lecture—3 hours. Prerequisite: graduate students in science or engineering. Polysaccharides as surfactant science theories as applied to physical and chemical interactions of carbohydrates and polysaccharides. Offered in alternate years. —F. Jeoh

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 of specializations within biological and agricultural engineering. Offered in alternate years. —S. 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, optical, rheological,
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.)—F, W, S. (F, W, S.)

298. Group Study (1-5)

299. Research (1-12) (S/U grading only)

Professional

390. Supervised Teaching in Biological and Agricultural Engineering (1-3) Laboratory—3 hours; tutorial—9 hours. Prerequisite: graduate standing; consent of instructor. Tutoring and teaching students in undergraduate courses offered in the Department of Biological and Agricultural Engineering. Weekly conferences with instructor; evaluation 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.)—F, W, S. (F, W, S.)

Engineering: Biomedical

[College of Engineering]

Alyssa Panitch, Chairperson of the Department

Department Office: 2303 Genome and Biomedical Sciences Facility 530-752-1033; http://www.bme.ucdavis.edu

Faculty

Kyriacos A. Athanasiou, Ph.D., Distinguished Professor (Biomedical Engineering; Medicine: Orthopaedic Surgery)
Sharon Aviran, Ph.D., Assistant Professor
Ramsey D. Badawi, Ph.D., Associate Professor (Biomedical Engineering; Radiology)
Craig J. Benham, Ph.D., Professor (Biomedical Engineering; Mathematics; Genome Center)
John M. Boone, Ph.D., Professor (Biomedical Engineering; Medicine: Radiology; Pharmacology and Internal Medicine/Cardiology)
Ye Chen-Izu, Ph.D., Associate Professor (Biomedical Engineering; Medicine; Pharmacology and Internal Medicine/Cardiology)
Simon R. Cherry, Ph.D., Distinguished Professor (Biomedical Engineering; Medicine: Radiology)
Jennifer H. Choi, Ph.D., Lecturer PSOE
Yong Duan, Ph.D., Professor
Marc T. Facciotti, Ph.D., Associate Professor (Biomedical Engineering; Medicine: Radiology; Pharmacology and Internal Medicine/Cardiology)
Katherine W. Fullerton, Ph.D., Distinguished Professor
David P. Fryhle, Ph.D., Professor (Biomedical Engineering; Medicine: Orthopaedic Surgery)
Volkan Heinrich, Ph.D., Associate Professor
Stephen M. Howard, M.D., Adjunct Professor
Tanya Kuhl, Ph.D., Professor (Biomedical Engineering; Chemical Engineering & Materials Science)
J. Kent Leach, Ph.D., Professor (Biomedical Engineering; Medicine: Orthopaedic Surgery)
Jamal Lewis, Ph.D., Assistant Professor
Angiela Louie, Ph.D., Professor
Laura Marcus, Ph.D., Professor (Biomedical Engineering; Medicine: Neurosurgery)
Tingrui Pan, Ph.D., Associate Professor
Alyssa Panitch, Ph.D., Professor
Alul N. Parikh, Ph.D., Professor (Biomedical Engineering; Chemical Engineering & Materials Science)
Anthony G. Passeri, Ph.D., Associate Professor
Jinji Qi, Ph.D., Professor
Alexander Revzin, Ph.D., Professor
David Rocke, Ph.D., Distinguished Professor (Biomedical Engineering; Medicine: Public Health Sciences)
Leonor Soiz, Ph.D., Associate Professor
Michael A. Savagavar, Ph.D., Distinguished Professor (Biomedical Engineering; Microbiology & Molecular Genetics)

Eduardo A. Silva, Ph.D., Assistant Professor
Scott Simon, Ph.D., Professor
Vivek J. Srinivasan, Ph.D., Assistant Professor (Biomedical Engineering; Medicine: Ophthalmology)
Julie L. Sutcliffe, Ph.D., Associate Professor (Biomedical Engineering; Medicine: Hematology and Oncology)
Cheemeng Tan, Ph.D., Assistant Professor
Soichiro Yamada, Ph.D., Associate Professor

Emeriti Faculty

Fitz-Roy Curry, Ph.D., Distinguished Professor (Biomedical Engineering; Medicine: Physiology and Membrane Biology)
Maury Hull, Ph.D., Professor Emeritus (Biomedical Engineering; Mechanical and Aerospace Engineering)

The Biomedical Engineering Undergraduate Major

The Biomedical Engineering program is accredited by the Engineering Accreditation Commission of ABET, see http://www.abet.org.

Biomedical engineering is an interdisciplinary area of study that integrates knowledge from engineering with the biomedical sciences. It is a very diverse field, with biomedical engineers working in systems ranging from medical imaging to the design of artificial organs. Some major research advances in biomedical engineering include the left ventricular assist device (LVAD), artificial joints, kidney dialysis, biomechanical skin, angioplasty, 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 of the Department of Biomedical Engineering is to combine exceptional teaching with state-of-the-art research for the advancement of technologies and computational techniques that meet medical and societal challenges. As a biomedical engineer, you can choose employment opportunities in industry, hospitals, academic research institutes, teaching, national laboratories, or government regulatory agencies.

The educational objectives of our program are that our graduates develop successful career related to biomedical engineering or another area of the student’s choosing, through employment in industry or government, or through pursuit of graduate or professional degrees; and contribute effectively to society through engineering practice, research and development, education, or in governmental, regulatory or legal aspects.

The biomedical engineering curriculum has been designed to provide a solid foundation in mathematics, life and physical sciences, and engineering, and to provide sufficient flexibility in the upper division requirements to encourage students to explore specializations within the field. Our instructional program is designed to impart knowledge of contemporary issues at the forefront of biomedical engineering research. Exclusive of General Education units, the minimum number of units required for the Biomedical Engineering degree is 157.

For information about graduate degree options, see Biomedical Engineering (A Graduate Group), on page 195.

Lower Division Required Courses

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

UNITs

Mathematics 21A or 21AH; 21B or 21BH; 21C or 21CH; 21D........................................... 16
Mathematics 22A or 22B ........................................... 6
Physics 9A or 9AH; 9B, 9C................................. 15
Chemistry 2A or 2AH, 2B or 2BH, 2C or 2CH................................. 15

Fall 2011 and on Revised General Education (GE) Areas: AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; AC—American Cultures; DD—Diverse Ethnicities, DQ—Quantitative, LS—Life Sciences; VL—Visual; WC—World Cultures; WR—Writing Experience

Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Diverse Ethnicities; Wrt—Writing Experience

Quarter Offered: F=fall, W=Winter, S=Spring, Su=Summer; 2017/2018 offering in parentheses
Chemistry 118A or 118B; or Biomedical Engineering 102, 161A, 161L, 161S, Chemistry 118C or any graded upper division course in the Biological Sciences, Chemistry, or Physics that is designated as Science and Engineering topical breadth. Four units of Biomedical Engineering 99 with the approval of the Biomedical Engineering Undergraduate Committee.

Upper Division Electives


*Electives to be chosen in consultation with the Biomedical Engineering Department Adviser.


Areas of Specialization

As Biomedical engineering is defined so broadly, specializing in a subfield of engineering can provide more in-depth expertise in a focus area. Through the judicious selection of upper division engineering and science electives, students can create this depth in one of our suggested areas of specialization or in an area of the student’s choosing. The focus area that the UC Davis program is the flexibility to design one’s own emphasis of study. These specializations are neither required nor degree-notated.

Biomechanics

Biomechanics is a broad subfield that includes orthopaedic/rehabilitation engineering (including the design of wheelchairs and prosthetics) as well as the study of mechanisms that are produced by biological systems. Biomechanics allows a better understanding of the fluid dynamics of blood flow and the forces acting on tissue in the artery to allow the design of better cardiovascular interventions. This field involves more extensive study of mechanics, dynamics and thermodynamics.

Cellular and Tissue Engineering

This focus area applies biomedical engineering principles to control behavior at the gene, protein, cell, and tissue level. Scientists in this area can work in diverse areas including cellular therapies, protein production, gene therapy, tissue engineering and regeneration, and drug development. This field can require study in biomedical transport, natural or synthetic biomaterials, pharmacokinetics and pharmacodynamics. It draws heavily from knowledge in the biological and chemical sciences.

Imaging

The visualization of anatomical structure, physiological processes, metabolic activity and molecular expression. In order to accomplish goals that include the diagnosis of disease, the development of new therapeutics, the evaluation of the response to therapeutics, and the guidance of intervention procedures. Our program has a particular strength in molecular imaging, in which molecular-scale events are detected within living systems. An imaging bioengineer can work in areas ranging 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 interest, this field can require further study in electronics signal processing, chemistry or computer programming.

Pre-Medical Students

Engineering is playing an increasing role in the practice of medicine, and students interested in medicine can focus on the intersection of engineering and medicine. To meet admission requirements for medical school, students must complete extra core work. These courses are in addition to the listed Department of Biomedical Engineering curriculum requirements.

Courses in Biomedical Engineering (BIM)

Lower Division

1. Introduction to Biomedical Engineering (2)

Lecture—1 hour; laboratory—3 hours. Pass One open to freshmen. Introduction to the field of biomedical engineering with emphasis on design, careers, and specializations, including (1) medical devices and instrumentation, (2) cellular & tissue engineering, (3) biomechanics, (4) systems & synthetic biology, and (5) biomedical imaging. GE credit: SciEng|SE, SCI, W.

20. Fundamentals of Bioengineering (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in Chemistry 26 and Mathematics 21D; Physics 9B. Basic principles of mass, energy and momentum conservation equations applied to solve problems in the biological and medical sciences. Only two units of credit to students who have previously taken Chemical Engineering 51, Engineering 105. GE credit: SciEng|QL, VE, VL, WE, QL.

98A. Topics in Biomedical Engineering (1-5)

Prerequisite: consent of instructor. Restricted to lower division students. Topics in Biomedical Engineering. (A) Cellular and Molecular Engineering. May be repeated for credit when topics differ. GE credit: SciEng|SE.

98B. Topics in Biomedical Engineering (1-5)

Prerequisite: consent of instructor. Restricted to lower division students. Topics in Biomedical Engineering. GE credit: SciEng|SE.

98C. Topics in Biomedical Engineering (1-5)

Prerequisite: consent of instructor. Restricted to lower division students. Topics in Biomedical Engineering. GE credit: SciEng|SE, WE.

99. Special Study for Undergraduates (1-5)

(P/NP grading only) GE credit: SE.
Upper Division

102. Quantitative Cell Biology (4)
Lecture/discussion—4 hours. Prerequisite: Biological Sciences 2A; Chemistry 8B. Open to College of Engineering upper division students. The cell biology for bioengineers. Emphasis on physical concepts underlying cellular processes including protein trafficking, cell motility, cell division and cell adhesion. Concepts of basic cell biology of cancer and stem cells will be discussed. Only two units of credit for students who have completed Biological Sciences 104 or Molecular and Cellular Biology 143. GE credit: SciEng | QL, SE, VL, W—(F. F.) Yoda

105. Probability and Statistics for Biomedical Engineers (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in Mathematics 21D; Engineering 6 (may be concurrently); Concepts of probability, random variables and processes, and statistical analysis with applications to engineering problems in biomedical sciences. Includes discrete and continuous random variables, probability distributions and models, hypothesis testing, statistical inference and Matlab applications. Emphasis on BME applications. GE credit: SciEng | QL, SE, VL—(F. Rocke)

106. Biotransport Phenomena (4)
Lecture—4 hours; discussion—1 hour. Prerequisite: C- or better in course 20; course 116 or Neurobiology, Physiology, and Behavior 101; Physics 9B; Mathematics 22B. Open to Biomedical Engineering majors. Introduction to momentum and mass transfer with applications to biomedical systems; emphasis on basic fluid transport related to blood flow, mass transfer across cell membranes, and the design and analysis of artificial organs. GE credit: SciEng | QL, SE, VL, W—(W.) Tan

107. Mathematical Methods for Biological Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in Engineering 6; course 20; Mathematics 22B. Restricted to Biomedical Engineering majors only. Mathematical and computational modeling to solve biomedical problems. Topics include stochastic processes and Monte Carlo simulations, and partial differential equations. Introduced to numerical techniques in MATLAB. Offered irregularly. GE credit: SciEng | QL, SE

108. Biomedical Signals and Control (4)
Lecture—4 hours. Prerequisite: Engineering 6, 17; grade of C- or better in Mathematics 22B. Restricted to Biomedical Engineering majors only. Systems and control theory applied to biomedical engineering problems. Time-domain and frequency-domain analysis of signals and systems, convolution, Laplace and Fourier transforms, transfer function, dynamic behavior of first and second order processes, and design of control systems for biomedical applications. No credit for students who have taken Electrical and Computer Engineering 150A; two units of credit for students who have taken Mathematical Engineering 171. GE credit: SciEng | QL, SE, —(S.) Qi

109. Biomaterials (4)
Lecture—4 hours. Prerequisite: course 106; Biological Sciences 2A; Chemistry 2C. Restricted to upper division Engineering majors. Introduce important concepts for design and application of biomaterials. Given the interdisciplinery nature of the subject, principles of polymer science, surface science, materials science and biology will be integrated throughout the course. GE credit: SciEng | QL, SE, VL—(S.) Rezvani

110. Biomedical Engineering Senior Design Experience (3)
Lecture/discussion—1 hour; project—6 hours. Prerequisite: course 115 (may be concurrent); course 111 (may be concurrent); consent of instructor. Restricted to senior Biomedical Engineering majors (or by consent of instructor). Application of bioengineering concepts and computational analysis to a design project culminating in the design of a unique solution to a problem. Design may be geared towards current applications in biotechnology or medical technology. Continues in course 110B. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE, OL, SL, VL—(W.) Passeri

110B. Biomedical Engineering Senior Design Experience (3)
Lecture/discussion—1 hour; project—6 hours. Prerequisite: course 110A. Application of bioengineering theory and experimental analysis to a design project culminating in the design of a unique solution to a problem. Design may be geared towards current applications in biotechnology or medical technology. GE credit: SciEng | QL, SE, VL, SL—(S.) Passeri

110L. Biomedical Engineering Senior Design Lab (3)
Laboratory—3 hours; laboratory/discussion—2 hours. Prerequisite: courses 105, 108, 109. Restricted to Senior Biomedical Engineering majors. Manufacturing processes, safety, and computer-aided design and fabrication of biomedical devices. Application of bioengineering principles and design theory to a project culminating in completion of a functional prototype that solves a biomedical problem. Continues in course 110B. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE—(F. W. F.) Passeri

111. Biomedical Instrumentation Laboratory (6)
Lecture—4 hours; discussion/laboratory—4 hours. Prerequisite: courses 105, and 108; Engineering 100 or Electrical Engineering 100; course 116 or Neurobiology, Physiology, and Behavior 101. Open to Biomedical Engineering majors only. Basic biomedical signals and sensors. Topics include analog and digital records using electronic, hydrodynamic, and optical sensors, and measurement methods used at cellular, tissue and whole organism level. GE credit: SciEng | SE—(F. W. F.) Marcu; Pan

116. Physiology for Biomedical Engineers (5)
Lecture—2 hours; discussion—3 hours. Prerequisite: C- or better in Biological Sciences 2A; Physics 9C; Mathematics 22B recommended. Basic human physiology for the nervous, musculoskeletal, cardiovascular, respiratory, gastrointestinal, renal, and endocrine systems. Emphasis on small group design projects and presentations in interdisciplinary topics relating biomedical engineering to medical diagnostics and therapeutics. GE credit: SciEng | OL, SE, SL, VL, WE—(F. F.) Silva

117. Analysis of Molecular and Cellular Networks (4)

118. Microelectromechanical Systems (4)
Lecture—2 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: Chemistry 2A; Engineering 17. Restricted to upper division standing in College of Engineering. One restricted to upper division standing in Biomedical Engineering. Introduction to the theory and practice of micro-electromechanical systems (MEMS), including fundamentals of micro-nano fabrication, microscale sensing and actuation, self assembly, microfluidics and lab-on-a-chip. Weekly hands-on laboratory sections are emphasized on implementation and testing of MEMS technologies. GE credit: SciEng | SE—(S.) Pan

126. Tissue Mechanics (3)
Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: Exercise Science 103 and/or Engineering 45 and/or consent of instructor. Structural and mechanical properties of biological tissues, including bone, cartilage, ligaments, tendons, nerves, and skeletal muscle. [Same course as Exercise Biology 126] GE credit: SciEng | OL, SL, WE

140. Protein Engineering (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A; Introduction to protein structure and function. Modern methods for designing, producing, and characterizing proteins and peptides. Design strategies, computer modeling, heterologous expression, in vitro mutagenesis. Protein crystallography, spectroscopic and calorimetric methods for characterizing proteins, basic other techniques. Offered in alternate years. GE credit: SciEng | QL, SE, SL—(J. Facciotti)

141. Cell and Tissue Mechanics (4)
Lecture—4 hours; discussion—1 hour. Prerequisite: Physics 98; Engineering 9 or 35. Mechanical properties that govern blood flow in the microcirculation. Concepts in blood rheology and cell and tissue viscoelasticity, biophysical aspects of cell morphology and function. Basic other techniques. GE credit: SciEng | QL, SE, VL—(W.) Simon

142. Principles and Practices of Biomedical Imaging (4)
Lecture—4 hours. Prerequisite: Mathematics 22B, course 108 (may be taken concurrently). Basic physics, engineering principles, and applications of biomedical imaging techniques including x-ray imaging, computed tomography, magnetic resonance imaging, ultrasonic and nuclear imaging. GE credit: SciEng | SE—(S.) Cherry

143. Biomolecular Systems Engineering: Synthetic Biology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A and Mathematics 22B. Structural, mechanical and dynamic properties of DNA. Topics include DNA structures and their mechanical properties, in vivo topological constraints on DNA, mechanical and thermodynamic equilibrium, DNA dynamics, and their roles in normal and pathological biological processes. GE credit: SciEng | SE

151. Mechanics of DNA (3)
Lecture—3 hours. Prerequisite: Biological Sciences 2A and Mathematics 22B. Structural, mechanical and dynamic properties of DNA. Topics include DNA structures and their mechanical properties, in vivo topological constraints on DNA, mechanical and thermodynamic equilibrium, DNA dynamics, and their roles in normal and pathological biological processes. GE credit: SciEng | SE—(S.) Saiz

161A. Biomedical Engineering (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A; Chemistry 8B. Restricted to upper division standing. Introduction to the basic concepts and techniques of biomolecular engineering such as recombinant DNA technology, protein engineering, and molecular diagnostics. Three units of credit for students who have taken course 161S. Offered in alternate years. GE credit: SciEng | QL, SE—(F.) Tan

161L. Biomedical Engineering Laboratory (3)
Laboratory—4.5 hours; lecture/discussion—1.5 hours. Prerequisite: course 161A or Biological Sciences 101. Introduction to the basic techniques in biomolecular engineering. Lectures, laboratory, and discussion sessions will cover basic techniques in DNA cloning, bacterial cell culture, gene regulation, protein expression, and data analysis. Offered irregularly. GE credit: SciEng | QL, SE, SL
1615. Biomolecular Engineering: Brief Course (1)
Lecture only. Prerequisite: Biophysics Sciences 2A; Chemistry 8B; course 161L (may be taken concurrently). Basic concepts and techniques in biomolecular analysis, recombinant DNA technology, and protein analysis. Not open for credit to students who have taken course 161A. Offered irregularly. GE credit: Sci|Eng | QL, SE.

162. Introduction to the Biophysics of Molecules and Cells (4)
Lecture: 6 hours; discussion: 1 hour. Prerequisite: C or better in Mathematics 22B; course 116 or Neuroscience, Physiology, and Behavior 101. Fundamentals of biophysics and biophysical principles to direct cell and tissue behavior and for such as boundary layer flow. Not open for credit to specialized applications including miscellaneous topics in the equations of motion, circulation, respiration and specific topics including receptor-ligand dynamics in cell signaling and function, cell motility, DNA replication and RNA processing, cellular energetics and protein sorting, and transport in biofluids. Offerings, requirements, group faculty and research foci.

Graduate

202. Cell and Molecular Biology for Engineers (4)
Lecture/discussion—4 hours. Prerequisite: Biological Sciences 104 or Molecular and Cellular Biology 121. Preparation for research and critical review in the field of cell and molecular biology for biomedically or applied science or engineers. Application of specific topics including receptor-ligand dynamics in cell signaling and function, cell motility, DNA replication and RNA processing, cellular energetics and protein sorting, and transport in biofluids. Offerings, requirements, group faculty and research foci.

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 cardiovascular and transport processes, fluid dynamics, and clinical chemistry. Offerings, requirements, group faculty and research foci.

209C. Topics in Biomedical Engineering: Biomedical Engineering (1-3)
Prerequisite: consent of instructor. Topics in Biomedical Engineering. May be repeated if topic differs. Offered irregularly. GE credit: Sci|Eng | QL, SE.

189C. Topics in Biomedical Engineering: Biomedical Engineering (1-3)
Prerequisite: consent of instructor. Topics in Biomedical Engineering. May be repeated if topic differs. Offered irregularly. GE credit: Sci|Eng | QL, SE.

190A. Upper Division Seminar in Biomedical Engineering (1)
Seminar—1 hour. Restricted to 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.) GE credit: SE.

192. Internship in Biomedical Engineering (1-12)
Internship—3.6-3.6 hours. Prerequisite: consent of instructor. Restricted to upper division majors. Super- vised work experience in the Biomedical Engineering field. May be repeated for credit. (P/NP grading only.) GE credit: SE—F, W, S, Su. (P, W, S, Su.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. May be repeated up to three times prior to graduation. Offerings, requirements, group faculty and research foci.

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. Special study for advanced undergraduates. (P/NP grading only.) GE credit: SE.

The Graduate Program in Biomedical Engineering

Doctoral and master’s degrees in Biomedical Engineering are offered through the interdisciplinary Graduate Program in Biomedical Engineering. Please see http://www.bme.ucdavis.edu and Biomedical Engineering (undergrad) page 195 of the catalog for a description of graduate education offerings, requirements, group faculty and research foci.
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 biological systems. (Same course as Mechanical and Aeronautical Engineering 240.) Offered in alternate years. —(W) Sarigül-Klijn

241. Introduction to Magnetic Resonance Imaging (3)
Lecture—3 hours. Prerequisite: Physics 9D, Mathematics 22B, 212. Magnetic resonance imaging of the body. Protocols and sequences, pulse sequences, image reconstruction, display and technology and how these are applied clinically. Lecture complements the technical course (246). Course (246 can be taken concurrently). —(F) Chaudhari

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 science. Modern and noninvasive imaging approaches. Systems in use in radiology, computed tomography, magnetic resonance, ultrasound, and optical microscopy. —(F) Chaudhari

243. Radiation Detectors for Biomedical Applications (4)
Lecture/discussion—4 hours. Prerequisite: Physics 9D, Mathematics 212, 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, semiconductor, and scintillation detectors. —(W) (J) Cherry

246. Magnetic Resonance Technology (3)
Lecture—3 hours. Prerequisite: Physics 9D, Mathematics 22B. Course covers MRI technology at an advanced level with focus on mathematical descriptions and problem solving. Topics include spin dynamics, signal generation, image reconstruction, pulse sequences, biophysical basis of T1, T2, RF gradient coil design, signal to noise, image artifacts. —(F)

251. Medical Image Analysis (4)
Lecture—4 hours. Prerequisite: Electrical and Computer Engineering 106. Techniques for assessing the performance of medical imaging systems. Principles of digital image formation and processing. Measurements that summarize diagnostic image quality and the performance of human viewers observing these images. Definition and other mathematical observers that may be used to predict performance from system design features. Offered in alternate years. —(W) Qi

252. C. Functional Methods in Biomedical Imaging (4)
Lecture—4 hours. Prerequisite: course 105 or Statistics 120; course 10B or Electrical and Computer Engineering 150A. Analytic tomographic reconstruction from projections. Emphasis on model-based image reconstruction methods; maximum likelihood and Bayesian methods; applications to CT, PET, and SPECT. (Same course as Electrical and Computer Engineering 205.) Offered in alternate years. —(W) Qi

255. Biophotonics in Medicine and the Life Sciences (3)
Lecture—4 hours. Prerequisite: Physics 108 and Biology 101-105; course 202 highly recommended; graduate standing. Introduction to the science and technology of biomedical optics and photonics, with an overview of applications in medicine and the life sciences. Upper division research supported by the NSF Center for Biophotonics at UC Davis Medical Center. (Same course as Applied Science 255 and Biophysics 255.) Offered in alternate years. —(S) Chau

257. Fundamentals of Tissue Optics and Biomedical Applications (5)
Lecture—4 hours. Prerequisite: course 284 or equivalent; graduate standing; undergraduate students by consent of instructor. Introduction to fundamental mechanisms governing the structure, function, and assembly of bio-macromolecules. Emphasis is on a quantitative understanding of the nano-to-microscale interactions between and within individual molecules, as well as their assembly into membranes. Not open for credit to students who have completed course 162. —(W) (J) Heinrich

262. Cell and Molecular Biophysics for Bioengineers (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, metabolism, networks and regulatory mechanisms. Focus on formulating and answering fundamental questions concerning network function, design, and evolution. —(F) Savageau

270. Biochemical Systems Theory (4)
Lecture—4 hours. Prerequisite: course 202 concurrently or consent of instructor. Analyzing and designing systems at the intersection of mathematics, engineering, biology, and technology and how these are applied clinically. Lecture complements the technical course (270). Offered in alternate years. —(W) (J) Savageau

272. Tissue Engineering (3)
Lecture/discussion—3 hours. Prerequisite: Biological Sciences 104 or Molecular and Cellular Biology 121. Based on morphogenetic signals, responding stem cells and extracellular matrix scaffolding. Design and development of scaffolds for functional restoration of organs damaged/lost due to cancer, disease and trauma. Fundamentals of morphogenetic signals, responding stem cells and extracellular matrix scaffolding. —(W) (J) Reddy

273. Integrative Tissue Engineering and Technologies (4)
Lecture/discussion—4 hours. Prerequisite: courses 202 and 204 or similar; strongly encourage completion of course 272 although not a prerequisite. Restricted to graduate standing. Engineering principles to direct cell and tissue behavior and formation. Content includes controlled release of bio-macromolecules, transport within and around biomaterials, examination of mechanical forces of engineered constructs, and current experimental techniques used in the field. —(F) (S) Srinivasan

281. Acquisition and Analysis of Biomedical Signals (4)
Lecture—3 hours, laboratory—3 hours. Prerequisite: Engineering 100, Statistics 130A. Restricted to upper division engineering majors and graduate students in sciences and engineering; priority given to Biomedical Engineering graduate students. Theoretical and practical aspects 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 solution techniques in MATLAB. —(W) (J) Duan

291. Biomechanics of Tissues and Organs (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mechanics of materials. Basic principles of tissue behavior. Emphasis on tissue-level biomechanics of biological tissues, with a focus on mechanical properties of muscle and bone. —(W) (J) Christiansen

299. Biomechanics of Tissues (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 102. Basic principles of tissue behavior. Emphasis on tissue-level biomechanics of biological tissues, with a focus on mechanical properties of muscle and bone. —(W) (J) Christiansen
286. Nuclear Imaging in Medicine and Biology (4) 
Lecture/discussion—4 hours. Prerequisite: course 243 or consent of instructor. Radioactive 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. Offered in alternate years. — S. Culliffe

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 imaging problems in medicine and biology. — S. Culliffe

289A. Selected Topics in Biomedical Engineering research. 
Variable. Prerequisite: consent of instructor. Selected topics in Cellular and Molecular Systems Engineering. May be repeated for credit when topic differs. — F, W, S. (F, W, S.)

289B. Selected Topics in Biomedical Engineering; Biomedical Imaging (1-5) 
Variable. Prerequisite: consent of instructor. Selected topics in Biomedical Imaging. May be repeated for credit when topic differs. — F, W, S. (F, W, S.)

289C. Selected Topics in Biomedical Engineering; Computational Bioengineering (1-5) 
Variable. Prerequisite: consent of instructor. Selected topics in Computational Bioengineering. May be repeated for credit when topic differs. — F, W, S. (F, W, S.)

289D. Selected Topics in Biomedical Engineering; Cell and Tissue Biomechanics (1-5) 
Variable. Prerequisite: consent of instructor. Selected topics in Cell and Tissue Biomechanics. May be repeated for credit when topic differs. — F, W, S. (F, W, S.)

289E. Selected Topics in Biomedical Engineering; Analysis of Human Movement (1-5) 
Variable. Prerequisite: consent of instructor. Selected topics in Analysis of Human Movement. May be repeated for credit when topic differs. — F, W, S. (F, W, S.)

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 conference on progress, problems, and techniques in biomedical engineering. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)

298. Directed Group Study (1-5) 
Open to graduate students in the Biomedical Engineering Graduate Group. or consent of instructor. Directed group study in Biomedical Engineering. (S/U grading only.)—F, W, S. (F, W, S.)

299. Research (1-12) 
(S/U grading only.)

Professional

396. Teaching Assistant Training Practicum (1-4) 
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)

Engineering: Chemical Engineering

Engineering: Chemical Engineering

(College of Engineering)

Roland Fuller, Ph.D., Chairperson of the Department 530-752-6290, fax 530-752-1031
Department Office. 3001 Ghousi Hall 530-752-0400; Fax 530-752-1031; http://chemsengineering.ucdavis.edu

Faculty

David E. Block, Ph.D., Professor and Endowed Chair (Chemical Engineering; Viticulture and Enology) Academic Senate Distinguished Teaching Award Roger B. Boulton, Ph.D., Professor and Endowed Chair (Chemical Engineering; Viticulture and Enology) Stephanie R. Dungan, Ph.D., Professor (Chemical Engineering; Viticulture and Enology) 

Academic Senate Distinguished Teaching Award

Noel El-Farra, Ph.D., Professor

Academic Senate Distinguished Teaching Award

Roland Fuller, Ph.D., Professor

Academic Senate Distinguished Teaching Award

Bruce C. Gates, Ph.D., Distinguished Professor

Academic Senate Distinguished Teaching Award

Tonya L. Kuhl, Ph.D., Professor

Academic Senate Distinguished Teaching Award

Marjorie L. Longo, Ph.D., Professor

Karen A. McDonald, Ph.D., Professor

Greg Miller, Ph.D., Professor

Adam Moule, Ph.D., Associate Professor

Alexandra Navrotsky, Ph.D., Distinguished Professor and Endowed Chair (Engineering; Materials Science and Engineering; Chemistry; Land, Air and Water Resources)

Ahmet Palazoglu, Ph.D., Professor

Ronald J. Phillips, Ph.D., Professor

Robert L. Powell, Ph.D., Professor

William Ristenpart, Ph.D., Associate Professor

Ron Runnebaum, Ph.D., Assistant Professor

(Chemical Engineering; Viticulture and Enology)

Spyros Tsergoumis, Ph.D., Lecturer (Chemical Engineering; Mechanical and Aerospace Engineering) 

Jason White, Ph.D., Lecturer

Emeriti Faculty

Brian G. Higgins, Ph.D., Professor Emeritus

Alan P. Jackman, Ph.D., Professor Emeritus

Benjamin J. McCoy, Ph.D., Professor Emeritus

Devey D.T. Kyu, Ph.D., Professor Emeritus

Pietro Stroeve, Ph.D., Distinguished Professor

Academic Senate Distinguished Teaching Award

Stephen Whitaker, Ph.D., Professor Emeritus

Academic Senate Distinguished Teaching Award

Affiliated Faculty

Lucas Arzola, Ph.D., Assistant Adjunct Professor

Cong-Yan Cheng, Ph.D., Adjunct Professor

The Department of Chemical Engineering offers two undergraduate programs: Chemical Engineering and Biochemical Engineering.

Mission Statement. To advance, through teaching and research programs, the frontiers of chemical and biochemical engineering; to educate students with a sense of professionalism and community; and to serve the public of California through outreach efforts.

Honors Program. An Honors Program is available to qualified students in the Chemical Engineering, Biochemical Engineering, and Materials Science and Engineering majors. It 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 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 3.50 to continue in the program. Successful completion of the Honors Program will be acknowledged on the student’s transcript.

Chemical Engineering Undergraduate Program

The Chemical Engineering program is accredited by the Engineering Accreditation Commission of ABET; see http://www.abet.org.

Chemical engineers apply the principles of chemistry and engineering to design processes for the effective, economical, and environmentally sound production of fuels, fuels, and chemicals. 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 chemical engineering and chemical principles and proficiency in conceiving, designing, and operating new processes.

The chemical engineering curriculum has been planned to provide a sound knowledge of engineering sciences and mathematics and to prepare students to become competent professionals. Students are encouraged to adhere carefully to all prerequisites. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed. Exclusive of General Education units, the minimum number of units required for the Chemical Engineering major is 156.

Lower Division Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>UNITS</th>
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<tbody>
<tr>
<td>Mathematics 21A-21B-21C-21D</td>
<td>16</td>
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<tr>
<td>Mathematics 22A-22B</td>
<td>9</td>
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<tr>
<td>Physics 9A-9B-9C</td>
<td>15</td>
</tr>
<tr>
<td>Chemistry 2A, 2B, 2C or Chemistry 2AH, 2B</td>
<td>15</td>
</tr>
<tr>
<td>Engineering and Materials Science 5, 5, 51, 80</td>
<td>12</td>
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<tr>
<td>Engineering 45 or 45Y</td>
<td>4</td>
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<tr>
<td>Biotechnology 1 or Biotechnology 2A, 2B</td>
<td>4 or 5</td>
</tr>
<tr>
<td>English 3 or University Writing Program 1, 1V</td>
<td>4</td>
</tr>
<tr>
<td>Comparative Literature 1, 2, 3, 4, 5 or Native American Studies 5</td>
<td></td>
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</tbody>
</table>
Options for Junior and Senior Years
The focus in your junior year is on fundamentals, such as thermodynamics, fluid mechanics, energy transfer, and transport phenomena. In the senior year, you draw together these fundamentals and apply them in a study of kinetics, process design, and process dynamics and control. The program includes design projects that use engineering principles and materials science electives that allow you to strengthen specific areas in chemical engineering, explore new areas, or pursue new areas of specialization.

Biochemical Engineering Undergraduate Program
The Biochemical Engineering program is accredited by the Engineering Accreditation Commission of ABET; see http://www.abet.org.

As the biotechnology industry expands and matures, there is increasing need for engineers who can move products from the research stage to large-scale manufacture. 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 chemical engineering, chemical 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, therapeutic proteins, and industrial enzymes); for health and/or environmental monitoring (such as diagnostic kits, microarrays, biosensors); or for environmental improvement (such as bioengineering). An understanding of biological processes is also becoming increasingly important in the industries that traditionally employ chemical engineers, including the industries that process materials, chemicals, foods, energy, fuels, and semiconductors.

Objectives. We educate students in the fundamentals of chemical and biochemical engineering, balanced with the application of these principles to practical problems; equip students as independent, critical thinkers who can also function effectively in a team; prepare students with a sense of community, ethical responsibility, and professionalism; prepare students for industry, government, and academia; teach students the necessity for continuing education and self-learning; and foster proficiency in written and oral communications.

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Exclusive of General Education units, the minimum number of units required for the Biochemical Engineering major is 162.

Lower Division Required Courses

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<tr>
<td>Mathematics 21A 21B 21C 21D</td>
<td>16</td>
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<tr>
<td>Mathematics 22A 22B</td>
<td>16</td>
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<tr>
<td>Physics 9A 9C 9D</td>
<td>15</td>
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<tr>
<td>Chemistry 2A 2B 2C</td>
<td>15</td>
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<tr>
<td>Chemistry 2AH</td>
<td>15</td>
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<tr>
<td>2B 2CH</td>
<td>15</td>
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<tr>
<td>Biological Sciences 2A</td>
<td>5</td>
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<tr>
<td>Chemical Engineering and Materials Science 5 11</td>
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Upper Division Required Courses

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<tr>
<td>Chemical Engineering 140 141 142 143 145A 145B 145A 152A 152B</td>
<td>15 15 18A 158C 16A 16B 16C 161 161B 161C</td>
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<tr>
<td>Biotechnology 102 103L</td>
<td>5</td>
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<tr>
<td>Chemistry 110A 128A 128B 129A</td>
<td>12</td>
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<tr>
<td>Biochemical Engineering electives</td>
<td>9</td>
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<tr>
<td>Choose at least one laboratory course from the Laboratory Elective list; additional courses may be chosen from either list. You may receive biochemical engineering elective credit up to a maximum of two units of upper-division (192) or independent study (199), or Biotechnology 189 with the approval of the director, provided that the course is a laboratory-based experimental project, related to the biological and/or biochemical engineering sciences, and that you submit a written report that demonstrates proficiency in laboratory skills, techniques, or methods. Research does not replace the required lab elective.</td>
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<tr>
<td>Laboratory elective list: Biomedical Engineering 161L Biotechnology 161A 161B Food Science and Technology 102B 104L 123L Molecular and Cellular Biology 120L 160L Neurobiology, Physiology, and Behavior 101 104L 107 114 140L 161L Vitruvian and Ecologia 123L 124L</td>
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<td>Lecture elective list: Biological Sciences 2B 2C 101 103 104 Biological Systems Engineering 102 107 109 117 140 161A 162 Biotechnology 160 188 Chemical Engineering 144 146 160 Chemistry 120A 132A 132B Technology 102A 104 123 Microbiology 140 150 Molecular and Cellular Biology 123 Neurobiology, Physiology, and Behavior 101 104 107 112 114 Plant Sciences 100A 152 Statistics 120A 130A 131A Vitruvian and Ecologia 123 124</td>
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</table>

Upper Division Requirement

One course from the following (grade of C- or better is required). University Writing Program 102E 102F 104E 104F 104T or passing the Upper Division Composition Exam.

Graduate Program in the Department of Chemical Engineering

The Department of Chemical Engineering is home to a top-20 ranked graduate program in Chemical Engineering. We offer a unique environment for graduate studies, we are large enough to boast world-renowned faculty and state-of-the-art research facilities, yet small enough to give every graduate student personal attention.

The Graduate Program in Chemical Engineering

M.S. and Ph.D. degrees are offered in the following areas: chemical, biochemical, or materials engineering. The Ph.D. program is designed to provide training in the fundamental and advanced studies leading to the highest degree of competence in one of these fields.

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Upper Division Requirement

One course from the following (grade of C- or better is required). University Writing Program 102E 102F 104E 104F 104T or passing the Upper Division Composition Exam.

Graduate Research in Chemical Engineering

M.S. and Ph.D. degrees are offered in the following areas: chemical, biochemical, or materials engineering. The Ph.D. program is designed to provide training in the fundamental and advanced studies leading to the highest degree of competence in one of these fields.

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Upper Division Requirement

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Graduate Research in Chemical Engineering

M.S. and Ph.D. degrees are offered in the following areas: chemical, biochemical, or materials engineering. The Ph.D. program is designed to provide training in the fundamental and advanced studies leading to the highest degree of competence in one of these fields.
189C. Special Topics in ECM; Process Control (1-5)
Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics; Process Control. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng | SE. – F, W, S. (F, W, S.)

189D. Special Topics in ECM; Chemistry of Catalytic Processes (1-5)
Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics; Chemistry of Catalytic Processes. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng | SE. – F, W, S. (F, W, S.)

189E. Special Topics in ECM; Biotechnology (1-5)
Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics; Biotechnology. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng | SE. – F, W, S. (F, W, S.)

189F. Special Topics in ECM; Interfacial Engineering (1-5)
Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics; Interfacial Engineering. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng | SE. – F, W, S. (F, W, S.)

189G. Special Topics in ECM; Thermodynamics (1-5)
Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics; Thermodynamics. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng | SE. – F, W, S. (F, W, S.)

189H. Special Topics in ECM; Membrane Separations (1-5)
Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics; Membrane Separations. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng | SE. – F, W, S. (F, W, S.)

189I. Special Topics in ECM; Novel Experimental Methods (1-5)
Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics; Novel Experimental Methods. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng | SE. – F, W, S. (F, W, S.)

189J. Special Topics in ECM; Transport Phenomena (1-5)
Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics; Transport Phenomena. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng | SE. – F, W, S. (F, W, S.)

189K. Special Topics in ECM; Biomolecular Engineering (1-5)
Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics; Biomolecular Engineering. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng | SE. – F, W, S. (F, W, S.)

189L. Special Topics in ECM; Electronic Materials (1-5)
Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics; Electronic Materials. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng | SE. – F, W, S. (F, W, S.)

189M. Special Topics in ECM; Ceramics and Minerals (1-5)
Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics; Ceramics and Minerals. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng | SE. – F, W, S. (F, W, S.)

189N. Special Topics in ECM; Physics and Chemistry of Materials (1-5)
Lecture and/or laboratory. Prerequisite: consent of instructor. Special topics; Physics and Chemistry of Materials. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng | SE. – F, W, S. (F, W, S.)
Upper Division

140. Mathematical Methods in Biochemical and Chemical Engineering (4)
Lecture/discussion—3 hours; laboratory—1 hour. Prerequisite: Mathematics 21B; and Chemical Materials Science 6 or Engineering 6 or equivalent. Mathematical methods for solving problems in chemical and biochemical engineering, with emphasis on transport phenomena and separation of variables. 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 150B. GE credit: SciEng | SE - F

141. Fluid Mechanics for Chemical and Chemical Engineers (4)
Lecture/discussion—4 hours. Prerequisite: course 140 and course 51 or concurrent. Principles and applications of fluid mechanics in chemical and biochemical engineering. Hydrostatics. The stress tensor and Newton’s law of viscosity. Not open for credit to students who have completed course 150B. GE credit: SciEng | QL, SE - W

142. Heat Transfer for Biochemical and Chemical Engineers (4)
Lecture/discussion—3 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 the thermal 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 150B. GE credit: SciEng | QL, SE - S

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 equations describing convective and diffusive mass transfer. Fick’s law and the Stefan-Maxwell constitutive equations. Mass transfer coefficients. Multicomponent mass transfer across gas/liquid interfaces. Applications: dryers, heterogeneous chemical reactions, and membrane separations. GE credit: SciEng | SE - S

144. Rheology and Polymer Processing (3)
Lecture/discussion—3 hours. Prerequisite: course 141. Deformation in steady shear, unsteady shear, and elongational flows. Linear and nonlinear viscoelastic constitutive models. The principle of material indifference and natural continuum transformations. Introduction to the internal operations of polymer processing. Not open for credit to students who have completed course 150C. Offered irregularly. GE credit: SciEng | SE - S

145A. Chemical Engineering Thermodynamics Laboratory (3)
Laboratory—2 hours; discussion—1 hour; extensive writing. Prerequisite: course 152A; course 152B [may be taken concurrently]. Open to majors in Chemical Engineering, Chemical Engineering/Materials Science, & Biochemical Engineering. Laboratory experiments in chemical engineering thermodynamics. GE credit: SciEng | SE; WE - W

145B. Chemical Engineering Transport Lab (3)
Laboratory—2 hours; discussion—1 hour; extensive writing. Prerequisite: course 141 and 145A. Open to majors in Chemical Engineering, Chemical Engineering/Materials Science, & Biochemical Engineering. Laboratory experiments in chemical engineering transport phenomena. GE credit: SciEng | SE; WE - W

148A. Chemical Kinetics and Reaction Engineering (3)
Lecture—3 hours. Prerequisite: course 143; course 152B. Ideal chemical reactors. Rate laws and stoichiometry. Design and analysis of isothermal reactor systems with multiple reactions. Not open for credit to students who have taken course 146. GE credit: SciEng | SE - F

148B. Chemical Kinetics and Reaction Engineering (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 148A. Design and analysis of non-isothermal reactors. Reaction design and-bed with pressure drop. Adsorption and heterogeneous catalysis. Transport limitations. Not open for credit to students who have taken course 146. GE credit: SciEng | SE - F

152A. Chemical Engineering Thermodynamics (3)
Lecture—4 hours. Prerequisite: Chemical and Materials Science Engineering 6 or concurrent enrollment. Application of principles of thermodynamics to chemical processes. Not open for credit to students who have completed Engineering 105 or 105A. GE credit: SciEng | SE - F

152B. Chemical Engineering Thermodynamics (4)
Lecture/discussion—4 hour. Prerequisite: course 152A. Continuation of course 152B. Not open for credit to students who have completed Engineering 105 or 105A. GE credit: SciEng | SE - W

155. Chemical Engineering Kinetics and Reactor Design Laboratory (4)
Laboratory—6 hours; discussion—1 hour; term paper. Prerequisite: courses 145B, 148A; [course 148B and 145B may be taken concurrently]; satisfaction of the upper division English composition requirement. Open to majors in Chemical Engineering, Chemical Engineering/Materials Science, and Biochemical Engineering. Laboratory experiments in chemical kinetics, reactor design and process control. Not open for credit to students who have taken course 155B. GE credit: SciEng | QE; VL, WE - W; S

155A. Chemical Engineering Laboratory (4)
Laboratory—6 hours; discussion—1 hour; term paper. Prerequisite: courses 141, 142, and 143 [may be taken concurrently]; satisfaction of the upper division English composition requirement. Open only to majors in Chemical Engineering, Chemical Engineering/Materials Science, Biochemical Engineering, Biomedical Engineering, and Biological Systems Engineering. Laboratory experiments in transport phenomena; chemical kinetics, and thermodynamics. GE credit: SciEng | WT; OL, QL, SE; VL, WE

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: SciEng | WT; OL, QL, SE, VL, WE

157. Process Dynamics and Control (4)
Lecture/discussion—4 hours. Prerequisite: course 140. Fundamentals of modelling of chemical processes. Design and analysis of feedback control of chemical processes. GE credit: SciEng | QE - F

158A. Process Economics and Green Design (4)
Lecture/discussion—4 hours. Prerequisite: courses 142, 143. Senior design experience in process and product creation and design with multiple realistic constraints. Course 158A fulfills the minimal investment concept. Profitability analysis techniques. Green chemistry, health risk assessment and life cycle assessment concepts. GE credit: SciEng or SocSci | SE or SS, VL, WE - F

158B. Separations and Unit Operations (4)
Lecture—4 hours. Prerequisite: course 158A. Senior design experience with multiple realistic constraints. Impact of multiple realistic constraints. Design, costing and profitability analysis of complete plants. Use of computer-aided design techniques. GE credit: SciEng | QL, QE, SI, VL, WE - S

160. Fundamentals of Biomanufacturing (3)
Lecture—3 hours. Prerequisite: Microbiology 102, Biological Sciences 102 or Animal Biology 110. Principles of large scale bioreactor production of metabolites, enzymes, and recombinant proteins including the development of strain/cell lines, fermentor/bioreactor design, monitoring and operation, product recovery and purification, and biomanufacturing economics. Not open for credit to students who have completed either course 161C or both 161A and 161B; only two units of credit to students who have completed either course 161A or 161B. Offered irregularly. GE credit: SciEng | QL, VL, WE

161A. Biochemical Engineering Fundamentals (4)
Lecture/discussion—4 hours. Prerequisite: course 148A. Biokinetics; bioreactor design and operation; transport phenomena in bioreactors; microbial, plant, and animal cell culture. GE credit: SciEng | QL, VL, WE

161B. Bioseparations (4)
Lecture/discussion—4 hours. Prerequisite: course 143. Process recovery and purification of biochemicals. Cell disruption, centrifugation, filtration, membrane separations, extraction, and chromatographic separation. GE credit: SciEng | QE, WE

161C. Biotechnology Facility Design and Regulatory Compliance (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 161A [co-requisite] and course 161B [corequisite], or Molecular & Cellular Biology 263 [corequisite]. Design of biotechnology manufacturing facilities. Fermentation and purification equipment, and utility systems. Introduction to current good manufacturing practices, regulatory compliance, and documentation. GE credit: SciEng or SocSci | QL, SE or SS, VL, WE

161L. Bioprocess Engineering Laboratory (4)
Laboratory—9 hours; discussion—1 hour; term paper. Prerequisite: course 161A and 161B, or Viti-culture and Enology 186, or Biological Sciences 103 and Molecular and Cellular Biology 120L. Pass One restricted to chemical/biochemical engineering majors. Laboratory experiments in the operation and analysis of bioreactors; determination of oxygen mass transfer coefficients in bioreactors and ion exchange chromatography. GE credit: SciEng, WT; OL, QL, WE - W

165A. Catalysis (4)
Lecture—3 hours. Prerequisite: course 148A; 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 by enzymes; catalysis in swellable polymers; catalysis in microspheric capsules (zeolites); catalysis on surfaces. Offered irregularly. GE credit: SciEng | SE - S

170. Introduction to Colloid and Surface Phenomena (3)
Lecture—3 hours. Prerequisite: Chemistry 110A. Introduction to the behavior of surfaces and dispersed systems. Fundamentals will be applied to the solution of practical problems in colloid science. Course
should be of value to engineers, chemists, biologists, soil scientists, and related disciplines. Offered irregularly. Graduate credit: GE—S. (S)

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 (Non-grading only) GE credit: SE—F, W, S. (F, W, S)

190X. Upper Division Seminar (1) Seminar—1 hour. Prerequisite: upper division standing. In-depth examination of a special topic in a small group setting. Offered irregularly.—F, W, S, Su. (F, W, S)

192. Internship in Chemical or Biological 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 Chemical or Biochemical. May be repeated for credit when project differs. (P/NP grading only) Offered irregularly. GE credit: SE—F, W, S, S. Su. (F, W, S, Su)

198. Group Study (1-5) Prerequisite: consent of instructor. Group study. (P/NP grading only) Offered irregularly. GE credit: SE—F, W, S, F, W, S

199. Special Study for Advanced Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only) GE credit: SE—F, W, S, F, W, S

Graduate

206. Biochemical Engineering (3) Lecture—3 hours. Prerequisite: Microbiology 102 and 102L, Biological Sciences 101, 102, 103, Molecular and Cellular Biology 120L, 120T, 200A; Food Science and Technology 205 recommended, or consent of instructor. Interaction of chemical engineering, biochemistry, and microbiology. Mathematical representations of microbial systems. Kinetic models, growth, death, and metabolism. Continuous fermentation, agitation, mass transfer and scale-up in fermentation systems, product recovery, enzyme technology. Offered irregularly.—W (W)

226. Enzyme Engineering (3) Lecture—3 hours. Prerequisite: Microbiology 102 and 102L, Biological Sciences 102, 103, Molecular and Cellular Biology 122, 120L, 200A; or consent of instructor. Application of basic biochemical and engineering principles of practical enzymatic processes. Lectures cover large scale production and separation of enzymes, immobilized enzyme systems, enzyme immobilization and optimization, and new applications of enzymes in genetic engineering related biotechnology. Offered irregularly.—W (W)

245. Micro- and Nano-Technology in Life Sciences (4) Lecture/discussion—4 hours. Prerequisite: graduate standing or consent of instructor. Survey of biomedi- cal device design from the engineering and biological perspectives; micro-/nano-fabrication and characterization techniques; surface chemistry and mass transfer; essential biological processes and models; proposal development skills to merge aforementioned themes in a multidisciplinary project. Offered irregularly. —SocSci VL, SocSci VL

264. 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 work was presented for understanding of the fundamental principles and for potential practical application. Offered irregularly.—W (W)

252. Statistical Thermodynamics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 105B or the equivalent. A treatment of the statistical basis of thermodynam-
289L. Special Topics in Chemical Engineering: Biomolecular Engineering (1-5)  
Lecture and/or laboratory. Prerequisite: consent of instructor. May be repeated for credit when topic differs. Offered irregularly.—F, W, S. (F, W, S.)

290. Seminar (1)  
Seminar—1 hour. Prerequisite: consent of instructor. Special topics in Biomolecular Engineering. May be repeated for credit when topic differs. Offered irregularly.—F, W, S. (F, W, S.)

290C. Graduate Research Group Conference (1)  
Discussion—1 hour. Prerequisite: consent of instructor. Research problems, progress and techniques in chemical engineering. May be repeated for credit. (S/U grading only.) Offered irregularly.—F, W, S. (F, W, S.)

294. Current Progress in Biotechnology (1)  
Seminar—1 hour. Prerequisite: graduate standing. May be repeated for credit. (Same course as Molecular and Cellular Biology 294.) (S/U grading only.) Offered irregularly.—F, W, S. (F, W, S.)

298. Group Study (1-5)  
Prerequisite: consent of instructor, Group study. (S/U grading only.) Offered irregularly.—F, W, S. (F, W, S.)

299. Research (1-12)  
Research. (S/U grading only.) Offered irregularly.—F, W, S. (F, W, S.)

Professional  
100. Teaching of Chemical Engineering (1)  
Discussion—1 hour. Prerequisite: qualifications and acceptance as teaching assistant and/or associate-in in chemical engineering. Participation as a teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, written and grading quizzes, use of laboratory equipment, and grading laboratory reports. May be repeated two times for credit. (S/U grading only.)—F, W, S. (F, W, S.)

Engineering: Civil and Environmental  
[College of Engineering]  
Amit M. Kanvinde, Ph.D., Chairperson of the Department  
530-752-0586

Department Office. 2001 Ghausi Hall  
530-752-0586; http://cee.envi.ucdavis.edu

Faculty  
John E. Bolander, Ph.D., Professor  
Fabian A. Flores, Ph.D., Associate Professor  
Ross W. Boulanger, Ph.D., Professor  
Colleen E. Bronner, Ph.D., Lecturer  
Christopher D. Cappa, Ph.D., Professor  
Y. H. (Roy) Chai, Ph.D., Professor  
Lijuan Cheng, Ph.D., Associate Professor  
Yannis F. Datalias, Ph.D., Professor  
Jeanne L. Darby, Ph.D., Professor  
Academic Senate Distinguished Teaching Award  
Jason T. De Jong, Ph.D., Professor  
Yueyue Fan, Ph.D., Professor  
Alexander L. Forrest, Ph.D., Assistant Professor  
John T. Harvey, Ph.D., Professor  
Jonathan D. Herman, Ph.D., Assistant Professor  
Miguel A. Jaller, Ph.D., Assistant Professor  
Boris Jeremic, Ph.D., Professor  
Amit M. Kanvinde, Ph.D., Professor  
M. Levent Kavvas, Ph.D., Professor  
Alissa Kendall, Ph.D., Associate Professor  
Michael J. Kleeman, Ph.D., Professor  
Sashi K. Kundra, Ph.D., Professor  
Bruce L. Kutter, Ph.D., Professor  
Frank J. Loge, Ph.D., Professor  
Jay R. Lund, Ph.D., Professor  
Sabbie A. Millei, Ph.D., Assistant Professor  
Mark P. Moadera, Ph.D., Professor (Civil and Environmental Engineering; Mechanical and Aerospace Engineering)  
Debbie A. Niemeyer, Ph.D., Professor  
Mark M. Rashid, Ph.D., Professor  
Academic Senate Distinguished Teaching Award  
S. Geoffrey Schladov, Ph.D., Professor  
Daniel Sperling, Ph.D., Professor (Civil and Environmental Engineering; Environmental Science and Policy)  
N. Sukumar, Ph.D., Professor  
Anthony S. Wexler, Ph.D., Professor (Civil and Environmental Engineering; Mechanical and Aerospace Engineering; Land, Air and Water Resources)  
Thomas M. Young, Ph.D., Professor  
Bassam A. Younis, Ph.D., Professor  
H. Michael Zhang, Ph.D., Professor

Emeriti Faculty  
Takashi Asano, Ph.D., Professor Emeritus  
Don O. Brush, Ph.D., Professor Emeritus  
Daniel P. Y. Chang, Ph.D., Professor Emeritus  
James A. Cheney, Ph.D., Professor Emeritus  
Leonard R. Herrmann, Ph.D., Professor Emeritus  
Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching and Scholarly Achievement  
I.M. Idriss, Ph.D., Professor Emeritus  
Timothy R. Ginn, Ph.D., Professor Emeritus  
Ian P. King, Ph.D., Professor Emeritus  
Bruce E. Ivar, Ph.D., Professor Emeritus  
Miguel A. Marín, Ph.D., Professor Emeritus  
(Civil and Environmental Engineering; Land, Air and Water Resources)  
Patricia L. Moak, Ph.D., Professor Emeritus  
Gerald T. Orlob, Ph.D., Professor Emeritus  
Otto G. Raabe, Ph.D., Professor Emeritus  
Melvin R. Ramsey, Ph.D., Professor Emeritus  
Karl M. Rommell, Ph.D., Professor Emeritus  
Academic Senate Distinguished Teaching Award  
Edward D. Schroeder, Ph.D., Professor Emeritus  
Academic Senate Distinguished Teaching Award  
Verne H. Scott, Ph.D., Professor Emeritus  
Michael A. Taylor, Ph.D., Professor Emeritus  
George Thobabenagous, Ph.D., Professor Emeritus  
Stefan Wurster, Ph.D., Professor Emeritus

Affiliated Faculty  
Norman A. Abramson, Ph.D., Adjunct Professor  
Kenneth J. Loh, Ph.D., Adjunct Associate Professor  
Patrick C. Lucia, Ph.D., Adjunct Professor  
Brian H. Maroney, D.Engr., Adjunct Assistant Professor  
Anthony S. Wexler, Ph.D., 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 professional education and training that prepares students for careers in environmental engineering. This area focuses on understanding and managing aspects of the natural and anthropogenic environments, and of the interactions between them.

Program Educational Objectives. The objectives of the Civil Engineering undergraduate program at the University of California, Davis are to produce civil and environmental engineers who (1) are proficient in the fundamentals of engineering science, analytical and computational methods, and design in the context of civil and environmental engineering, (2) are able to apply these skills in developing safe, sustainable, economically and environmentally sound solutions to civil engineering problems within the professional or through post-graduate research, (3) grow professionally in their careers through continued development of technical and management skills, (4) achieve professional licensure, and assume roles of responsibility in professional service, and (4) understand the needs and represent the diversity of the program’s constituencies*, thereby serving the needs of society and the profession.

The constituency of the CEE program includes our students and those organizations or employers that they might join during their professional careers, including graduates who have engaged in the Civil and Environmental Engineering discipline.

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed. Exclusive of General Education units, the minimum number of units required for the Civil Engineering major is 102 (77 units in lower division and 75 units in upper division).

Lower Division Required Courses

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Upper Division Requirements: Environmental Engineering. This area focuses on understanding and managing aspects of the natural and anthropogenic environments, and of the interactions between them. 

Pre-Fall 2011 General Education (GE):  
ArHum = Arts and Humanities; SciEng = Science and Engineering; SocSci = Social Sciences; Div = Diversity; Wrt = Writing Experience  
Semester Offered: F-Y, W-Y, S-Y, C-Y; Summer 2017-2018 offering in parentheses  

*The constituency of the CEE program includes our students and those organizations or employers that they might join during their professional careers, including graduates who have engaged in the Civil and Environmental Engineering discipline.

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed. Exclusive of General Education units, the minimum number of units required for the Civil Engineering major is 102 (77 units in lower division and 75 units in upper division).

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Upper Division Requirements: Environmental Engineering. This area focuses on understanding and managing aspects of the natural and anthropogenic environments, and of the interactions between them.

Geotechnical Engineering. This area deals with civil infrastructure and environmental problems that require quantifying the behavior of geologic materials (such as soils and rocks). Examples of geotechnical engineering problems include foundations for buildings and bridges, earthwork (such as dams, tunnels, highways), earthquake hazards (such as ground motions, liquefaction, soil-structure interaction), and geo-environmental problems (ground water flow, subsurface contaminant transport and remediation).

Suggested Advisers. R.W. Boulanger, Y.F. Dalallas, J.T. Harvey, B. Jeremic, B.L. Kutter, P.C. Lucia

Structural Engineering and Structural Mechanics. Structural Engineering addresses the conception, sustainable design, analysis, construction, and life-cycle modeling of all types of civil infrastructure, including buildings, bridges, dams, ports, highways, and industrial facilities subject to sources of loadings ranging from gravity, to earthquakes, to extreme environmental events. Structural Mechanics encompasses the theory of solid structures, and the associated methods of analysis and computation used in the practice of Structural Engineering. For both disciplines, materials of particular interest include steel, reinforced concrete, timber, advanced composites and particulate media.


Transportation Planning and Engineering. This area deals with the movement of people and goods in a manner consistent with society’s environmental and socio-economic goals. Transportation engineering applies engineering, physical and mathematical sciences, economics, and behavioral social science principles to plan, analyze, design, and operate resilient and sustainable transportation systems, such as highways, transit, airfields and ports. Transportation planning involves the formulation and analysis of transportation policy, program, and project alternatives in consideration of societal goals, budgetary constraints, socio-economic (such as safety, equity and mobility) and environmental objectives (such as air and water quality, climate change, and human energy), and technological feasibilities (such as vehicle, infrastructure, and information technologies).

Suggested Advisers. Y. Fan, J.T. Harvey, M.A. Taller, A. Kendall, M.P. Modera, D.A. Niemeier, D. Sperling, H.M. Zhang

Water Resources Engineering. This area includes hydrology, hydraulics, fluid mechanics, and water resource systems planning and design. Hydrology deals with quantifying and understanding all aspects of the hydrologic cycle, including relationships between precipitation, runoff, groundwater, and surface water. Water quality and contaminant transport issues are linked to hydrologic considerations. Hydraulics and fluid mechanics deal with flows in pipes, open-channel water-distribution systems, and natural systems, such as lakes and estuaries. Water resource systems planning and design deals with the comprehensive developmental of water resources to meet the multiple needs of industry, agriculture, municipalities, recreation, and other activities.


Additional information on areas of specialization and potential faculty advisers can be obtained from the departmental website.

Civil Engineering

Upper Division Required Courses

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<tr>
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<td>Engineering 102 or 105.............................</td>
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<td>Civil and Environmental Engineering 114, 190........</td>
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<tr>
<td>One course from Civil and Environmental Engineering 115, 153; Mathematics 118A; or Statistics 108...............</td>
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<tr>
<td>Civil &amp; Environmental Engineering breadth........</td>
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Select one course from the following group options: 
- Hydrology: Civil and Environmental Engineering 140 or 148B or 149
- Geotechnical: Both Civil and Environmental Engineering 171 and 171 Lab
- Structures: Civil and Environmental Engineering 150
- Transportation: Civil and Environmental Engineering 161 or 163 or 165
- Water Resources: Both Civil and Environmental Engineering 141 and 141 Lab
- Civil & Environmental Engineering Depth
  - Select two courses from the following group options: 
    - Water Resources: Civil and Environmental Engineering 161, 162, 179
    - Water Resources: Civil and Environmental Engineering 142, 144, 145, 146

Senior Design Requirement: Must complete at least two of the following courses as part of the Civil & Environmental Engineering depth and elective: Civil & Environmental Engineering 127, 136, 145, 148B, 150, 162, or 173

Civil & Environmental Engineering electives................................. | 20 |

Upper Division Composition Requirement ...................................... | 0.4 |

One course from the following (grade of C- or better is required): Unstructured Writing Program 101, 102E, 102G, 104A, 104E, 104T or passing the Upper Division Composition Exam.

* No unit of coursework may be used to satisfy two different degree requirements, i.e., although a course may be listed in more than one category, that course may only satisfy one requirement.
* A maximum of 4 units of upper-division courses outside of Civil & Environmental Engineering may be considered on a petition basis. Please consult with the undergraduate staff adviser.

Construction Engineering and Management Minor

To declare this minor program offered by the Department of Civil and Environmental Engineering, students must complete ENG 104 with a C- or better and submit a short personal statement focusing on academic and career goals, including relevant coursework taken for minor.

Construction Engineering and Management Minor

All prerequisites must have been taken for a letter grade; no course lower than a C- will be accepted in any prerequisite course.

Successful completion and transcript notation of the minor requires both a minimum overall UC GPA of 2.000 and a minimum 2.000 GPA for the coursework completed for the minor, with no grade lower than a C- for any course used for the minor.

Minor Requirements:
- Prerequisite courses must be completed prior to enrollment in coursework taken for minor.

Sustainability in the Built Environment Minor

All courses must be taken for a letter grade. A grade of C- or better is required for all courses used to satisfy minor requirements with an overall GPA in minor requirement courses of 2.000 or better.

Sustainability in the Built Environment Minor


* Due to variability in series course offering, consent of minor adviser is required.

Minor advisers. F.J. Loge, A. Kendall

The Graduate Program in Civil and Environmental Engineering

M.S. and Ph.D.; Designated Ph.D. emphasis available in Biotechnology

http://cee.engr.ucdavis.edu

With over thirty faculty members, over $20 million in annual research expenditures and over 200 graduate students, the Department of Civil and Environmental Engineering integrates research, education and professional services to meet the needs of 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 study and research by robust funding and have access to state-of-the-art research centers. For example, the Center for Geotechnical Modeling, http://cgm.engr.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 1960, researchers at the J. Amorcho Hydraulics Laboratory (JHLL) have served the state of California by solving ecological, biological, environmental and hydraulic engineering problems. Students may also have the opportunity to work in one of the many modern environmental engineering...
labs or the structural testing facilities in the department. 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:
- Alternative fuel transportation infrastructure
- Earthquake engineering
- Environmental engineering
- Environmental planning and management
- Geotechnical engineering
- Hydraulics and fluid mechanics
- Hydrology
- Structural engineering
- Structural health monitoring
- Structural mechanics
- Systems planning and design
- Transportation engineering
- Transportation planning and design
- Water resources engineering

Research Facilities and Partnerships:
- Advanced Transportation Infrastructure Research Center
- Center for Geotechnical Modeling
- Center for Watershed Sciences
- Center for Water-Energy Efficiency
- Institute of Transportation Studies
- J. Amorecho Hydrological Laboratory [JAHL]
- John Muir Institute of the Environment
- Nano-Engineering and Smart Structures Technologies
- Tahoe Environmental Research Center
- Western Cooling Efficiency Center

Complete Information on our website.

Courses in Engineering: Civil and Environmental (ECI)

Lower Division

3. Civil Infrastructure and Society (4)
Lecture: 3 hours—lab: 2 hours. Prerequisite: Mathematics 21A (may be taken concurrently). Restricted to lower division students; Civil Engineering majors. Introduction to civil infrastructure and its relationship with society and the natural environment. Exposure to innovative research on civil engineering and environmental systems. Participation in laboratory experiments illustrative of the solution of representative but simplified engineering problems. Not open for credit to upper division students. GE credit: SciEng or SocSci, Div, SS, W, Wrt.

16. Spatial Data Analysis (2)

17. Surveying (2)
Lecture: 2 hours. Prerequisite: Physics 9A (may be taken concurrently). Restricted to Civil Engineering and Systems Engineering majors; non-majors accommodated on a space-available basis. Theory behind and description of modern methods of land surveying in Civil Engineering. Offered irregularly. GE credit: SciEng, SE.

19. C Programming for Civil and Environmental Engineers (4)
Lecture: 3 hours—lab: 2—3 hours. Prerequisite: Mathematics 21A (may be taken concurrently). Pass One open to Civil Engineering majors and Optical Science and Engineering majors. Computational problem solving in Civil and Environmental Engineering applications using structured C programming. Algorithm design applied to realistic problems. Offered irregularly. GE credit: SciEng, SE.

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. GE credit: SciEng, SE.

92. Internship in Engineering (1-5)
Internship: 1—5 hours. Prerequisite: lower division standing; approval of project prior to period of internship. Supervised work experience in civil engineering. May be repeated for credit. (P/NP grading only.) GE credit: SE.

98. Directed Group Study (1-5)
Prerequisite: consent of instructor; lower division standing; (P/NP grading only.) GE credit: SE.

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor; lower division standing; (P/NP grading only.) GE credit: SE.

Upper Division

114. Probabilistic Systems Analysis for Civil Engineers (4)
Lecture: 4 hours. Prerequisite: C or better in 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. GE credit: SciEng, QL, SE. —W, S, W, S, W, S, S.

115. Computer Methods in Civil & Environmental Engineering (4)
Lecture: 3 hours—lab: 3 hours. Prerequisite: Engineering 9 or Computer Science Engineering 30, and Mathematics 22B. Open to Civil Engineering majors only. Presentation, implementation and application of numerical algorithms and computer models for the solution of practical problems in Civil and Environmental Engineering. GE credit: SciEng, SE.

119. Parallel Processing for Engineering Applications (4)
Lecture: 3 hours—lab: 3 hours. Prerequisite: C programming experience 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 irregularly. GE credit: SciEng, SE. —Kleeman, Jeremic

123. Urban Systems and Sustainability (4)
Lecture: 4 hours. Prerequisite: upper division standing. Systems-level approach of how to evaluate and then modify sustainability of urban systems based on interaction with natural environments. Topics include: definition/metrics of urban sustainability; system analyses of urban systems; understanding urbanization, policies, legislation; measures and modification of ecological footprints. GE credit: SciEng or SocSci. Div, Wrt. ACCH, DD, SE, SL, SS, WE. —S, S, S, W, F, S, J, Kendall

125. Building Energy Performance (4)
Lecture: 4 hours—lab: 4 hours. Prerequisite: upper division standing in Engineering. Open to students in the College of Engineering. Mechanisms of energy consumption in buildings including and uses, thermal loads, ventilation, air infiltration, thermal energy distribution, and HVAC systems; energy performance simulation; methods and strategies of energy efficiency. Offered in alternate years. GE credit: SciEng, SE. —(S) Modern

126. Integrated Planning for Green Civil Systems (4)
Lecture: 3 hours—lab: 3 hours. Prerequisite: Physics 9C or Landscape Architecture 60 or Design 145 or Environmental Science and Policy 100 or Nature and Culture 120 or Anthropology 100 or Statistics 132 or SIS 101; consent of instructor. Working within multidisciplinary teams, a heuristic learning environment, and multiple realistic constraints, an integrated design process will be applied to the planning of a project-based green and sustainable civil system. Offered irregularly. GE credit: SciEng, SE.

127. Integrated Design for Green Civil Systems: Senior Design Experience (4)
Lecture: 3 hours—lab: 3 hours. Prerequisite: course 126; consent of instructor. Restricted to senior level standing. Working within multidisciplinary teams and a heuristic, project-based learning environment, a green and sustainable civil system will be designed. Evaluate various design options under architectural, structural, cost and environmental constraints, and present designs through oral and written presentations. Offered irregularly. GE credit: SciEng, SE.

128. Integrated Construction for Green Civil Systems (4)
Lecture: 2 hours—lab: 6 hours. Prerequisite: course 127. Working within multidisciplinary teams, a heuristic learning environment, and multiple realistic constraints, an integrated design process will be applied to the construction of a project-based green and sustainable civil system. Offered irregularly. GE credit: SciEng, SE.

130. Structural Analysis (4)
Lecture: 4 hours. Prerequisite: C or better in Engineering 104; Mathematics 22A. Open to Civil Engineering majors. Elastic structural analysis of determinate and indeterminate trusses, beams and frames. Plastic bending and limit analysis. GE credit: SciEng, QL, SE. —W, S, F, S, J.

131. Matrix Structural Analysis (4)
Lecture: 3 hours—lab: 3 hours. Prerequisite: course 127. Working with multidisciplinary teams, a heuristic learning environment, and multiple realistic constraints, an integrated design process will be applied to the construction of a project-based green and sustainable civil system. Offered irregularly. GE credit: SciEng, SE.

135. Structural Design: Concrete Elements (4)
Lecture: 3 hours—lab: 3 hours. Prerequisite: course 130. Design of metallic beams, columns, and other members for various types of loading and boundary conditions; design of connections between members; member performance within structural systems. GE credit: SciEng, SE, W, S, F, L, Bolander, Kanvinde

136. Building Design: Senior Design Experience (4)
Lecture: 3 hours—lab: 3 hours. Prerequisite: course 130 or 131. Restricted to Civil Engineering, Civil Engineering/Materials Science and Engineering, and Materials Science and Engineering majors only. Strength design procedures for columns, rectangular beams, beams and girders, and other systems. Building code requirements for bending, shear, axial load, combined stresses and bond. Introduction to precast concrete. GE credit: SciEng, QL, SE. —W, W, W, W, J, Chang

137. Construction Principles and Project Management (4)
Lecture: 3 hours—lab: 3 hours. Restricted to upper division standing in Engineering. Project management, with civil engineering construction and

138. Earthquake Loads on Structures (4)
nath

139. Advanced Structural Mechanics (4)
Lecture—3 hours; Prerequisite: C- or better in Engineer
ning 104. Review of stress, strain, equilibrium, compatibility, and elastic material behavior. Plane stress and plane strain problems in elasticity; energy methods. Theories for unsymmetric bending, straight and curved beams. Beams on elastic foundations; stresses in plates and shells; elastic stability. Offered irregularly. GE credit: SciEng | SE. — Rashid, Sukumaran

140. Environmental Analysis of Aqueous Systems (3)
Lecture—3 hours. Prerequisite: Chemistry 28B. Intro-
duction to chemical principles underlying current problems in sampling and analysis of water and wastewater. GE credit: SciEng | SE. — F. (F.) Darby, Young

140L. Environmental Analysis of Aqueous Systems Laboratory (1)
Laboratory—3 hours. Prerequisite: Chemistry 28B 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. Offered irregularly. GE credit: SciEng | SE. — F. Darby

141. Engineering Hydraulics (3)
Lecture—3 hours. Prerequisite: C- or better in Engi
neering 103. Nature of flow of a real fluid; flow in pipes; open channel flow; turbomachinery; fluid forces on objects: boundary layers, lift and drag. GE credit: SciEng | SE. — W. (W.) Bombardelli, Schladow, Younis

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. GE credit: SciEng | SE. — W. (W.) Bombardelli, Schladow, Younis

142. Engineering Hydrology (4)
Lecture—4 hours. Prerequisite: course 141 (may be taken concurrently). Restricted to students in the College of Letters and Science. Emphasis on surface water and ground water resource systems. GE credit: SciEng | QL, SE. — F. (F.) Kavvas

143. Green Engineering Design and Sustainability (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 106; course 148A. Restricted to upper division standing. Pass One restricted to Civil Engineering majors. Application of concepts, goals and metrics of sustainability, green engineering and industrial ecology to engineering design. Other course topics include life-cycle assessments, analysis of environmental management systems, and economics of pollution prevention and sustainability. GE credit: SciEng | QL, SE. — W. (W.) Bronner

144. Groundwater Systems Design (4)
Lecture—4 hours. Prerequisite: course 141. Ground-
water occurrence, distribution, and movement; groundwater flow systems; radial flow to wells and aquifer testing; impacts of contaminants; groundwater contamination; salute transport by groundwater; fate and transport of subsurface contaminants. Groundwater supply and transport modeling. GE credit: SciEng | QL, SE. — W. (W.) Bronner

144L. Groundwater Systems Design Laboratory (1)
Laboratory—3 hours. Prerequisite: course 144, taken concurrently. Computer modeling of groundwater flow under regional gradients. Computer software: pre- and post-processing; code and standards, design drawings and specifications. Offered irregularly. GE credit: SciEng | SE. — S. (S.) Younis

145. Hydraulic Structure Design: Senior Design Experience (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: C- or better in course 141. Restricted to senior level standing. Project-based course covering the design of an integrated urban drainage system, including consideration of design alternatives, multiple realistic constraints (public safety, economic, environmental, sustainability and health), quantitative data analysis, computer modeling, codes and standards, design drawings and specifications and cost analysis. Offered irregularly. GE credit: SciEng | SE. — S. (S.) Younis

146. Water Resources Simulation (4)
Lecture—4 hours. Prerequisite: Engineering 103. 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: SciEng, Wrt | SE. — W. (W.) Bombardelli, Younis

148A. Water Quality Management (4)
Lecture—4 hours. Prerequisite: C- or better in Chemi-
stry 28B. Basic concepts of water quality measure-
ments and regulations. Introduction to physical, biological and chemical processes in natural waters. Fundamentals of mass balances in water and waste-
water treatment. GE credit: SciEng | SE. — W. (W.) Bronner, Young

148B. Water and Wastewater Treatment System Design: Senior Design Experience (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: C- or better in Engineering 103 and course 148A. Restricted to senior level standing. Design and evalu-
ation of wastewater treatment systems. GE credit: SciEng | QL, SE, VL, WE. — S. (S.) Darby

149. Air Pollution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21D, 22B; C- or better in Chemistry 28B, Atmospheric Science 121A or C- or better in Engineering 103. Physical and technical aspects of air pollution. Emphasis on geophysical processes and air pollution meteorology as well as physical and chemical processes. Classic source models. GE credit: SciEng | QL, SE, SL. — F. (F.) Cappa

150. Air Pollution Control System Design: Senior Design Experience (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in Atmospheric Science 149 or course 149. Restricted to senior level standing. Design and evaluation of air pollution control devices and sys-
tems. GE credit: SciEng | SE. — W. (W.) Cappa

153. Deterministic Optimization and Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 21C and 22A; computer programming course. Operations research. Optimization tech-
niques such as linear, dynamic programming, and non-linear programming. GE credit: SciEng | SE. — F. (F., S.) Kutter

155. Water Resources Engineering Planning (4)
Lecture—4 hours. Prerequisite: Engineering 106 or Environmental Engineering 105. Emphasis on water resource systems planning concepts, role of engineering, economic, environ-
mental and social information and analysis; institutional, political and legal aspects. Case studies and computer models illustrate planning and operation of water resources systems. GE credit: SciEng or SocSci. Wrt | QL, SE or SS, SL, WE. — S. (W.) Herman, Lunn

161. Transportation System Operations (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in both Mathematics 21C and Physics 9A. Principles of transportation system operations; traffic characteristics and methods of measurement; models of transportation operations and congestion applied to urban streets and highways. GE credit: SciEng | QL, SE. — F. (F.) Zhang

162. Transportation Land Use Sustainable Design: Senior Design Experience (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: C- or better in course 161. Restricted to senior level standing. Interactions between land use and transportation systems design. Generalized design paradigms, project-based solutions for transportation land use. Students will select from various strategies to satisfy multiple constraints including cost, effectiveness and environmental sus-
tainability. Oral, poster and written presentations required. GE credit: SciEng | SE, SL. — S. (S.) Nie-
meier

163. Energy and Environmental Aspects of Transportation (4)
Lecture—3 hours; extensive writing. Prerequisite: Economics 1A or Engineering 106. Engineering, economic, and systems planning concepts. Analysis and evaluation of energy, air quality and selected environmental attributes of transportation technolo-
gies. Strategies for reducing pollution and petroleum consumption in light of institutional and political con-
straints. Evaluation of vehicle emission models. (Same course as Environmental Science and Policy 163.) Offered in alternate years. GE credit: SciEng or SocSci, Wrt | QL or SE or SS, SL, WE. — F. (F.) Sperling

165. Transportation Policy (3)
Lecture—3 hours. Transportation and associated environmental problems confronting urban areas, and prospective technological and institutional solu-
tions. Draws upon concepts and methods from eco-
nomics, engineering, political science and environmental studies. Offered in alternate years. GE credit: SciEng or SocSci, Wrt | QL or SE or SS, SL, WE. — F. (F.) Sperling

171. Soil Mechanics (4)
Lecture—4 hours. Prerequisite: C- or better in Engi-
neering 104; Engineering 103 (may be concurrent); course 171L (co-requisite). Restricted to Civil Engi-
neering and Civil Engineering/Materials Science and Engineering majors only. Soil formations, mass-
volume relationships, soil classification, effective stress, soil-water-void relations, shear strength, capillarity, compressibility, consolidation, strength, states of stress and failure, lateral earth pressures, and slope stability. GE credit: SciEng | SE. — F, S, F. (F.)

171L. Soil Mechanics Laboratory (1)
Laboratory—3 hours. Prerequisite: course 171 must be taken concurrently. Laboratory studies utilizing standard testing methods to determine physical, mechanical and hydraulic properties of soils and demonstration of basic principles of soil behavior. GE credit: SciEng | SE. — S. (S.) Kutter

173. Foundation Design: Senior Design Experience (4)
Lecture—4 hours. Prerequisite: course 171. Restricted to senior level standing. Soil exploration and determination of properties for design; design of shallow and deep foundations for bearing capac-
ty and settlements; design of retaining structures;
189A. Selected Topics in Civil Engineering: Environmental Engineering (1-5)
Prerequisite: consent of instructor. Directed group study in Environmental Engineering. May be repeated for credit when the topic is different. GE credit: SciEng | SE.—F, W, S. (F, W, S.)

189B. Selected Topics in Civil Engineering: Hydraulics and Hydrologic Engineering (1-5)
Prerequisite: consent of instructor. Directed group study in Hydraulics and Hydrologic Engineering. May be repeated for credit when the topic is different. GE credit: SciEng | QL, SE, SL, VL—F (F) Harvey

189C. Selected Topics in Civil Engineering: Water Resources Planning (1-5)
Prerequisite: consent of instructor. Directed group study in Water Resources Planning. May be repeated for credit when the topic is different. GE credit: SciEng | SE.—F, W, S. (F, W, S.)

189D. Selected Topics in Civil Engineering: Structural Mechanics (1-5)
Prerequisite: consent of instructor. Directed group study in Structural Mechanics. May be repeated for credit when the topic is different. GE credit: SciEng | SE.—F, W, S. (F, W, S.)

189E. Selected Topics in Civil Engineering: Materials Science (1-5)
Prerequisite: consent of instructor. Directed group study in Materials Science. May be repeated for credit when the topic is different. GE credit: SciEng | SE.—F, W, S. (F, W, S.)

189F. Selected Topics in Civil Engineering: Transportation Engineering (1-5)
Prerequisite: consent of instructor. Directed group study in Transportation Engineering. May be repeated for credit when the topic is different. GE credit: SciEng | SE.—F, W, S. (F, W, S.)

189G. Selected Topics in Civil Engineering: Water Resources Engineering (1-5)
Prerequisite: consent of instructor. Directed group study in Water Resources Engineering. May be repeated for credit when the topic is different. GE credit: SciEng | SE.—F, W, S. (F, W, S.)
234. Pressured Concrete (4) Lecture—4 hours. Prerequisite: courses 130 or 131, 135. Survey of methods and applications; prestressing, cracks, and posttensioning; prestressed concrete design; design for shear and torsion; deflection computation and control; continuous beams and indeterminate structures; design of compression members; strut-and-tie models. Offered in alternate years. —Bolander

235. Cement Composites (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 104. Applications of cement composites; composite classification; manufacturing process; micromechanical property determination; classical lamination theory, strength theories, first-ply-failure, test methods, design practice. Study of strengthening and retrofitting of existing reinforced concrete structures. —(S. S.) Cheng

237. Bridge Design (4) Lecture—4 hours. Prerequisite: courses 130, 135; course 234 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 of seismic design and analysis of concrete bridges, modern bridges using advanced fiber reinforced polymer composites; fieldtrip required. —(S. S.) Cheng


241. Environmental Reactive Chemical Transport Modeling (4) Lecture—4 hours. Prerequisite: Chemistry 2A, or Chemistry 2B, or course 149, or equivalent. Modeling of reactive chemical transport in air and water including kinetic reactions, equilibrium reactions, and transport processes. Emphasis on numerical solution schemes and programming techniques to provide deeper insight into model performance and limitations. Offered in alternate years. —S. S. Kleeman

242. Applied Environmental Chemistry (4) Lecture—4 hours. Prerequisite: Engineering 105, Chemistry 2B or the equivalent, course 140, Chemistry 2C or 107A recommended. Chemistry of natural and polluted waters. Topics include chemical equilibria, chemical kinetics, redox reactions, gas solution and solid-solution equilibria, thermodynamics, carbonates systems, coordination chemistry, interfacial phenomena. Offered in alternate years. —(F.) Kendall

245A. Applied Environmental Chemistry: Inorganic (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 105, Chemistry 2B or the equivalent, course 140, Chemistry 2C or 107A recommended. Chemistry of natural and polluted waters. Topics include chemical equilibria, chemical kinetics, redox reactions, gas solution and solid-solution equilibria, thermodynamics, carbonates systems, coordination chemistry, interfacial phenomena. Offered in alternate years. —(S.) Young

245B. Applied Environmental Chemistry: Organic (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 128A, 128B, 128C, or the equivalent; Chemistry 2C or the equivalent. 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, photographic and chemical transformation reactions. Offered in alternate years. —(S.) 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 wastewater treatment. —(W.) (W.) Darby

248. Biofilm Processes (4) Lecture—4 hours. Prerequisite: course 243A or 243B or consent of instructor. Fundamentals of microorganism behavior. Natural and engineered biofilms, including biofilm formation, transport, and function. Emphasis on experimental techniques for measuring biofilm structure and composition, and on modeling of biogeochemical processes within biofilms. —(F.) Kleeman

249. Probabilistic Design and Optimization (4) Lecture—4 hours. Prerequisite: courses 114 and 153 and Engineering 106, or equivalents. Design by optimization for probabilistic systems, decision theory, the value of information, probabilistic linear programming, probabilistic nonlinear, nonlinear optimization. Applications in civil engineering design, project evaluation, and risk management. Offered in alternate years. —W. Lund

250. Civil Infrastructure System Optimization and Implementation (4) Lecture—4 hours. Prerequisite: Mathematics 21C, 22A, programming course; Applied Science Engineering 115 and mathematical modeling course recommended. Applied mathematics with a focus on optimization, statistical and numerical methods, decision analysis, and control and planning of civil infrastructure systems. Offered in alternate years. —(S.) 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. —(F.) Nie-mieier

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 technology options, including alternative fuels, electric propulsion, and IVHS. Analysis of market demand and behavior, environmental impacts, economics and politics. (Same course as Environmental Science and Policy 252.) Offered in alternate years—S. S. Spiering


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 to characterization of choice behavior, hypothesis testing, and forecasting. Emphasis on computer exercises using real-world data sets. (Same course as Geography 279.)

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 movement of vehicles on a road network, including travel speed, travel time, congestion concepts, can-following and hydrodynamic traffic models. —(F.) Zhang

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, extreme principles in network flows, minimum cost maximizing, equilibrium assignment, stochastic equilibrium assignment, extensions of equilibrium assignments and dynamic transportation network assignment. —(W.) (W.) Zhang
258. Transportation Planning in Developing Countries (3) Lecture—4 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 potential transportation planning and modeling problems for designing transportation systems in regions of differing socioeconomic, geographic, and institutional settings. Offered in alternate years. —(W.) Harvey

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 pavement analysis. Asphalt aggregate properties, bitumen, mixing, properties, and recycling. Recent developments and research. Offered in alternate years. —(W.) 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. —Schladow

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 estuaries and their impacts on water quality. Case studies of specific lakes and rivers. Offered in alternate years. —F. (S.) 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. —Schladow

265. Stochastic Hydrology and Hydraulics (4) Lecture—4 hours. Prerequisite: course 266 or consent of instructor. Physics-based stochastic methods in modeling hydrologic and hydraulic processes; theory for modeling hydrologically/hydraulically governed equations as stochastic partial differential equations applied to various hydrologic/hydraulic processes under uncertainty, including transport, open channel flow, atmosphere/land surface interaction, and groundwater. Offered in alternate years. —F. (S.) Kavvas

266. Applied Stochastic Methods in Engineering (4) Lecture—4 hours. Prerequisite: course 114 or Mathematics 130A or 131A; Mathematics 118A may be taken concurrently. Stochastic processes classification; Gaussian random fields; stochastic calculus in mean square; Ito and Stratonovich processes classification; Gaussian random fields; stochastic calculus in mean square; Ito and Stratonovich processes classification; Gaussian random fields; stochastic calculus in mean square; Ito and Stratonovich processes classification. Offered in alternate years. —(W.) Kavvas

267. Water Resource Management (3) Lecture—3 hours. Prerequisite: course 114, 141, and 142; course 153 recommended. Engineering, institutional, economic, and social basis for managing local and regional water resources. Examples in the context of water development and management. Uses of computer modeling to improve water management. [Same course as Geography 212.] —F. (S.) Lund

268. Infrastructure Economics (3) Lecture—3 hours. Prerequisite: Economics 1A, Engineering 106 or the equivalent. Economics applied to infrastructure engineering planning, operations, maintenance, and management problems; microeconomic and macroeconomic theories; behavioral analysis; effect of uncertainty; optimization economics; non-classical economics; public finance. Offered in alternate years. —(W.) 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 for air quality modeling. Offered in alternate years. —S. Niemier

270. Advanced Water Resources Management (3) Lecture—3 hours. Prerequisite: courses 153 and 267 or the equivalent. Discussion of technical papers related to water systems maintenance, regionalization, mult-objective methods, risk analysis, institutional issues, pricing model application, economic development, forecasting, operations, and other topics. Offered in alternate years. —Lund

271. Inverse Problems (4) Lecture—3 hours. Prerequisite: courses 114 and 144 or equivalents. Inverse calibration of distributed parameter models, using data representing model outputs. Forward and inverse mappings, stability, uniqueness, identifiability. Optimization formulation of inverse problems, mathematical and objective function concepts and direct and indirect approaches, solution by UCODE in hands-on project format.


272C. Multiphase Reactive Transport (4) Lecture—4 hours. Prerequisites: courses 142, 144, 148A. Multicomponent reactive transport including multiple phases. Advection/dispersive transport, chemical equilibria, and mass transformation kinetics. Natural chemical/microbiological processes including sorption, complexation, biodegradation, and diffusive mass transfer. Eulerian and Lagrangian averaging, averaging to contaminant remediation problems in river and subsurface hydrology. Offered in alternate years.

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, reservoir operation, and design and operation of reservoir systems. Surface water and groundwater management. Offered in alternate years.


277A. Computational River Mechanics I (4) Lecture—4 hours. Prerequisite: Applied Science Engineering 115, course 141 (both may be taken concurrently). Unsteady open channel flows, computation of water surface profiles, shallow water equations, St. Venant equations, method 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 277A. —Younis

277B. 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, coordinates transformation and grid generation, finite-difference solution techniques, applications to two-dimensional momentum and pollutant transport in rivers. Offered irregularly. —Younis

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, body forces and mixing, roughness effects, turbulence modeling and simulation. Offered irregularly. —Younis


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 elastoplastic problems, including computational techniques based on the finite element method and the theory of elastoplasticity. Offered in alternate years. —W. 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 dynamic problems. Offered in alternate years. —W. Jeremic

281A. Advanced Soil Mechanics (4) Lecture—4 hours. Prerequisite: course 281A. Site investigation and soil characterization within the context of slope stability analysis. —W. (W.) Delong

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. Highways, airfields, port facilities; new facilities, rehabilitation. Mechanistic-empirical procedures, material, climate and traffic characterization. Use of current design methods; recent developments and research. Offered in alternate years. —S. Jeremic

283. Physico-Chemical Aspects of Soil Behavior (4) Lecture—3 hours. Laboratory—3 hours. Prerequisite: course 171. Study of the geotechnical behavior of soils considering formation, transport, mineralogy, etc.
soil-fluid-electrolyte systems, surface tension, particle mechanics, shape, fabric, and structure. Laboratory experiences demonstrate effects of fundamental interparticle forces (contact, Van Der Waals, capillarity and chemical). Offered in alternate years.—F. F. Kutter

284. Theoretical Geomechanics (4)
Lecture—4 hours. Prerequisite: course 171. Elasticity, plasticity, micromechanics, coupled behavior and large deformations for geomaterials. Prediction of stress-strain-volume change behavior of geomaterials. Monotonic and cyclic loading, anisotropy, bifurcation of deformation.—W (W.) Jeremić

286. Advanced Foundation Design (4)
Lecture—4 hours. Prerequisite: course 173. Design and analysis of pile and pier foundations, including seismic effects; deep excavation systems; tie-back, nailing, and anchor systems; caffer dams; loads on buried conduits; ground modification techniques; and other related topics.—F. (F.) De Jong

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.—S. (S.) De Jong

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 consideration of fault movements; construction; environmental considerations, instrumentation; maintenance and retrofit of existing dams. Offered in alternate years.—W (W.) Boulanger

289A. Selected Topics in Civil Engineering: Environmental Engineering (1-5)
Prerequisite: consent of instructor. Directed group study in Environmental Engineering. May be repeated for credit.—F. W. S. (F. W. S.)

289B. Selected Topics in Civil Engineering: Hydraulics and Hydrologic Engineering (1-5)
Prerequisite: consent of instructor. Directed group study in Hydraulics and Hydrologic Engineering. May be repeated for credit.—F. W. S. (F. W. S.)

289C. Selected Topics in Civil Engineering: Engineering Planning (1-5)
Prerequisite: consent of instructor. Directed group study in Engineering Planning. May be repeated for credit.—F. W. S. (F. W. S.)

289D. Selected Topics in Civil Engineering: Geotechnical Engineering (1-5)
Prerequisite: consent of instructor. Directed group study in Geotechnical Engineering. May be repeated for credit.—F. W. S. (F. W. S.)

289E. Selected Topics in Civil Engineering: Structural Engineering (1-5)
Prerequisite: consent of instructor. Directed group study in Structural Engineering. May be repeated for credit.—F. W. S. (F. W. S.)

289F. Selected Topics in Civil Engineering: Structural Mechanics (1-5)
Prerequisite: consent of instructor. Directed group study in Structural Mechanics. May be repeated for credit.—F. W. S. (F. W. S.)

289G. Selected Topics in Civil Engineering: Transportation Engineering (1-5)
Prerequisite: consent of instructor. Directed group study in Transportation Engineering. May be repeated for credit.—F. W. S. (F. W. S.)

289H. Selected Topics in Civil Engineering: Transportation Planning (1-5)
Prerequisite: consent of instructor. Directed group study in Transportation Planning. May be repeated for credit.—F. W. S. (F. W. S.)

289L. Selected Topics in Civil Engineering: Water Resources Engineering (1-5)
Lecture, laboratory; lecture/laboratory. Prerequisite: consent of instructor. Directed group study in Water Resources Engineering. May be repeated for credit.—F. W. S. (F. W. S.)

290. Seminar (1)
Seminar.—1 hour. Discussion of current graduate research, and guest lectures on recent advances. Oral presentation of individual study. Course required of graduate degree candidates. (S/U grading only.)—F. W. S. (F. W. S.)

290C. Graduate Research Group Conference (1)
Discussion—1 hour. Research problems, progress, and techniques in civil engineering. May be repeated for credit. (S/U grading only.)—F. W. S. (F. W. S.)

296. Topics in Water and Environmental Engineering (1)
Seminar.—2 hours. Seminars presented by visiting lecturers, UC Davis faculty and, graduate students. May be repeated for credit. (S/U grading only.)—F. W. S. (F. W. S.)

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only)

299. Research (1-12)
(S/U grading only)

Professional

390. The Teaching of Civil Engineering (1)
Discussion—1 hour. Prerequisite: meet qualifications for teaching assistant and/or associate in Civil Engineering. Participation as teaching assistant or associate 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 for total of 9 units. (S/U grading only.)—F. W. S. (F. W. S.)

Engineering: Computer Science

(College of Engineering)
Nina Amenta, Ph.D., Chairperson of the Department
Department Office. 2063 Kemper Hall 530-752-7004; http://www.cs.ucdavis.edu

Faculty
Nina Amenta, Ph.D., Professor Zhaojun Bai, Ph.D., Professor Matthew Bishop, Ph.D., Professor Hao Chen, Ph.D., Associate Professor Ian Davidson, Ph.D., Professor Premkumar T. Devanbu, Ph.D., Professor David Doty, Ph.D., Professor Raissa D’Souza, Ph.D., Professor Kurt Eiselt, Ph.D., LSCE Matthew K. Farren, Ph.D., Professor Vladimir Filkov, Ph.D., Professor Matthew Franklin, Ph.D., Professor Dipak Ghosal, Ph.D., Professor Daniel Gusfield, Ph.D., Professor Francis Choi, Ph.D., Professor Bernd Hamann, Ph.D., Professor Cho-Jui Hsieh, Ph.D., Assistant Professor Patrice Koehl, Ph.D., Professor Yong Joe Lee, Ph.D., Assistant Professor Karl Levitt, Ph.D., Professor Xin Liu, Ph.D., Associate Professor Kwan-Liu Ma, Ph.D., Professor Norman Matloff, Ph.D., Professor Nelson Max, Ph.D., Distinguished Professor Prasant Mohapatra, Ph.D., Professor Prasant Mohapatra, Ph.D., Professor Biswanath Mukherjee, Ph.D., Distinguished Professor Michael Neff, Ph.D., Associate Professor Ronald A. Olson, Ph.D., Professor Emeritus Phillip Rogaway, Ph.D., Professor

Cindy Rubio Gonzalez, Ph.D., Assistant Professor Zhendong Su, Ph.D., Department Chair Prasant Mohapatra, Ph.D., Professor Ilia Tagkopoulos, Ph.D., Associate Professor S. Felix Wu, Ph.D., Professor

Emeriti Faculty
John Bruno, Ph.D., Professor Emeritus Kenneth I. Joy, Ph.D., Professor

Academic Senate Distinguished Teaching Award
Peter Linz, Ph.D., Professor Emeritus Charles U. Martel, Ph.D., Professor

Raju Pandey, Ph.D., Associate Professor Richard F. Waiters, Ph.D., Professor Emeritus

Academic Senate Distinguished Teaching Award

Affiliated Faculty
Peer-Timo Bremer, Ph.D., Adjunct Associate Professor Matt Butter, M.S., Lecturer

Seann Davis, M.S., Lecturer

Todd J. Green, Ph.D., Assistant Professor Hans Hagen, Ph.D., Adjunct Professor Rob Gysei, Ph.D., Lecturer

Bertram Ludaescher, Ph.D., Professor

Christopher Niltol, Ph.D., Assistant Adjunct Professor Sean Peisert, Ph.D., Assistant Adjunct Professor Massimo Tornatore, Ph.D., Adjunct Associate Professor Gunther Weber, Ph.D., Assistant Adjunct Professor

The Computer Science and Engineering 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 two minors: Computer Science in the College of Letters and Science, and Computational Biology in the College of Engineering. For information on the Computer Science curriculum and minor, see Computer Science, on page 231.

The Computer Science Engineering major (below) prepares students to do further work in hardware, software, theory, or electronics, either in industry or in postgraduate study.

The primary differences between the Computer Science Engineering and the Computer Science majors are the extent of course work covering hardware and the flexibility of the curriculum. The Computer Science Engineering major develops a solid understanding of the entire machine, including hands-on experience with its hardware components. The Computer Science major has some course work on hardware, at the digital-design level, on simulators. The Computer Science Engineering major has fewer free electives. The CS major’s more generous electives make it easier to complete a minor or double major.

A key theme of the Computer Science Engineering curriculum is the hardware/software interaction, a theme reflected in the courses required and the orientation of the courses themselves.

The Computer Science and Engineering major provides students with a solid 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.

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 in three ways. First, its undergraduate and graduate education programs seek to educate students in the fundamental principles of computer science and the skills needed to solve the complex technological problems of modern society. The breadth of the coursework provides a framework for lifelong learning and an appreciation for multidisciplinary activities. Second, through its research programs, the department contributes to the development and growth 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 through publications, public service, and professional activities.

Department Objectives. — We seek to provide undergraduate students with a thorough understanding of the key principles and practices of computing, with students gaining a strong theoretical background in mathematics, basic sciences, and engineering fundamentals and an ability to apply this knowledge to practical problems. We endeavor to provide comprehensive educational programs to work creatively and productively in multidisciplinary work teams; this breadth, in its broadest context, will form the basis for an appreciation and interest in lifelong learning. We provide students with the opportunities to design and conduct experiments, and to collect and analyze data in core, as well as more specialized, areas of computer science. We 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 between computing and society. We 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.

—We develop computer science 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. We train graduates to practice computer science and engineering in a broad range of industries; we prepare interested graduates for graduate education or other professional degrees; we give students the tools to become computing of software and hardware systems, and both theoretical and experimental approaches to problem solving; we ready graduates for lifelong learning, and we 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, and Electrical and 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 six units for these students. Students can begin graduate studies immediately after completing their 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 Undergraduate Program

The Computer Science and Engineering program is accredited by the Engineering Accreditation Commission of ABET; see http://www.abet.org.

Exclusion of General Education units, the minimum number of units for the Computer Science and Engineering major is 124.

Students are encouraged to adhere closely to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

Lower Division Required Courses

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<tr>
<th>UNITS</th>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>4</td>
<td>Mathematics 21A or 21B, 21C, 21D</td>
<td>Mathematics 21A or 21B, 21C, 21D</td>
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<tr>
<td>6</td>
<td>Mathematics 22A or 67</td>
<td>Mathematics 22A or 67</td>
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<tr>
<td>3</td>
<td>Mathematics 22B</td>
<td>Mathematics 22B</td>
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<tr>
<td>3</td>
<td>Physics 9A-9B-9C-9D</td>
<td>Physics 9A-9B-9C-9D</td>
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<tr>
<td>5</td>
<td>Chemistry 2A</td>
<td>Chemistry 2A</td>
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<tr>
<td>6</td>
<td>Computer Science Engineering 20, 30, 40, 60</td>
<td>Computer Science Engineering 20, 30, 40, 60</td>
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<tr>
<td>16</td>
<td>Computer Science Engineering 50 or Electrical and Computer Engineering 70</td>
<td>Computer Science Engineering 50 or Electrical and Computer Engineering 70</td>
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<tr>
<td>3</td>
<td>Computer Science Engineering 17</td>
<td>Computer Science Engineering 17</td>
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<tr>
<td>4</td>
<td>English 3 or University Writing Program 1</td>
<td>English 3 or University Writing Program 1</td>
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<tr>
<td>1</td>
<td>1V, 1Y or Comparative Literature 1, 2, 3, or 4</td>
<td>1V, 1Y or Comparative Literature 1, 2, 3, or 4</td>
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</table>

4, or Native American Studies 5 (grade of C- or better required)                           |

Communication 1: Listed elective or course 10 or course 30 or Engineering 6; not open to students who have taken course 12 or Engineering 6; not open to students who have completed course 30. GE credit: SciEng | QL, SE, SL, -F, W, S, E, B. Max

12. Introduction to Media Computation (4) Lecture — 3 hours; discussion/laboratory — 1 hour. Introduction to key computational ideas necessary to understand and produce digital media. Fundamentals of programming are covered as well as analysis of how media are represented and transmitted in digital form. Aimed primarily at non-computer science students. Two units of credit for students that have taken course 10 or 12 or Engineering 6. [Same course as Cinema and Technocultural Studi 012.] GE credit: ArtHum or SciEng | AH or SE, VL, -W, (W) Neff

15. Introduction to Computers (4) Lecture — 3 hours; discussion/laboratory — 3 hours. Not open for credit to students who have completed course 30. Computer uses in modern society. Emphasis on uses in nonscientific disciplines. Includes word processing, spreadsheets, web-page creation, elementary programming, basic computer organization, the Internet, the uses of computers and their influence on society. Course not intended for CS or CSE majors. Only two units of credit allowed to students. Two have completed Plant Science 21. GE credit: SciEng, Wrt1, QL, SE, -F, W, F, W, S, Eisel


30. Programming and Problem Solving (4) Lecture — 3 hours; discussion — 1 hour. Prerequisite: Mathematics 16A or 21A (may be taken concurrently); prior experience with basic programming concepts (variable, loops, conditional statements) recommended. Pass One open to Computer Science, Computer Science Engineering, Computer Engineering, and Electrical Engineering Majors only. Elements of good program style. Programming in the C language. Use of basic UNIX tools. GE credit: SciEng | QL, SE — F, W, S, Eisel


50. Computer Organization and Machine-Dependent Programming (4) Lecture — 3 hours; discussion — 1 hour. Prerequisite: grade of C- or better in course 40. Pass One open to Computer Science, Computer Science Engineering, and Computer Engineering Majors only. Comparative study of different hardware architectures via programming in the assembly language of various microprocessors and machines. Role of system software in producing an abstract machine. Introduction to I/O devices and programming. Only one unit of credit allowed to students who have taken Electrical and Computer Engineering 70. GE credit: SciEng | SE — F, W, S, Eisel
60. Data Structures and Programming (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 20, 40 [Cal 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 programming. GE credit: SciEng |QL, SE. —F, W, S. (F, W, S. Davis)

89A. Special Topics in Computer Science; Computer Science Theory (1–5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Computer Science Theory. May be repeated for credit when topic differs. GE credit: SciEng | SE. —F, W, S. (F, W, S.)

89B. Special Topics in Computer Science; Architecture (1–5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Architecture. May be repeated for credit when topic differs. GE credit: SciEng | SE. —F, W, S. (F, W, S.)

89C. Special Topics in Computer Science; Programming Languages and Compilers (1–5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Programming Languages and Compilers. May be repeated for credit when topic differs. GE credit: SciEng | SE. —F, W, S. (F, W, S.)

89D. Special Topics in Computer Science; Operating Systems (1–5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Operating Systems. May be repeated for credit when topic differs. GE credit: SciEng | SE. —F, W, S. (F, W, S.)

89E. Special Topics in Computer Science; Software Engineering (1–5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Software Engineering. May be repeated for credit when topic differs. GE credit: SciEng | SE. —F, W, S. (F, W, S.)

89F. Special Topics in Computer Science; Databases (1–5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Databases. May be repeated for credit when topic differs. GE credit: SciEng | SE. —F, W, S. (F, W, S.)

89G. Special Topics in Computer Science; Artificial Intelligence (1–5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Artificial Intelligence. May be repeated for credit when topic differs. GE credit: SciEng | SE. —F, W, S. (F, W, S.)

89H. Special Topics in Computer Science; Computer Graphics (1–5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Computer Graphics. May be repeated for credit when topic differs. GE credit: SciEng | SE. —F, W, S. (F, W, S.)

89I. Special Topics in Computer Science; Networks (1–5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Programming Networks. May be repeated for credit when topic differs. GE credit: SciEng | SE. —F, W, S. (F, W, S.)

89J. Special Topics in Computer Science; Scientific Computing (1–5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Scientific Computing. May be repeated for credit when topic differs. GE credit: SciEng | SE. —F, W, S. (F, W, S.)

89L. Special Topics in Computer Science; Computer Science (1–5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Computer Science. May be repeated for credit when topic differs. GE credit: SciEng | SE. —F, W, S. (F, W, S.)

92. Internship in Computer Science (1–5)
Internship. Prerequisite: lower division standing; project approved by period of internship; supervised work experience in computer science. May be repeated for credit. (P/NP grading only.)

98. Directed Group Study (1–5)
(P/NP grading only.)

98F. Student-Facilitated Course (1–4)
Prerequisite: consent of instructor. Student facilitated course intended primarily for lower division students. (P/NP grading only.) Offered irregularly.

99. Special Study for Lower Division Students (1–5)
(P/NP grading only.)

Upper Division

120. Theory of Computation (4)

122A. Algorithm Design and Analysis (4)

122B. Algorithm Design and Analysis (4)

124. Theory and Practice of Bioinformatics (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: courses 10 or 30 or Engineering 6; Statistics 12 1 or 13 or 32 or 100 or 113A or Mathematics 135A; Biological Science 2A or Molecular and Cellular Biology 10. Pass One open to Computer Science, Computer Science Engineering, and Biotechnology majors only. Fundamental biological, mathematical and algorithmic models underlying bioinformatics and systems biology; sequence analysis, database search, genome annotation, clustering and classification, functional gene networks, regulatory network inference, phylogenetic trees, applications of common bioinformatics tools in molecular biology and genetics. GE credit: SciEng | SE. —F, W, S. (F, W, S.) Tagkopoulos

127. Cryptography (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 20 or Mathematics 108. Pass One open to Computer Science and Computer Science Engineering Majors only. Study of the theory and practice of cryptographic techniques used in computer security. Encryption (secret-key and public-key), message authentication, digital signatures, entity authentication, key distribution, and other cryptographic protocols. The social context of cryptography. GE credit: SciEng | QL, SE. —Franklin, Rogaway

129. Computational Structural Bioinformatics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: completion of an introductory programming course; Biological Science 2A or Molecular and Cellular Biology 10. Pass One open to Computer Science, Computer Science Engineering, and Biotechnology majors only. Fundamental biological, chemical and algorithmic models underlying computational structural bioinformatics; protein structure and nucleic acids structure; comparison of protein structures; protein-protein and molecular simulations; databases and online services in computational structural biology. GE credit: SciEng | SE. —F, W, S. (F, W, S.) Koehl

130. Scientific Computation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 20 or 30 or Engineering 6; Mathematics 22A or Mathematics 67. Pass One open to Computer Science and Computer Science Engineering Majors only. Matrix-vector approach using MATLAB for floating-point arithmetic, error analysis, data interpolation, least squares data fitting, quadrature, zeros, optimization and matrix eigenvalues and singular values. Parallel computing for matrix operations and essential matrix factorizations. GE credit: SciEng | SE. —F, W, S. (F, W, S.) Bai

132. Probability and Statistical Modeling for Computer Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40; course 50 or Engineering Electrical and Computer 70; Mathematics 21C; Mathematics 22A or Mathematics 67. Pass One open to Computer Science and Computer Science Engineering Majors only. Univariate and multivariate distributions, estimation and model building. Markov/Hidden Markov models. Applications to data mining, networks, software engineering, bioinformatics. GE credit: SciEng | QL, SE, SL.—Franklin, Rogaway, Matloff

140A. Programming Languages (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 20 or Electrical Computer Engineering 70; course 60. Pass One open to Computer Science, Computer Science Engineering, and Computer Engineering Majors only. Syntactic definition of programming languages. Introduction to programming language features including variables, data types, data abstraction, object-orientation, scoping, parameter disciplines, exception handling. Non-imperative programming languages. Comparative study of several high-level programming languages. GE credit: SciEng | QL, SE, SL.—Franklin, Rogaway, Olsson, Nitta, Su

140B. Programming Languages (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 140A. Pass One open to Computer Science and Computer Science Engineering Majors only. Continuation of programming language principles. Further study of programming paradigms such as functional and logic; additional programming language paradigms such as concurrent (parallel); key implementation issues for those paradigms; and programming language semantics. Offered in alternate years. GE credit: SciEng | LEVIT, Ols- son, Pandey

142. Compilers (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 20, 140A; consent of Pass One. Pass One open to Computer Science and Computer Science Engineering Majors only. Principles and techniques of lexical analysis, parsing, semantic analysis, code generation, and code optimization. Implementation of compilers. GE credit: SciEng | SE—Pandey, Su

145. Scripting Languages and Their Applications (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: programming skill at the level of course 60. Pass One open to Computer Science and Computer Science Engineering Majors only. Goals and philosophy of scripting languages, with Python and R as prime examples. Applications include networking,
150. Operating Systems and System Programming (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40, course 50 or Electrical and Computer Engineering 170. Pass One open to Computer Science, Computer Science Engineering, and Computer Engineering Majors only. Basic concepts of operating systems and system programming. Processes and interprocess communication, virtual storage, multiprogramming, memory management, file system, and I/O subsystems; utility programs. Study of a real operating system. GE credit: SciEng | SE. — W, S (W, F, S) Lewis, Wu.

152A. Computer Networks (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 60, course 132 or Electrical and Computer Engineering 161 or Mathematics 135A or Statistics 131A, or Statistics 120 or Sociology 120. Pass One open to Computer Science and Computer Science Engineering Majors only. Overview of computer networks, TCP/IP protocol suite, computer-networking applications and protocols, transport-layer protocols, network architectures, Internet Protocol (IP), routing, link-layer protocols, local area and wireless networks, medium access control, physical aspects of data transmission, and network performance analysis. Only 2 units of credit for students who have taken course 157. (Same course as Electrical and Computer Engineering 173A.) GE credit: SciEng | SE. — W, F, S) Ghosal, Mukherjee.

152B. Computer Networks (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 152A or Electrical and Computer Engineering 173A. Pass One open to Computer Science and Computer Science Engineering Majors only. TCP/IP protocol suite, computer networking applications, client-server and peer-to-peer architectures, application-layer protocols, transport-layer protocols, transport-layer interface in TCP/IP operating system, remote procedure call, and network management. GE credit: SciEng | SE. — Ghosal, Matloff, Mohapatra, Mukherjee.

152C. Advanced Topics in Computer Networks (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 152A or Electrical and Computer Engineering 173A. Advanced topics in computer networks, wireless networks, network application and data networking, traffic analysis and modeling, network design and management, network simulation and performance analysis, and design projects in communication network research (same as Electrical and Computer Engineering 173B.) Offered in alternate years. GE credit: SciEng | SE. — Chuah, Liu, Mukherjee.

153. Computer Security (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 150, 152A. Pass One open to Computer Science and Computer Science Engineering Majors only. Principles, mechanisms, and implementation of computer security and data protection. Policy, encryption and authentication, access control, and integrity models and mechanisms; network security; secure systems; programming and vulnerabilities analysis. Study of an existing operating system. Not open to credit for students who have completed course 155. GE credit: SciEng | SE. — F (F) Bishop.

154A. Computer Architecture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 50 or Electrical and Computer Engineering 70. Introduction to computer architecture. 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 implementation of operating system software. GE credit: SciEng | SE. — F, W (F, W) Butner, Davis.

154B. Computer Architecture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 154A or both Electrical and Computer Engineering 170 and Electrical and Computer Engineering 180A. Pass One open to Computer Science and Computer Science Engineering Majors only. Hardware and microprogrammed MPU design. Memory hierarchies. Uniprocessor performance analysis under varying program mixes, Introduction to pipelining and multiprocessors. GE credit: SciEng | SE. — W, S (W, F, S) Talukder.

158. Programming on Parallel Architectures (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 150 and 154B recommended. Pass One open to Computer Science and Computer Science Engineering Majors only. Techniques for software development using the shared-memory and message-passing paradigms, on parallel architectures and networks of workstations, barriers, and other techniques for synchronization. Introduction to parallel algorithms. GE credit: SciEng | SE. — F (F) Gygi.

160. Software Engineering (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 144. Pass One open to Computer Science and Computer Science Engineering Majors only. Requirements, specification, design, implementation, testing, and verification of large software systems. Study and use of software engineering methodologies. Team programming. GE credit: SciEng | SE. — F, W (F, W, S) Nitta.

163. Information Interfaces (4)

165A. Database Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 60. Pass One open to Computer Science and Computer Science Engineering Majors only. Database modeling and design, relational model, algebra, query languages (SQL), file and index structures, query processing, transaction management. GE credit: SciEng | SE. — F (F) Nitta.

165B. Database Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 165A. Pass One open to Computer Science and Computer Science Engineering Majors only. Data modeling and design, relational database modeling, and implementation of intelligent computer systems. Knowledge representation and organization. Memory and inference. Problem solving. Natural language processing. GE credit: SciEng | SE. — S (S)

170. Introduction to Artificial Intelligence (4)

171. Machine Learning (4)

173. Image Processing and Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 60, Mathematics 67 or C or better in Mathematics 22A. Pass One open to Computer Science and Computer Science Engineering Majors only.

Techniques for automated extraction of high-level information from images generated by cameras, three-dimensional surface sensors, and medical devices. Typical applications include detection of objects in various types of images and describing biological specimens appearing in medical images. GE credit: SciEng | SE. — S (S) Lee.

174. Computer Vision (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 60; Mathematics 22A or Mathematics 67. Pass One open to Computer Science and Computer Science Engineering Majors only. Computer vision is the study of enabling machines to “see” the visual world (e.g., understand images and videos). Explores several fundamental topics in the area, including feature detection, grouping and segmentation, and recognition. GE credit: SciEng | SE. — S (S) Lee.

175. Computer Graphics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 174 or both Computer Science and Computer Science Engineering Majors only. Pass One open to Computer Science and Computer Science Engineering Majors only. Principles of computer graphics, with a focus on interactive systems. Current graphics hardware, elementary operations in two- and three-dimensional space, geometric transformations, camera models and interaction, graphics system design, standard graphics APIs, individual projects. GE credit: SciEng | SE. — F, W (W) Hamann, Jay.

177. Scientific Visualization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 175. Pass One open to Computer Science and Computer Science Engineering Majors only. Computer graphics techniques for generating images of various types of measured or simulated data. Typical applications for these graphics techniques include study of airflow around car bodies, medical data, and molecular structures. GE credit: SciEng | SE. — W, W (W) Max.

178. Geometric Modeling (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 175. Pass One open to Computer Science and Computer Science Engineering Majors only. Interactive graphics techniques for defining and manipulating geometrical shapes used in computer animation, car body design, aircraft design, and architectural design. GE credit: SciEng | SE. — S (S) Hamann.

180. Ethics in an Age of Technology (4)

189A. Special Topics in Computer Science; Computer Science Theory (1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Computer Science Theory. May be repeated for credit when topic differs. GE credit: SciEng | SE. — F, W, S (F, W, S).

189B. Special Topics in Computer Science; Architecture (1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Architecture. May be repeated for credit when topic differs. GE credit: SciEng | SE. — F, W, S (F, W, S).

189C. Special Topics in Computer Science; Programming Languages and Compilers (1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Programming Languages and Compilers. May be repeated for credit when topic differs. GE credit: SciEng | SE. — F, W, S (F, W, S).
189D. Special Topics in Computer Science; Operating Systems (1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Operating Systems. May be repeated for credit when topic differs. GE credit: SciEng | SE — F, W, S. (F, W, S.)

189E. Special Topics in Computer Science; Software Engineering (1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Software Engineering. May be repeated for credit when topic differs. GE credit: SciEng | SE — F, W, S. (F, W, S.)

189F. Special Topics in Computer Science; Databases (1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Databases. May be repeated for credit when topic differs. GE credit: SciEng | SE — F, W, S. (F, W, S.)

189G. Special Topics in Computer Science; Artificial Intelligence (1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Artificial Intelligence. May be repeated for credit when topic differs. GE credit: SciEng | SE — F, W, S. (F, W, S.)

189H. Special Topics in Computer Science; Computer Graphics (1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Computer Graphics. May be repeated for credit when topic differs. GE credit: SciEng | SE — F, W, S. (F, W, S.)

189I. Special Topics in Computer Science; Networks (1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Networks. May be repeated for credit when topic differs. GE credit: SciEng | SE — F, W, S. (F, W, S.)

189J. Special Topics in Computer Science; Computer-Aided Design (1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Computer-Aided Design. May be repeated for credit when topic differs. GE credit: SciEng | SE — F, W, S. (F, W, S.)

189K. Special Topics in Computer Science; Scientific Computing (1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Scientific Computing. May be repeated for credit when topic differs. GE credit: SciEng | SE — F, W, S. (F, W, S.)

189L. Special Topics in Computer Science; Computer Science (1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Computer Science. May be repeated for credit when topic differs. GE credit: SciEng | SE — F, W, S. (F, W, S.)

189M. Special Topics in Computer Science; Computer Science and Engineering (1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Computer Science and Engineering. May be repeated for credit when topic differs. GE credit: SciEng | SE — F, W, S. (F, W, S.)

189N. Special Topics in Computer Science; Bioinformatics and Computational Biology (1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Bioinformatics and Computational Biology. May be repeated for credit when topic differs. Offered irregularly.

190C. Research Group Conferences in Computer Science (1)
Discussion — 1 hour. Prerequisite: upper division standing in Computer Science and Engineering; consent of instructor. Research group conferences. May be repeated for credit. (P/NP grading only) — F, W, S. (F, W, S.)

190X. Senior Seminar (2)
Seminar — 2 hours. Prerequisite: senior standing. Examination of a special topic in a small group setting.

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 by a faculty member. May be repeated for credit. (P/NP grading only)

193A. Senior Design Project (2)
Lecture — 1 hour; laboratory — 3 hours. Prerequisite: course 160 recommended (may be concurrent) or consent of instructor. Pass One open to Computer Science Engineering Majors only. Pass Two open to Computer Science and Computer Science Engineering Majors only. Team design project involving analysis, design, implementation and evaluation of a large-scale problem involving computer and computational systems. The project is supervised by a faculty member. Students must pass course 193A and 193B to receive credit. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE — F, W, S. (F, W, S.)

193B. Senior Design Project (2)
Lecture — 1 hour; laboratory — 3 hours. Prerequisite: IP grade in course 193A. Pass One open to Computer Science Engineering Majors only; Pass Two open to Computer Science and Computer Science Engineering Majors only. Team design project involving analysis, design, implementation and evaluation of a large-scale problem involving computer and computational systems. The project is supervised by a faculty member. Students must pass course 193A and 193B to receive credit. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE — F, W, S. (F, W, S.)

197T. Tutoring in Computer Science (1-3)
Discussion — 1 hour; laboratory/discussion — 3-6 hours. Prerequisite: consent of instructor. Restricted to upper-division standing. Tutoring in computer science courses, especially introductory courses. (P/NP grading only) — F, W, S. (F, W, S.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

198F. Student Facilitated Course (1-4)
Prerequisite: consent of instructor. Student facilitated course intended primarily for upper division students. (P/NP grading only) Offered irregularly.

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)

199FA. Student Facilitated Course Development (1-4)
Prerequisite: course 3 or University Writing Program 1; consent of instructor. STU FAC. Under the supervision of a faculty member, an undergraduate student plans and develops a course they will offer under 98F/198F. (P/N grading only) Offered irregularly.

199FB. Student Facilitated Teaching (1-4)
Prerequisite: course 199FA; consent of instructor. STU FAC. Under the supervision of a faculty member, an undergraduate student may teach a course under 98F/198F. (P/N grading only) Offered irregularly.

The Graduate Program in Computer Science
Doctoral and Masters degrees in Computer Science are offered through the interdisciplinary Graduate Group in Computer Science. Please see http://www.cs.ucdavis.edu and the Graduate Program in Computer Science (A Graduate Group), on page 231, for a descrip- tion of graduate education offerings, requirements, group faculty and research foci.

Graduate 201A. Advanced Computer Architecture (4)
Lecture — 3 hours; term paper. Prerequisite: course 154B or Electrical Engineering 170; course 150. Pass 1 and Pass 2 open to Graduate Students in Computer Science only. Modern research topics and methods in computer architec- ture. Design implications of memory latency and bandwidth limitations. Performance enhancement via within-processor and between-processor parallelism. Term project involving research extensions/modifications of work in the research literature. Not open for credit to students who have completed course 250A. — (F) Fenners

201B. High-Performance Uniprocessing (4)
Lecture — 3 hours; term project — 1 hour. Prerequisite: course 201A. Pass 1 and Pass 2 open to Graduate Students in Computer Science only. Maximizing uniprocessor performance. Barriers to high performance; solutions to the problems; historical and current processor designs. Not open for credit to students who have completed course 250B. Offered in alternate years. — (W) Fenners

201C. Parallel Architectures (4)
Lecture — 3 hours; project — 1 hour. Prerequisite: course 201A. Evolution of parallel architectures from special-purpose machines to commodity servers. Emphasis on recent machines and applications that drive them. Not open for credit to students who have completed course 250C.

203. Novel Computing Technologies (4)
Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 201A. Pass One and Pass Two open to Grad- uate Students in Computer Science only. Novel computing technologies that could revolutionize computer architecture. Quantum computing technol- ogies, including algorithms, devices, and fault toler- ance. A survey of other unconventional technologies including nanoscale electronics, MEMS devices, bio- logical devices, and nanotechnology. Offered in alternate years. — (W) Chong

220. Theory of Computation (4)
Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 120, 122A. Pass 1 and Pass 2 open to Graduate Students in Computer Science only. Computational models related to systems and synthetic biology. An overview of machine learning techniques related to the analysis of biological data, biological networks. Predictive modeling and simulation of biological systems. Topics on bio- logical circuit construction. — (F) Tagkopoulos

222A. Design and Analysis of Algorithms (4)
Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 122A; Statistics 31A recommended. Pass One and Pass Two open to Graduate Students in Computer Science only. Techniques for designing efficient algorithms, analyzing their complexity and applying these algorithms to a broad range of applica- tions. Methods for recognizing and dealing with difficult problems. — (S) Gysel

222B. Advanced Design and Analysis of Algorithms (4)
Lecture — 3 hours; project — 1 hour. Prerequisite: course 222A. Pass One and Pass Two open to Graduate Students in Computer Science only. Advanced topics in complexity theory, problem classification. The classes P, NP, P-space, co-NP, Matching and net- work flow algorithms. Matrix multiplication. Approximation algorithms. — (W) Gusfield, Franklin, Martel, Ragno

223. Parallel Algorithms (4)
Laboratory/discussion — 3 hours; project — 1 hour. Prerequisite: course 222A. Pass One and Pass Two open to Graduate Students in Computer Science only. Models of parallel computer systems including PRAMs, loosely coupled systems and interconnection networks. Parallel algorithms for classical problems and general techniques for their design and analy- sis. Proving lower bounds on parallel computation in several settings. Offered in alternate years. — (F) Amenta, Martel
224. String Algorithms and Applications in Computational Biology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 175, 222A. Pass One and Pass Two open to Graduate Students in Computer Science only. Algorithms that operate on strings. Pattern matching, sets of patterns, longest common proper prefix matching, suffix trees and applications, inexact similarity, parametric sequence alignment, applications to DNA sequencing and protein database searching. Offered in alternate years.—(W.) O'Sullivan

225. Graph Theory (3)

226. Computational Geometry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 175, 222A. Pass One and Pass Two open to Graduate Students in Computer Science only. Mathematics of unstructured data. Algorithms for data structure design, algorithms, and arrangements. Applications in computer graphics, concentrating on problems in three-dimensions. Offered in alternate years.—S. (J.) Amenta, Max Amenta, Max
d

227. Modern Cryptography (4)
Lecture—3 hours. Prerequisite: course 220 or 222A. Pass One and Pass Two open to Graduate Students in Computer Science only. Modern cryptography as a discipline emphasizing formal definitions and proofs of security. One-way functions, pseudorandomness, encryption, digital signatures, zero-knowledge, secure protocols. Offered in alternate years.—(W.) Kogawy

228. Cryptography for E-Commerce (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 220 or 222A. Pass One and Pass Two open to Graduate Students in Computer Science only. Cryptographic primitives and protocols of importance to e-commerce, present and future, including context distribution mechanisms, payment mechanisms, pricing mechanisms, anonymity and privacy mechanisms, fair exchange mechanisms. Offered in alternate years.—(W.) Koei

229. Applied Computational Structural Bioinformatics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing. Pass One and Pass Two open to Graduate Students in Computer Science only. Algorithms for protein structure prediction (including comparative modeling and ab initio protein structure prediction); molecular simulations (molecular dynamics and Monte Carlo simulations). Offered in alternate years.—(W.) Koehl

230. Applied Numerical Linear Algebra (4)
Laboratory/discussion—3 hours; discussion—1 hour. Prerequisite: course 150 or Engineering Applied Sciences 109. Mathematical Methods 167. Pass One and Pass Two open to Graduate Students in Computer Science only. Numerical linear algebra (NLA) with emphasis on applications in engineered systems, perturbation bounds, and rounding error analyses of fundamental NLA algorithms. —S. (S.) Gygi

231. Large-Scale Scientific Computation (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 130. Pass One and Pass Two open to Graduate Students in Computer Science only. Algorithms and techniques for large-scale scientific computation, including basics for high performance computing, iterative methods, domain decomposition, fast Fourier transform, Poisson solvers, particle methods, spectral graph partition and its applications. Offered in alternate years.—(S.) Bai

234. Computational Functional Genomics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 124; graduate standing in Computer Science or Life Sciences. Pass One and Pass Two open to Graduate Students in Computer Science only. 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, IT-DNA binding and other data in modeling of biological networks.—(W.) Filkov

235A. Computer and Information Security (4)
Lecture—3 hours; project. Prerequisite: course 150; course 152A recommended. Pass One and Pass Two open to Graduate Students in Computer Science only. Modern topics in computer security, including: protection, access control, operating systems security, network security, applied cryptography, cryptographic protocols, 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 235.—(F.) Chen

235B. Foundations of Computer and Information Security (4)
Lecture—3 hours; project. Prerequisite: course 225A; course 150 recommended. Pass One and Pass Two open to Graduate Students in Computer Science only. Theoretical foundations of methods used to protect data in 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.—W. (W.) Bishop

236. Computer Security: Intrusion Detection Based Approach (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150; 153 recommended. Pass One and Pass Two open to Graduate Students in Computer Science only. Concepts of intrusion detection, anomaly detection based on machine learning, signature-based detection using pre-animated response to attacks using artificial intelligence planning, tracing intruders based on principal component analysis, security policy languages. Offered in alternate years.—(S.) D'Souza

240. Programming Languages (4)
Lecture—3 hours; discussion—1 hour. Prerequisites: courses 140A, 142. Pass One and Pass Two open to Graduate Students in Computer Science only. 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 languages, alternative programming languages, in-depth semantic theory and models of language implementation.—W. (W.) Su

242. Translation of Programming Languages (4)
Lecture—3 hours; laboratory—3 hours. Prerequisites: course 240. Pass One and Pass Two open to Graduate Students in Computer Science only. Lexical analysis, parsing, storage management, symbol table design, semantic specification, compiler generation, LR, LALR grammars. Compiler-compilers. —(S.) Pandey

243. Code Generation and Optimization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 201A or Engineering Electrical and Computer Engineering 270. Pass One and Pass Two open to Graduate Students in Computer Science only. Compiler optimizations for performance, code size and power reduction. Topics include control- and data-flow analysis, reduced instruction sets, code generation, register allocation, local and global instruction scheduling, and modulo scheduling.—W. (W.) Wilken

244. Principles of Concurrent Programming (4)
Lecture—3 hours; laboratory—3 hours. Prerequisites: courses 20, 150. Pass One and Pass Two open to Graduate Students in Computer Science only. Fundamentals and applications of parallel and distributed systems. Concurrency and termination: synchronization mechanisms in programming languages; distributed programming techniques; case studies of languages.—(F.) Olsson

247. Concurrent Programming Languages (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 140A, 150. Pass One and Pass Two open to Graduate Students in Computer Science only. 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).—(F.) Olsson, Pandey

251. Operating Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150. Pass One and Pass Two open to Graduate Students in Computer Science only. Models, design, implementation, performance evaluation in operating systems. Algorithms, internal architectures for processor and I/O systems. Operating systems security, concurrency control, recovery, security. OS kernel-level programming. Special topics embedded systems, real-time system, device driver, NPU (Network Processing Unit).—S. (S.) Nilsson

252. Computer Networks (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 152B. Pass One and Pass Two open to Graduate Students in Computer Science only. Internet protocol based computer network applications, transport network layer protocols. High speed LAN technologies: Ethernet, Asynchronous Transfer Mode (ATM). Delay models in data networks: analysis of multicriteria techniques in polling, ring, random access networks. Multimedia applications requirements and design.—S. (S.) Ghosal, Mukherjee, Mohapatra

253. Network Theory and Applications (4)
Lecture/discussion—4 hours. Prerequisite: Mathematics 22A, Mathematics 22B, Statistics 13 or 120, experience with computer software; or consent of instructor. Develops the mathematical theory underlying growth, structure and function of networks with applications to physical, social, biological and engineered systems. Topics include social and information resilience, epidemiology, phase transitions, software and algorithms, routing and search control, cascading failures. Same course as Mechanical & Aeronautical Engineering 253L. Offered in alternate years.—(S.) D'Souza

255. Resource Management in Wireless Communication Networks (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 252A. Advanced research issues in wireless communication networks, including multi-user diversity and cross-layer optimization, basic network information theory, NIMO systems and the impact on networks, and dynamics spectrum management. Offered in alternate years.—(S.) Liu

256. Performance Evaluation (4)
Lecture—3 hours; project—1 hour. Prerequisite: courses 20, 152A, 154A-B or Electrical and Computer Engineering 170, Statistics 131A; course 150 recommended. Pass One and Pass Two open to Graduate Students in Computer Science only. Use of simulation and queuing theory in computer and communication system design. Applications to processor scheduling, memory hierarchies; I/O systems; packet and circuit switched networks; fault-tolerance; computer networks application. Offered in alternate years to students who have completed course 256A. Offered in alternate years.—(W.) Ghosal, Matloff, Mohapatra, Mukherjee
257. Mobile and Wireless Networks (4) Lecture—3 hours; independent study. Prerequisite: course 252. Pass One and Pass Two open to Graduate Students in Computer Science and Electrical and Computer Engineering only. Concepts of mobile networks and their implementation. Mobile networks, wireless technologies, and their interaction with software and network components. Offered in alternate years. —[F] Ghosal, Mohapatra, Mukerjee

258. Networking Architecture and Resource Management (4) Lecture—3 hours; project. Prerequisite: course 152A or Electrical Engineering 172A. Pass One and Pass Two open to Graduate Students in Computer Science and Electrical and Computer Engineering only. Concepts and design principles of computer networks. Network architectures, protocol mechanisms and implementation principles (transport/network/data-link layers), network algorithms, router mechanisms, design requirements of application programs, simulation, modeling and performance analysis. (Same course as Electrical & Computer Engineering 273.) Offered in alternate years. —[W] Chuah, Mohapatra


260. Software Engineering (4) Lecture—3 hours; project. Prerequisite: course 142; course 160 recommended. Pass One and Pass Two open to Graduate Students in Computer Science only. Advanced topics in software engineering for domain-specific software reuse. —[W] (W.) Devanbu

261. Program Verification (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 125 or Philosophy 112 or familiarity with first-order logic; knowledge of an iterative and functional programming language. Methods of proving correctness of programs with respect to formal specifications, with attention to those suited for employing automated deduction. Logic background, symbolic execution, techniques suited to iterative programming, methods from denotational semantics, termination, dynamic logic and proofs of concurrent programs. Offered in alternate years. —[F] Levitt


265. Distributed Database Systems (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 165A. Pass One and Pass Two open to Graduate Students in Computer Science only. Concepts of distributed database systems and architectures, distributed database design, distributed query processing and optimization, transaction management and concurrency control, heterogeneous and multidatabase systems. —[S.] Ladescher

266. Spatial Databases (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 165A. Concepts, models, and architectures for supporting spatial access methods, query processing, spatio-temporal data management, moving objects, spatial data mining. Offered in alternate years. —[W] Ladescher

267. Wide-Area Distributed Information Systems (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 152B or 165A. Pass One and Pass Two open to Graduate Students in Computer Science only. Wide-area distributed information systems, data broadcasting, replicated service, service differentiation, information retrieval, Web caching. Offered in alternate years. —[S.]

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 alternate years. —[F.] Ladescher


271. Machine Learning and Discovery (4) Lecture—3 hours; project—1 hour. Prerequisite: course 170. Pass One and Pass Two open to Graduate Students in Computer Science only. Artificial intelligence techniques for machine learning and discovery. Systems that learn from examples, analogies, and solved problems. Systems that discover numerical or qualitative relationships. Projects centering on implementation and evaluation. Offered in alternate years. —[S.] Levitt, Vemuri

272. Information Visualization (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: course 163 or 175 recommended. Pass One and Pass Two open to Graduate Students in Computer Science only. Advanced topics in information visualization: perceptually effective display methods, color design and selection, interaction models and techniques, focus-context techniques, distortion methods, large graph visualization techniques, visual data mining methods, and evaluation methods. —[W.] Ma


274. Automated Deduction (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 125 or Philosophy 112 or familiarity with first-order logic. Techniques of mechanical theorem proving. Methods based on resolution and rewriting. Decision procedures. Induction. Applications to program verification, question/answering and plan generation. Study existing mechanical theorem provers. Offered in alternate years. —[F.] Hamann, Joy, Ma, Max

275A. Advanced Computer Graphics (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: course 175 or 177 recommended. Pass One and Pass Two open to Graduate Students in Computer Science only. Advanced topics in computer graphics. Hidden surface models, rendering of various surface types, subdivision methods, shading techniques, anti-aliasing, modeling techniques. —[W.]

275B. Advanced Computer Graphics (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: course 175 or 177 or 178. Pass One and Pass Two open to Graduate Students in Computer Science only. Advanced topics in computer graphics and geometric modeling. Topics taken from advanced research papers in computer graphics, image synthesis, visualization and computer animation. Discussion of current research in the field. Offered in alternate years. —[W.] Joy, Hamann, Ma

276. Advanced Volume Visualization (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 177. Pass One and Pass Two open to Graduate Students in Computer Science only. Applications, available tools and techniques, the challenges confronting the field of volume visualization, and some of the advanced topics in this field. Focus on basic principles, emphasis on advanced software and hardware techniques to achieve interactive visualization. Offered in alternate years. —[S.] Hamann, Joy, Ma, Max

277. Computer-Aided Geometric Design (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: course 175. Mathematical techniques for the definition and manipulation of curves and surfaces.Bezier curves and surfaces, B-spline curves and surfaces, subdivision surfaces, wavelets. Integration into various computer graphics rendering models, visualization systems and computer-aided design systems. Offered in alternate years. —[S.] Hamann, Joy

279. Computer Animation (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 175 or 277. Pass One and Pass Two open to Graduate Students in Computer Science only. Course surveys current research and fundamental techniques that lie behind character animation tools. Emphasis on the mathematical and physical aspects involved: motion and how physics, motion capture data, the arts and psychology literature, and interactive techniques can be used towards this goal. Offered in alternate years. —[W.]

280. Virtual Reality Technology (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 175. Pass One and Pass Two open to Graduate Students in Computer Science only. 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. —[S.] Joy

289A. Special Topics in Computer Science: Computer Science Theory (1-5) Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Computer Science Theory. May be repeated for credit when topic differs. —[F., W., S.] W. S. (F., W., S.)

289B. Special Topics in Computer Science: Programming Languages and Compilers (1-5) Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Programming Languages and Compilers. May be repeated for credit when topic differs. —[F., W.] W. S. (F., W., S.)

289C. Special Topics in Computer Science: Computer Animation (1-5) Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Computer Animation. May be repeated for credit when topic differs. —[F., W.] W. S. (F., W., S.)

289D. Special Topics in Computer Science: Operating Systems (1-5) Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Operating Systems. May be repeated for credit when topic differs. —[F., W.] W. S. (F., W., S.)

289E. Special Topics in Computer Science: Software Engineering (1-5) Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Software Engineering. May be repeated for credit when topic differs. —[F., W.] W. S. (F., W., S.)

289F. Special Topics in Computer Science: Databases (1-5) Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Databases. May be repeated for credit when topic differs. —[F., W.] W. S. (F., W., S.)
Ethical issues in research/collaborative work. (S/U grading only.)

Finding research methodologies (experimental, applied and computational biology). May be repeated for credit when topic differs. — F, W, S. (F, W, S.)

Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Computer Graphics. May be repeated for credit when topic differs. — F, W, S. (F, W, S.)

Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Computer Security. May be repeated for credit when topic differs. — F, W, S. (F, W, S.)

Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Computer-Aided Design. May be repeated for credit when topic differs. — F, W, S. (F, W, S.)

Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Scientific Computing. May be repeated for credit when topic differs. — F, W, S. (F, W, S.)

Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Bioinformatics and Computational Biology. May be repeated for credit when topic differs. — F, W, S. (F, W, S.)

Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topic in Computer Science; 293A recommended. Pass One and Pass Two open to Graduate Students in Computer Science only. Offered irregularly.

Seminar in Computer Science (1) — 1 hour. Participating seminar; discussion and presentation of current research and development in computer science. (S/U grading only.) — F, W, S. (F, W, S.)

Seminar in Graduate Research Group Conference (1) — 1 hour. Research problems, progress and techniques in computer science. May be repeated for credit. (S/U grading only.) — F, W, S. (F, W, S.)

Research in Computer Science (1) — Lecture; laboratory, lecture/laboratory. Prerequisite: graduate standing in computer science; Pass One and Pass Two open to Graduate Students in Computer Science only. Study of research topics in computer science, Ph.D. level research methodologies (experimental, applied and theoretical). Study skills necessary to successfully find/solve significant research problems. (S/U grading only.) — W (W) Martel

Group Study (1-5) — Lecture, laboratory, or combination. Prerequisite: consent of instructor. (S/U grading only.)

Research Assistantship (1-12) (S/U grading only.)

The Teaching of Computer Science (1) — Discussion — 1 hour. Prerequisite: meet qualifications for teaching assistant and/or associate-in in Pass One and Pass Two open to Graduate Students in Computer Science only. Computer Science Computer Engineering. Participating 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 for credit. (S/U grading only.) — F, W, S. (F, W, S.)

Teaching Assistant Training Practicum (1-4) — Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)

Engineering: Electrical and Computer Engineering

[College of Engineering]

Faculty

Khaled Abdel-Ghaffar, Ph.D., Professor
Venkatesh Akella, Ph.D., Professor
Hussain Al-Assaad, Ph.D., Associate Professor
Jayant Amrinarajah, Ph.D., Professor
Bevan Baas, Ph.D., Professor
G. R. Bramer, Ph.D., Professor
Srabanti Chowdhury, Ph.D., Associate Professor
Chen-Nee Chuah, Ph.D., Professor
Shuguang "Robin" Cui, Ph.D., Professor
Zhi Ding, Ph.D., Professor
Soheil Ghiasi, Ph.D., Associate Professor
Q. Jane Gu, Ph.D., Associate Professor
A. Nazli Gündes, Ph.D., Professor
Joshua Hilsht, Ph.D., Assistant Professor
Charles E. Hunt, Ph.D., Professor
Paul J. Hurst, Ph.D., Professor
Safar Islam, Ph.D., Professor
Andre Knoesen, Ph.D., Professor
H. Brian Kolber, Ph.D., Associate Professor
Bernard C. Levy, Ph.D., Professor
Stephen H. Lewis, Ph.D., Professor
Xiaoguang "Leo" Liu, Ph.D., Assistant Professor
Neville C. Luhmann, Ph.D., Professor
Omeed Momeni, Ph.D., Assistant Professor
John Owens, Ph.D., Professor
Ant-Hyo Pham, Ph.D., Professor
Erkin Seker, Ph.D., Assistant Professor
Kent Willken, Ph.D., Professor
Jerry M. Woodall, Ph.D., Professor
S.J. Ben Yoo, Ph.D., Professor
Qing Zhao, Ph.D., Professor

Emeriti Faculty

V. Ralph Alpaez, Ph.D., Professor Emeritus
Robert W. Bower, Ph.D., Professor Emeritus
Tsu-Shuan Chang, Ph.D., Professor Emeritus
John N. Churchill, Ph.D., Professor Emeritus
Jean-Pierre Colinge, Ph.D., Professor Emeritus
K. Wayne Current, Ph.D., Professor Emeritus
Andrew Dienes, Ph.D., Professor Emeritus

Richard C. Dorf, Ph.D., Professor Emeritus
Herman J. Fink, Ph.D., Professor Emeritus
Gerard F. Ford, Ph.D., Professor Emeritus
Academic Senate Distinguished Teaching Award
William A. Gardner, Ph.D., Professor Emeritus
Mohammed S. Ghaoui, Ph.D., Professor Emeritus/Dean Emeritus
Stephen H. Haley, Ph.D., Professor Emeritus
Jonathan P. Heritage, Ph.D., Professor Emeritus
T.C. Steve Huia, Ph.D., Professor Emeritus
Vojin G. Oklobdzija, Ph.D., Professor Emeritus
G.R. Redinbo, Ph.D., Professor Emeritus
Ronald F. Sathofo, Ph.D., Professor Emeritus
Richard R. Spencer, Ph.D., Professor Emeritus
Shi-Hsi Wang, Ph.D., Professor Emeritus

Affiliated Faculty

Shu Lin, Ph.D., Adjunct Professor
Augusto Sarti, Ph.D., Adjunct Professor
Diego Yankilevich, Ph.D., Adjunct Professor

The Electrical and Computer Engineering Undergraduate Programs

The department administers two undergraduate curricula in the College of Engineering: (1) the Electrical Engineering curriculum and (2) the Computer Engineering curriculum.

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 superior breadth and depth of technical material. The IDP program in the Department of Electrical and Computer Engineering is available only to UC Davis undergraduates with strong academic records enrolled in the Electrical Engineering, Computer Engineering, Electronic Materials Engineering or Applied Physics curricula. Applicants in their junior year must apply for the IDP by March 31. For more information on 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 to transfer the results of 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 select a focus area intelligently; to provide undergraduate students with sufficient depth in a narrower discipline to allow them to develop the ability to solve complex technological 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; to update and/or shift the foci of these programs frequently in response to the needs of industry and the nation; to provide a stimulating environment that encourages our graduate students to develop their abilities as far as possible.
Electrical Engineering Undergraduate Program

The Electrical Engineering program is accredited by the Engineering Accreditation Commission of ABET; see http://www.abet.org.

Electrical engineering involves the design, analysis, and critical thinking 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, entertainment, 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 with effective and useful contributions. 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 the responsibilities to society at large. Exclusive of General Education units, the minimum number of units for the Electrical Engineering major is 146.

Lower Division Required Courses

<table>
<thead>
<tr>
<th>COURSE</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics 21A-21B-21C-21D</td>
<td>16</td>
</tr>
<tr>
<td>Mathematics 22A-22B</td>
<td>8</td>
</tr>
<tr>
<td>Physics 9A-9B-9C-9D</td>
<td>19</td>
</tr>
<tr>
<td>Chemistry 2A</td>
<td>4</td>
</tr>
<tr>
<td>Computer Science 30</td>
<td>4</td>
</tr>
<tr>
<td>Engineering 6, 17</td>
<td>8</td>
</tr>
<tr>
<td>Electrical and Computer Engineering 1, 10</td>
<td>5</td>
</tr>
<tr>
<td>(Electrical and Computer Engineering 10 is designed for sophomore students and is not recommended for upper-division students. Transfer of and change of major students who do not take Electrical and Computer Engineering 10 will substitute four additional units of upper-division electives.) English 3 or University Writing Program 1, 1Y or 1V or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 (grade of C or better required) Communication 1 or 3</td>
<td>4</td>
</tr>
</tbody>
</table>

Upper Division Requirements: Electrical Engineering Curriculum Areas of Specialization

For updated recommended courses, see the department website at http://www.ece.ucdavis.edu/undergrad/undergradhandbook.html.

Physical Electronics: solid-state devices, circuits and fabrication and the theory courses supporting those subjects.

Recommended elective courses:


Electromagnetics: microwave circuits and systems, and fiber optical systems.

Recommended elective courses:


Analog Electronics: transistor- and system-level analog circuit design.

Recommended elective courses:


Suggested Advisers. R. Amirfazl, Q.J. Gu, P.J. Hurst, S.H. Lewis, O. Momeni

Digital Electronics: transistor- and system-level digital circuit design.

Recommended elective courses:


Suggested Advisers. R. Amirfazl, P.J. Hurst, S.H. Lewis

Communication Controls and Signal Processing: digital communication, robotics, classical controls and communication, 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 157A and 157B or 165 Select remaining upper division design electives from Electrical and Computer Engineering 112 and 130B, or 146A

Suggested Advisers. R. Amirfazl, A.H. Gu, S. Cui, Z. Ding, A.N. Gunders, B.C. Levy, Q. Zhao

Upper Division Required Courses

<table>
<thead>
<tr>
<th>COURSE</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical and Computer Engineering 110A, 130A, 140A, 150A, 161, 180A, 196</td>
<td>31</td>
</tr>
<tr>
<td>Computer Engineering 116, 190 or Computer Science Engineering 188</td>
<td>34</td>
</tr>
</tbody>
</table>

Upper-division electives**

32

At least one design project course**

Electrical and Computer Engineering 119A, 134AB, 136AB, 181AB, 193AB, 195AB

The remaining electives may be any letter-graded upper division electrical and computer engineering course not used to satisfy another major requirement; Computer Science Engineering 40, 150, 152B, 163, 175, 177, or 178 Technical electives**

9

Chemistry 2B, 2C and any upper-division course except Chemistry 195 & 197

Engineering 35, 45, and any upper-division engineering course not used in satisfaction of core degree requirements, excluding Engineering 100, 160, 190 (each restricted to one unit of technical elective), 198, Computer Science Engineering 132, 153, 157, 188, 154A, & 154B (ECS 154AB courses may be used by EE major students who did not take ECS 170). A maximum of 6 units for any combination of engineering courses numbered 190C, 192, 198, and 199 may be used.

Mathematics: any upper-division course except Mathematics 135A & 197TC

Physics: any upper-division course except 116, 137, 160 (restricted to one unit of technical elective), 195, 197T


Upper Division Composition Requirement:
One course from the following (a grade of C- or better is required): University Writing Program 101, 102AL, 104AT or passing the Upper Division Composition Exam...

4

Maximum of one course appearing on both the core elective list and the design elective list may be counted in both categories.

** All design project courses are also considered design lab courses and may be counted in both categories simultaneously.

*** After completion of the upper division elective requirement (at least 8 courses, 2 core, 2 with labs, 1 project) any units in excess of 32 will count toward the technical elective requirement.

Computer Engineering Undergraduate Program

The Computer Engineering program is accredited by the Engineering Accreditation Commission of ABET; see http://www.abet.org.

Exclusive of General Education units, the minimum number of units required for the Computer Engineering undergraduate major is 148.

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authori-
ized to drop students from a course for which stated prerequisites have not been completed.

Lower Division Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics 21A, 21B, 21C, 21D</td>
<td>16</td>
</tr>
<tr>
<td>Mathematics 22A, 22A-L, 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>Computer Engineering 20, 30, 40, 60, 80, 100</td>
<td>16</td>
</tr>
<tr>
<td>Electrical and Computer Engineering 1, 10, 88, 165</td>
<td>5</td>
</tr>
<tr>
<td>[Electrical and Computer Engineering 10 is designed for sophomore students and is not recommended for upper-division students. Transfer and change of major students who do not take Electrical and Computer Engineering 10 will substitute four additional units of upper-division electives.]</td>
<td></td>
</tr>
<tr>
<td>Engineering 17, 178</td>
<td>4</td>
</tr>
<tr>
<td>English 4, 4A Writing Program 1, 1Y or 1Y Comparative Literature 1, 2, 3, or 4</td>
<td>4</td>
</tr>
<tr>
<td>Computer Science 156A, 156B</td>
<td>6</td>
</tr>
<tr>
<td>Computer Engineering 192A, 192B, 192C, 192D</td>
<td>4</td>
</tr>
</tbody>
</table>

Upper Division Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Science 122A, 150</td>
<td>8</td>
</tr>
<tr>
<td>Engineering 160, 190, or Computer Science Engineering 188</td>
<td>3-4</td>
</tr>
<tr>
<td>Upper-Division Electrical Courses</td>
<td>9-11</td>
</tr>
<tr>
<td>Engineering 199AB, 134AB, 136A, 181AB, 193AB, 195AB</td>
<td>1</td>
</tr>
<tr>
<td>One upper division Electrical and Computer Engineering course</td>
<td>8</td>
</tr>
<tr>
<td>excluding Computer Science 132, 155, 157, 188, 154A, &amp; 154B.</td>
<td>8</td>
</tr>
<tr>
<td>Technical electives</td>
<td>8</td>
</tr>
<tr>
<td>Chemistry 2B, 2C and any upper-division course except Chemistry 195 &amp; 197.</td>
<td>4</td>
</tr>
<tr>
<td>Engineering 35, 45, and any upper-division course</td>
<td>6</td>
</tr>
<tr>
<td>Engineering 100, 160, 190 (each restricted to one unit of technical elective)</td>
<td>4</td>
</tr>
<tr>
<td>Computer Science Engineering 132, 155, 157, 188, 154A, 154B.</td>
<td>8</td>
</tr>
<tr>
<td>A maximum of 6 units for any combination of engineering courses numbered 190C, 192, 198, and 199 may be used.</td>
<td>8</td>
</tr>
<tr>
<td>Mathematics: any upper-division course except Mathematics 135A &amp; 197TC</td>
<td>4</td>
</tr>
<tr>
<td>Physics: any upper-division course except Physics 116, 137, 160 (restricted to unit of technical elective)</td>
<td>4</td>
</tr>
<tr>
<td>Engineering 195, 197T</td>
<td>7</td>
</tr>
<tr>
<td>Statistics: any upper-division course except Statistics 100, 102, 103, 104, 106, 108, 120, 130A</td>
<td>8</td>
</tr>
<tr>
<td>Biological Sciences 101, 101D, 102, 103, 104, 120F, 122, 129P, 132</td>
<td>8</td>
</tr>
<tr>
<td>Economics 100, 101, 102, 132, 140 Management 11A, 11B, 100, 120, 140</td>
<td>8</td>
</tr>
<tr>
<td>Upper Division Composition Requirement</td>
<td>0-4</td>
</tr>
<tr>
<td>One course from the following [a grade of C- or better is required]: University Writing Program 101, 102A, 104A-T or passing the Upper Division Composition Exam.</td>
<td>4</td>
</tr>
</tbody>
</table>

Electrical Engineering Minor

There has been an increasing need for professionals in most engineering disciplines to understand the fundamentals of electronic circuits, electronic signals, semiconductor devices, applied electromagnetics, control systems, computer systems, and communication systems.

The objective of this minor program is to prepare students with the necessary theoretical and practical training in one or many of the above mentioned fields. The minor program curriculum is designed to allow flexibility while ensuring a solid foundation of fundamental electrical engineering concepts. The program is expected to accommodate students of diverse backgrounds.

The minor must be outside the department or program of your major. No more than one course may be counted toward both your minor and your major. The courses you take to satisfy the requirements of a minor, including those completed elsewhere, must be approved by an Advisor in the Department of Electrical and Computer Engineering. You must have a minimum overall GPA of 2.000 and satisfy the minor course requirements, listed below. To receive notification on your diploma, you must obtain a minor petition and file it no later than the deadline for filing for graduation.

Minor Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Engineering 21</td>
<td>8</td>
</tr>
<tr>
<td>Electrical and Computer Engineering 100</td>
<td>4</td>
</tr>
<tr>
<td>At least one of the following combinations:</td>
<td>5</td>
</tr>
<tr>
<td>Analogic circuits: Electrical and Computer Engineering 110A and 110B</td>
<td>8</td>
</tr>
<tr>
<td>Electromagnetc basics: Electrical and Computer Engineering 130A and 130B</td>
<td>8</td>
</tr>
<tr>
<td>Physical Electronics: Electrical and Computer Engineering 140A and 140B</td>
<td>8</td>
</tr>
<tr>
<td>Signals and Systems: Control Systems</td>
<td>10</td>
</tr>
<tr>
<td>Control Systems: Electrical and Computer Engineering 150A and 150B</td>
<td>8</td>
</tr>
<tr>
<td>Communication: Electrical and Computer Engineering 150A and 160</td>
<td>5</td>
</tr>
<tr>
<td>Control Systems: Electrical and Computer Engineering 150A and 157A</td>
<td>5</td>
</tr>
<tr>
<td>Digital Systems: Electrical and Computer Engineering 180A and 180B</td>
<td>8-10</td>
</tr>
<tr>
<td>At least 8 additional units of Electrical and Computer Engineering courses numbered 101 or above, except for Electrical and Computer Engineering 190, 192, 196, 197, 198, 199, 298, 299, 390, and 396. If you elect to do a design project, you must be registered for both quarters.</td>
<td>8-10</td>
</tr>
</tbody>
</table>

Minor Advisers: Z. Ding, X. Liu

The Graduate Program in Electrical and Computer Engineering

M.S. and Ph.D.

http://www.eee.ucdavis.edu

530-752-8251

The Department of Electrical and Computer Engineering prepares graduate students to do meaningful research and acquire skills and insights vital to solving some of the world’s most complex technological problems. Our graduate program offers a challenging experience, with opportunities to learn optical, wireless and wireless communications, telecommunication networks, computer engineering, circuits, electromagnetics, physical electronics, optoelectronics, control, and signal processing. The depth of resources in the study of circuit design alone, with one of the largest faculty groups in the field in the UC system, distinguishes us from other programs, while our program in microwave communications and devices is unique.

The Electrical and Computer Engineering Graduate Program benefits from the highly interdisciplinary culture at UC Davis and attracts faculty from biomedical, chemical, electrical, mechanical, and civil engineering, as well as computer science and mathematics.

Many of our graduates go on to leadership and technology management roles in industry, returning each year for our industrial affiliates meeting to work with other industry representatives, current students and faculty.

Generous financial support is available in the form of research assistantships, teaching assistantships, fellowships and financial aid.

Research Highlights:

- Communications, control, networking, and signal processing
- Computer engineering
- Electronic circuits
- Optoelectronics
- RF, micro- and millimeter waves
- Physical electronics

Research Facilities and Partnerships:

- Center for Information Technology in the Interest of Society
- Northern California Center for Nanotechnology
- Center on Polymer Interfaces and Macromolecules
- Lawrence Livermore National Laboratory
- Lawrence Berkeley National Laboratory
- Los Alamos National Laboratory
- California Lighting Technology Center
- PlanetLab Consortium
- Sandia National Laboratory

Complete information on our website.

Courses in Engineering: Electrical and Computer Engineering (EEC)

Lower Division

1. Introduction to Electrical and Computer Engineering (1)

Lecture—1 hour. Electrical and Computer Engineering as a professional activity. What Electrical and Computer Engineers know and how they use their knowledge. [P/NP grading only] GE credit: SE.—F, F. (S.)

2. Introduction to Digital and Analog Systems (3)

Lecture—1 hour; laboratory—3 hours. Prerequisite: Computer Science Engineering 30, and Physics 9C or 9HD (may be taken concurrently); consent of instructor. Open to Electrical and Computer Engineering sophomores. Interactive and practical introduction to fundamental concepts of electrical and computer engineering by implementing electronic systems, which can be digitally controlled and interfaced, with a programmable microcontroller with the ability to program the electrical connections between analog and digital components. GE credit: SciEng | SE.—W, W, S. (W, S.)

3. Computer Structure and Assembly Language (4)

Lecture—3 hours; workshop—1 hour. Prerequisite: Computer Science Engineering 30. Computer architecture, machine language, assembly language, macros and conditional macros; subroutines/parameter passing; input/output programming, interrupt and trap; direct-memory access; absolute and relocatable code; re-enterted-trocated code; program development in an operating system. Only one unit of credit to students who have completed Computer Science Engineering 50. GE credit: SciEng | SE.

89A. Special Topics in Electromagnetics (1-5)

Prerequisite: consent of instructor. Special topic in Electromagnetics. May be repeated for credit if topic differs. Offered irregularly. GE credit: SciEng | SE.

89B. Special Topics in Physical Electronics (1-5)

Prerequisite: consent of instructor. Special topic in Physical Electronics. May be repeated for credit if topic differs. Offered irregularly. GE credit: SciEng | SE.

89C. Special Topics in Active and Passive Circuits (1-5)

Prerequisite: consent of instructor. Special topic in Active and Passive Circuits. May be repeated for credit if topic differs. Offered irregularly. GE credit: SciEng | SE.
89D. Special Topics in Signals and Systems (1-5)
Prerequisite: consent of instructor. Special topics in Signals and Systems. May be repeated for credit if topic differs. Offered irregularly. GE credit: SciEng | SE.

89F. Special Topics in Computer Systems and Software (1-5)
Prerequisite: consent of instructor. Special topics in Computer Systems and Software. May be repeated for credit if topic differs. Offered irregularly. GE credit: SciEng | SE.

89G. Special Topics in Digital System Design (1-5)
Prerequisite: consent of instructor. Special topics in Digital System Design. May be repeated for credit if topic differs. Offered irregularly. GE credit: SciEng | SE.

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.)—F, S, W. (F, W, S.)

90X. Lower Division Seminar (1-4)
Seminar—1 hour. 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.)

99. Directed Group Study (1-5)
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

100. Circuits II (5)
Laboratory—3 hours; lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 17, C- or better. Restricted to the following majors: Electrical Engineering, Computer Engineering, Computer Science & Engineering, Electronic Materials Engineering, Electrical Engineering/Materials Science, Optical Sciences & Engineering, Biomedical Engineering, Applied Physics, Electrical & Computer Engineering graduate students. Theory, application, and design of analog circuits. Methods of analysis including frequency response, signal simulation, and Laplace transform. Operational amplifiers and design of active filters. Students who have completed Engineering 100 may receive 3.5 units of credit. GE credit: SciEng | QL, SE, VL, F, W. (F, W, S.)

110A. Electronic Circuits I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 110A. Analysis and design of integrated circuits. Introduction to the design of transistor amplifiers and logic gates. GE credit: SciEng | SE, VL, W, S. (F, W, S.)

110B. Electronic Circuits II (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 110A. Analysis and design of integrated circuits. Single-stage amplifiers, cascaded amplifier stages, differential amplifiers, current sources, frequency response, and return ratio analysis of feedback circuits. GE credit: SciEng | SE, VL, S. (S.)

112. Communication Electronics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 110A and 150A; course 110B recommended. 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. GE credit: SciEng | SE, VL, S. (S.)

116. VLSI Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 110A; course 180A recommended. CMOS devices, layout, circuits, and functional units; VLSI fabrication and design methodologies. GE credit: SciEng | SE. F. (F.)

118. Digital Integrated Circuits (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 110A, 180A. Analysis and design of digital integrated circuits. Emphasis on MOS logic circuit families. Logic gate construction, voltage transfer characteristics, propagation delay, and power consumption. Regenerative circuits, sequential elements, interconnected RAMs, ROMs, and PLAs. GE credit: SciEng | SE. F. (F.)

119A. Integrated Circuit Design Project (3)
Workshop—1 hour; laboratory—6 hours. Prerequisite: course 116 or 118. Design course involving architecture, circuit design, physical design, and validation through extensive simulation of a digital or mixed-signal integrated circuit of substantial complexity under given design constraints. Team project that includes a final report. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE. F. (F.)

119B. Integrated Circuit Design Project (3)
Workshop—1 hour; laboratory—6 hours. Prerequisite: course 116 or 118. Design course involving architecture, circuit design, physical design, and validation through extensive simulation of a digital or mixed-signal integrated circuit of substantial complexity under given design constraints. Team project that includes a final report. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE. F. (F.)

130A. Electromagnetics I (4)

130B. Introductory Electromagnetics II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 120A. Plane wave propagation in lossy media, reflection and guided waves, simple and complicated waves, and dispersion of electric and magnetic fields. GE credit: SciEng | SE, F, W. (F, W.)

132A. RF and Microwaves in Wireless Communication (4)
Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 110A, 130B. 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 parameters. GE credit: SciEng | SE. F. (F.)

132B. RF and Microwaves in Wireless Communication (5)
Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 132A. Passive RF and microwave devices and circuits, design, fabrication, and testing for wireless applications. RF and microwave filter and coupler design. Introductory analysis and design of RF and microwave transistor amplifiers. GE credit: SciEng | SE. F. (F.)

132C. RF and Microwaves in Wireless Communication (5)
Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 132B. RF and microwave amplifier design, including transistor models, stability considerations, noise models and noise design. Theory and design of microwave transistor oscillators and mixers. Wireless system design and analysis. GE credit: SciEng | SE. F. (F.)

133. 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. GE credit: SciEng | SE, F. (F.)

134A. RF/Microwave Systems Design (3)
Workshop—3 hours; laboratory—6 hours. Prerequisites: course 130B or 110B or 150A. Course limited to 24 students. Board-level RF design, fabrication, and characterization of an RF/microwave system, including the antenna, RF front-end, mixers, signal processing, and digital signal processing models. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE, F. (F.)

134B. RF/Microwave Systems Design (3)
Workshop—3 hours; laboratory—6 hours. Prerequisites: course 134A. Course limited to 24 students. Board-level RF design, fabrication, and characterization of an RF/microwave system, including the antenna, RF front-end, mixers, signal processing, and digital signal processing models. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE, F. (F.)

135. Optical Communications I: Fibers (4)
Lecture—4 hours. Prerequisite: course 130B. Principles of optical communication systems. Planar dielectric waveguides. Optical fibers: single-mode, multi-mode, step and graded index, and optical dispersion in optical fibers. Optical sources (LEDs and lasers) and receivers. Design of digital optical transmission systems. GE credit: SciEng | SE, F. (F.)

136A. RF/Microwave Systems Design (3)
Workshop—1 hour; laboratory—6 hours. Prerequisite: Computer Science Engineering 30; courses 100, 180A; and either 110B, 157A (may be taken concurrently), or 180B. Pass One restricted to major. Course will focus on the design and implementation of an opto-electronic system operating under performance and economic constraints. Measurement techniques will be designed and implemented, and the system will be characterized. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE, W. (F.)

136B. Electronic Design Project (3)
Workshop—1 hour; laboratory—6 hours. Prerequisite: course 136A. Optical, electronic and communication-engineering design of an opto-electronic system operating under performance and economic constraints. Measurement techniques will be designed and implemented, and the system will be characterized. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE, W. (F.)

140A. Principles of Device Physics I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 17; Physics 9D or 9HE. Semiconductor device fundamentals, equilibrium and non-equilibrium statistical mechanics, conductivity, diffusion, electrons and holes, pn junctions, first-order metal-oxide-semiconductor (MOS) field effect transistors, bipolar junction transistor fundamentals. GE credit: SciEng | SE, F, W, SS. (F, W, SS.)

140B. Principles of Device Physics II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 140A. Electrical properties, designs, models and advanced concepts for MOS, Bipolar, and Junction Field-Effect Transistors, including scaling, minority carrier distribution, non-ideal effects, and device fabrication methods. MESFET and heterojunction bipolar transistors (HBTs). Fundamentals of solar cells, photodetectors, LEDs and semiconductor lasers. GE credit: SciEng | SE, SS. (F, W, SS.)

145. Electronic Materials (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 140A. Electronic and physical properties of materials used in electronics, ICs, optoelectronics and MEMS. Semiconductors, dielectrics, metals, optical materials, organic semiconductor, optical...
Lecture—4 hours; discussion—1 hour. Prerequisite: course 100; Engineering 6 or Mathematics 222AL. Probabilistic and statistical analysis of electrical and computer systems. Discrete and continuous random variables, expectation and moments, transformation of random variables. Joint and conditional densities. Limit theorems and statistics. Noise models, system reliability and testing. GE credit: SciEng | SE—F, S. (F, S.)

165. Statistical and Digital Communication (4)

170. Introduction to Computer Architecture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 180A, Computer Science Engineering 30. Introduction to basic aspects of computer architecture, including computer performance measurement, instruction set design, computer arithmetic, pipeline/non-pipelined implementation, and memory hierarchies (cache and virtual memory). Presents a simplified Reduced Instruction Set Computer using logic design methods from the prerequisite course. GE credit: SciEng | SE—F, F. (F)

171. Parallel Computer Architecture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 170 or Computer Science Engineering 154B. Organization and design of parallel processors including shared memory multiprocessors, cache coherency, memory consistency, snooping protocols, synchronization, scalable multiprocessors, message passing protocols, distributed shared memory and interconnection networks. GE credit: SciEng | SE—S. (S)

172. Embedded Systems (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 100; and course 170 or Computer Science Engineering 154A. Introduction to embedded-system hardware and software topics: include: embedded processor and memory architecture; input/output hardware and software, including interrupts and direct memory access; interfacing with sensors and actuators; and embedded networking. GE credit: SciEng | SE—W, W. (W, S)

173A. Computer Networks (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Computer Science Engineering 60; Computer Science and Engineering and Computer Engineering 161 or Mathematics 135A or Statistics 131A, or Statistics 120 or Statistics 132. Pass One open to Computer Science, Computer Science and Engineering, and Electrical Engineering Majors only. Overview of computer networks, TCP/IP protocol suite, computer-networking applications and protocols, transport-layer protocols, network architectures, Internet Protocol (IP), routing, link-layer protocols, local area and wireless networks, medium access control, physical aspects of data transmission, and network performance analysis. Only units of credit for students who have taken course 157. [Same course as Computer Science Engineering 152A.] GE credit: SciEng | SE—F, W, W, S. (F, W, S)

173B. Design Projects in Communication Networks (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 172A or Computer Science and Engineering 152A. Advanced topics and design projects in communication networks. Example topics include wireless networks, multimedia networking, network design and management, traffic analysis and modeling, network simulations and performance analysis. (Same course as Computer Science Engineering 152C.) Offered in alternate years. GE credit: SciEng | SE—S. (S)

180A. Digital Systems I (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: Physics 9C or 9HD. Introduction to digital systems design including combinational logic design, sequential and asynchronous circuits, computer arithmetic, memory systems and algorithmic state machine design; computer aided design (CAD) methodologies and tools. GE credit: SciEng | SE—F, W, W. (W, W)

180B. Digital Systems II (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: course 180A. Computer-aided design of digital systems with emphasis on hardware description languages (VHDL), logic synthesis and field-programmable gate arrays (FPGA). May cover access topics in digital system design such as static timing analysis, pipelining, memory system design, testing digital circuits. GE credit: SciEng | SE—S. (S)

181A. Digital Systems Design Project (3)
Workshop—1 hour; laboratory—6 hours. Prerequisite: courses 180B and either course 170 or Computer Science 122A. Digital-system and computer-engineering design course involving architecture, design, implementation, and testing of a prototype application-specific processor under given design constraints. This is a team project that includes a final presentation and report. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE—S. (S)

181B. Digital Systems Design Project (3)
Workshop—1 hour; laboratory—6 hours. Prerequisite: course 181A. Digital-system and computer-engineering design course involving architecture, design, implementation and testing of a prototype application-specific processor under given design constraints. This is a team project that includes a final presentation and report. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE—S. (S)

183. Testing and Verification of Digital Systems (5)
Lecture—3 hours; laboratory—4 hours. Prerequisite: courses 170 and 180B. Computer-aided testing and design verification techniques for digital systems; physical fault testing; simulation-based design verification; formal verification; and testing analysis. GE credit: SciEng | SE—W, W. (W)

189A. Special Topics in Electrical Engineering and Computer Science; Computer Science (1-5)
Lecture; laboratory; presentation and report. Prerequisite: consent of instructor. Special topic in Computer Science. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng | SE—F, W, W, S. (F, W, W, S)

189B. Special Topics in Electrical Engineering and Computer Science; Programming Systems (1-5)
Lecture; laboratory; presentation and report. Prerequisite: consent of instructor. Special topics in Programming Systems. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng | SE—F, W, W, S. (F, W, W, S)

189C. Special Topics in Electrical Engineering and Computer Science; Digital Systems (1-5)
Lecture; laboratory; presentation and report. Prerequisite: consent of instructor. Special topics in Digital Systems. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng | SE—F, W, W, S. (F, W, W, S)
189D. Special Topics in Electrical Engineering and Computer Science: Communication—(1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Communications. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng [SE]—F, W, S. (F, W, S.)

189E. Special Topics in Electrical Engineering and Computer Science; Signal Transmission—(1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Signal Transmission. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng [SE]—F, W, S. (F, W, S.)

189F. Special Topics in Electrical Engineering and Computer Science; Digital Communication—(1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Digital Communication. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng [SE]—F, W, S. (F, W, S.)

189G. Special Topics in Electrical Engineering and Computer Science; Control Systems—(1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Control Systems. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng [SE]—F, W, S. (F, W, S.)

189H. Special Topics in Electrical Engineering and Computer Science; Robotics—(1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Robotics. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng [SE]—F, W, S. (F, W, S.)

189I. Special Topics in Electrical Engineering and Computer Science; Image Processing—(1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Image Processing. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng [SE]—F, W, S. (F, W, S.)

189K. Special Topics in Electrical Engineering and Computer Science; High-Frequency Phenomena and Devices—(1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in High-Frequency Phenomena and Devices. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng [SE]—F, W, S. (F, W, S.)

189L. Special Topics in Electrical Engineering and Computer Science; Solid-State Devices and Physical Electronics—(1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Solid-State Devices and Physical Electronics. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng [SE]—F, W, S. (F, W, S.)

189M. Special Topics in Electrical Engineering and Computer Science; Systems Theory—(1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Systems Theory. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng [SE]—F, W, S. (F, W, S.)

189N. Special Topics in Electrical Engineering and Computer Science; Active and Passive Circuits—(1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Active and Passive Circuits. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng [SE]—F, W, S. (F, W, S.)

189O. Special Topics in Electrical Engineering and Computer Science; Integrated Circuits—(1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Integrated Circuits. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng [SE]—F, W, S. (F, W, S.)

189P. Special Topics in Electrical Engineering and Computer Science; Computer Software—(1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Computer Software. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng [SE]—F, W, S. (F, W, S.)

189Q. Special Topics in Electrical Engineering and Computer Science; Computer Engineering—(1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Computer Engineering. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng [SE]—F, W, S. (F, W, S.)

189R. Special Topics in Electrical Engineering and Computer Science; Microprocessors—(1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Microprocessors. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng [SE]—F, W, S. (F, W, S.)

189S. Special Topics in Electrical Engineering and Computer Science; Electromagnetics—(1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Electromagnetics. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng [SE]—F, W, S. (F, W, S.)

189T. Special Topics in Electrical Engineering and Computer Science; Optoelectronics—(1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Optoelectronics. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng [SE]—F, W, S. (F, W, S.)

189U. Special Topics in Electrical Engineering and Computer Science; Computer Networks—(1-5)
Lecture; laboratory; lecture/laboratory. Prerequisite: consent of instructor. Special topics in Computer Networks. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng [SE]—F, W, S. (F, W, S.)

190. Research Group Conferences in Electrical and Computer Engineering—(1-5)
Discussion—1 hour. Prerequisite: upper division standing in Electrical and Computer Engineering, consent of instructor, and attendance at the conference. May be repeated for credit. (P/NP grading only.) GE credit: SciEng [SE]—F, W, S. (F, W, S.)
Classification of digital filters, linear phase systems, all-pass functions, FIR and IIR filter design methods and optimization metrics. Application to commercially robust structures for digital filters. — W. (W.)

202. Advanced Digital Signal Processing (4)
Lecture—4 hours. Prerequisite: courses 201, 260, and 265, and Mathematics 167 are recommended. Multirate systems and wavelets, optimal transform and subband coders in data compressions, advanced sampling theory and oversampled A/D converters, transmultiplexers and precoders in digital communication systems, genomic signal processing. Offered in alternate years. — S. (S.)

205. Computational Methods in Biomedical Imaging (4)
Lecture—4 hours. Prerequisite: Biomedical Engineering 100B or Biomedical Engineering 108 or course 150A. Analytic tomographic reconstructions from projections in 2D and 3D; model-based image reconstruction methods; maximum likelihood and Bayesian methods; applications to CT, PET, and SPECT. (Same course as Biomedical Engineering 252.) — W. (W.)

206. Digital Image Processing (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 118 or 210. Study of digital image processing systems and applications, image perception, sampling and quantization, transform theory and applications, enhancement, filtering and restoration, image analysis, and image processing systems. — W. (W.)

210. MOS Analog Circuit Design (3)
Lecture—3 hours. Prerequisite: course 140A and 110B. Analysis and design of MOS amplifiers, bias circuits, voltage references and other analog circuits. Stabilized buffers, op-amps, and oscillator and stabilizer circuits. Introduction to noise analysis in MOS circuits. — F. (F.)

211. Advanced Analog Circuit Design (3)
Lecture—3 hours. Prerequisite: course 210; Statistics 131A is recommended. Noise and distortion in electronic circuits and systems. Application to communication circuits. Specific applications include mixers, low-noise amplifiers, power amplifiers, phase-locked loops, oscillators and receiver architectures. Offered in alternate years. — W. (W.)

212. Analog MOS IC Design for Signal Processing (3)

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. — S. (S.)

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 linear and nonlinear circuits. Gradient-based design optimization. Behavioral simulations. Extensive CAD project. — W. (W.)

215. Circuits for Digital Communications (3)
Lecture—3 hours. Prerequisite: courses 150B and 216B may be taken concurrently. course 165, 166, or 265 (DSP recommended). Advanced, digital, and mixed-signal CMOS implementations of communication-circuit blocks; gain control, adaptive equalizers, sampling circuits, clock recovery. Offered in alternate years. — F. (F.)

216. Low Power Digital Integrated Circuit Design (3)

217. Biomedical Electronics (4)
Lecture—3 hours; project. Prerequisite: course 210 or consent of instructor. Application of electronic circuits and systems in monitoring and control of physiological signals. Applications in portable electronics and sensors. Thermodynamic limits. Offered in alternate years. — W. (W.)

219. Advanced Digital Circuit Design (3)
Lecture—3 hours. Prerequisite: course 118 or 218A. Analysis and design of digital circuits. Both bipolar and MOS circuits; digital logic and static and static MOS RAM cells and sense amplifiers. Advanced MOS families. Multivalued logic. — S. (S.)

221. Analog Filter Design (3)
Lecture—3 hours. Prerequisite: courses 100 and 150A. Design of active and passive filters including filter specification and approximation theory. Passive LC filter design will cover doubly-terminated reactive two-port synthesis. Active filter design will include sensitive and insensitive building blocks, cascode, multi-loop, ladder and active-R filter design. Offered in alternate years. — F. (F.)

222. RF IC Design (3)
Lecture—3 hours. Prerequisite: courses 132C and 210. Radio-frequency ICs: amplifier design, device modeling and design rules; non-linear RF circuit design techniques; use of non-linear computer-aided (CAD) tools; RF power amplifier design. Offered in alternate years. — F. (F.)

228. Advanced Microwave Circuit and Device Design Techniques (4)

229. RF-MEMS and Adaptive Wireless Frontends (4)
Lecture—3 hours; discussion—3 hours. Prerequisite: course 130A. Focusing on the modeling, design, fabrication, and characterization of RF-MEMS while providing a thorough introduction to the technology with an emphasis on how it will benefit the design of adaptive RF/microwave wireless systems. Offered in alternate years. — S. (S.)

230. Electromagnetics (3)
Lecture—3 hours. Prerequisite: course 130B. Maxwell’s equations, plane waves, reflection and refraction, complex waves, waveguides, resonant cavities, and basic antennas. — F. (F.)

231A. Plasma Physics and Controlled Fusion (3)
Lecture—3 hours. Prerequisite: consent of instructor. Equilibrium plasma properties; single particle motion; fluid equations; waves and instabilities in a fluid plasma; plasma kinetic and transport coefficients; linear and nonlinear Vlasov theory; fluctuations, correlations and radiation; inertial and magnetic confinement systems in controlled fusion. Offered in alternate years. — W. (W.)

231C. Plasma Physics and Controlled Fusion (3)
Lecture—3 hours. Prerequisite: course 231B; consent of instructor. Equilibrium plasma properties; single particle motion; fluid equations; waves and instabilities in a fluid plasma; plasma kinetic theory and transport coefficients; linear and nonlinear Vlasov theory; fluctuations, correlations and radiation; inertial and magnetic confinement systems in controlled fusion. Offered in alternate years. — S. (S.)

232A. Advanced Applied Electromagnetics (3)
Lecture—3 hours. Prerequisite: course 132B. The exact formulation of applied electromagnetic problems using Green’s functions. Applications of these techniques to transmission circuits. Offered in alternate years. — W. (W.)

232B. Advanced Applied Electromagnetics II (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 132B. Advanced treatment of electromagnetism applications to passive microwave devices and antennas. Offered in alternate years. — S. (S.)

233. High Speed Signal Integrity (3)
Lecture—3 hours. Prerequisite: course 130B. Design and analysis of interconnects in high-speed circuits and sub-systems; understanding of high-speed signal propagation and signal integrity concepts; electromagnetic modeling tools and experimental techniques. Offered in alternate years. — S. (S.)

234A. Physics and Technology of Microwave Vacuum Electron Beam Devices I (4)
Lecture—4 hours. Prerequisite: B.S. degree in physics or electrical engineering or the equivalent background. Physics and technology of electron beam emissions, flow and transport, electron gun design, space charge waves and klystrons. Offered in alternate years. — F. (F.)

234B. Physics and Technology of Microwave Vacuum Electron Beam Devices II (4)
Lecture—4 hours. Prerequisite: course 234A. Theory and experimental design of traveling wave tubes, backward wave oscillators, and extended interaction oscillators. Offered in alternate years. — W. (W.)

234C. Physics and Technology of Microwave Vacuum Electron Beam Devices III (4)
Lecture—4 hours. Prerequisite: course 234A. Physics and technology of gated guns, ground-based, free electron lasers, magnetrons, crossed-field amplifiers and relativistic devices. Offered in alternate years. — S. (S.)

235. Photonics (4)
Lecture—3 hours; project—1 hour. Prerequisite: course 230 (may be taken concurrently). Optical propagation of electromagnetic waves and beams in photonic components and the design of such devices using numerical techniques. Offered in alternate years. — W. (W.)

236. Nonlinear Optical Applications (3)
Lecture—3 hours. Prerequisite: course 130B, course 230 [may be taken concurrently]. Nonlinear optical interactions in optical communication, optical information processing and integrated optics. Basic concepts underlying optical nonlinear interactions in materials and guided media. Not open for credit to students who have completed course 233. Offered in alternate years. — W. (W.)

237A. Lasers (3)
Lecture—3 hours. Prerequisite: course 130B or the equivalent and course 235. Theoretical and practical description of lasers. Theory of population inversion, amplification and oscillation using semiclassical oscillator model and rate equations. Description and design of real laser system [Not open for credit to students who have completed course 226A or 236A.] Offered in alternate years. — F. (F.)

Fall 2017 and on Revised General Education (GE): AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; AGCM—American Cultures; DD—Domestic Diversity; OL—Other; VL—Visual; WC—World Cultures; WE—Writing Experience

PreFall 2011 General Education (GE): ArthHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Domestic Diversity; Wr—Writing Experience
237B. Laser Physics II (4)
Lecture—3 hours; extensive problem solving. Prereq.: course 237A or Applied Science Engineering 265A. Radiation field and quantum theory: quantum-statistical, coherent, and incoherent light propagation in materials; lasers and their applications; lasers in biology and medicine; optoelectronics; quantum well, 2DEG, and quantum dot lasers. (Same course as Biomedical Engineering 217.)—F. (F.)

245. Micro- and Nano-Technology in Life Sciences (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing or consent of instructor. Survey of biomedically relevant micro and nanobiological perspectives; micro- and nano-fabrication and characterization techniques; surface chemistry and mass transfer; essential biological processes and models; properties of devices to merge aforementioned themes in a multidisciplinary project. (Same course as Chemical Engineering 245 and Materials Science and Engineering 243.)—S. (S.)

246. Advanced Projects in IC Fabrication (3)
Discussion—1 hour; laboratory 2 hours. Prerequisite: course 148. Individual projects in the fabrication of analog or digital integrated circuits. Offered in alternate years. —W.

247. Advanced Semiconductor Devices (4)
Lecture—3 hours. Prerequisite: graduate standing in Engineering. Semiconductor devices, including MOSFETs, heterojunction transistors, light-emitting diodes, lasers, sensors, detectors, power and high-voltage transistors, MEMS resonators, organic semiconductors and photovoltaics. All material is from recent literature, encouraging students to utilize search methods and critically assess the latest research. Offered in alternate years. —W.

248. Photovoltaics and Solar Cells (3)
Lecture—3 hours. Prerequisite: course 140B or equivalent, or consent of instructor. Physics and application of photovoltaics and solar cells, including design, fabrication, and interconnections. Mono and microcrystalline silicon devices; thin-film technologies, heterojunction and organic-semiconductor technologies. Collectors, electrical inverters, and infrastructure issues. Challenges and concerns. (Same course as Engineering-Material Science 246.) Offered in alternate years.—W.

249. Nanofabrication (3)
Lecture—3 hours. Prerequisite: graduate standing in Engineering. Theory and practices of nanofabrication used for producing ICs, electronic devices, optoelectronics, sensors, and microstructures. Major topics include electron, photon, and ion-beams and their interactions with solids, chemical vapor deposition, plasma processing and micromachining. Offered in alternate years.—S.

250. Linear Systems and Signals (4)
Lecture—4 hours. Prerequisite: course 150A. Mathematical description of linear time-invariant systems in both continuous-time and discrete-time domains. Classical and state-space models; system realization; stability, controllability and observability; state estimation, Kalman filtering, measurement and disturbance models; root locus and Bode plots; Nyquist stability criterion. Offered in alternate years. —S.

251. Nonlinear Systems (3)
Lecture—3 hours. Prerequisite: course 250. Nonlinear differential equations, second-order systems, approximate methods, Lyapunov stability, absolute stability, Popov criterion, circle criterion, feedback linearization techniques. Offered in alternate years.—S.

252. Multivariable Control System Design (3)
Lecture—3 hours. Prerequisite: course 250. Modern control system design, theory, and techniques. Topics will include single-loop feedback design, stability, performance and robustness of multivariable control systems; LQG design; H infinity design; frequency response methods, and optimization-based design. Offered in alternate years. —W. (W.)

254. Optimization (3)
Lecture—3 hours. Prerequisite: Mathematics 22A, knowledge of FORTRAN or C. Modeling optimization problems in engineering design and other applications; optimality conditions; unconstrained optimization (gradient, conjugate gradient and quasi-Newton algorithms); duality and Lagrangian relaxation constrained optimization. (Primal method and an introduction to penalty and augmented Lagrangian methods.) Offered in alternate years. —W.

255. Robotic Systems (3)
Lecture—3 hours. Introduction to robotic systems. Mechanical manipulators, kinematics, manipulator positioning and path planning. Dynamics of manipulators. Robot motion programming and control algorithms. Offered in alternate years. —W. (W.)

256. Stochastic Optimization in Dynamic Systems (4)
Lecture—4 hours. Prerequisite: course 260 or the equivalent. Markov Decision Processes (MDP), dynamic programming, multiaimed bandit, Partially observable MDP, optimal stopping, stochastic scheduling, sequential detection and quickest change detection, competitive MDP and game theory, applications in dynamic systems such as queuing networks, communication systems, and multi-agent systems. Offered in alternate years. —W.

260. Random Signals and Noise (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 120, course 150A; course 250 recommended. Random processes as probabilistic models for signals and noise. Review of probability, random variables, and expectation. Study of correlation function and spectral density, ergodicity and duality between time averages and expected values, filters and optimal estimation. Applications. —F. (F.)

261. Signal Processing for Communications (4)
Lecture—4 hours. Prerequisite: course 165, 260 or consent of instructor. Signal processing in wireless and wireline communications. Channel equalization and distortion of wireless and wireline channels. Channel equalization and maximum likelihood sequence estimation. Channel precoding and pre-equalization. OFDM and transmit diversity. Array processing. Offered in alternate years.—S. (S.)

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.—S. (S.)

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 signaling over bandwidth-constrained linear filter channels and over multi-path channels. Spread spectrum signals. —W. (W.)
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. —S.

267. Mobile Communications (4)
Lecture/laboratory—2 hours. Prerequisite: courses 260 and 265 (can be taken concurrently). Time-varying multi-path fading channel models and receiver performance in fading channels; multiple access techniques and multiple access receivers. Performance measures and optimum design of the capacity of wireless channels. Offered in alternate years. —W.

269A. Error Correcting Codes I (3)
Lecture—3 hours. Prerequisite: Mathematics 22A and course 160. Introduction to the theory and practice of block codes, linear block codes, cyclic codes, decoding algorithms, coding techniques. —F, F.

269B. Error Correcting Codes II (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 and trellis decoding. Offered in alternate years. —S, S.

270. Computer Architecture (3)
Lecture—3 hours. Prerequisite: course 170 or Computer Science Engineering 154B. Introduction to modern techniques for high-performance single and multiple processor systems. Topics include advanced pipeline design, advanced memory hierarchy design, optimizing pipeline and memory use, and memory hierarchy design. Case studies of recent and single multiple processor systems. —F, F.

272. High-Performance Computer Architecture (4)
Lecture—4 hours. Prerequisite: course 270 or Computer Science Engineering 201A. Designing and analysis of high-performance computer architecture with emphasis on vector processing, on-chip interconnect networks, chip-multiprocessors, memory and storage subsystem design and impact of technological advances on computer architecture. Offered in alternate years. —S. (S.)

273. Networking Architecture and Resource Management (4)
Lecture—3 hours; project. Prerequisite: course 173A or Computer Science and Engineering 152A. Pass One and Pass Two open to Graduate Students in Computer Science and Electrical and Computer Engineering only. Concepts and design principles of computer networks. Network architectures, protocol mechanisms and implementation principles (transport/network layers), network algorithms, router mechanisms, design requirements of applications, network simulation, modeling and performance analysis. (Same course as Computer Science Engineering 258A). —W, W.

274. Internet Measurements, Modeling and Analysis (4)
Lecture—3 hours; project. Prerequisite: Computer Science Engineering 252 or course 272. Advanced topics in Internet measurements of network measurements, modeling, and statistical inference. Applications to Internet engineering, routing optimization, load balancing, traffic engineering, fault tolerance, anomaly detection, and network security. Individual project requirement. Offered in alternate years. —S. (S.)

276. Fault-Tolerant Computer Systems: Design and Operation (4)
Lecture—3 hours. Prerequisite: courses 170, 180A. Introduces fault-tolerant digital system theory and practice. Covers recent and classic fault-tolerant 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. —W.

277. Graphics Architecture (3)
Lecture—3 hours. Prerequisite: Computer Science Engineering 154B or course 170, 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. —W, W.

278. Computer Arithmetic for Digital Implementation (3)
Lecture—3 hours; project. Prerequisite: courses 170, 180A. The design and implementation of computer arithmetic logic units are studied with particular emphasis on high-speed performance requirements. Addition, multiplication, division, and operation. Number representation and floating point representation are covered. Fixed and floating point representation are examined. Offered in alternate years. —S.

281. VLSI Digital Signal Processing (4)
Lecture—3 hours; project. Prerequisite: courses 150B, 170, 180A or consent of instructor. Digital signal processors, building blocks, and algorithms. Design and implementation of processor algorithms, architectures, control, functional units, and circuit topologies for increased performance and reduced circuit size and power dissipation. Offered in alternate years. —W, W.

282. Hardware Software CoDesign (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 170. Course introduces design and design of embedded systems; modeling and performance estimation; hardware/software partitioning; co-simulation; design reuse; platform-based design; reconfigurable computing. —S, S.

283. Advanced Design Verification of Digital Systems (4)
Lecture—3 hours; project. Prerequisite: courses 170 and 180A. Design verification techniques for digital systems; simulation based design verification techniques, formal verification techniques, including equivalence checking, model checking, and theorem proving; timing analysis and verification; application of design certification techniques to microprocessors. Offered in alternate years. —W, W.

Lecture—4 hours. Prerequisite: courses 170 and 180B, or consent of instructor. Computer Science Engineering 122A recommended. Introduction to design and optimization of digital computing systems for embedded applications. Topics include combinational optimization, performance and energy optimization in embedded systems, compilation and architecture-specific mapping, programmable and reconfigurable platforms; design automation and algorithmic techniques for computer performance. Offered in alternate years. —W, W.

286. Introduction to Digital System Testing (3)
Lecture—3 hours. Prerequisite: course 180A. Statistics 120 or 131A. A review of several current techniques used to diagnose faults in both combinational and sequential circuits. Topics include path sensitization techniques, Boolean difference, D-algorithm random test generation, analysis of testability and an analysis of the effects of intermittent faults. Not open for credit to students who have completed course 276A. Offered in alternate years. —W.

289A. Special Topics in Electrical and Computer Engineering: Computer Science (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Computer Science. May be repeated for credit when topic differs. —F, W, S, S. (W, W.)

289B. Special Topics in Electrical and Computer Engineering: Programming Systems (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Programming Systems. May be repeated for credit when topic differs. —F, W, S, S. (W, W.)

289C. Special Topics in Electrical and Computer Engineering: Digital Systems (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Digital Systems. May be repeated for credit when topic differs. —F, W, S, S. (W, W.)

289D. Special Topics in Electrical and Computer Engineering: Digital Communication (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Digital Communication. May be repeated for credit when topic differs. —F, W, S, S. (W, W.)

289E. Special Topics in Electrical and Computer Engineering: Computer Networks (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Computer Networks. May be repeated for credit when topic differs. —F, W, S, S. (W, W.)

289F. Special Topics in Electrical and Computer Engineering: Robotics (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Robotics. May be repeated for credit when topic differs. —F, W, S, S. (W, W.)

289G. Special Topics in Electrical and Computer Engineering: Image Processing (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Image Processing. May be repeated for credit when topic differs. —F, W, S, S. (W, W.)

289H. Special Topics in Electrical and Computer Engineering: High Frequency Phenomena and Devices (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in High Frequency Phenomena and Devices. May be repeated for credit when topic differs. —F, W, S, S. (W, W.)

289I. Special Topics in Electrical and Computer Engineering: Solid-State Devices and Physical Electronics (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Solid-State Devices and Physical Electronics. May be repeated for credit when topic differs. —F, W, S, S. (W, W.)
289M. Special Topics in Electrical and Computer Engineering: Systems Theory (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Systems Theory. May be repeated for credit when topics differ. —F, W, S. (F, W, S.)

289N. Special Topics in Electrical and Computer Engineering: Active and Passive Circuits (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Active and Passive Circuits. May be repeated for credit when topics differ. —F, W, S. (F, W, S.)

289O. Special Topics in Electrical and Computer Engineering: Integrated Circuits (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Integrated Circuits. May be repeated for credit when topics differ. —F, W, S. (F, W, S.)

289P. Special Topics in Electrical and Computer Engineering: Computer Software (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Computer Software. May be repeated for credit when topics differ. —F, W, S. (F, W, S.)

289Q. Special Topics in Electrical and Computer Engineering: Computer Engineering (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Computer Engineering. May be repeated for credit when topics differ. —F, W, S. (F, W, S.)

289R. Special Topics in Electrical and Computer Engineering: Microprocessing (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Microprocessing. May be repeated for credit when topics differ. —F, W, S. (F, W, S.)

289S. Special Topics in Electrical and Computer Engineering: Electronics (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Electronics. May be repeated for credit when topics differ. —F, W, S. (F, W, S.)

289T. Special Topics in Electrical and Computer Engineering: Electromagnetics (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Electromagnetics. May be repeated for credit when topics differ. —F, W, S. (F, W, S.)

289U. Special Topics in Electrical and Computer Engineering: Optoelectronics (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Optoelectronics. May be repeated for credit when topics differ. —F, W, S. (F, W, S.)

289V. Special Topics in Electrical and Computer Engineering: Computer Networks (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topic in Computer Networks. May be repeated for credit when topics differ. —F, W, S. (F, W, S.)

290. Seminar in Electrical and Computer Engineering (1)
Seminar—1 hour. Discussion and presentation of current research and development in Electrical and Computer Engineering. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)

290C. Graduate Research Group Conference in Electrical and Computer Engineering (1)
Discussion—1 hour. Prerequisite: consent of instructor. Research problems, progress, and techniques in electrical and computer engineering. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)

291. Solid-State Circuit Research Laboratory Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing. Lectures on solid-state circuit and system design by various visiting experts in the field. May be repeated for credit. (S/U grading only.)—S. (S.)

292. Seminar in Solid-State Technology (1)
Seminar—1 hour. Prerequisite: graduate standing. Lectures on solid-state technology by various visiting experts in the field. May be repeated for credit. (S/U grading only.)—F, S. (F, S.)

293. Computer Engineering Research Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing. Discussion—1 hour. Prerequisite: consent of instructor. Lectures, tutorials, and seminars on topics in computer engineering. May be repeated for credit up to four times. (S/U grading only.)—F, S. (F, S.)

294. Communications, Signal and Image Processing Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing. Communications, signal and image processing, video engineering and computer vision. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)

295. Systems, Control and Robotics Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing. Seminars on current research in systems and control by faculty and visiting experts. Technical presentations and lectures on current topics in robotics research and robotics technology. May be repeated for credit. (S/U grading only.)—W. (W.)

296. Photonics Research Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing. Lectures on photonics and related areas by faculty and visiting experts. May be repeated for credit. (S/U grading only.)—F, S. (F, S.)

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Professional

390. The Teaching of Electrical Engineering (1)
Discussion—1 hour. Prerequisite: meet qualifications for teaching assistant or/and associate-in in Electrical Engineering. Participation as a teaching assistant or associate-in in a designated engineering course. Methods of leading discussion groups or laboratory sections, giving presentations, use of laboratory equipment, and grading laboratory reports. May be repeated for credit. (S/U grading only.)—F. (F.)

396. Teaching Assistant Training Practicum (1-5)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)
Upper Division Required Courses

Lower Division Required Courses

Biomedical Engineering 20, 106*, 109
Fall 2011 and on Revised General Education (GE): AH

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Units</th>
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<tr>
<td>21A-21B-21C-21D</td>
<td>Mathematics</td>
<td>16</td>
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<tr>
<td>25A-25B</td>
<td>Physics</td>
<td>6</td>
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<tr>
<td>2A, 2B, 2C or Chemistry 2AH</td>
<td>Chemistry</td>
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<tr>
<td>117, 45 or 45Y</td>
<td>Materials Science and Engineering</td>
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<td>121, 122L, 172, 172L, 174, 174L</td>
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<tr>
<td>2BH, 2CH</td>
<td>Chemistry</td>
<td>15</td>
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<tr>
<td>2A, 2B, 2C or Chemistry 2AH</td>
<td>Chemistry</td>
<td>6</td>
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<tr>
<td>21A-21B-21C-21D</td>
<td>Mathematics</td>
<td>16</td>
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<tr>
<td>172 or 174</td>
<td>Materials Science Engineering</td>
<td>4</td>
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<tr>
<td>180, 181 or 182</td>
<td>Materials Science and Engineering</td>
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<tr>
<td>21A-21B-21C-21D</td>
<td>Mathematics</td>
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<td>190</td>
<td>Engineering</td>
<td>3</td>
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<td>135A, Statistics 120, 131A, 131B, 132A, 132B</td>
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<td>75, 165</td>
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<td>147, 162L, 172, 172L, 174, 174L</td>
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<td>15</td>
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<td>123, 125, 143</td>
<td>Engineering</td>
<td>3-4</td>
</tr>
<tr>
<td>158A, Materials Science Engineering 170, Engineering 106, 160, 180, or Civil Engineering 123, 130, 143</td>
<td>Materials Science and Engineering</td>
<td>3-4</td>
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<tr>
<td>102, 103, 104</td>
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<tr>
<td>180, 181, 182</td>
<td>Materials Science and Engineering</td>
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</tbody>
</table>

Materials Science Minor

There is a constant need for professionals with more knowledge and experience in understanding the behavior of materials from which products such as electronics, sensors, biological implants, transportation vehicles, medical devices and infrastructure were made. The goal of this minor is to prepare students for careers that require training in materials science, including the fundamentals of thermodynamics and kinetics of and their interaction with composition and structure, as well as the complex relationships between composition, structure, processing and behavior/performance. Topics covered include material thermodynamics and kinetics, materials structural analysis, and structure-property relationships for electronic, optical, magnetic and mechanical behavior. The minor is expected to accommodate a wide variety of undergraduate and graduate students, with a focus on materials science and engineering.

All courses must be taken for a letter grade. A grade of C- or better is required for all courses used to satisfy minor requirements, with an overall GPA in minor requirement courses of 2.000 or better.

Minor Requirements

<table>
<thead>
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<th>Course Code</th>
<th>Title</th>
<th>Units</th>
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<tbody>
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<td>120, 125, 143</td>
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<td>140, 141, 142</td>
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<td>75, 165</td>
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<td>123, 125, 143</td>
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<tr>
<td>102, 103, 104</td>
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<td>4</td>
</tr>
<tr>
<td>180, 181, 182</td>
<td>Materials Science and Engineering</td>
<td>4</td>
</tr>
</tbody>
</table>

Graduate Programs in the Department of Materials Science and Engineering

The Department of Materials Science and Engineering is home to a top-20 ranked graduate programs in Materials Science & Engineering. We offer a unique interdisciplinary environment for graduate students, with renowned faculty and state-of-the-art research facilities.

The Graduate Program in Materials Science and Engineering

M.Eng., M.S., and Ph.D.

Ph.D. designated emphases are available as specializations in biotechnology, biophysics, and nuclear science.

http://chems.engineering.ucdavis.edu
530-752-7952

The Materials Science and Engineering Graduate Program provides students with a strong background in advanced materials synthesis, processing, and characterization, both from an experimental and theoretical standpoint.

Doctoral students are typically offered competitive 4-year financial offers of fellowships and research/teaching assistantships which include tuition, fees, and a stipend.

Financial offers are subject to satisfactory progress towards completion of degree requirements.

Research areas include biomaterials, catalysts, ceramics, electronic and electrochemical properties and devices, glasses, green engineering and design, interfaces, magnetic materials and devices, materials microstructure and/or processing, mathematical modeling, mechanical properties and synthesis, metals, microscopy, molecular modeling, nanomaterials, optical properties and devices, polymers, renewable energy, sintering, structural materials, thermal chemistry, and thin films.

Research Facilities and Partnerships:

- Interdisciplinary Center for Electron Microscopy
- Center for Northern California Nanotechnology
- Center for Nanomaterials in the Environment, Agriculture and Technology

Complete Information is available on our website.

Courses in Engineering: Materials Science and Engineering (EMS)

For courses in Chemical and Materials Science Engineering (CEM) and Chemical Engineering (CHEC), see Engineering: Chemical Engineering, on page 277.

Lower Division

2. Materials Marvels (2)

| Lecture/discussion | 2 hours. Restricted to lower division students only. Role of materials in technological societies and their impact on us. Exploration of how materials are extracted from the earth, processed, and shaped into products, including discussion of disposal and reuse of materials. GE credit: SciEng | 2 |

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. Restricted to students in the Materials Science and Engineering Honors Program. Examination of materials science computer applications through additional readings, discussions, collaborative work, or special activities which may include projects or computer simulations. Offered irregularly. | 1 |

9H. Honors Solid-State Materials Science (1)

| Discussion | 1 hour. Prerequisite: enrollment in the Materials Science and Engineering Honors Program; concurrent enrollment in Physics 9D required. Restricted to students in the Materials Science and Engineering Honors Program. 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. Offered irregularly. | 1 |
164. Rate Processes in Materials Science (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in Engineering 45, and course 160. Basic kinetic laws and the principles governing phase transformations. Applications in diffusion, oxidation, nucleation, growth and spinodal transformation. GE credit: SciEng | QL, SE, SL, VL.—W (W).

170. Sustainable Energy Technologies: Batteries, Fuel Cells, and Photovoltaic Cells (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 or GS. Open to students in Engineering or related fields. Basic principles of future energy devices such as lithium batteries, fuel cells, and photovoltaic cells. Examines the current status of these energy technologies and analyze challenges that still must be overcome. Offered irregularly. GE credit: SciEng | SE.—Su (So).

172. Electronic, Optical and Magnetic Properties of Materials (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 110A or Physics 9D; Engineering 6 or Chemical and Materials Science 6 or equivalent (recommended). Electronic, optical, and magnetic properties of materials as related to structure and processing of solid state materials. Physical principles for understanding the properties of metals, semiconductors, ceramics, and amorphous solids and the applications of these materials in engineering. GE credit: SciEng | QL, SE, SL, VL.—F (F).

172L. Electronic, Optical and Magnetic Properties Laboratory (2)  
Laboratory—3 hours; lecture/laboratory—1 hour. Prerequisite: course 172 (concurrent enrollment recommended). Extensive freshman investigation of electronic, optical and magnetic properties of engineering materials, emphasizing the fundamental relationship between microstructure and properties as well as the influences on the evolution of the microstructure and properties. GE credit: SciEng, Wrt | QL, SE, SL, VL, WE.—F (F).

174. Mechanical Behavior of Materials (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: C- or better in Engineering 45; course 162 (recommended). Microscopic and macroscopic aspects of the mechanical behavior of engineering materials, with emphasis on recent development in materials characterization through destructive testing. Fundamentals of plasticity in engineering materials, strengthening mechanisms and mechanical failure modes of materials systems. GE credit: SciEng, Wrt | QL, SE, SL, VL, WE.—F (F).

174L. Mechanical Behavior Laboratory (2)  
Laboratory—3 hours; lecture/laboratory—1 hour. Prerequisite course 174 (concurrent enrollment recommended). Experimental investigation of mechanical behavior. Laboratory exercises emphasize the fundamental relationship between microstructure and mechanical properties, and the evolution of the microstructure as a consequence of rate process. Not open for credit to students who have completed course 138L. GE credit: SciEng, Wrt | QL, SE, SL, VL, WE.—S (S).

180. Materials in Engineering Design (4)  
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: C- or better in Engineering 45. Restriction to students with upper division standing. Quantitative treatment of materials selection for engineering applications. Discussion of design and material selection strategies and process selection: strategy, process economics, life-cycle thinking and eco-design. Use of materials selection software. GE credit: SciEng, Wrt | QL, SE, SL, VL, WE.—S (S).

181. Materials Processing (4)  
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: C- or better in Engineering 45, and Engineering 105 or Chemical Engineering 152B or Electrical & Computer Engineering 140A or course 164. Principles of phase equilibria, thermodynamics and reaction kinetics applied to materials processing. Effects of processing variables on the structure-property relationship. Fundamentals of the manufacturing processes for electronic, optical, functional and structural materials. GE credit: SciEng, Wrt | QL, SE, SL, VL, WE.—W (W).

182. Failure Analysis (4)  

188A. Materials Design Project (4)  
Laboratory—4 hours; discussion—1 hour. Prerequisite: courses 160, 162, 164, 172, and 174. Major design materials science experience involving analysis of real materials processing, fabrication and technological applications including critical assessments of economic, manufacturing, and ethical constraints. Various principles of materials science are integrated into a thesis design project. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | QL, SE, SL, VL, WE.—W (W).

188AH. 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. Open only to students in the Materials Science and Engineering Honors Program. Offered irregularly.—S. (S.)

190C. Research Group Conferences (1)  
Discussion—1 hour. Prerequisite: consent of instructor; upper division standing. Individual and/or group conference on progress of research and techniques in materials research. May be repeated for credit. [P/NP grading only]—F, W, S. [F, W, S.]

198. Directed Group Study (1-5)  
Lecture—1-5 hours. Prerequisite: consent of instructor. Group study of selected topics. [P/NP grading only] Offered irregularly.—F, W, S. [F, W, S.]

199. Special Study for Advanced Undergraduates (1-5)  
Prerequisite: consent of instructor. Special study for advanced undergraduates. [P/NP grading only]—F, W, S. [F, W, S.]

Graduate

230. Fundamentals of Electron Microscopy (3)  
Lecture—2 hours; lecture/discussion—1 hour. Prerequisite: course 162. Principles and techniques of scanning and transmission of electron microscopy used in the study of materials will be described. Emphasis upon practical applications. —W (W).

230L. Laboratory for Electron Microscopy (2)  
Laboratory—6 hours. Prerequisite: course 230 concurrently. Practical application of techniques of electron scanning and transmission microscopy including x-ray microanalysis. Offered irregularly.—W (W).

232. Advanced Topics in Transmission Electron Microscopy (3)  
Lecture—1 hour; discussion—2 hours. Prerequisite: course 230. Advanced course in the techniques of electron microscopy including analytical techniques, probe diffraction methods, and high resolution imaging. Offered irregularly.—W (W).

232L. Laboratory for Advanced Transmission Electron Microscopy (2)  
Discussion—1 hour; laboratory—3 hours. Prerequisite: course 230L. Laboratory in advanced transmission electron microscopy techniques relevant to specific graduate research projects in materials science. Offered irregularly.—W (W).

241. Principles and Applications of Dislocation Mechanics (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing in Engineering; consent of instructor. Concepts in dislocation theory are applied to explain plasticity of crystalline solids. Glide and climb of dislocations, strain hardening, recrystallization, theories of creep processes and interaction of dislocation with solute atoms, precipitates and impurity clouds are discussed. Offered irregularly.—W (W).

Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing in Engineering and consent of instructor; course 160 recommended. Theory of alloying, kinetics of phase

245. Micro- and Nano-Technology in Life Sciences (4) Lecture—4 hours. Prerequisite: graduate standing in engineering. Survey of biomaterials, materials for drug delivery, and environmental concerns. Topics will vary each time the course is offered. —F, W, S.

246. Photovoltaics and Solar Cells (3) Lecture—3 hours. Prerequisite: Electrical & Computer Engineering 140B or equivalent, or permission of instructor. Fundamentals of photovoltaics and solar cells, including device design, fabrication technology, and grid incorporation. Nano and microcrystalline silicon devices, thin-film technologies, heterojunctions, and other semiconductor technologies. Collectors, electrical inverters and infrastructure issues. Challenges and concerns. —Same course as Electrical and Computer Engineering 248B. Offered irregularly. —W (W).

248. Fracture of Engineering Materials (3) Lecture—3 hours. Prerequisite: course 174. Description of the failure of materials by crack propagation. Topics include the stress fields about elastic cracks, the Griffith-Irwin analysis, descriptions of plastic zones, fracture toughness testing, microstructural aspects of fracture and failure at elevated temperatures. Offered irregularly. —F (F).

249. Mechanisms of Fatigue (3) Lecture—3 hours. Prerequisite: course 174 or consent of instructor; course 248 recommended. Microstructural description of the mechanisms of fatigue in metals. Topics include a phenomenological treatment of cyclic deformation and fracture processes in cyclic deformation, fatigue crack nucleation, Stage I crack growth, threshold effects and high temperature cyclic deformation. Offered irregularly. —F (F).

250A. Special Topics in Polymer and Fiber Science (3) Lecture—3 hours. Prerequisite: course 147 or consent of instructor. Selected topics of current interest in polymer and fiber sciences. Topics will vary each time the course is offered. (Same course as Fiber and Polymer Science 250A.) —S (S).

250B. Special Topics in Polymer and Fiber Science (3) Lecture—3 hours. Prerequisite: course 147 or consent of instructor. Selected topics of current interest in polymer and fiber sciences. Topics will vary each time the course is offered. (Same course as Fiber and Polymer Science 250B.) —S (S).

250C. Special Topics in Polymer and Fiber Science (3) Lecture—3 hours. Prerequisite: course 147 or consent of instructor. Selected topics of current interest in polymer and fiber sciences. Topics will vary each time the course is offered. (Same course as Fiber and Polymer Science 250C.) Offered irregularly. —W (W).

250D. Special Topics in Polymer and Fiber Science (3) Lecture—3 hours. Prerequisite: course 147 or consent of instructor. Selected topics of current interest in polymer and fiber sciences. Topics will vary each time the course is offered. (Same course as Fiber and Polymer Science 250D.) Offered irregularly. —W (W).

250E. Special Topics in Polymer and Fiber Science (3) Lecture—3 hours. Prerequisite: course 147 or consent of instructor. Selected topics of current interest in polymer and fiber sciences. Topics will vary each time the course is offered. (Same course as Fiber and Polymer Science 250E.) Offered irregularly. —W (W).

251. Applications of Solid State Nuclear Magnetic Resonance Spectroscopy (3) Lecture—3 hours. Prerequisite: graduate standing in chemistry, physics or engineering. of solid state materials. Offered in alternate years.

260. Advanced Thermodynamics of Solids (4) Lecture/discussion—4 hours. Prerequisite: course 160. Thermodynamic principles, formalism and their application to solids. Topics include: solidification from simple and complex examples, from ceramic and solid state systems. Use of thermodynamic approach in developing understanding of constraints for processes in real systems. Offered in alternate years. —F (F).

262. Advanced Topics in Structure of Materials (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 162; course 174 recommended; graduate standing in Engineering or consent of instructor. Nature of microscopic behavior in engineering materials. Crystalline and non-crystalline structures, with special emphasis on grain boundary segregation in the development of polycrystalline microstructure and the radial distribution function of amorphous materials. Not open for credit to students who previously completed (canceled) course 245. —F (F).


272. Advanced Functional Properties of Materials (4) Lecture/discussion—4 hours. Prerequisite: graduate standing in Physics, Chemistry, and Engineering. Fundamental physical properties and solid-state materials important to solid state devices, specifically electronic, magnetic, and optical properties. Topics include band structures, metals, semiconductors, semiconductors and dielectrics, optical properties, and magnetic properties and implementation of these properties into devices. Offered irregularly. —F (F).

274. Advanced Mechanical Properties of Materials (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 174. Comprehensive study of mechanical properties of materials, with special attention to dislocations and deformation and fracture control mechanisms. Emphasis on the conventional engineering materials as well as advanced materials such as nanocrystalline solids and thin films are considered. Offered in alternate years. —W (W).

282. Glass Science and Technology (3) Lecture—2 hours, extensive writing—1 hour. Prerequisite: graduate standing in Chemistry, Physics or Engineering, or consent of instructor. Modern paradigms in glass science and their applications to technologies. Relation of macroscopic 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 irregularly. —S (S).

289A. Special Topics in Materials Science; Electronic Materials (1-5) Lecture/laboratory. Prerequisite: consent of instructor. Special topics in Electronic Materials. May be repeated for credit when topic differs. Offered irregularly. —F, W, S. (F, W, S).

289B. Special Topics in Materials Science; Materials Processing (1-5) Lecture/laboratory. Prerequisite: consent of instructor. Special topics in Materials Processing. May be repeated for credit when topic differs. Offered irregularly. —F, W, S. (F, W, S).

289C. Special Topics in Materials Science; Physics and Chemistry of Materials (1-5) Lecture/laboratory. Prerequisite: consent of instructor. Special topics in Physics and Chemistry of Materials. May be repeated for credit when topic differs. Offered irregularly. —F, W, S. (F, W, S).

289D. Special Topics in Materials Science; Materials Science and Forensics (1-5) Seminar—1 hour. Prerequisite: consent of instructor. Special topics in Materials Science and Forensics. May be repeated for credit when topic differs. Offered irregularly. —F, W, S. (F, W, S).

289E. Special Topics in Materials Science; Surface Chemistry of Metal Oxides (1-5) Lecture/laboratory. Prerequisite: consent of instructor. Special topics in Surface Chemistry of Metal Oxides. May be repeated for credit when topic differs. Offered irregularly. —F, W, S. (F, W, S).

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. (S/U grading only.) —F, W, S. (F, W, S).


Professional

390. The Teaching of Materials Science (1) Discussion—1 hour. Prerequisite: meet qualifications for teaching assistant and/or Associate in materials science and engineering. Participation as a teaching assistant or associate in a designated engineering course. Methods of leading discussion groups on laboratory sections and grading laboratories, use of laboratory equipment, and grading laboratory reports. May be repeated for credit. (S/U grading only) —F, W, S. (F, W, S).
Engineering: Mechanical and Aerospace Engineering

(College of Engineering)

C. P. (Case) van Dam, D. Engr., Chairperson of the Department
Benjamin D. Shaw, Ph.D., Vice Chairperson of the Department

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530-752-0580, Fax 530-752-4158;
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Faculty
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Harry H. Cheng, Ph.D., Professor
Mohamed M. Hafez, Ph.D., Professor
Andrew A. Frank, Ph.D., Professor Emeritus
James W. Baughn, Ph.D., Professor Emeritus

Jean-Pierre Delplanque, Ph.D., Professor (Computer Science; Mechanical and Aerospace Engineering)

Fidelis O. Eke, Ph.D., Professor
Paul A. Erickson, Ph.D., Associate Professor
Rita T. Farouki, Ph.D., Professor
Mohamed M. Hafez, Ph.D., Professor
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Mohamed M. Hafez, Ph.D., Professor
Rida T. Farouki, Ph.D., Professor
Valeria La Saponara, Ph.D., Associate Professor
Seangkyu Lee, Ph.D., Assistant Professor
Barbara S. Linke, Ph.D., Assistant Professor
Mark P. Modera, Ph.D., Professor (Civil and Environmental Engineering; Mechanical and Aerospace Engineering)

Jason Moore, Ph.D., Lecturer with Potential Security of Employment
Vinod Narayanan, Ph.D., Professor
Tae Won Park, Ph.D., Professor
Bahram Ravani, Ph.D., Professor
Stephen K. Robinson, Ph.D., Professor
Nesrin Sarigul-Klijn, Ph.D., Professor
Benjamin D. Shaw, Ph.D., Professor
Masakazu Soshi, Ph.D., Assistant Professor
Spyros Tserenguis, Ph.D., Lecturer with Security of Employment (Chemical Engineering and Materials Science; Mechanical and Aerospace Engineering)

C. P. (Case) van Dam, D. Engr., Professor
Steven A. Velinsky, Ph.D., Professor
Anthony S. Wester, Ph.D., Professor (Civil and Environmental Engineering; Mechanical and Aerospace Engineering; Land, Air and Water Resources)

Kazuo Yamazaki, Ph.D., Professor

Emeriti Faculty
Hector A. Baldes, Ph.D., Professor Emeritus
James W. Baughn, Ph.D., Professor Emeritus
Academic Senate Distinguished Teaching Award
Charles W. Beadle, Ph.D., Professor Emeritus
Jean-Jacques Chatot, Ph.D., Professor Emeritus
Harry A. Dwyer, Ph.D., Professor Emeritus
Andrew A. Frank, Ph.D., Professor Emeritus
Jerald M. Henderson, D. Engr., Professor Emeritus
Myron A. Hoffman, Sc.D., Professor Emeritus
Mont Hubbard, Ph.D., Professor Emeritus
Maury L. Hull, Ph.D., Professor Emeritus
Dean C. Karnopp, Ph.D., Professor Emeritus
John D. Kemper, Ph.D., Professor Emeritus
Wolfgang Kollmann, Sc.D., Professor Emeritus
Donald L. Margolis, Ph.D., Professor Emeritus

Allan A. McKilp, Ph.D., Professor Emeritus
Bruce R. White, Ph.D., Professor Emeritus

Affiliated Faculty
James Schroa, Ph.D., Lecturer

The Mechanical and Aerospace Engineering Undergraduate Programs

The Department of Mechanical and Aerospace Engineering administers two undergraduate programs in the College of Engineering: (1) Mechanical Engineering, and (2) Aerospace Science and Engineering. For more information about our programs, please see http://mae.ucdavis.edu/ug.php.

Mission. The Department of Mechanical and Aerospace Engineering is committed to educating future engineers so that they may contribute to the economic growth and well-being of the state, the nation, and the world, and to the advancement of knowledge in the mechanical and aerospace sciences.

Objectives. The objectives of the programs offered in Mechanical and Aerospace Engineering include the following: to provide its graduates with the skills to practice mechanical and/or aerospace engineering in a broad range of industries, to enable interested graduates to pursue graduate education, to present its graduates to participate in research and development, and in other creative and innovative efforts in science, engineering, and technology and to allow interested graduates to pursue entrepreneurial endeavors.

Preparatory Requirements. In order to change to any major offered by the Department of Mechanical and Aerospace Engineering, students must:

- Be a registered student and have completed at least one quarter (minimum of 12 units) at UC Davis;
- Have completed not more than 135 cumulative units (excluding AP units);
- Be in good academic standing and meet minimum progress requirements;
- Have received a letter grade for all courses that satisfy Engineering degree requirements;
- Have: a) completed at least the following five courses: Mathematics 21A, B, C, Physics 9A and 9B, and have a GPA of 2.800 better in all completed Mathematics, Physics, Biology and Chemistry courses required for your intended major, and have received a C- or better in each of these courses;
- Have no grade lower than a C- in any completed engineering course required for your intended major(s) taken at UC Davis;
- Have a 2.800 UC GPA in completed engineering courses.

Mechanical Engineering Undergraduate Program


The mechanical engineer uses basic science in the design and manufacture of complex engineering systems, requiring the 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, material science, applied mechanics, thermodynamics, heat transfer, mass transfer, electricity, manufacturing processes, and economics.

The Mechanical Engineering program is designed to provide knowledge in mechanical engineering and associated applied sciences so that graduates may practice in a broad range of industries, pursue graduate studies, participate in research and development, and/or pursue entrepreneurial endeavors.

Areas of Interest

Students spend their third year in further study of fundamental courses, and in the fourth year they may tailor their studies to their interests by selecting courses in controls and systems analysis, fluid mechanics, heat transfer, mechanical design or thermodynamics. Students can either prepare for graduate study in mechanical engineering or obtain a broad background for entering engineering practice.

Students may select elective courses from among the areas of interest listed below.

Mechanical Design. The creation and improvement of products, processes, or systems that are mechanical in nature are creative and innovative efforts in the area of mechanical design.

Solutions to such major social problems as environmental pollution, the lack of mass transportation, the lack of raw materials, and energy shortages, will depend heavily on the engineer's ability to create new types of machinery and mechanical systems.

The engineer-designer must have a solid and relatively broad background in the physical and engineering sciences and the ability to synthesize the information from such a broad background in a creative problem solving. In addition to having technical competence, the designer must be able to consider the socioeconomic consequences of a design and its possible impact on the environment.

Product safety, reliability, and economics are other considerations.

Suggested technical electives:

- Aerospace Science and Engineering 133, 139
- Biological Systems Engineering 114, 120, 165
- Biomedical Engineering 118/Electrical and Computer Engineering 122, 160 (only one unit of credit towards Technical Electives requirement)
- Mathematics and Science Engineering 180, 181, 182
- Mechanical Engineering 121, 134, 150B, 151, 152, 154, 161, 163


Biomedical and Mechanical Engineering Fluid Mechanics. 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 flow 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 pollution transport and environmental concerns; aerodynamic flow around transport 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:

- Aerospace Science and Engineering 138 Engineering 160 (only one unit of credit towards technical requirements)
- Chemical Engineering 161A, 161B
- Civil and Environmental Engineering 144, 149
- Mechanical Engineering 161, 163


Combustion and the Environment. Combustion is widely used for energy generation, propulsion, heating, and waste disposal, as well as for

Fall 2011 and on Revised General Education (GE) requirements:

- Aesthetic and Humanities: AH
- Science and Engineering: SE
- Social Sciences: SS
- Multicultural: DD
- Oral Skills: SL
- Visual: VL
- Writing Experience: WRT

Pre-Fall 2011 General Education (GE) requirements:

- Aesthetic and Humanities: AH
- Science and Engineering: SE
- Social Sciences: SS
- Multicultural: DD
- Oral Skills: SL
- Visual: VL
- World Cultures: WC
- Writing Experience: WRT

Quarter Offered: F, W, S, Spring, Summer, 2017-2018 offering in parentheses
many other applications. Mechanical engineers are often heavily involved with the design of combustion systems—such as jet engines, gas turbines, furnaces, etc.—and deal with aspects of combustion ranging from increasing efficiencies to reducing pollutant emissions. This specialization is for those who would like to work in the fields that use combustion, or that deal with pollution related to combustion. With the current interest in reducing pollutants while maintaining or increasing efficiency, the efforts of mechanical engineers in designing and improving combustion systems are becoming more important.

Suggested technical electives:

Mechanical Engineering 161, 163
Civil and Environmental Engineering 149, 150

Suggested Advisers. R.C. Aldredge, R. Davis, P.A. Erickson, I.M. Kennedy, B.D. Shaw

Heat Transfer, Thermodynamics, and Energy Systems. This specialization emphasizes the fundamentals of heat transfer and thermodynamics in complex engineering systems. Students are able to design efficient, cost-effective, and reliable systems with less environmental pollution and impact. An understanding of heat transfer and thermodynamics is required for the design of systems that are cost-effective for power generation, propulsion, or energy storage. This specialization requires the study of materials, processes, and devices in the areas of heat transfer and energy conversion. It is also required for 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:

Aerospace Science and Engineering 127, 129, 139
Civil and Environmental Engineering 130, 149, 160
Engineering 122, 160 (only one unit of credit towards technical electives requirement)

Suggested Advisers. P.A. Erickson, M. Hill, J. Park, P. Sarigolli, V. Velinsky

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, power transmission, lightweight structures and systems, and control. This specialization requires the students to understand and control the complex systems that are involved in the design and operation of vehicles. Competence in these areas allows for the development of alternative propulsion concepts, such as electric, hybrid, and fuel cell.

Suggested technical electives:

Aerospace Science and Engineering 127, 129
Biological Systems Engineering 114, 120
Civil and Environmental Engineering 131, 149
Engineering 122, 160 (only one unit of credit towards Technical Electives requirement)

Suggested Advisers. P.A. Erickson, J.W. Park, S. Velinsky

Mechanical Engineering Program Requirements

Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed. Exclusion of General Education units, the minimum number of units required for the Mechanical Engineering major is 159.

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>
</tr>
<tr>
<td>Mathematics 22A-22B</td>
<td>8</td>
</tr>
<tr>
<td>Physics 9A-9B-9C-9D</td>
<td>16</td>
</tr>
<tr>
<td>Chemistry 2A-2B or 2AH-2BH</td>
<td>10</td>
</tr>
<tr>
<td>Engineering 4</td>
<td>3</td>
</tr>
<tr>
<td>Engineering 6 or Mechanical Engineering 4</td>
<td>4</td>
</tr>
<tr>
<td>Engineering 17, 35, 45, or 45S</td>
<td>12</td>
</tr>
<tr>
<td>Mechanical Engineering 50, 51, 52</td>
<td>4</td>
</tr>
</tbody>
</table>

English 3 or University Writing Program 1, 1Y or IV, or Comparative Literature 1, 2, 5, or 4, or Native American Studies 5 (grade of C or better is required).............. 4
Communication 1 or 3...................... 4

Upper Division Required Courses

Engineering 100, 102, 103, 104, 105, 190
Mechanical Engineering 185A & 185B (taken in consecutive quarters), or Aerospace Science and Engineering 197 and 198.................. 8
Select one course from the following:
Select one course from the following:
System Dynamics/Mechanical Design Electives: Engineering 122, Mechanical Engineering 121, 139, 150B, 154, 171.............. 4
Select two courses from the following:
Restricted Electives: Aerospace Science and Engineering 129, 136, 140, 141, 142; Engineering 122, 183, 197; Mechanical Engineering 180, 182; Mechanical Engineering 134, 152, 161, 163, 164.
Students may also choose from Aerospace Science and Engineering 130B, 130P, Mechanical Engineering 121, 139, 150B, 154, 151, 154, 171 if these courses are not used in satisfaction of other degree requirements.

Technical Elective Requirement.................. 7

At least four units must be taken from any Upper Division Engineering course, which may include courses from the above System Dynamics/Mechanical Design or Restricted Elective lists if these courses are not used in satisfaction of other degree requirements. Up to 4 units may be selected from Mechanical Engineering 185A/B or any engineering 192, 199 not used in satisfaction of other degree requirements.

Courses that cannot be used are Biomedical Engineering 110L, Engineering 160, 191, 198; Computer Science Engineering 188 or any 197T course.
Up to three units may be used from the following technical electives list:
Agricultural and Resource Economics 100A, 100B, 112
Applied Biological Systems Technology 101, 142, 165
Atmospheric Science 149, 160
Biological Sciences 2A, 2B, 2C
Chemistry 2C, 2CH, 8A, 8B and any upper division course except Chemistry 195 and 197
Economics 100, 101, 102, 103, 122
Engineering: Any upper division course offered in the college of engineering except Biomedical Engineering 110L, Engineering 160, 191, 198; Computer Science Engineering 188 or any 197T course.

Environmental and Resource Sciences 100, 100L, 121, 131, 136, 185, 186, 186L
Exercise Biology 102
Fiber and Polymer Science 100 (same as Materials Science Engineering 147)
Food Science and Technology 159, 160
Geology 17, 32, 35, 36, 30, 50, 60, 100, 104L, 191, 193, 191, 193, 161, 162, 163
Hydrologic Science 110, 124, 134, 141, 142, 143, 144, 146, 151, 152
Management 11A, 11B, 120, 120, 140, 150, 160, 170, 180

Fall 2011 and on Revised General Education (GE): AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; AC—American Cultures; DD—Diverse Domestic; OL—Other; VL—Visual; WC—World Cultures; WE—Writing Experience
Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Diverse Domestic; Wrt—Writing Experience
Quarter Offered: F—Fall; W—Winter; S—Spring; Su—Summer; 2017/2018 offering in parenthesis
The Aerospace Science & Engineering undergraduate program is accredited by the Engineering Accreditation Commission of ABET. The Aerospace Science and Engineering major is unique to UC Davis. Students are encouraged to adhere carefully to all prerequisite requirements. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed. The program requires a minimum number of units for the Aerospace Science and Engineering major is 163.

### Lower Division Required Courses

<table>
<thead>
<tr>
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<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-98-9C-9D</td>
<td>19</td>
</tr>
<tr>
<td>Chemistry 2A-BB</td>
<td>10</td>
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<tr>
<td>Engineering 2A-BB</td>
<td>8</td>
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<tr>
<td>Engineering 4</td>
<td>4</td>
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<tr>
<td>Engineering 6 or Mechanical Engineering 5</td>
<td>3</td>
</tr>
<tr>
<td>Engineering 17, 35, 45 (or 45Y)</td>
<td>12</td>
</tr>
<tr>
<td>English 3 or University Writing Program 1, 1Y or 1V, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 (grade of C- or better required)</td>
<td>4</td>
</tr>
<tr>
<td>Communication 1 or 3</td>
<td>4</td>
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</table>

### Upper Division Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace Science and Engineering 100, 102, 103, 104, 105</td>
<td>22</td>
</tr>
<tr>
<td>Select one course from: Engineering 180, Mechanical Engineering 115 or 128</td>
<td>4</td>
</tr>
<tr>
<td>Technical electives</td>
<td>12</td>
</tr>
</tbody>
</table>

### Research Highlights:

- Aeronautics and aerodynamics
- Spacecraft design and operation
- Space environmental studies
- Remote sensing
- Electrical propulsion
- Flight dynamics and control
- Computational fluid dynamics
- Experimental MHD turbulence studies
- Dynamic systems and controls
- Robotics
- Materials modeling
- Manufacturing and Mechanical design
- Reacting flows
- Heat transfer
- Automotive system dynamics
- Biosensors/Microelectromechanical Systems (MEMS)
- Molecular self-assembly
- Radiation effects in solids
- Nonlinear dynamics and phase-locking
- Biofluid mechanics
- Biosolid mechanics
- Sports biomechanics
- Energy Systems/Fuel Cell/Hybrid Vehicle Technology
- High energy density science and applications
- Nuclear fusion energy
- Wind energy

### courses in Engineering: Mechanical (EME)

Courses in Mechanical Engineering (EME) are listed below; courses in Aerospace Science and Engineering (EAE) are listed immediately following; graduate courses in Mechanical and Aeronautical Engineering (MAE) follow.

### Lower Division

1. **Mechanical Engineering (1-5)**
   - Lecture—1 hour. Description of the field of mechanical engineering, examples taken from industrial applications, discussions of the practice with respect to engineering principles, ethics, and responsibilities. (F/NP grading only)—F (F)

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. GE credit: QL, SE, SL, VL—F (F)

3. **Manufacturing Processes (4)**
   - Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: C or better in: Engineering 4 and Physics 9A. Restricted to Mechanical Engineering and Materials Science Engineering majors. Modern manufacturing methods, safety, manufacturing instructions, computer-aided manufacturing and their role in the engineering design and development process. GE credit: SciEng | QL, SE, VL—F, W, Su, F (F, W, Su) Farouki, Linke, Sashi
Upper Division

106. Thermo-Fluid Dynamics (4)

108. Measurement Systems (4)
Lecture—2 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: C or better in Engineering 100 and Engineering 102; Engineering 104 recommended. Restricted to Mechanical Engineering, Aerospace Science and Engineering, and Mechanical Engineering/Materials Science Engineering majors. Not open for credit to students who have taken course 50. Introduction to measurement systems. Not open for credit to students who have taken course 50. GE credit: SciEng | QL, SE, VL, WE — F, W, S. (F, W, S) Erickson, Hill, Horsley, La Saponara

109. Experimental Methods for Thermal Fluids (4)
Lecture—2 hours; laboratory—1.5 hours; discussion—1 hour; extensive writing. Prerequisite: grade of C or better in course 106. Restricted to Mechanical Engineering, Aerospace Science & Engineering and Mechanical Engineering/Materials Science Engineering majors. Not open for credit to seniors who have taken course 50. Introduction to principles of thermal-fluid systems. Statistical and uncertainty analysis of data. Data processing and experimental design. GE credit: SciEng | QL, SE, VL — F, W, S. (F, W, S) Aldridge, Davis, Delplanque, Hwang, Kennedy, Robinson

115. Introduction to Numerical Analysis and Methods (4)
Lecture—3 hours; discussion/discussion—1 hour. Prerequisite: C or better in: Engineering 6 or course 5 or Computer Science Engineering 30 or Mechanical Engineering 6; C or better in: Mathematics 210, 212, 220, 221. Prerequisite: C or better in: Physics 9A, 9B, 9C. Number representation, Taylor expansions, error and stability analysis, root finding, interpolation, least squares, numerical integration, ordinary differential equations. Not open for credit to students who have taken Applied Science Engineering 115. GE credit: SciEng | SE — F, W, (F, W) Jensen

121. Engineering Applications of Dynamics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: C or better in Engineering 102; C or better in Engineering 6 or course 5 or Computer Science Engineering 30. Restricted to Mechanical Engineering, Aerospace Science and Engineering, and Mechanical Engineering/Materials Science Engineering majors. Principles of mechanics. Theory of machines and mechanisms. GE credit: SciEng | QL, SE, VL — F, W, (F, W) Margolis

134. Vehicle Stability (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: C or better in: course 5 or C or better in: Engineering 100 and Engineering 102. Restricted to Mechanical Engineering, Aerospace Science and Engineering, and Mechanical Engineering/Materials Science and Engineering. Mechanical systems and controls architecture, microcontroller and interface technology for mechatronics control, mechanical systems, actuators, drives, GE credit: SciEng | QL, SE, VL — S. (S.) Yamazaki

139. Stability of Flexible Dynamic Systems (4)

150A. Mechanical Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: C or better in: Engineering 45 or Engineering 45Y; C or better in both Engineering 104 and course 50 (may be taken concurrently). Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering majors. Prerequisites: completion of Engineering mechanics applied to the design and selection of mechanical components. Design projects, which concentrate on conceptual design, engineering analysis, methods of manufacturing, materials selection and cost. Introduction to Computer-Aided Design. GE credit: SciEng | QL, SE, VL, WE — F, S, Su, (F, S, Su, Hill) Moore, Ravani, Schaad

150B. Mechanical Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: C or better in course 150A. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. Principles of design, analysis of computer-aided design, optimization, and manufacturing design. GE credit: SciEng | QL, SE, VL — W. S. (W. S.) Farouki, Linke

151. Statistical Methods in Design and Manufacturing (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: C or better in course 150A. Restricted to students who have taken both course 106 and course 50 or Computer Science Engineering 30. GE credit: SciEng | QL, SE, VL — W. S. (W. S.) Davis, Modera

152. Computer-Aided Mechanism Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: C or better in Engineering 102; C or better in course 5 or Engineering 6 or Computer Science Engineering 30; C or better in Engineering 103 and 105. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering, and Mechanical Engineering/Materials Science Engineering. GE credit: SciEng | QL, SE, VL — F, W, (F, W) Jee, Eke, Horsley, Joshi

154A. Mechanotronics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: C or better in: each of the following: Engineering 100 and Engineering 102 and course 50. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. Mechatronics system concept and overview, control system design were architecture, microcontroller and interface technology for mechatronics control, engineering development systems, actuators, drives, GE credit: SciEng | QL, SE, VL — S. (S.) Yamazaki

161. Combustion and the Environment (4)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: grade of C or better in 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. GE credit: SciEng | QL, SE, VL — F, W. (W.) Shaw

163. Internal Combustion Engines and Future Alternatives (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: C or better in course 50 and course 106. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. GE credit: SciEng | QL, SE, VL — F, W, (F, W) Erickson, Park

164. Introduction to Heating, Ventilation and Air Conditioning Systems (4)
Lecture—4 hours. Prerequisite: C or better in both course 50 and course 106. Restricted to Mechanical Engineering, Electrical Engineering, Computer Science Engineering 30; C or better in Engineering 102; C or better in Engineering 6 or course 5 or Computer Science Engineering 30; C or better in Engineering 103 and 105. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. GE credit: SciEng | QL, SE, VL — F, S, Su, (F, S, Su, R) R. Davis, Narayanan, Shaw

171. Analysis, Simulation and Design of Mechatronic Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: C or better in Engineering 102 and 103. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. GE credit: SciEng | QL, SE, VL — F, W, (F, W) Assadian, Horsley, Karnopp

172. Automatic Control of Engineering Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: C or better in Engineering 100 and 102. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. GE credit: SciEng | QL, SE, VL — F, W, (F, W) Assadian, Horsley, Karnopp

185A. Mechanical Engineering Systems Design Project (4)
Lecture—1 hour; laboratory—3 hours. Prerequisite: C or better in: course 150A and course 165 (may be taken concurrently); Communications 1 or 3 recommended; upper division composition recommended. Restricted to Senior standing in Mechanical
Engineering: Mechanical and Aerospace Engineering

189A. Selected Topics in Mechanical Engineering: Energy Systems and the Environment (1-5)
Prerequisite: consent of instructor. Directed group study in Energy Systems and the Environment. May be repeated for credit when the topic is different. Offered irregularly.

189B. Selected Topics in Mechanical Engineering: Engineering Controls (1-5)
Prerequisite: consent of instructor. Directed group study in Engineering Controls. May be repeated for credit when the topic is different. Offered irregularly.

189C. Selected Topics in Mechanical Engineering: Aerospace Engineering (1-5)
Prerequisite: consent of instructor. Directed group study in Aerospace Engineering. May be repeated for credit when the topic is different. Offered irregularly.

189D. Selected Topics in Mechanical Engineering: Manufacturing Engineering (1-5)
Prerequisite: consent of instructor. Directed group study in Manufacturing Engineering. May be repeated for credit when the topic is different. Offered irregularly.

189G. Selected Topics in Mechanical Engineering: Mechanical Engineering and Product Design (1-5)
Prerequisite: consent of instructor. Directed group study in Mechanical Engineering and Product Design. May be repeated for credit when the topic is different. Offered irregularly.

189H. Selected Topics in Mechanical Engineering: Mechatronics Systems (1-5)
Prerequisite: consent of instructor. Directed group study in Mechatronics Systems. May be repeated for credit when the topic is different. Offered irregularly.

189I. Selected Topics in Mechanical Engineering: MEMS/Nanotechnology (1-5)
Prerequisite: consent of instructor. Directed group study in MEMS/Nanotechnology. May be repeated for credit when the topic is different. Offered irregularly.

189J. Selected Topics in Mechanical Engineering: Solid and Structural Mechanics (1-5)
Prerequisite: consent of instructor. Directed group study in Solid and Structural Mechanics. May be repeated for credit when the topic is different. Offered irregularly.

189K. Selected Topics in Mechanical Engineering: Thermodynamics (1-5)
Prerequisite: consent of instructor. Directed group study in Thermodynamics. May be repeated for credit when the topic is different. Offered irregularly.

189L. Selected Topics in Mechanical Engineering: Vehicle and Transportation Systems (1-5)
Prerequisite: consent of instructor. Directed group study in Vehicle and Transportation Systems. May be repeated for credit when the topic is different. Offered irregularly.

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)

197TC. Mentoring and Tutoring Engineering in the Community (1-4)
Prerequisite: upper division standing; consent of instructor. Mentoring, coaching, tutoring and/or supervision of students in K-12 schools in engineering-related topics. 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 Aerospace Science and Engineering (EAE)

Lower Division

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)—F (F)

10. From the Wright Brothers to Drones and Quadcopters (2)
Lecture—2 hours. History of aircraft and its influence on society. Topics covered will include Unmanned Aerial Vehicles, safety considerations, economics and privacy issues. Aerodynamics, stability and control will also be introduced. (P/NP grading only)—F (F)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor and lower division standing. (P/NP grading only)

Upper Division

126. Theoretical and Computational Aerodynamics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: C or better in course 127; C or better in Engineering 180 or Applied Science Engineering 115 or Mechanical Engineering 115 or Mathematics 128C. Development of the equations of fluid motion. Study of flow field kinematics and dynamics. Flow about a body. Thin airfoil theory. Viscous effects. Applications of basic fluid mechanics to wing analysis and design. GE credit: SciEng or SocSci (SE or SS;—Su. (Su.)

127. Applied Aircraft Aerodynamics (4)

129. Stability and Control of Aerospace Vehicles (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: grade of C or better in Engineering 102. Restricted to upper division standing. Aircraft and spacecraft stability and control. Derivation of fundamental equations of motion for aircraft/spacecraft. Specialization of equations for aircraft. Fundamentals of flight control systems. Specialization of equations of motion for orbiting spacecraft. Spacecraft attitude control systems. GE credit: QL, SL, WE.—W (W) Hess, Hong

130A. Aircraft Performance and Design (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: C or better in course 127; C or better in course 129 (may be taken concurrently). Major aircraft design experience with multiple realistic constraints including performance, strength, stability and control, and appropriate engineering standards. GE credit: SciEng (SE, QL, WL, WE) —Van Dam

130B. Aircraft Performance and Design (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: grade of C or better in course 130A. Restricted to upper division standing. Major aircraft design experience incorporating multiple realistic constraints including performance, stability, strength, and control to the aerospace structural design process. GE credit: SciEng (SE, QL, WL, WE)—S (S) van Dam

133. Finite Element Methods in Structures (4)
Lecture—3 hours; laboratory—3 hours. Prerequisites: grade of C or better in Engineering 104. Open to College of Engineering Students. Introduction to the aerospace structural design process. History of aircraft and space vehicle materials. Effects of loading beyond elastic limit. Deflections and stresses due to combined loading. Virtual work principles, and finite element methods. Applications to aero-space structures. GE credit: SciEng (SE) —F (F) Sarigul-Klijn

135. Aerospace Structures (4)
Lecture—4 hours. Prerequisite: C or better in Engineering 104; course 126 or 127 recommended. Analysis and design methods used in aerospace structures. Stress in flow in laminar and turbulent flow, and multilayered and corrugated sheets, tension field beams, local buckling. GE credit: SciEng (SE);—W (W) La Saponara

137. Structural Composites (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: grade of C or better in Engineering 104. Overview of materials and technology for creating structures from fiber reinforced resin matrix composite material systems. Elementary design analysis and case studies emphasizing aeronautical applications. GE credit: SE.—La Saponara

138. Aircraft Propulsion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: C or better in Mechanical Engineering 106. Introduction to gas turbine engines. Development and application of cycle performance prediction techniques for important engine configurations. Introduction to the operation and design of inlets, compressors, burners, turbines, and nozzles. Cycle design studies for specific applications. GE credit: SciEng (QL, SE.—W (W) R. Davis

140. Rocket Propulsion (4)
Lecture—4 hours. Prerequisites: consent of instructor and Mechanical Engineering 106. Restricted to upper division standing. Fluid and thermodynamics of rocket engines, liquid and solid rocket propulsion. Space propulsion concepts and system requirements. Not open for credit to students who have taken identical course 189A prior to Fall Quarter 2013. GE credit: SciEng (SE.—S (S) R. Davis, Delponzo

141. Space Systems Design (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: grade of C or better in Engineering 102 and Mechanical Engineering 106. Introduction to space systems design including space project organization, requirements definition and specification, concept formulation, system tradeoffs, subsystem design. Prototype space mission concepts are presented and a multidisciplinary mission design is...
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 membrane and the design and analysis of artificial human organs. (Same course as Biomedical Engineering 212.) Offered irregularly.—Albrecht

213. Advanced Turbulence Modeling (4)
Lecture—4 hours. Prerequisite: course 2108. Methods of analyzing turbulence; kinematics and dynamics of homogeneous turbulence; Reynolds stress and heat flux equations, closures and their simplification; numerical methods; application to boundary layer-type flows; two-dimensional and three-dimensional hydraulic and environmental flows. Offered irregularly.—Albrecht

215. Biomedical Fluid Mechanics and Transport Phenomena (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 or Chemical Engineering 1508 or Civil and Environmental Engineering 141. Application of fluid mechanics and transport to biomedical systems. Flow in normal physiological function and pathological conditions (includes circulation) and respiratory flows, effect of flow on cellular processes, transport in the arterial wall and in tumors, and tissue engineering. [Same course as Biomedical Engineering 215.] Offered irregularly.

216. Advanced Aerothermodynamics (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. Offered in alternate years.—W. Shaw

217. Combustion (4)
Lecture—3 hours, lecture/discussion—1 hour. Prerequisite: Engineering 103 and 105, Mechanical Engineering 106. Restricted to graduate students. Review of chemical thermodynamics and chemical kinetics. Discussion of reacting flows, their governing equations and transport phenomena; detonations; laminar flame structure and turbulent combustion. Offered in alternate years.—(W.J.) Shaw

218. Advanced Micromechanics (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, overall powerplant performance for one advanced concept such as a fission, magnetohydrodynamic, or solar electric power-plant.—(F.) Erickson

219. Introduction to Scientific Computing in Solid and Fluid Dynamics (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. Scientific computations in solid and fluid dynamics are performed with examples in C, C++, FORTRAN, and MATLAB script files. Derivation of the basic equations of motion in finite volume form with applications to elastic solids and fluids.—(F.) Deboprat

220. Mechanical Vibrations (4)
Lecture—4 hours. Prerequisite: Engineering 122. Multiple degrees of freedom; damping measures; Rayleigh’s method; vibration absorbers; eigenvalues and mode shapes; forced oscillations; forced vibrations; random processes and vibrations; auto-correlation; spectral density; first passage and fatigue failure; nonlinear systems; phase plane. Offered in alternate years.—Ekke

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 principle; Lagrange’s equations; Hamilton-Jacobi theory; modal dynamics orthogonality; wave dynamics; dispersion.—F. (P.) Karnopp

223. Multibody Dynamics (4)
Lecture—4 hours. Prerequisite: Engineering 102. Coupled rigid-body kinematics/dynamics; reference frames; vector differential and motion constraints; holonomicity; generalized speeds; partial velocities; mass, inertia tensor/theorems; angular momentum; generalized forces; computing Newton/Euler, Lagrange forces, Koiter’s method; computer-aided equation derivation; orientation; Euler; Rodrigues parameters. [Same course as Biomedical Engineering 223.]—W. S. (W.) Eke, Ravani

225. Spatial Kinematics and Robotics (4)
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 control, automatic architecture and software implementation. [Same course as Biomedical Engineering 225.] Offered irregularly.—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 design, acoustic enclosures and sound walls, room acoustics, design of quiet machinery.—Sarigul-Klijn

227. Research Techniques in Biomechanics (4)
Lecture—2 hours; laboratory—4 hours; term paper or discussion—1 hour. Prerequisite: Mathematics 228 and 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 platform analysis, strength assessment, planar and three-dimensional videography, data reduction and smoothing, body segment parameter determination, electromyography, and biomechanical modeling. [Same course as Biomedical Engineering 227/Exercise Science 227.] Offered irregularly.

228. Introduction to BioMEMS (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: BS engineering discipline or consent of instructor. Ideal for beginning graduate or advanced undergraduate students interested in applications of microelectronic and micro-opto-electromechanical systems (MEMS) topics related to biological applications. Covers topics from various disciplines related to BioMEMS: mechanical, electrical, biomedical, chemical engineering, and materials science. Offered in alternate years.—F. C. Davis

Lecture—4 hours. Prerequisite: consent of instructor; Engineering 45, 100, 101, 102. Engineering 122 recommended. Mechanical design of micro-electromechanical systems (MEMS) Device modeling: lumped parameter models; energy methods; nonlinearities; electrical and mechanical analysis; control, measurement and measurement methods: capacitive, piezoresistive, thermal, piezoelectric, and optical techniques. Review of basic electronics: bridge circuits, amplitude modulation, lock-in detection. Offered in alternate years.—S. (J.) Horsley

231. Musculo-Skeletal System Biomechanics (4)
Lecture—4 hours. Prerequisite: Engineering 102. Mechanics of skeletal muscle and connective tissue 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.] Offered irregularly.

Fall 2011 and on Revised General Education (GE) 2011-2012

ACGH—American Cultures; DD—Domestic Diversity; ACE—Arts and Humanities; DQ-General Education; DL—Writing Experience; SL—Science and Engineering; SLQ—Quantitative; SLV—Visual; WC—World Cultures; WE—Writing Experience

Pre-Fall 2011 General Education (GE) 2011-2012

ArHums—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Domestic Diversity; WrEx—Writing Experience

Quarter Offered: F=Fall, W=Winter, S=Spring, Su=Summer; 2017/2018 offering in parentheses
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 the tissue structure by aging and disease. The tissues covered include bone, cartilage and synovial fluid, ligament and tendon. [Same course as Biomedical Engineering 232]—S. (F) Yamazaki

234. Design and Dynamics of Road Vehicles (4)
Lecture—4 hours. Prerequisite: Mechanical Engineering 134. Analysis and numerical simulation of road vehicles with design applications.—W. (W) Velinsky

236. Aerodynamics in Nature and Technology (3)
Lecture—4 hours. Prerequisite: Engineering 103. Introduction to aerodynamics in nature, fundamen- tals of turbulence in atmospheric flows, planetary boundary layers, pedestrian-level winds in urban areas. Criteria for laboratory modeling of atmospheric flows, wind-tunnel testing. Offered irregularly.

237. Analysis and Design of Composite Structures (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 104 or equivalent. Modeling and analysis methodology for composite structures including response and fatigue analysis of plate bending theory. Introduction to failure processes. Includes discussion of aerospace structural analysis.—S. (F) La Saponara

238. Advanced Aerodynamic Design and Optimization (4)
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 irregularly.—S. (W) Sarigül-Klijn

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 element optimization of design of components under realistic loading conditions and constraints. [Same course as Biomedical Engineering 239] Offered in alternate years.—W. (S) Sarigül-Klijn

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-the-art methods. Numerical treatment of nonlinear dynamics; classification of coupled problems; applications of finite element methods to mechanical, aeronauti- cal, and biological systems. [Same course as Biomedical Engineering 240] Offered irregularly.—Sarigül-Klijn

242. Stability of Thin-Walled Structures (4)
Lecture—4 hours. Prerequisite: Engineering 104 or equivalent. Stability of thin-walled aerospace structures treated from both theoretical and practical design perspectives. Both monolithic and composite construction considered. Buckling of stiffened panels, thick beams, and composite beams, experimental methods and failure/crippling processes. Offered irregularly.—La Saponara

248. Advanced Turbomachinery (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: 247. Preliminary aerodynamic design of axial and radial flow compressors and turbines. Design of diffusers. Selection of turbomachinery and configurations and approximations to optimum dimensions and flow angles. Introduction to flow phenomena in compressors, axial and radial turbines, and aerodynamics of fans and blowers. Offered in alternate years.—S. (F) R. Davis

250A. Advanced Methods in Mechanical Design (4)
Lecture—4 hours. Prerequisite: Mechanical Engineering 150A and 150B or the equivalents, or consent of instructor. Applications of advanced techniques of solid mechanics to mechanical design problems. Coverage of advanced topics in stress analysis and static and dynamic results with emphasis in design of machine elements. Design projects emphasizing advanced analysis tools for life cycle evaluation.—F. (R) Farvani, Velinsky

250B. Advanced Methods in Mechanical Design (4)
Lecture—4 hours. Prerequisite: course 250A. Applications of advanced techniques of solid mechanics to mechanical design problems. Advanced topics in variable stress/strain conditions with emphasis in design of machine elements. Design projects emphasizing advanced analysis tools.—W. Hill

250C. Mechanical Performance of Materials (4)
Lecture—4 hours. Prerequisite: undergraduate course in stress analysis and mechanical behavior of materials. Occurrence, mechanisms, and prediction of fatigue and fracture phenomena. Use of stress and strain data to predict failure of fracture mechanics to predict failure and crack propagation. Effects of stress concentration, manufacturing, load sequence, irregular loading, and multiaxial loading.—Hill

251. Mechatronics System Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 154 and 152 or Electrical and Computer Engineering 157A, 157B. Motion mechanism design, electric actuator, power electronics, motion control, sensors, real-time computing and sensor/actuator interfacing. Application of mechatronics to design of autonomous robots. Offered in alternate years.—W. (W) Yamazaki

252. Information Processing for Autonomous Robotics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 6, Mechanical Engineering 5, or equivalent programming experience, Mechanical Engineering 134, 171, or consent of instructor. Computational algorithms and text, reasoning, and navigation for autonomous robots. Offered in alternate years.—W. (W) Joshi

253. Network Theory and Applications (4)
Lecture/discussion—4 hours. Prerequisite: Mathematics 22A, Mathematics 13 or 120; experience with computer software; or consent of instructor. Develops the mathematical theory underlying network, structure and function of networks with applications to social, biological and engineering networks. Topics include network growth, resilience, epidemiology, phase transitions, software and algorithms, routing and search control, cascading failures. [Same course as Science Engineering 253] Offered in alternate years.—F. D'Souza

254. Engineering Software Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mechanical Engineering 154, Engineering 180. Principles and design of engineering software. Advanced topics in engineering software design, applications of object-oriented programming, very high level lan- guages, real-time multi-threaded computing and software fusion, Web-based network computing, graphics, and GUI in engineering. Offered in alternate years.—F. Cheng

255. Computer-Aided Design and Manufacturing (4)
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 computations. Coordinate systems and transformations. Bézier and B-spline curves and surfaces. Interpola- tion and approximation methods. Intersections, offsets, and blends. Path planning for machining, inspection, and robotics applications. Offered in alternate years.—R.

258. Hybrid Electric Vehicle System Theory and Design (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mechanical Engineering 150B, graduate standing in Mechanical and Aerospace Engineering. Advanced vehicle design for fuel economy, performance, and low emissions, considering regulations, societal demands and manufacturability. Analysis and verification of components and control of vehicle systems in real vehicle tests. Advanced engine concepts. Offered irregularly.

261. Gas Dynamics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 or equivalent. Aeronautical Engineering 126. Study of inviscid and viscous flows about aeroelastic shapes of subsonic, transonic and supersonic conditions. Application of aerodynamic theory to design for reduced drag and increased lift. Offered irregularly.—Hafez

263. Introduction to Computational Aerodynamics and Fluid Dynamics (4)
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. Finite difference solutions to classical model equations pertinent to wave phenomena, diffusion phenomena, or equilibrium. Application to the incompressible Navier-Stokes equation. Offered irregularly.

264. Computational Aerodynamics (4)
Lecture—4 hours. Prerequisite: Aeronautical Sci- ence and Engineering 126, Engineering 180, or consent of instructor. Numerical methods for aero- dynamics fluid simulation in the transonic regime. Solutions of steady and unsteady potential and compressible boundary layer equations. Numerical schemes for mixed type, entropy, shock waves/numerical grid generation. Viscous/inviscid interaction and coupling procedures. Offered irregularly.—Hafez

266. Advanced Wind-Tunnel Testing (4)
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 problems. Developing techniques and codes, scale effects, force and moment measurements, and flow visualization. Offered irregularly.—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. Offered in alternate years.—(F) R. Davis
269. Fuel Cell Systems (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: Mechanical Engineering 106, 107, 165, or equivalent; consent of instructor; graduate or senior undergraduate as a technical elective. Limited enrollment. Basics of electrochemistry and fuel cell engine models in mobile and stationary applications. Analysis and grading quizzes, use of laboratory equipment, and grading laboratory reports. May be repeated for credit. (S/U grading only.)—F, W, S.

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)

271. Advanced Modeling and Simulation of Mechatronic Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mechanical Engineering 172 or the equivalent. Multitasking in mechanical, electrical, hydraulic, and thermal devices; bond graphs, block diagrams and state space equations; modeling of multiple energy domain systems; three-dimensional mechanisms; digital simulation laboratory. —F, F

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. —Assad

Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 172. Discrete systems analysis; digital filtering; sample data systems; state space and transform design techniques; quantization effects; multi-input, multi-output systems. Offered in alternate years. —S, Hess, Kong

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, basic data analysis. Offered in alternate years.

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.)—F, W, S. (F, W, S.)

297. Seminar (1)
Discussion—1 hour. Prerequisite: consent of instructor. Current topics in engineering including developments in mechanical and aeronautical engineering with presentations by professors, faculty, and visitors. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only.)

Professional

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.)—F, W, S. (F, W, S.)

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 core 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 art criticism. 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 Opportunities. Graduates have found the major excellent pre-professional training for careers in teaching, writing, law, medicine, library work, journalism, and more. Many graduates are employed in publishing, advertising, or the tech sector. Others have worked in local, state, and federal government agencies, as well as in industry. Many have gone on to graduate study in a wide range of fields including English, education, counseling, and more.

A.B. Major Requirements:

Preparatory Subject Matter........................................20
English 3 or University Writing
Program 1..............................................................4
One course from: English 40, 43, 44, 45
English 10A, 10B, 10C ..............................................12

Depth Subject Matter............................................44
English 110A or 110B
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
1500-1800
English 115, 117, 122, 123, 142,
150A, 155A, 185A
One course focusing on literature written in English between 1800 and 1900:
English 130, 133, 143, 144, 155B,
158A, 181A, 185B
One course focusing on literature written in English between 1900 and present:
English 137N, 138, 146N, 147, 150B,
155C, 156, 158B, 166, 167, 185C
One course focusing on literature written in English between 1900 and present and present:
English 137N, 138, 146N, 147, 150B,
155C, 156, 158B, 166, 167, 185C
Non-Historical Distribution Requirements ........8
One course on literature and ethnicity, literature and gender, or literature and sexuality:
English 125, 139, 140, 141, 166, 167,
178, 179, 181A, 181B, 185A, 185B,
185C, 186
One course in film and media studies, language studies, cultural studies and contexts, literature and science/technology, or literature and the environment:
English 105, 106, 107, 120, 160,
161A, 161B, 162, 172, 198, 199A,
Technology Studies 164, 171A, 171B,
172, 173, 175, 180, 182, 183, 184,
Linguistics 106, Science and Technology
Studies 173
Please note that while some courses are identified as fulfilling more than one...
distribution requirement, a given course can only fulfill one such requirement.

### Area of Emphasis (choose one)

<table>
<thead>
<tr>
<th>Area Emphasis</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Literature, Criticism, and Theory</td>
<td>12</td>
</tr>
<tr>
<td>One upper division English elective. Two advanced courses, one of which can be a seminar.</td>
<td></td>
</tr>
</tbody>
</table>

Please note that English 110A or 110B is a prerequisite for advanced study in the major.

English 149, 153, 159, 163, 165, 177, 187A, 188A, 189, 194H, 195H

Creative Writing

Three sections of English 100F, 100P, 100NF, 100FA, 100PA

### Total Units for the Major

<table>
<thead>
<tr>
<th>Area of Emphasis</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Majors</td>
<td>64</td>
</tr>
</tbody>
</table>

Up to four upper division units in a national literature other than English or American, or in Comparative Literature, may count toward the requirements of the major.


Major Advising. All new and prospective English majors are encouraged to see the undergraduate staff advisor, individually, once per year, at minimum.

Foreign Languages. Students who contemplate advanced study in English should prepare for foreign language requirements for higher degrees and should consult with the graduate adviser.

Undergraduate Adviser. See Department website at http://english.ucdavis.edu or the Departmental Advising Office in 177 Voorhies Hall.

### Minor Program Requirements:

<table>
<thead>
<tr>
<th>Minor Program Requirements</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>20</td>
</tr>
</tbody>
</table>

Five upper division courses, at least four of which will be literature courses.

### Honors and Honors Program

A Senior Honors Program is available to an invited group of English majors, who prepare and write a Senior Thesis (either a research paper or creative writing) in their senior year. The honors program consists of four units of 194H and four units of 195H, normally taken during Winter and Spring quarters of the senior year. The creative writing honors program consists of four units of 100FA or 100PA, normally taken during Spring quarter of the junior year, and four units of 195H, normally taken Winter quarter of the senior year. Completion of the program is a prerequisite for High or Highest Honors at graduation.

Eligibility criteria and application materials may be obtained at the Undergraduate Advising office in 177 Voorhies Hall or by accessing the Department website at http://english.ucdavis.edu. For more details, see Graduation Honors, on page 96.

### Education Abroad Options

The department strongly encourages interested students to pursue their studies abroad. It is possible for students to complete significant portions of the English major provided that the course is evaluated as at least four UC Davis units; the course is considered upper division by the standards set forth by UC Davis Study Abroad; the student presents copies of the coursework, syllabus, and writing assignments to the department’s advising staff.

### Teaching Credential Subject Representative

See the Teacher Education program.

### Graduate Study

The Department of English offers programs for advanced research leading to the M.A. in literature and creative writing and the Ph.D. in literature. Detailed information may be obtained from the graduate adviser or the Chairperson of the Department.

The department’s affiliation with the Critical Theory Program also provides the opportunity for students in English to prepare for the designated emphasis in Critical Theory (an interdisciplinary program in theories and methodologies in the humanities and social sciences).

Graduate Director. Mark Jerge, Ph.D.

Entry Level Writing. Students must have met the Entry Level Writing requirement before taking any course in English. C. Botes, Director.

Prerequisites. English 3 or University Writing Program 1 is required for admission into all preparatory courses (40, 43, 44, 45, 10A, 10B, 10C), and all upper division courses, unless otherwise stated in the course listings. Comparative Literature 1, 2, 3, or 4 Native American Studies 5 may normally be substituted for English 3 or University Writing Program 1.

### Courses in English (ENL)

#### Lower Division

### 3. Introduction to Literature (4)

Lecture-discussion—4 hours. Prerequisite: completion of Entry Level Writing requirement. Introductory study of several genres of English literature, emphasizing both analysis of particular works and the range of forms and styles in English prose and poetry. Frequent writing assignments will be made. GE credit: ArtHum, Wrt|AH, WE.—F, W, S (F, W, S).

#### 4. Critical Inquiry and Literature: Freshman Seminar (4)

Seminar—4 hours. Prerequisite: completion of Subject A requirement and consent of instructor; enrollment limited to freshmen. Critical inquiry into significant literary texts. Emphasis on close reading, classroom dialogue, and the writing of several papers or a longer seminar paper. GE credit: ArtHum, Wrt|AH, WE.—S (S).

#### 5F. Introduction to Creative Writing: Fiction (4)

Lecture-discussion—4 hours. Prerequisite: completion of Entry Level Writing requirement. Elementary principles of writing fiction. Write both in prescribed forms and in experimental forms of their own choosing. No final examination. May be repeated one time for credit. GE credit: ArtHum, Wrt|AH, WE.—F, W, S (F, W, S).

#### 5P. Introduction to Creative Writing: Poetry (4)

Lecture-discussion—4 hours. Prerequisite: completion of Entry Level Writing requirement. Elementary principles of writing poetry. Write both in prescribed forms and in experimental forms of their own choosing. No final examination. May be repeated one time for credit. GE credit: ArtHum, Wrt|AH, WE.—F, W, S (F, W, S).

#### 5NF. Introduction to Creative Writing: Non-Fiction (4)

Lecture-discussion—4 hours. Prerequisite: completion of Entry Level Writing requirement. Elementary principles of writing creative non-fiction. Work in prescribed literary forms (such as essay, meditation, biography, memoir, book review, documentary, or experimental non-fiction forms) and forms of students’ choosing. No final examination. May be repeated one time for credit when instructor differs. GE credit: ArtHum, Wrt|AH, WE.

#### 10A. Literatures in English I: To 1700 (4)

Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or equivalent. Historical introduction to English language and literature from 800-1700. Linguistic borrowing, innovation, 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: ArtHum | AH, WE.—F, W, S (F, W, S).

#### 10C. Literatures in English III: 1900 to Present (4)

Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or equivalent. Study of a special topic. Literature written in English in any period or place or genre. GE credit: ArtHum, Wrt|AH, WE.

### 40. Introductory Topics in Literature (4)

Lecture-discussion—3 hours; film viewing—3 hours. Prerequisite: course 3 or University Writing Program 1 or equivalent. Close reading and interpretation of literature from a variety of traditional and contemporary approaches. Topics include textual and historical approaches; new criticism; formalism; psychological criticism; feminism and gender issues; postcolonialism; materialist approaches. Frequent written assignments. GE credit: ArtHum, Wrt|AH, WE.

### 43. Introductory Topics in Drama (4)

Lecture-discussion—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or equivalent. Close reading of, and topics relating to, selected works of British and American drama from a range of historical periods. May be repeated two times for credit when content differs. GE credit: ArtHum, Wrt|AH, WE.

### 44. Introductory Topics in Fiction (4)

Lecture-discussion—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or equivalent. Close reading of, and topics relating to, selected works from English and American poetry. May be repeated two times for credit when content differs. GE credit: ArtHum, Wrt|AH, WE.

### 45. Introductory Topics in Poetry (4)

Lecture-discussion—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or equivalent. Close reading of and topics relating to, selections from English and American poetry. May be repeated two times for credit when content differs. GE credit: ArtHum, Wrt|AH, WE.

### 92. Internship in English (1-12)

Internship—1-12 hours. Prerequisite: 3 or University Writing Program 1 or equivalent. Some internships in fields where students can practice their skills. May be repeated for credit for a total of 12 units. (P/NP grading only)—F, W, S (F, W, S).

### 98F. Directed Group Study (1-5)

Prerequisite: course 3 or University Writing Program 1 or consent of instructor. May be repeated for credit for a total of 5 units. (P/NP grading only) —F, W, S (F, W, S).

### 98F. Student Facilitated Course (1-4)

Prerequisite: course 3 or University Writing Program 1 or consent of instructor. Student facilitated course intended primarily for lower division students. (P/NP grading only) —Offered irregularly.

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* Fall 2011 and on Revised General Education (GE): AH=Arts and Humanities; SC=Science and Engineering; SS=Social Sciences; DL=Diverse Domestic; DO=Diverse Overseas; OL=Other Skills; QU=Quantitative; SL=Scientific; VL=Visual; WE=World Cultures; WE=Writing Experience
* Pre-Fall 2011 General Education (GE): ArtHum=Arts and Humanities; SocSci=Social Sciences; Div=Diverse Domestic; Wrt=Writing Experience
* Quarter Offered: F=Fall; W=Winter; S=Spring; Su=Summer; 2017/2018 offering in parentheses

English 317
100. Introduction to Literary Theory (4) Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused study of the relationship between literature and other cultures. GE credit: ArtHum, Wrt|AH, WE.

110. Topics in Modern Literature (4) Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused study of works of 20th-century literature. GE credit: ArtHum, Wrt|AH, WE.

111. Topics in Medieval Literature (4) Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. History of literary criticism in the modern era, with emphasis on the ties with the past and the special problems presented by modern literary theory. GE credit: ArtHum, Wrt|AH, WE.

112. Chaucer: The Canterbury Tales (4) Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Practice in using the conventions of English. (Same course credit: ArtHum, Wrt|AH, WE). Writing of poetry. May be repeated for credit with consent of instructor. No final examination.

113. Chaucer: Troilus and the "Minor" Poems (4) Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Development and evaluation of students' work in prose, primarily in the workshop format. Geome reading and discussion of published novels and short stories. Conferences with individual students once per quarter. May be repeated for credit with consent of instructor. No final examination.

114. Renaissance and the Scientific Revolution (4) Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Key historical, conceptual, and philosophical issues and trends. GE credit: ArtHum, Wrt|AH, WE.

115. Topics in Sixteenth and Seventeenth Century Literature (4) Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Practice in using the conventions of English. 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 the Renaissance. GE credit: ArtHum, Wrt|AH, WE.

116. Eighteenth-Century British Literature (4) Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Study of postcolonial literature of Anglophone colonies. Specific emphases may include literature from and about Anglophone India, the Caribbean, the Middle East, South Asia, Africa, and/or South America. GE credit: ArtHum, Wrt|AH, WE.
from the period between 1900 and the end of World War II. GE credit: ArtHum, Wrt|ACGH, AH, DD, WE.

147. American Literature, 1945 to the Present (4) Lecture—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or equivalent. Historically or thematically focused study of American literature from its beginnings; Hawthorne, techniques, and formal character as a literary form. Offered in alternate years. GE credit: ArtHum, Wrt|ACGH, AH, DD, WE.

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: ArtHum, Wrt|AH, WE.

150A. British Drama to 1800 (4) Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused study of works of English drama prior to 1800. GE credit: ArtHum, Wrt|AH, WC, WE.

150B. Drama from 1800 to the Present (4) Lecture/discussion—3 hours; extensive writing or discussion. 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. GE credit: ArtHum, Wrt|AH, WC, WE.

153. Topics in Drama (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historically or thematically focused study of drama. May be repeated for credit when topic differs. GE credit: ArtHum, Wrt|AH, WE.

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 focused study of the 18th-century British novel, with particular emphasis on its evolution, including the epistolary novel, the novel of sentiment, and the Gothic novel: Richardson, Fielding, Sterne, Austen. GE credit: ArtHum, Wrt|AH, WC, WE.

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 focused examination of 19th-century British novels, with emphasis on the historical novel, the social novel, and the detective novel: Scott, Dickens, the Brontes, Eliot, Hardy. GE credit: ArtHum, Wrt|AH, WC, WE.

155C. 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 focused study of the 20th-century British novel, with emphasis on modernism; the role of the novel in society; postwar British novels: Lawrence, Railton, Waugh, and others. GE credit: ArtHum, Wrt|AH, WE.

158A. 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 the rise and development of the American novel, with its beginnings: Hawthorne, Melville, Twain, James, and others. GE credit: ArtHum, Wrt|ACGH, AH, WE.

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 important American novels from 1900 to the present: authors may include Willa Cather, Nathanael West, William Faulkner, Ralph Ellison, Zora Neale Hurston, Thomas Pynchon, Ishmael Reed, Maria Elena Viamonte, Rachel Kushner, and others. GE credit: ArtHum, Wrt|AH, DD, WE.

159. Topics in the Novel (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Examination of a novel or novels arranged thematically. Topics might include Bildungsroman, stream-of-consciousness novel, Gothic novel, historical novel. May be repeated for credit when topic differs. GE credit: ArtHum, Wrt|AH, WE.

160. Film as Narrative (4) Lecture—3 hours; film viewing—3 hours. Prerequisite: course 3 or University Writing Program 1. Study of modern film (1930 to present) as a storytelling medium. Offered in alternate years. GE credit: ArtHum, Wrt|AH, VL, WE.

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 its origins in the 1890s through 1945. (Courses 161A and 161B need not be taken in sequence.) Offered in alternate years. GE credit: ArtHum, Wrt|AH, VL, WE.

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|AH, VL, WE.

162. Film Theory and Criticism (4) Lecture—3 hours; film viewing—3 hours. Prerequisite: course 3 or University Writing Program 1. Film theory and film criticism. Exposes students to major film critics and to ten major works of international film art. Offered in alternate years. GE credit: ArtHum, Wrt|AH, VL, WE.

163. Literary Study in the British Isles (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Course 3 or University Writing Program 1. Enrollment by application only through the Education Abroad Center. Literary Study in the British Isles: On-site study of the literature, film, and, or performance of the British Isles during two times if subject matter differs. GE credit: ArtHum, Wrt|AH, WC, WE. —S. (S.)

164. Writing Science (4) Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3 or Science and Technology Studies 1 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 scientific fiction. (Same course as Science and Technology Studies 164.) GE credit: ArtHum, Wrt|AH, SL, WE —Milburn

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 topic covers different poets and poems. GE credit: ArtHum, Wrt|AH, WE.

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: Div, ArtHum, Wrt|ACGH, AH, WE.

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 irregularly. GE credit: ArtHum, Div, Wrt|ACGH, AH, WE.

168. 20th Century American Poetry (4) Lecture—3 hours; extensive writing. Prerequisite: course 3 or University Writing Program 1 or equivalent. Historical Study of American poetry since 1900, with thematic and formal focus at the instructor’s discretion. Offered irregularly. GE credit: ArtHum, Wrt|ACGH, AH, WE.

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. GE credit: ArtHum, Div, Wrt|AH, WC, WE.

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. GE credit: ArtHum, Div, Wrt|AH, WC, WE.

172. Video Games and Culture (4) Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or Technocultural Studies 1 or Science and Technology Studies 1 or equivalent. Critical approaches to the study of video games, focusing on formal, historical, and cultural modes of analysis. History of software and hardware in North American and global contexts. Relations of games to society, politics, economics, literature, media, and the arts. (Same course as Cinema and Technocultural Studies 172 and Science and Technology Studies 172.) GE credit: ArtHum or SocSci|ACGH, AH or SS, VL.

173. Science Fiction (4) Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3 or Science and Technology Studies 1 or equivalent. 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 culture. (Same course as Science and Technology Studies 173.) GE credit: ArtHum, Wrt|AH, WE.

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; southwestern and New England humor; pre- and post-Civil War masters; local colorists; journalistic gadflies; anti-provinciality; modernist poets and prose writers, black humor. Offered irregularly. GE credit: ArtHum, Wrt|AH, WE.

177. Study of an Individual Author (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 110A or 111B, a detailed study of an author’s works; historical context; relation to predecessors and contemporaries; critical reception; influence. May be repeated one time if author differs. GE credit: Wrt|AH, WE.
187. Topics in Native American Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or equivalent. Comparative study of what constitutes “American” literature. Possible emphases: North American or Latin American literature; Pacific Rim or Circum-Atlantic approaches; interrelations among different modes of racialization within and beyond U.S. borders. May be repeated twice for credit. GE credit: ArtHum, Div, Wrt | AH, WE.

188. Women’s Writing I (4)
Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or equivalent. Literary productions of a local, regional, national, transnational, or other geo-graphical form. Possible emphases: the global South; literature of Hawaii; literature of Australia. May be repeated two times for credit. GE credit: ArtHum, Div, Wrt | AH, WE.

189. Women’s Writing II (4)
Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or equivalent. Literary production of the African American literary culture from a primarily oral tradition to various literary genres, including the Harlem Renaissance. GE credit: ArtHum, Div, Wrt | AH, WE.

190. 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. Particular emphasis on the rapid development of the African American literary culture from a primarily oral tradition to various literary genres, including the Harlem Renaissance. GE credit: ArtHum, Div, Wrt | AH, WE.

191. 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. May include Richard Wright, Ann Petry, James Baldwin, Ralph Ellison, Paule Marshall, Toni Morrison, Alice Walker, Clarence Major. GE credit: ArtHum, Div, Wrt | AH, WE.

192. 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 | AH, WE.

193. Young Adult Literature (4)
Lecture—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1, or equivalent. Theoretical, critical, and literary issues informing the study and teaching of American young adult literature. GE credit: ArtHum | AH, WE.

194. Literature and the Environment (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Possible emphases: the age of Germanic literature. Offered in alternate years.

195C. Women’s Writing III (4)
Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1. Women’s Writing in English from 1800 to 1900; organized by period, place, genre, or theme. GE credit: ArtHum, Div, Wrt | AH, WE.

195D. Women’s Writing IV (4)
Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1. Women’s Writing in English after 1900; organized by period, place, genre, or theme. Offered irregularly. GE credit: Div, Wrt | AH, WE.

196. Literature, Sexuality, and Gender (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or the equivalent. Historically or thematically focused intensive examinations of gender and sexuality in British and American literature. GE credit: ArtHum, Div, Wrt | AH, WE.

197. Topics in Literature and Media (4)
Seminar—3 hours; film viewing—3 hours. Prerequisite: course 110A or 110B; consent of instructor. Group study of a topic centered on the relationships between literature and film and moving-image media. GE credit: Wrt | AH, WE.

198. Topics in Literary and Critical Theory (4)
Seminar—3 hours; term paper. Prerequisite: course 110A or 110B; consent of instructor. Comparative study of what constitutes “American” literature. Possible emphases: North American or Latin American literature; Pacific Rim or Circum-Atlantic approaches; interrelations among different modes of racialization within and beyond U.S. borders. May be repeated two times for credit when topic differs. GE credit: ArtHum, Div, Wrt | AH, WE.

199. Directed Group Study (1-5)
Field experience, with individuals or in small voluntary discussion groups affiliated with one faculty member, an undergraduate student, or the equivalent. May be repeated for credit for a total of 12 units. (P/N grading only.)—F, W, S. (F, W, S.)

200. Seminar for Honors Students (4)
Seminar—3 hours; term paper. Prerequisite: course 110A or 110B; one advanced study course; consent of instructor. Preparation of a thesis, under the supervision of a faculty member. A maximum of four units is allowed toward the major in English. May be repeated for credit for a total of 12 units. (P/N grading only.)—F, W, S. (F, W, S.)

201. Introduction to Graduate Studies in English (4)
Lecture—3 hours; conference and term paper. GE credit: ArtHum, Div, Wrt | AH, WE.

202. 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.

203. 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.

204. Topics in American Literature (4)
Seminar—3 hours; term paper. May be repeated for credit for a total of 12 units. (P/N grading only.)—F, W, S. (F, W, S.)

205. Anglo-Saxon Language and Culture (4)
Lecture—3 hours; conference and term paper. May be repeated for credit for a total of 12 units. (P/N grading only.)—F, W, S. (F, W, S.)

206. Anglo-Saxon Language and Culture (4)
Lecture—3 hours; conference and term paper. May be repeated for credit for a total of 12 units. (P/N grading only.)—F, W, S. (F, W, S.)

207. Middle English (4)
Discussion—3 hours; term paper. Study of the phonology, morphology, syntax, and lexicology of Middle English; readings in Old English prose and poetry. Offered in alternate years.

210. English Literature (4)
Seminar—3 hours; conference and term paper. May be repeated for credit if topic differs.

211. Renaissance Literature (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

212. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

213. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

214. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

215. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

216. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

217. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

218. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

219. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

220. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

221. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

222. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

223. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

224. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

225. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

226. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

227. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

228. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

229. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.

230. Shakespearean Drama (4)
Seminar—3 hours; term paper. May be repeated for credit if topic differs.
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 tragicomedy. 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 topic differs.

237. Seminar for Writers (4) Seminar—3 hours; extensive writing. Prerequisite: graduate standing. Varied topics in the study of literature and literary culture and poetics from the perspective of the writer/practitioner. May be repeated two times for credit if focus differs. Offered irregularly.—W. (W.)

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 papers. 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. Offered irregularly.

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.

258. American Literature: 1800 to the Civil War (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.

260. American Literature: Civil War to 1914 (4) Seminar—3 hours; conference—1 hour. Studies in American literature from Civil War to 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.

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. Offered irregularly.

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 master’s program in Creative Writing. Emerging global, international or transnational techniques, theories, and individual works of contemporary world prose or poetry. Discussion, seminar reports, research papers. May be repeated for credit when topic differs.

280. Seminar in Research Processes (4) Lecture/discussion—3 hours; seminar—2 hours. Must have passed Departmental Preliminary Exam. Study of various practical and technical skills needed to perform research in literary studies. 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.

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. Offered irregularly.

287. Topics in Literature and Media (4) Seminar—3 hours; film viewing—3 hours. Prerequisite: graduate standing. Study of a topic centered on film or other moving-image media. Course materials to be selected by the instructor. Preparation and evaluation of research papers. May be repeated for credit when topic differs.

288. Prospectus Workshop (2) Conference—2 hours. Must have passed Departmental Preliminary Exam. Training in writing the dissertation prospectus. Participation in group discussions of preparatory assignments and final proposal. (S/U grading only.)

289. Article Writing Workshop (2) Conference—2 hours. Prerequisite: consent of instructor. Class size limited to 12 students; nomination for admission by Dissertation Director. Training in preparing an article for publication. Participation in group discussions of article drafts. May be repeated one time for credit. (S/U grading only.)

290. Creative Writing: Special Topic (4) Seminar—3 hours; conference—1 hour. Prerequisite: consent of instructor. Writing that falls outside the generic confines of traditional genres (fiction, poetry, and nonfiction) or traditional workshop formats. Evaluation of written materials and individual student conferences. May be repeated for credit. Offered irregularly.—F. (F.)

290F. Creative Writing: Fiction (4) Seminar—3 hours; conference—1 hour. Prerequisite: consent of instructor; graduate standing, with preference given to those enrolled in master’s program in Creative Writing. Writing of prose fiction. Evaluation of written materials and individual student conferences. May be repeated for credit.—F. W. S. (F. W. S.)

290NF. Creative Writing: Non-Fiction (4) Seminar—3 hours; conference—1 hour. Prerequisite: consent of instructor; graduate standing, with preference given to those enrolled in master’s program in Creative Writing. Writing of literary non-fiction, with emphasis on autobiography, biography, memoir, the occasional or nature essay, or other non-fiction prose narratives. May be repeated for credit. Offered in alternate years.

290P. Creative Writing: Poetry (4) Seminar—3 hours; conference—1 hour. 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.—F. W. S. (F. W. S.)

298. Directed Group Study (1-5) (S/U grading only)—F. W. S. (F. W. S.)

299. Individual Study (1-12) (S/U grading only)—F. W. S. (F. W. S.)

299D. Special Study for the Doctoral Dissertation (1-12) (S/U grading only)—F. W. S. (F. W. S.)

Professional

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. May be repeated for credit when topic differs.

392. 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)—S. (S.)

396. Teaching Assistant Training Practicum (1-4) Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—F. W. S. (F. W. S.)
Entomology and Nematology

Formerly the departments of Entomology and Nematology (College of Agricultural and Environmental Sciences)

Steve Nadler, Ph.D., Chairperson of the Department
Joanna Chiu, Ph.D., Vice Chairperson of the Department

Faculty

James R. Carey, Ph.D., Distinguished Professor
Edward P. Caswell-Chen, Ph.D., Professor
Joanna Chiu, Ph.D., Associate Professor
Bruce D. Hamrock, Ph.D., Distinguished Professor
Academic Senate Distinguished Teaching Award
BriAnn R. Johnson, Ph.D., Assistant Professor
Richard Karban, Ph.D., Professor
Lynn S. Kimsey, Ph.D., Professor
Karl Kjer, Ph.D., Professor, Schlinger Endowed Chair in Systematics
Sharon P. Lawler, Ph.D., Professor
Edwin P. Leewer, Ph.D., Professor
Steven A. Nadler, Ph.D., Professor
Christian Nansen, Ph.D., Assistant Professor
Jay Rosenheim, Professor
Academic Senate Distinguished Teaching Award
Diane E. Ullman, Ph.D., Professor
Rachel Vannette, Ph.D., Assistant Professor
Philip S. Ward, Ph.D., Professor
Becky B. Westerdahl, Ph.D., Professor
Neal M. Williams, Ph.D., Associate Professor
Louie H. Yang, Ph.D., Associate Professor
Frank G. Zalom, Ph.D., Distinguished Professor

Emeriti Faculty

Oscar G. Bacon, Ph.D., Professor Emeritus
Peter S. Cranston, Ph.D., Professor Emeritus
Hugh Dingle, Ph.D., Professor Emeritus
John D. Edman, Ph.D., Professor Emeritus
Leslie E. Ehler, Ph.D., Professor
Bruce F. Eldridge, Ph.D., Professor Emeritus
Howard Ferris, Ph.D., Professor Emeritus
Mary L. Flint, Ph.D., Specialist in Cooperative Extension, Emerita
Norman E. Gary, Ph.D., Professor Emeritus
Jeffrey Grannett, Ph.D., Professor Emeritus
Alberita G. Grigarick, Jr., Ph.D., Professor Emeritus
Penelope J. Gullan, Ph.D., Professor Emeritus
Bruce A. Jaffe, Ph.D., Professor Emeritus (Nematology)
Harry K. Kaya, Ph.D., Professor Emeritus (Entomology, Nematology)
Robert E. Page Jr., Ph.D., Professor Emeritus
Michael P. Parrella, Ph.D., Professor Emeritus (Plant Sciences)
Christina Y. Peng, Ph.D., Professor Emeritus
Robbin W. Thorp, Ph.D., Professor Emeritus
Thomas W. Scott, Ph.D., Professor Emeritus
Robert K. Washino, Ph.D., Professor Emeritus
Valerie M. Williamson, Professor Emeritus

Affiliated Faculty

Anthony Cornell, Ph.D., AES Entomologist
Elina Nino, Ph.D., Specialist in Cooperative Extension
Larry Godfrey, Ph.D., Specialist in Cooperative Extension, AES Entomologist
Robert Kimsey, Ph.D., Lecturer
Shirley Luckhart, Ph.D., Adjunct Professor
(Medical Microbiology and Immunology; School of Medicine)
Eric C. Mussen, Ph.D., Specialist in Cooperative Extension, Emeritus
William K. Reisen, Ph.D., Research Entomologist (Pathology, Microbiology and Immunology; School of Veterinary Medicine)

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 economic 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. The Entomology Faculty encourages students to do research internships in their laboratories.

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 biotechnology, 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 entomology graduates pursue careers in primary, secondary, and college level science education.

B.S. Major Requirements:

Preparatory Subject Matter.............................................. 49-53

<table>
<thead>
<tr>
<th>UNITs</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Biological Sciences 2A, 2B, 2C</td>
</tr>
<tr>
<td>16</td>
<td>Chemistry 2A, 2B, 8A, 8B</td>
</tr>
<tr>
<td>9-12</td>
<td>Mathematics 16A-16B-16C or 17A-17B-17C or 21A-21B-21C</td>
</tr>
<tr>
<td>9-10</td>
<td>Physics 1A, 1B</td>
</tr>
<tr>
<td>9-12</td>
<td>Statistics 13, 32, or Plant Sciences 120, 21</td>
</tr>
<tr>
<td>3-4</td>
<td>Engineering 5</td>
</tr>
</tbody>
</table>

Depth Subject Matter.............................................. 34-40

<table>
<thead>
<tr>
<th>UNITs</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Entomology 104, Plant Biology 148, Plant Pathology 120 or 162</td>
</tr>
<tr>
<td>3-4</td>
<td>Biological Sciences 101, 102</td>
</tr>
<tr>
<td>4</td>
<td>Entomology 105, Environmental Science and Policy 100 or Evolution and Ecology 101</td>
</tr>
<tr>
<td>4</td>
<td>Evolution and Ecology 100</td>
</tr>
<tr>
<td>4</td>
<td>Biological Sciences 102 and 103 or Animal Biology 102 and 103</td>
</tr>
<tr>
<td>6-10</td>
<td>Entomology 106 or 107</td>
</tr>
<tr>
<td>7</td>
<td>At least 7 units from Entomology 102, 103, 104, 107, 109, or 116 or Nematology 110</td>
</tr>
</tbody>
</table>

Restricted Electives.............................................. 34

Upper division Entomology and Nematology courses ................. 14

Upper division electives related to student’s interest with approval of adviser .................. 20

Note: No more than a total of six units from Entomology 192, 197 and 199 may count toward fulfilling depth subject matter or restricted elective units.

Total Units for the Major........................................... 117-127

Minor Advisers. S. Lawler, S. Nadler

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.

Insect Biology......................................................... 19-23

Entomology 100, 100L ............................................. 6
At least seven units from Entomology 102, 103, 104, 105, 107, 109 .................. 7
At least two additional upper division Entomology courses (except courses 192, 198, 199) . 6-10

Agricultural Pest Management.................................. 21-23

Entomology 100, 100L, 110, 135 .................................. 15
At least two courses from: Nematology 100, Plant Sciences 105, 176, Plant Pathology 120 ......................................................... 6-8

Insect Ecology and Evolution................................... 20-21

Entomology 100, 100L, and Entomology 104 or 105 .................................. 9-10
At least seven units from Entomology 103, 107, 109, 116, 158 .......................... 7
Evolution and Ecology 149 or Environmental Science and Policy 121 .................. 4

Medical-Veterinary Entomology................................ 19

Entomology 100, 100L, 104, 153, 156 .............................. 15
At least four units from Entomology 156L, 158, Microbiology 162 .......................... 4

Forensic Entomology................................................. 22

Entomology 100, 100L, 102, 158 .................................. 13
Biological Science 2A ................................................. 5
Entomology 105, Evolution and Ecology 101, or Environmental Science and Policy 100 ......................................................... 4

Minor Advisers, S. Lawler, S. Nadler

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 121 and the Graduate Announcement, for further details.

Graduate Advisers. See http://entomology.ucdavis.edu/Graduate/.

Related Courses. See courses in Nematology.

Courses in Entomology (ENT)

Lower Division

I. 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, interactions with humans and importance in human culture. Multidisciplinary approaches in education and career paths in entomology and art. GE credit: ArtHum or SciEng or SocSci | AH or SE or SS, OL, VL, WE. — S. (S.) Ullman

II. 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). Human interactions with the environment, aesthetics, 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 | SE, SS, WE, WE, — F. (F)

III. Natural History of Insects (3)

Lecture—3 hours. Introduction to the insects detailing their great variety, structures, habits, and their significance in relation to plants and animals including man. 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. GE credit: SciEng, Wrt | SS, SS, WE, WE, W. (W.) Johnson, Kjer

IV. Special Topics in Entomology (2)

Seminar—2 hours. Prerequisite: consent of instructor. 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 — F, W, S.)
92. Internship (1-12) Internship—3-36 hours. Prerequisite: consent of instructor. Work-learning experience on and off campus in an area of interest selected by the department, supervised by a member of the 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


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: Wrt|W.—F. L. 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 anatomy, histology and fine structures of important organs and tissues will be discussed. GE credit: SciEng. —W. (W.)

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 physiological research. Emphasis on detailed analysis of metabolic, physiological, and behavioral processes. Emphasis on analysis of methodology, fact, and theory. GE credit: SciEng | SE, WE.—W. (W.) Chiu

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—S.


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 in California with emphasis on collection, identification, and natural history. Offered in alternate years. GE credit: SciEng, Wrt|W| SE.—S. 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|W| SE.—(S.) Ward

110. Arthropod Pest Management (5) Lecture—3 hours; laboratory—6 hours. Prerequisite: Biological Science 1B. Development of the ecological basis for pest management paradigms 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|W| SE, WE.—W. (W.) Godfrey

116. Freshwater Macroinvertebrates (3) Lecture—2 hours; laboratory—3 hours. Prerequisite: Biological Sciences 2B or equivalent. Limited enrollment. Biological Sciences 180B. Study of freshwater macroinvertebrates, including insects, crustaceans, mollusks, worms, leeches, flatworms and others. Adaptations to freshwater aquatic food webs. Uses of macroinvertebrates to determine water quality and trend analysis. Field trips during regular lab hours. GE credit: SciEng | SE, SL.—S. (S.) Lawler

116L. Aquatic Insect Collection (2) Laboratory—4 hours; field work—2 hours. Prerequisite: course 100 or course in entomology. Collection process for aquatic insects and their identification to Family level. Collections will require two, one-day weekend field trips (by arrangement). Collection requirement is 40 Families. —S. (S.) Lawler

117. Longevity (4) Lecture—3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Nature, origin, determinants, and limits of longevity with particular reference to human beings; emphasis on implications of findings from non-human model systems including natural selection and evolution of life span; description of basic demographic techniques including life table methods. (Same course as Human Development 135.) GE credit: SciEng, Wrt|W| SE, SL, WE.—F. Carey

119. Apiculture (3) Lecture—3 hours; papers. Biology and behavior of honeybees; communication, orientation, social organization, foraging activities, honey production, pollination activities. GE credit: SciEng, Wrt|W| OL, VL, WE.—S. (S.) Johnson

123. Plant-Virus Vector-Interaction (3) Lecture—3 hours. Prerequisite: Biological Sciences 2A, Biological Sciences 101; Plant Biology 105, Plant Pathology 120, and 100 recommended. Analysis of interactions necessary for viruses to infect plants. Interactions among insect vectors and host plants involved in the plant-virus life cycle. Evolutionary and molecular components in viral infection and modern approaches to the interdiction of viral movement. (Same course as Plant Biology 122 and Plant Biology 123.) GE credit: SciEng, Wrt|W| OL, VL, WE.—F. (F.) 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 (1st part). GE credit: SciEng, Wrt|W| SE, SL, WE.—F. (F.) Lucas, Gilbertson, Ullman

153. Medical Entomology (3) Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B, upper division standing in one of the biological sciences, entomology or consent of instructor. Classification and medical importance of arthropods with special emphasis on the ecology of arthropod-borne diseases and principles of their control. Relationships of arthropods and man. GE credit: SciEng, Wrt|W| SL, SE, WE.—W. (W.)

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 protozoa and metazoan fauna. GE credit: SciEng | SE.—S. (S.) Nadler

156L. Biology of Parasitism Laboratory (1) Laboratory—3 hours. Prerequisite: course 156 (concurrently) or consent of instructor. Laboratory demonstrations selected to exemplify and understand the relationships of parasitoids and the metazoan organisms with various techniques used in parasitology to exemplify concepts presented in the lectures. GE credit: SciEng, Wrt|W| SE.—S. (S.) Nadler

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, development cycles of species, population biology in matters of criminal prosecution and civil litigation. Emphasis on basic arthropod biology, ecological and developmental concepts and methods, development of research and research ability, implication, development of opinions and evidence. GE credit: SciEng or SocSci, Wrt|W|—S. (S.) R. Kimsey

180A. Experimental Ecology and Evolution in the Field (4) Lecture/labatory—3 hours; fieldwork—3 hours. Prerequisite: course 105, or Environmental Science and Policy 100; Evolution and Ecology 100; Evolution and Ecology 101. Experimental design in field ecology. Examination of primary literature, experimental design, independent and collaborative research, analysis of data, development of original research paper based on field experiments. (Same course as Evolution and Ecology 180B.) Offered in alternate years. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | GL, SE, VL, WE.—W. (W.) Yang

180B. Experimental Ecology and Evolution in the Field (4) Lecture/labatory—3 hours; fieldwork—3 hours. Prerequisite: Evolution and Ecology or Entomology 100A, Evolution and Ecology 101, or Environmental Science and Policy 100; course 105. Experimental design in field ecology; Examination of primary literature, experimental design, independent and collaborative research, analysis of data; development of original research paper based on field experiments. (Same course as Evolution and Ecology 180B.) Offered in alternate years. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | OL, SE, VL, WE.—Y. Yang

192. Internship (1-12) Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Laboratory experience or field work off campus in all subject areas offered in the Department of Entomology. Internships supervised by a member of the faculty. (P/NP grading only.)

197. Tutoring in Entomology (1-3) Discussion—1-3 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

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 defense mechanisms. Molecular biology of insect viruses. Baculovirus expression vectors and posttranslational modification of expressed polypeptides. Biological control of insect hormones and taxin genes in insect viruses. Offered in alternate years.—W. (W.)

214. Vector-borne Infectious Diseases: Changing Patterns (2) Lecture/discussion—2 hours. Prerequisite: consent of instructor required. Restrictions: open to graduate students, MPVM and MPH students, DVM and medical students with second- or third-year standing.
Environmental and Resource Sciences

Open to upper division undergraduate students with consent of instructor(s). Vector-borne infectious diseases and pest management. Lectures and discussions emphasize cycling patterns associated with climatic changes, trade and population movement. Same course as PMI 214. — F (Fr) Lanzaro, Reisen

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 plant projects. Ecological hypothesis testing, data gathering, analysis and writing and oral presentation of results. (Same course as Ecology 225/Population Biology 225.) — S. (S.) Karban

230. Advanced Biological Control (4) Lecture—2 hours; laboratory—6 hours. Prerequisite: graduate or upper division standing in biological science or consent of instructor. Principles and current issues in biological control of pests and weeds; laboratory devoted to identification and life history of the major groups of parasitic and predatory arthropods. Offered irregularly. — F (Fr)

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 anthropo-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 irregularly. — S

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, criminology). May be repeated for up to 8 units of credit when topics differ. — F, W, S.

291. Current Topics in Medical and Veterinary Entomology (2) Seminar—2 hours. Prerequisite: course 153. Discussion of parasitology, ecology and epidemiology related to vectors of pathogens causing disease in humans and animals. May be repeated one time for credit. Offered irregularly. — F, W, S. R. Kimsey

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 topics 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. Offered irregularly. — F, W, S.

293N. 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 topics 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. Offered irregularly. — F, W, S.

294. 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 up to 6 units of credit if topic differs. Offered irregularly. — F, W, S. Hammad

295. Current Topics in Agricultural Entomology and Bee Biology (2) Seminar—2 hours; prerequisite: course 110 if topic covers pests and beneficial insects, course 119 if topic is bee biology, or either if topics bridges both. Discussion of advanced topics about the biology, ecology, behavior, and management of pests and beneficial insects. May be repeated for up to 8 units of credit if topic differs. Offered irregularly. — F, W, S.

297N. Seminar in Entomology (1) Seminar—1 hour, weekly entomology seminar. May be repeated up to 9 units of credit if topic differs. (S/U grading only)— F, W, S. (F, W, S.)

298. Group Study (1-5) (S/U grading only.)

299. Research (1-12) (S/U grading only.)

Environmental and Resource Sciences

[College of Agricultural and Environmental Sciences] This major was discontinued as of Fall 2008; see Environmental Science and Management, on page 326.

Environmental Geology

[College of Letters and Science] The minor in Environmental Geology examines the multidisciplinary factors of geology and related earth science fields, and planning and resources oriented programs. Students in the minor are encouraged to participate in internship programs that assist them in solidifying the Environmental Geology minor with their Geology major or other major field areas that include geologic components. The minor is sponsored by the Department of Earth and Planetary Sciences in 2119 Earth and Physical Sciences Building.

Minor Program Requirements: UNITS

Environmental Geology ................................. 25-26

Geology 130, 134, and Environmental Science and Management 186 ............... 9

Soil Science 118 ........................................ 4

Hydrologic Science 141 or Civil and Environmental Engineering 142 .............. 4

Two courses chosen from Environmental Science and Policy 160, 171, 179

Hydrologic Sciences 144, 146 ....................... 8-9

Minor Adviser. See Geology major advisers.

Environmental Horticulture

[College of Agricultural and Environmental Sciences] Faculty. See Plant Sciences, on page 516.

Major Program. See Environmental Horticulture and Urban Forestry, on page 325.

Minor Program Requirements: UNITS

Environmental Horticulture .......................... 23-25

Environmental Horticulture 6 and 105 ............... 5

Plant Sciences 171 ....................................... 4

Select three courses from: Environmental Horticulture 100, 120, 125, 130, 133 .................. 11-13

Minor Adviser. A. Volder (Plant Sciences)

Related Undergraduate Programs. See the undergraduate majors in Ecological Management and Restoration, on page 561, Plant Biology, on page 511, and Plant Sciences, on page 516.

Graduate Study. For graduate study related to this field, see the M.S. and Ph.D. degree programs in the graduate groups of Horticulture and Agronomy, Plant Biology, and Ecology. Also see Graduate Studies, on page 121.

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 in 1224 Plant and Environmental Sciences Building 530-752-7738.

Lower Division

1. Introduction to Environmental Horticulture/Urban Forestry (3) Lecture—3 hours. Introductory to the use of plants to enhance the physical, visual and social environment, the use of ecological principles in developing sustainable, low maintenance landscape systems, and the career opportunities in these areas. GE credit: SciEng | SE, VL. — F (Fr) Volder

6. 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. GE credit: SciEng | SE, VL. — F (Fr) Young

Upper Division

100. Urban Forestry (4) Lecture—2 hours; laboratory—3 hours; term paper. Prerequisite: Biological Sciences 11C or Plant Sciences 2. Principles and practices of planning and managing urban vegetation. Basics of tree appraisal, natural resource inventory, and development of long term urban forest management plans. GE credit: SciEng | SE. — F, W. (F, W) 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; contribution of trees to this ecosystem. Bicycle required. GE credit. GE credit. SciEng | VL. — S. (S.) Harding

102. Physiological Principles in Environmental Horticulture (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 11C. Physiological principles and processes essential to floriculture, nursery crop production, turfduction, landscape horticulture. Emphasis on the control of vegetative and reproductive development for a broad species range in greenhouse and extensive landscape environments. GE credit: SciEng | SE.

105. 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. GE credit. SciEng | VL. — S. (S.) 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...
Environmental Horticulture and Urban Forestry

(College of Agricultural and Environmental Sciences)

Faculty. See Department of Plant Sciences, on page 516.

The Major Program. Students majoring in Environmental Horticulture and Urban Forestry learn how plants improve the environment and the quality of our lives. The major focuses on the biological and physical concepts and horticultural principles of plant production, management of plants and plant ecosystems in landscape settings and sociological aspects of plant/people interactions in the urban environment. Plants are used to revegetate and restore disturbed landscapes, control erosion and reduce energy and water consumption. The major prepares students to improve the aesthetic quality of urban and rural landscapes, recreational areas, interstices and commercial sites is an important aspect of this major. Students may select one or more of the following resource areas of specialization: Floriculture/Nursery, Plant Biodiversity/Restoration, or Urban Landscape Management.

Internships and Career Opportunities. Students are encouraged to develop internships on or off campus to augment their activities in the classroom and laboratory. Internships are available within the department's greenhouse facility, the UC Davis Arboretum, landscape designers, local nurseries, government agencies, regional non-profits, and restoration firms. Career opportunities in this field include growing and managing plants in a variety of settings, including nurseries and arboretums, consulting as an arborist, or as an urban landscape, or restoration horticulturist; business ownership; park management; contract horticulturist; working in the public or private sector, or for non-profit organizations.

B.S. Major Requirements: 

UNITs Communications 1 recommended as part of the College English Composition Requirement or the Words and Images Core Literacy Component.

Preparatory Subject Matter .............. 56-62
   Environmental Horticulture 1 and 6 ........ 7
   Landscape Architecture 30 .................. 4
   Biological Sciences 2A, 2B, and Plant Sciences 2 .................. 14
   Chemistry 2A-2B ............................ 10
   Environmental Science and Policy 1 or 10 or 30 .................. 3-4
   Physics 1A-1B ............................... 6
   Plant Sciences 21 ............................ 3
   Mathematics 16A or Statistics 13 ........ 3-4
   University Writing Program 102B, 102G, or 104E, or other upper division composition course [may overlap with college composition requirement specified by passing the English Composition Exam] .................. 0-4
   Lower division restricted electives ....... 6
   Select one: science course and one lower division science/humanities course in consultation with adviser; minimum 6 units.

Depth Subject Matter .................. 42-46
   Environmental Horticulture 102 or Plant Sciences 100A .......................... 3-4
   Environmental Horticulture 105 or Plant Sciences 102 or Plant Biology 108 ....... 4-5
   Plant Biology 117 or Plant Sciences 150 .... 4
   Plant Sciences 150 or Plant Biology 117 or 150 ..... 4
   Soil Science 100 ............................. 5
   Select two courses from Entomology 110, Entomology 100, Plant Pathology 120, Plant Sciences 100 or 117 .......................... 7-9
   Internship or research; must be approved by major adviser .................. 3
   Upper division restricted electives ....... 12
   Select two upper division science courses and two upper division science/humanities courses in consultation with adviser; minimum 12 units.

Areas of Specialization (choose one) 
No course may be used to satisfy more than one requirement.

Floriculture/Nursery Option .......... 18
   Environmental Horticulture 120, 125 ....... 8
   Applied Biological Systems Technology 165, 166 .......................... 2
   Entomology 135 ............................. 2
   Plant Sciences 100C or 158 or Soil Science 109 .................. 4
   Plant Biodiversity/Restoration Option ........................................ 16-22
   Environmental Horticulture 160, 165 ....... 4
   Environmental Horticulture 117 or Evolution and Ecology 100, or Plant Biology 116 .................. 3-5
   (a) Select one course from: Environmental Science and Management 155, Environmental Science and Policy 127, 155L, Plant Sciences 130, 150, Wildlife, Fish, and Conservation Biology 155 .................. 3-4
   (b) Select one course from: Environmental Science and Policy 155, Plant Biology 108, 117, 119, Plant Sciences 102, 144, 147

147L, 163, 176, Wildlife, Fish, and Conservation Biology 156, 157 .............. 3-5 
Select one additional class from section a or b .................. 3-5

Urban Landscape Management Option .................................................. 16-17
   Environmental Horticulture 100, 133 ......... 8
   Applied Biological Systems Technology 165, 166 .......................... 2
   Plant Sciences 162 .......................... 3
   Science and Society 18 or Landscape Architecture 150 .......................... 3-4

Total Units for the Major .......... 114-130

Advising Center for the major is located in 1224 Plant and Environmental Sciences 530.752.7738

Environmental Policy Analysis and Planning

(College of Agricultural and Environmental Sciences)

The Major Program. The major in environmental policy analysis and planning develops skills for designing and assessing sustainable policies for environmental quality and natural resource management. Any student in good standing is eligible to transfer to the major; to do so, please see the staff advisor, Melissa Whaley, in 2134 Wickson Hall, or the master advisor, Prof. J. Sanchirico, in 2102 Wickson Hall.

The Program. This major provides students with a strong background in policy analysis, including the evaluation of policy alternatives and the study of factors affecting policy formulation and implementation. Key components of this interdisciplinary training include a general background in the natural sciences relevant to environmental policy, economics, political science, statistics, and research methodology to quantitatively analyze environmental problems and policy options. In addition, students are encouraged to develop substantive knowledge in a specific field of environmental policy, such as urban and regional planning, water policy, transportation and energy, climate policy, or conservation management.

Careers. Environmental policy analysis and planning graduates are prepared for employment in environmental, natural resource, energy, and transportation focused public agencies, consulting firms, non-governmental organizations, and businesses, or as legislative aides for elected representatives. The major is also excellent preparation for students who want to go on to graduate work in law, planning, public policy, political science, economics, or business.

B.S. Major Requirements: 

UNITs English Composition and Public Speaking Requirement .................................................................. 3-8
   University Writing Program 101, 102A-G, 104A-E, or passing the Div I Division II English Composition exam .................. 0-4
   Communication 1 or 3 or Dramatic Art 10 .................. 3-4

Preparatory Subject Matter .............. 46-52
   Biological Sciences 2A, 2B, or 10V, Chemistry 2A or 10, and Physics 1A .................. 11-13
   Biological Sciences 2B or Chemistry 2B or Physics 1B .................. 3-5
   Plant Sciences 21, or Science & Society 18 .................. 3
   Economics 1A, 1B .................. 8
   Animal Science 1, Animal Science 60, Environmental Science & Management 100, Geology 1 or 134, Plant Sciences 12, or Wildlife, Fish, & Conservation Biology 11 .......................... 3-5
Environmental Science and Management

Select one course from: Environmental Science 116, Civil & Environmental Engineering 123, 143, Engineering 160, Environmental Science & Management 131, or Geology 130 .................................................. 4

Environmental Policy & Politics

Select one course from: Political Science 100, 104, 105, 107, or 108 ............................... 4

Select one course from: Political Science 162, 164, 165, or 170 ............................... 4

Select one course from: Civil & Environmental Engineering 155, Environmental Science & Policy 165N, 166N, 167, 169, 170, 171, 172, 173 .................................................. 4

Select one course from: Civil & Agricultural & Resource Economics 176, Civil Environmental Engineering 153, Economics 130, or Environmental Science & Policy 173 ................. 4

Integrative Policy

Students choosing this individualized track must consult with a faculty adviser to identify an area of emphasis within this track and to select four upper division courses with a common theme. Possible areas of emphasis are marine policy, pollutants in the environment, planning in the presence of environmental hazards, sustainable development, or environmental and natural resource economics. If you are considering this track, please contact the major adviser as soon as possible.

Water Management

Select two courses from: Environmental Science & Policy 166N, 169, or Hydrologic Science 150 .................................................. 4

Select two courses from: Environmental Science & Management 100, 121, Environmental Science & Policy 151, 155, Geology 134, Hydrologic Science 141, 143, Soil Science 118, Wildlife, Fish, & Conservation Biology 120, Biological Sciences 124, Environmental Science & Policy 116N, 124, 150C, or 152........ 6-8

Total Units for the Degree ............110-128

Major Adviser. J. Sanchirico (Environmental Science and Policy)

Minor Program Requirements:
The faculty for environmental policy analysis and planning offers the following minor. The Environmental Policy Analysis minor is for natural and social science students desiring basic training in policy analysis theory and methods.

Environmental Policy Analysis ........23-25

Preparation: Economics 1A; basic course in political science.

Environmental Science & Policy 149 .................................................. 3

Environmental Science & Policy 166N, 169, 170, or 172 .................................................. 6-8

Select one course from: Environmental Science & Policy 165N; 169, 170, or 172 ....... 4

Select two courses from: Atmospheric Science 116, Civil & Environmental Engineering 123, 143, Engineering 160, Environmental Science & Management 131, or Geology 130 .................................................. 4

Energy & Transportation Planning

Economics 125, Engineering 104, or Environmental Science & Policy 175 ....... 3-4

Select two courses from: Civil & Environmental Engineering 162, 165, Environmental Science & Policy 163, 167, or 172 .................................................. 7-8

Students who choose this major will study the interaction of physical, biological, and social components of environmental problems. 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.

The Program. Courses in biology, chemistry, physics, economics, geology, and calculus form the lower-division preparatory foundation of the curriculum. These are then tied together with Environmental Science and Policy "An Introduction to Environmental Analysis," which provides an interdisciplinary analysis of several environmental problems. The upper-division core consists of foundation courses in physical, biological, and social sciences, as well as applied courses in environmental monitoring, GIS, impact reporting, and statistical analysis. In their junior year, students must choose a specialized track from the following six options:

(a) Ecology, Biodiversity, and Conservation

(b) Natural Resource Management

(c) Climate Change and Air Quality

(d) Geospatial Information Science

(e) Watershed Science

(f) Soils and Biogeochemistry

A capstone course is required for all seniors and serves to integrate the science, policy, management and biology aspects of the ESM major. All students gain practical experience through field courses and a required internship. Selected students may also pursue an honors thesis in their senior year.

The 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 Wickson Hall or in 1150 Plant and Environmental Sciences Building.
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<tr>
<th>Track</th>
<th>Units</th>
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<tr>
<td><strong>Ecology, Biodiversity and Conservation Track</strong></td>
<td>36-46</td>
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<td>Select one course from:</td>
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<td>Environmental Science 60, 116, 133, Environmental Science and</td>
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<td>Management 121, 131, Environmental Science and Policy 192</td>
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<td>Horse Throat-Environmental Science and Management 194H</td>
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**Total Units for the Major** ........................................... 111-114

**Major Advisers.** Marcel Holyoak (Environmental Science and Policy) and Terrance Nathan (Land, Air and Water Resources)

**Advising centers** for the major, including peer advising, are located in both the Environmental Science and Policy and Land, Air and Water Resources departments.

Students whose last names begin with the letters AL, please see Melissa Whaley in 2134 Wickson Hall. Students whose last names begin with the letters ML, Z, please see Lacie Brooks in 1150 Plant and Environmental Sciences.

**Courses in Environmental Science and Management (ESM)**

**Lower Division**

8. **Water Quality at Risk** (3)

Lecture—2 hours, discussion—1 hour. Natural and human threats to water quality. Balance of science and policy in all aspects of attaining, maintaining, and managing water quality, water contamination. Decoding popular media of water quality and water contamination. (Same course as Science and Society 8.) Not open to students who have successfully completed Environmental and Resource Sciences 8. For former Environmental and Resource Sciences GE credit: SciEng|QL, SE, SL, SS, WE — (W) Hennes

30. **World Ecosystems & Geography (3)**

Lecture—3 hours. 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, agriculture and other human activities interact in different regions of the world. (Same course as Environmental Science and Policy 30.) Not open to students who have successfully completed Environmental and Resource Sciences 30. For former Environmental and Resource Sciences GE credit: SciEng|QL, SE, SS, WE — (W) Jackson

47. **Watershed Processes and Water Quality in the Tahoe Basin (2)**

Lab—2 hours, fieldwork—9 hours; discussion—3 hours; term paper. Prerequisite: basic knowledge of environmental, soil, or hydrologic sciences. Watershed processes, runoff, water-quality management, restoration in Lake Tahoe Basin. Soils, precipitation-runoff, revegetation and adaptive management related to erosion control, effective solutions, development of restoration strategies. Students develop field restoration plan and involves 3 days of instruction in Tahoe City. (Same course as Hydrologic Science 47.) Not open to students who have successfully completed Environmental and Resource Sciences 47. For former Environmental and Resource Sciences GE credit: SciEng|QL, SS, WE — (W) Jackson

92. **Internship** (1-12)

Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off-campus in related position, internship supervised by a member of the faculty. (P/NP grading only.) May be repeated for credit.—F, W, S, F, W, S

98. **Directed Group Study** (1-5)

Prerequisite: consent of instructor. For primarily lower division students. (P/NP grading only.)
141. Role of Fire in Natural Ecosystems (4)
Lecture—3 hours; term paper. Prerequisite: basic biological concepts: Biological Sciences 2A or Plant Sciences 2; former Environmental and Resource Sciences 2B or 2C. Fire regimes and roles in major North American vegetation types, especially in the west. Physics of fire, fire effects on organisms and ecosystem functioning, reconstructing fire histories, fire in resource management, and fire use by indigenous people. Not open to students who have successfully completed Environmental Sciences 141. (Formerly Environmental and Resource Sciences 141.) GE credit: SciEng | SE, SL, W. (W.) Latimer

144. Trees and Forests (4)
Lecture—3 hours; laboratory—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. [Same course as Plant Sciences 144.] Not open for credit to students who have completed Plant Biology 144 or Environmental Horticulture 144 or Environmental Resource Science 144. (Former course Plant Biology/Environmental Horticulture/Environmental Resource Science 144.) GE credit: SciEng | SE, SL, W. (F.) Berry, Dahlgren, Rice

185. Aerial Photo Interpretation and Remote Sensing (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: upper division standing. Basics of remote sensing and photogrammetry, images and grids and point projections, aerial photo interpretation, sensors and platforms for aerial and space photography and non-photographic imaging, microthermography, microwave sensing, and introduction to remote sensing applications. Not open to students who have successfully completed Environmental Resource Science 185. (Formerly Environmental Resource Science 185.)—F (F.) Jin

186. Environmental Remote Sensing (5)
Lecture—3 hours; laboratory—6 hours. Prerequisite: Mathematics 16B and Physics 7C or 2B; upper division standing; Landscape Architecture 150 recommended. Overview of satellite, airborne, and ground-based remote sensing, building on properties of electromagnetic radiation. Applications include hydrological processes, weather and climate, ecology and land use, soils, geology, forestry, and agriculture. Computer based analysis and visualization of images and processing techniques. Not open to students who have successfully completed Hydrologic Sciences 186 or Environmental and Resource Sciences 186. (Formerly Hydrologic Sciences 186 and formerly Environmental and Resource Sciences 186.) GE credit: SciEng | SE, SL, W. [W.] Ustin

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units; consent of instructor. Work experience off and on campus in resource sciences. Internship supervised by a member of the faculty. (P/NP grading only.)—F, W, S. (F, W, S.)
Upper Division

100. General Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisites: Biological Sciences 2A, 2B, 2C, Mathematics 16A and 16B or 17B or 21A and 21B. 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. GE credit: SciEng | SE, SL — F. (F.) Harrison, Sih

Lecture—3 hours. Prerequisite: Anthropology 1 or 2 or course 30 or Evolution and Ecology 100 or Biological Sciences 101 recommended. Interdisciplinary study of diversity and change in human societies, using frameworks from anthropology, evolutionary ecology, history, archaeology, psychology, and other fields. Topics include population dynamics, subsistence transitions, family organization, disease, economics, warfare, politics, and resource conservation. (Same course as Anthropology 101.) Offered irregularly. GE credit: SocSci, Div, Wrt| SS, WC, WE.—Borgerhoff Mulder

105. Evolution of Societies and Cultures (4)
Lecture—3 hours. Prerequisite: Anthropology 1 or 2 or course 30 or Evolution and Ecology 100 or Biological Sciences 101 recommended. Interdisciplinary study of social and cultural evolution in human societies. System of inheritance, psychology of cultural learning, culture as an adaptive system, evolution of maladaptations, evolution of technology and institutions, evolutionary transactions in human history. Application of genetic and cultural variation. Only 2 units of credit to students who have completed course 101 or Anthropology 101 prior to fall 2004. (Same course as Anthropology 105.) Offered irregularly. GE credit: SocSci, Wrt| SS, WC, WE.

(a) Environmental Science

110. Principles of Environmental Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 1A or 7A, Mathematics 168 or 218, and Biological Sciences 1A. Application of physical and chemical principles, ecological concepts, and systems approach to policy analysis of atmospheric environments, freshwater and marine environments, land use, energy supplies and technology, and other resources. GE credit: SciEng | QL, SE or SS, SL.—W. (W.) Morgan

111. Marine Environmental Issues (1)
Lecture—1 hour. Examination of critical environmental issues occurring in coastal waters including the effects of climate change, overfishing, and other human impacts. Through readings and group discussions, students will develop an integrative understanding of the oceanographic and ecological processes. May be repeated twice for credit when topics differ. (Same course as Evolution and Ecology 111.) GE credit: SciEng | SE, SS, SL.—F. (F.) Arnold, Holyoak

(b) Ecological Analysis

116N. Oceanography (3)
Lecture—2 hours; laboratory—3 hours; fieldwork. Prerequisite: Geology 1 or 2 or 16 or 50. Advanced oceanographic topics: Chemical, physical, geological, and biological processes; research methods and data analysis; ocean circulation; biogeochemical cycles; and climate change; integrated earth/ocean/atmosphere systems; weekly lab and one weekend field trip. Offered in alternate years. (Same course as Geology 116N.) GE credit: SciEng | SS, SL.—W. (W.) McClain

116N. Oceanography (3)
Lecture—2 hours; laboratory—3 hours; fieldwork. Prerequisite: Geology 1 or 2 or 16 or 50. Advanced oceanographic topics: Chemical, physical, geological, and biological processes; research methods and data analysis; ocean circulation; biogeochemical cycles; and climate change; integrated earth/ocean/atmosphere systems; weekly lab and one weekend field trip. Offered in alternate years. (Same course as Geology 116N.) GE credit: SciEng | SS, SL.—W. (W.) Hill

121. Population Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A, 2B, 2C, Mathematics 16B or 17B or 21B. 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. GE credit: SciEng | Wrt1 | QL, SE, SL.—W. (W.) Basket, Hastings

123. Introduction to Field and Laboratory Methods in Ecology (4)
Lecture—2 hours; laboratory—2 hours; fieldwork—4 hours. Prerequisite: course 100 or Evolution and Ecology 101 or the equivalent. Statistics 100 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. Offered in alternate years. GE credit: SciEng | SE, SL.—J. (J.) Grusholz

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. Interdisciplinary study of biology (Ecology 100) recommended; residence at or near Bodega Marine Lab required. Enrollment restricted to students with prerequisites. Offered irregularly. GE credit: SciEng | SE, SL.

127. Plant Conservation Biology (4)
Lecture/discussion—3 hours; discussion—1 hour; term paper. Prerequisite: course 100 or Evolution and Ecology 101 or equivalent upper division general education biology course. Topics governing the conservation of plant species and plant communities, including the roles of fire, exotic species, grazing, pollination, soils, and population genetics; analytical and practical techniques for plant conservation; and introduction to relevant legal, ethical, and policy issues. Offered irregularly. GE credit: SciEng | SE, SL.

(d) Aquatic Ecosystems Analysis

150A. Physical and Chemical Oceanography (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Environmental Science and Policy 116N or Geology 116N; Physics 9B, Mathematics 21D, Chemistry 21D. Consent of instructor. Physical and chemical properties of seawater, fluid dynamics, air-sea interaction, currents, waves, tides, mixing, major oceanic-chemical cycles. (Same course as Geology 150A.) GE credit: SciEng | Wrt| QL, SE—F. (F.) McClain, Spero

150B. Geological Oceanography (3)
Lecture—3 hours. Prerequisite: Geology 50 or 116N or Geology 116N. Introduction to the origin and geological evolution of ocean basins. Composition and structure of oceanic crust; marine volcanism; and deposition of marine sediments. Interpretation of geological history of the ocean floor in terms of sea-floor spreading theory. (Same course as Geology 150B.) GE credit: SciEng | SE, SS—W. (W.) McClain

150C. Biological Oceanography (4)
Lecture—2 hours; discussion—1 hour; fieldwork. Prerequisite: Biological Sciences 1A and 116N or Geology 116N. Introduction to the origin and geological evolution of ocean basins. Composition and structure of oceanic crust; marine volcanism; and deposition of marine sediments. Interpretation of geological history of the ocean floor in terms of sea-floor spreading theory. (Same course as Geology 150C.) GE credit: SciEng | SE, SL.—F. (F.) Hill

151. Limnology (4)
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. GE credit: SciEng | SE.
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. GE credit: SciEng | SE.

152. Coastal Oceanography (3) Lecture—1 hour; laboratory—3 hours; fieldwork—3 hours. Prerequisite: upper division standing or consent of instructor; physics (Physics 9B), calculus (Mathematics 21B) and exposure to physical and chemical oceanography (Geology/Environmental Policy 150A) recommended; residence at or near Bodega Marine Laboratory required. Enrollment restricted to application at www.bml.ucdavis.edu. Oceanography of coastal waters, including bay, river plumes, nearshore and estuaries; focus on transport patterns, how they are forced and implicated for ecological and environmental problems. Pertinent for students in oceanography, ecology, environmental engineering, geology and hydrology. GE credit: SciEng | SE, SL—Su. (Su.) Larger.

155. Wetland Ecology (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A or equivalent; course 100 or Evolution and Ecology 101 recommended. Introduction to wetland ecology. The structure and function of major wetland types and principles that are common to wetlands and that distinguish them from terrestrial and aquatic ecosystems. GE credit: SciEng | SE—F. (F.) Rejmanekova

155L. Wetland Ecology Laboratory (3) Lecture—1 hour; laboratory—6 hours; fieldwork—2-1 day weekend field trips. Prerequisite: course 155 required (may be taken concurrently). Modern and classic techniques in wetland field ecology. Emphasis on sampling procedures, vegetation analysis, laboratory analyses and procedures, and examples of successful wetland restoration techniques. GE credit: SciEng | SE, SL—Su. (Su.) Rejmanekova

(e) Environmental Policy Analysis

160. The Policy Process (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Political Science 1; Economics 1A and 1B or Statistics 1B recommended. Alternative models of public policy-making and application to case studies in the U.S. and California. GE credit: SocSci | SS—S. (S.) Arnold

161. Environmental Law (4) Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing and one course in environmental science or political science recommended. Introduction to fact-based problem solving for high 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, Wrt | SS—S. (S.) Springborn

162. Environmental Policy (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A. Compares economic with socio-cultural 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. GE credit: SocSci, Wrt | SS—S. (S.) Rejmanekova

163. Energy and Environmental Aspects of Transportation (4) Lecture—3 hours; extensive writing. Prerequisite: Economics 1A or Engineering 106. Engineering, economic, and policy planning concepts; analysis and evaluation of energy, air quality and selected environmental attributes of transportation technologies. Strategies for reducing pollution and petroleum consumption through national and political constraints. Evaluation of vehicle emission models. (Same course as Civil and Environmental Engineering 163.) Offered in alternate years. GE credit: SciEng or SocSci, Wrt | SE or SS, SL, WE—F. Sperring

164. Ethical Issues 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. Offered irregularly. GE credit: SocSci | SS.

165N. Climate Policy (3) Lecture/discussion—3 hours. Prerequisite: course 1 or Economics 1A or consent of instructor. Models, data and assumptions behind competing arguments regarding societal response to the prospect of climate change at the state, national and international level from economic, ethical and policy science perspectives. (S.) Spargario

166N. Ocean and Coastal Policy (3) Lecture—3 hours. Prerequisite: course 1 or consent of instructor. Limited enrollment. Overview of U.S. and International ocean and coastal policy, including energy, coastal land-use and water quality, protected areas, and coastal state and federal law. GE credit: SocSci | SS—W. (W.) Sanchirico

167. Energy Policy (4) Lecture—4 hours; term paper. Prerequisite: Economics 1A and Mathematics 168 or 178 or 21B, or consent of instructor. Study of public energy resources (fossil, renewable, nuclear), energy conversion methods, future energy demand scenarios, and environmental impacts of energy. Overview of energy policy in its historical context and how alternative strategies for addressing environmental-related energy and national security issues. Offered in alternate years. GE credit: SocSci | SS—S. (S.) Ogden

168A. Methods of Environmental Policy Evaluation (5) Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: Statistics 13; Economics 100 or Agricultural and Resource Economics 100A; Mathematics 168 or 178 or 21B; course 1; upper division standing. Evaluation of alternatives for solution of complex environmental problems; impact analysis, benefit-cost analysis, distributional analysis, decision making under uncertainty, and multi-objective evaluation. GE credit: SocSci | SS—F. (F.) Ogden

168B. Methods of Environmental Policy Analysis (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 168A. Continuation of course 168A, with emphasis on examination of the literature for applications of research and evaluation techniques to problems of transportation, air and water pollution, land use, and resource management. GE credit: SocSci | SS—S. (S.) Sanchirico

169. Water Policy and Politics (3) Lecture—3 hours. Prerequisite: Economics 1A or Political Science 1 recommended. The governance of water, including issues of water pollution/quality and water supply. The politics of water decision-making and effectiveness of water policy. Broad focus on federal water policies and globally significant U.S. and internationally significant U.S. watersheds. Offered in alternate years. GE credit: SocSci | SS—S. (S.) Lubell

(f) Environmental Planning

170. Conservation Policy (4) Lecture—3 hours; discussion—1 hour. Prerequisite: one course in environmental science (e.g., course 1), conservation (e.g., Wildlife, Fish, and Conservation Biology 11 or 154), or government (e.g., Political Science 1) recommended. Analysis of policies designed to conserve species and their habitats. Emphasis on how individual incentives affect the success of conservation policies. Valuation of endangered species is considered for deciding conservation priorities. Offered in alternate years. GE credit: SciEng or SocSci | SE or SS—S. (S.) Schwartz

171. Urban and Regional Planning (4) Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: course 1 recommended. How cities plan and grow in ways that minimize environmental harm. Standard city planning tools (general plan, zoning ordinance) and innovative new approaches. Focus on planning required for cities in California. Relationships between local, regional, state, and federal policy. GE credit: SocSci | SS, WE—S. (S.) Handy

172. Public Lands Management (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A recommended. Investigation of alternative approaches to public lands management by Federal and state agencies. The role each agency’s legislation plays in determining the range of resource allocations. GE credit: SocSci | AGCH, SS—F. (F.) Lubell

173. Land Use and Growth Controls (4) Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing; one course in environmental science, political, and legal factors affecting land use and growth controls, and helps students critically evaluate written materials in terms of their arguments and supporting data. GE credit: SocSci | SS—S. (S.) Lubell

175. Natural Resource Economics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural and Resource Economics 100B or Economics 100 or the equivalent. Economic concepts and policy issues associated with natural resources, renewable resources (ground water, forests, fisheries, and wildlife populations) and non-renewable resources (minerals and energy resources, soil). (Alternative course as Agricultural and Resource Economics 175.) GE credit: SocSci | SS—S. (S.) Lin

178. Applied Research Methods (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural & Resource Economics 106 or Sociology 106 or Statistics 100 or 103 or 108 or the equivalent. Research methods for analysis of urban and regional land use, transportation, and environmental problems. Survey research and other data collection techniques; demographic analysis; basic forecasting, air quality, and transportation models. Collection, interpretation, and critical evaluation of data. GE credit: SocSci | SS.

179. Environmental Impact Assessment (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or the equivalent. Introduction to the information resources and methods typically used in environmental impact analysis. Emphasis on how environmental information is applied to planning, environmental regulation, and public policymaking, with case studies from California land use and natural resource policy. GE credit: SocSci | SS—W. (W.)

180. Environmental Impact Reporting Using Geographic Information (2) Laboratory/discussion—2 hours; laboratory—4 hours. Prerequisite: course 179 concurrently. Introduction 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, 1 or Agricultural Systems and Environment 122. GE credit: SciEng | SE.

(g) Other Courses

190. Workshops on Environmental Problems (1-8) Laboratory—2-16 hours. Prerequisite: consent of instructor. Workshops featuring empirical analyses of contemporary environmental problems by multidisciplinary student teams. Guided by faculty and lay professionals, the teams seek to develop an integrative view of a problem and outline a series of alternative solutions. Open to graduate and senior students on application. (P/NP grading only.) GE credit: SE—F. W. S. (F. W. S.)
Environmental Sciences

Environmental Toxicology

(College of Agricultural and Environmental Sciences)

Robert H. Rice, Ph.D., Chairperson of the Department

Department Office. 4138 Meyer Hall 530-725-1142; http://elex.ucdavis.edu

Faculty

Gary N. Cherr, Ph.D., Professor
(Environmental Toxicology, Nutrition)

Michael S. Denison, Ph.D., Professor

Nilesh Gaikwad, Ph.D., Associate Professor

Michelle La Merrill, Ph.D., M.P.H., Assistant Professor

Tran B. Nguyen, Assistant Professor

Patricia Oteiza, Ph.D., Professor
(Environmental Toxicology, Nutrition)

Raymond P. Deisher, Ph.D., Professor

Tayukii Shibamoto, Ph.D., Distinguished Professor

Ronald S. Tjedrenko, Ph.D., Professor

Andrew Whitehead, Ph.D., Associate Professor

Matthew J. Wood, Ph.D., Associate Professor

Qi Zhang, Ph.D., Professor

Emeriti Faculty

Arthur Craigmill, Ph.D., Specialist in Cooperative Extension, Emeritus

Donald G. Crasby, Ph.D., Professor Emeritus

Dennis P. H. Hsieh, Sc.D., Professor Emeritus

James N. Seiber, Ph.D., Emeritus

Michael W. Stimmann, Ph.D., Specialist in Cooperative Extension, Emeritus

Dorothy E. Woolley, Ph.D., Professor Emeritus

Affiliated Faculty

Beck, John, Ph.D., Associate Adjunct Professor

Deborah Bennett, Ph.D., Associate Professor

(Public Health Sciences, School of Medicine)

Cassandra Calloway, Ph.D., Assistant Adjunct Professor

Matt Hengel, Ph.D., Associate Adjunct Professor

Dirk Halsege, Ph.D., Associate Adjunct Professor

Norman Kado, Ph.D., Adjunct Professor

John Knezovich, Ph.D., Adjunct Professor

Charlie L. Ph.D., Assistant Adjunct Professor

Melanie Marty, Ph.D., Associate Adjunct Professor

Alyson E. Mitchell, Ph.D., Professor

(Toxicology and Environmental Sciences)

Karen Rieves, Ph.D., MPH, Assistant Adjunct Professor

Jeff Rodzen, Ph.D., Lecturer

(UC Davis Extension Forensic Science Program)

Cecilia Van Beraldening, Ph.D., Lecturer

(UC Davis Extension Forensic Science Program and Department of Justice)

Zachary A. Wong, Ph.D., Adjunct Professor

The Major Program

Toxic agents in the environment include pesticides, food additives, industrial waste, and metals as well as chemicals produced by animals, plants, fungi and bacteria. Students in the Environmental Toxicology major learn how toxicants produce adverse effects by understanding their environmental fates and biological activities. They learn about monitoring concentrations and the distribution and persistence of adverse agents found in water, soil, air and foods. Toxicity testing procedures and exposure assessments are used to help evaluate potential for harm to humans and other species. By understanding the cellular target 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 exposure.

The Program

Preparatory courses in biology, chemistry, mathematics, and physics are required to provide fundamental principles that underlie toxicology. Students in the major are expected to understand the environmental fates and biological activities of different classes of toxic substances, and subject to consent of instructor. An overview of present status of knowledge on structure and processes of major tropospheric ozone precursors and similarities among tropical and temperate systems stressed. Offered in alternate years. —(S) Rejman- kova

228. Advanced Simulation Modeling (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: courses 128-128L, 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. Later half of course will introduce model evaluation in ecological and social system models.

252. Sustainable Transportation Technology and Policy (3)
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. Strategies for technology options, including alternative fuels, electric propulsion, and IVHS. Analysis of market demand and travel behavior, environmental impacts, economics and politics. (Same course as Civil and Environmental Engineering 252.) —S. Sperling

275. Economic Analysis of Resource and Environmental Policies (4)
Lecture/discussion—4 hours. Prerequisite: Agricultural and Resource Economics 204/Economics 204. Development of externality theory, market failure concepts, welfare economics, theory of renewable and non-renewable resource use, and political economic models. Applications to policy issues regarding the agricultural/environment interface and managing resources in the public domain. (Same course as Agricultural and Resource Economics 275.) —S. Sperling

278. Research Methods in Environmental Policy (3)
Lecture/discussion—3 hours. Prerequisite: Agricultural 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 intersubjectively reliable fashion with explicit recognition of its uncertainties.

298. Directed Group Study (1-5)
Lecture/discussion—3 hours. Prerequisite: Agricul-
ture Economics 106 or the equivalent; Agriculture and Resource Economics 204/Economics 204. Advanced techniques in simulation modeling; optimization and simulation, dynamic parameter estimation, linear models, error propagation, and sensitivity testing. Later half of course will introduce model evaluation in ecological and social system models.

Environmental Sciences

See Atmospheric Science, on page 185; Environmental and Resource Sciences, on page 331; Environmental Horticulture and Urban Forestry, on page 325; Environmental Policy Analysis and Planning, on page 325; Environmental Toxicology, on page 331; Hydrology, on page 378; Landscape Architecture, on page 394; and Wildlife, Fish, and Conservation Biology, on page 588.
Environmental Toxicology

Minor Program Requirements:

<table>
<thead>
<tr>
<th>Units</th>
<th>Environmental Toxicology 101, 102A, 103A</th>
<th>12</th>
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|       | Completion of laboratory course in ENH 101 and 102A should be completed satisfactorily before major elective courses.
|       | Environmental Toxicology elective courses six units minimum, selected from the following list: Environmental Toxicology 104, 120, 127, 128, 136, 137, 138, and 146. | 6-14 |

Minor Adviser: Qi Zhang

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, Molecular, Cellular, and Developmental Biology, and Agricultural and Environmental Chemistry; and the Forensic Science Master's Degree Program. For information on graduate study, contact the Advising Office or the appropriate graduate adviser.

Courses in Environmental Toxicology (ETX)

Lower Division

10. Introduction to Environmental Toxicology (3)

Lecture—3 hours. Basic principles of forensic science, types of information on which investigations focus, how information is obtained and used in criminal investigations, types of scientific skills required to practice forensic science, guidance on training. Real cases discussed; demonstrations of methods provided. GE credit: SciEng | Wr| SE, SL, VL—W. (W.) Wood

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, and herbal remedies, environmental contaminants, and recreational drugs) on humans and other living systems. GE credit: SciEng | SE—S. (S.) Wood

92. Internship (1-12)

Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience offered 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.] GE credit: SE.

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor. [P/NP grading only.] GE credit: SE.

Upper Division

101. Principles of Environmental Toxicology (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 88, 118B, or 122B 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. GE credit. SciEng | SE, SL—F. (F.) Tijerdeda

102A. Environmental Fate of Toxicants (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 88, 118B, or 122B or consent of instructor. Properties of toxic chemicals influencing their distribution and transformations, action of environmental forces affecting the environment, air pollutants, water, and soil; and accumulation; sources and occurrence of major classes of environmental toxicants. Not open for credit to students who have completed course 112A. GE credit: SciEng | QL, SE, SL, VL, WE.—W. (W.) Tijerdeda

102B. Quantitative Analysis of Environmental Toxicants (5)

Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 102A. Sample preparation methods for total analysis of toxicants. Concept and techniques of advanced analytical instrumentation. Interpretation and use of analytical data. Not open for credit to students who have completed course 114B. GE credit: SciEng | SE, VL—S. (S.) Hengel, Shimabata

103A. Biological Effects of Toxicants (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 102; course 101 and Neurobiology, Physiology, and Behavior. Importance of biological 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 completed course 114B. GE credit: SciEng | SE, VL, WE—W. (W.) LaMerrill, Tijerdeda

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 completed course 114B. GE credit: SciEng | SE, VL, WE—S. (S.) Wood

104. Environmental and Nutritional Factors in Cellular Regulation and Nutritional Toxicology (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 10 or the equivalent or consent of instructor; Chemistry 119B recommended. Examination of toxic tragedies, their origins, consequences, and effects on toxic regulation. GE credit: SciEng | Wr| SL, VL, WE—W. (W.) Rice

111. Introduction to Mass Spectrometry (3)

Lecture—3 hours. Prerequisite: Chemistry 118C. Introduction to mass spectrometry, including ionization techniques, mass analyzers, interpretation of mass spectra, and applications of mass spectrometry. GE credit: SciEng | WE—S. (S.) Cherr, Wood

120. Perspectives in Aquatic Toxicology (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 88, 118B or 128B, Biological Sciences 1A, or consent of instructor. Toxic substances, their fate in marine and freshwater systems, and their effects on aquatic organisms and ecosystems. Emphasis on substances and issues of current concern. Offered in alternate years. GE credit: SciEng | QL, SE, SL, VL, WE.—W. Cherr, Tijerdeda, Wood

127. Environmental Stress and Development in Marine Organisms (10)

Lecture—4 hours; laboratory—12 hours; discussion—2 hours. Prerequisite: course 101 or Biological Sciences 102 or 104. GE credit: SciEng | QL, SE, SL, VL, WE.—W. Cherr, Tijerdeda, Wood

Fall 2011 and on Revised General Education (GE): AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; ACCH—American Cultures; DD—Diversity; OL—Oral Skills; QL—Quantitative; SL—Social Sciences; VL—Visual; WC—World Cultures; WE—Writing Experience

Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Diversity; Wr—Writing Experience

Quarter Offered: F—Fall, W—Winter, S—Spring, Su—Summer; 2017/2018 offering in parentheses
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: SciEng | OL, SE, SI, VL, W. (F, S.) Gaikwad, Mitchell

130. The Role and Applications of Toxicology in Modern Industry (3)  

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 air, indoor, and occupational environments. Health effects, sources, environmental fate, pulmonary responses, sampling and analyses, and air-quality criteria and ambient standards. GE credit: SciEng | SE, VL, F, F. (F.) Kado

135. Health Risk Assessment of Toxics (3)  
Lecture—3 hours. Prerequisite: course 101; course 114A recommended. Current practices of health risk assessment of chemical toxins using toxicological principles and their application to regulatory control of these chemicals. GE credit: SciEng | QL, SE, SI, VL, W. (F.) Rives

140. Genes and the Environment (3)  
Lecture/discussion—3 hours. Prerequisite: Biological Science 101 required or permission of instructor; coursework in genetics and molecular biology and/or environmental biology recommended. Evaluation of evidence that human health and disease susceptibility result from complex interactions between genes and the environment. Emphasis on cancer, metabolic, cardiovascular, and neurological health outcomes assessed by genotoxicity and toxicogenomic methods. Offered in alternate years. —(F.) La Merrill

146. Exposure and Dose Assessment (3)  
Lecture—3 hours. Prerequisite: course 112A; course 135 recommended. The exposure component of risk assessment; specifically, the presence and/or formation of toxic substances in environmental media, their movement within and between contaminated media, and the contacts of human populations with those media. Offered in alternate years. GE credit: SciEng | QL, SE, SI, VL. —(S. S.) Bennett

190C. Environmental Toxicology Seminar (1 hour)  
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. Repeatable for credit with permission concerning oral and written presentations, literature sources, and career opportunities. (P/NP grading only) GE credit: SciEng | SE. —F, W, S. (W.S.)

190C. Research Grant 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) GE credit. SE. —F, W, S. (W.S.)

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.) GE credit: SE. —F. (F.)

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; deferred grading pending completion of sequence.) GE credit: SciEng | SE. —F, W, S. (F, W, S.)

194HA. Honors Research (3)  
Discussion—1 hour; laboratory—6 hours. Prerequisite: senior standing; minimum GPA of 3.250; consent of instructor. Specific research project 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 sequence.) GE credit: SciEng | SE. —F, W, S. (F, W, S.)

194HB. Honors Research (3)  
Discussion—1 hour; laboratory—6 hours. Prerequisite: senior standing; minimum GPA of 3.250; consent of instructor. Specific research project 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 sequence.) GE credit: SE. —F, W, S. (F, W, S.)

194HC. Honors Research (3)  
Lecture—1.5 hours; lecture/discussion—1.5 hours. Prerequisite: senior standing; minimum GPA of 3.250; consent of instructor. Continuation of course 194HA-194HB. (P/NP grading only.) GE credit: SE.

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.) GE credit: SE.

199. Directed Group Study (1-5)  
Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE.

199. Special Study for Advanced Undergraduates (1-5)  
(P/NP grading only.) GE credit: SE.

Graduate  
203. Environmental Toxicants (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 128C (or the equivalent), or Chemistry 88 and consent of instructor. Toxic chemicals: selected topics illustrating their occurrence, structure, and the reactions underlying detection, toxicity, fate, and ecological importance. Offered in alternate years. —S. Beck, Seiber

214. Mechanisms of Toxic Action (3)  
Lecture—3 hours. Prerequisite: Biological Sciences 102, 103, and/or Chemical, bio-chemical, 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. —S. Denison, Hammock

220. Analysis of Toxicants (3)  
Lecture—3 hours. Prerequisite: coursework in organic chemistry: Principles of microanalysis of toxicants. Theoretical and computational separation, detection and quantitative determination of toxicants using chemical and instrumental techniques. (Same course as Forensic Science 220.) —F. (F.) Zhang

220L. Analysis of Toxicants Laboratory (2)  
Lecture—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. —F. (F.) Tang

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 investigating mass spectral fragmentations and their application to the structural elucidation. Practical application of GC/MS in current research. Experience given to environmental toxicology graduate students. Offered in alternate years. —(W.) Holstge

234. Current Topics in Neurotoxicology (3)  
Lecture—3 hours. Prerequisite: core courses in one of the following graduate programs: Pharmacology and Toxicology, Agricultural and Environmental Chemistry, Biochemistry and Molecular Biology, Cell and Developmental Biology, Immunology, Molecular Cellular and Integrative Physiology or Neuroscience. Restricted to upper level graduate students must obtain permission from the course coordinator. General principles of neurotoxicology, the cell and molecular mechanisms of the effects of the impacts of specific neurotoxants and the contribution of neurotoxic compounds to complex neurodegenerative disorders. (Same course as Molecular Biosciences 234 and Molecular, Cellular, and Integrative Physiology 234.) —S. (S.) Lein

240. Ecotoxicology (3)  
Lecture—3 hours. Prerequisite: elementary course in toxicology and ecology or 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 toxic effects, modeling, and field research. Selected case histories are analyzed and presented in class. —S. (S.) Whitehead

250. Reproductive Toxicology (3)  
Lecture—1.5 hours; discussion—1 hour; laboratory—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 as development of mechanistic approaches to understanding how chemical exposure can adversely affect reproduction. Offered in alternate years.

260. Immunotoxicology (3)  
Lecture—2 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 to interpret and evaluate research on the impact of environmental toxicants on immunological function in human and wildlife populations. Offered in alternate years.

270. Toxicology of Pesticides (3)  
Lecture—3 hours. Prerequisite: one course each in (a) Organic Chemistry, (b) Biochemistry, (c) Toxicology or the equivalent), or consent of instructor; graduate standing. Classification and chemical properties of pesticides, metabolism and disposition, pesticide resistance, effects on human health and ecological health and methods of risk benefit analyses. Offered in alternate years.

278. Molecular Toxicology (3)  
Lecture—2 hours. Prerequisite: graduate standing or consent of instructor. Recombinant DNA technology and its applications. (Same course as Forensic Science 278.) Offered in alternate years. —(F.) Denison, Rice

280. Forensic DNA Analysis (3)  
Lecture—3 hours. Prerequisite: coursework in genetics and molecular biology. Graduate standing; consent of instructor required for all students not enrolled in related graduate programs. GE credit: SciEng | VL, VLS, SS, WS, W. (F, W, S.)
281. Principles and Practice of Forensic Serology and DNA Analysis (3)
Lecture—2 hours; lecture/discussion—3 hours. Prerequisite: Forensics/course 278 or Forensics/course 280, or equivalent; consent of instructor. Restricted to students enrolled in the M.S. in Forensic Science Program or by consent of Forensic Science Program Director. Comprehensive overview of forensic serology and DNA typing techniques and technologies. Strong emphasis on real-world applications, including preservation and tracking of biological evidence, detection and identification of bodily fluids, and methods to extract, quantify, and type human DNA. (Same course as Forensic Science 281.)—S. / F. / W. / S. Rodzen

284. Non-Human Forensic DNA—Theory and Casework Application (2)
Lecture—2 hours. Prerequisite: consent of instructor required for all students not enrolled in the MS in Forensic Science program; upper division Molecular Biology and Genetics for its elective. Restricted to graduate standing. Provides a comprehensive understanding of plant and animal forensic biology in terms of sample collection, preservation, analytical methods, and of the invaluable lines of inquiry these forensic evidence may permit. (Same course as Forensic Science 284.) Offered in alternate years.

290. Seminar (1)
Seminar—1 hour. Current topics in environmental toxicology. (S/U grading only)—F. W. S. (F. W. S.)

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)—F. W. S. (F. W. S.)

297T. Tutoring in Environmental Toxicology (1-5)
Hours and duties will vary depending upon course being tutored. Prerequisite: graduate 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. (S/U grading only.)

298. Group Study (1-5)
(S/U grading only)

Professional

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—F. W. S. (F. W. S.)

Epidemiology

See Medicine and Epidemiology (VME), on page 383.
Prerequisite: course 204A; Statistics 108 recommended.
Lecture—3 hours; laboratory/discussion—1 hour.

204B. Statistical Models, Methods, and Data Analysis
Involves topics in mathematical statistics foundation for statistical models, methods, and data analysis.

204A. Foundation of Statistical Models, Methods, and Data Analysis for Scientists
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: course 203, or Statistics 130A, or Statistics 131A, or 131A, or 133; basic course in Epidemiology (205 or equivalent); consent of instructor. Builds on concepts presented in Preventive Veterinary Medicine 205A or Preventive Veterinary Medicine 405 and 406 or the equivalent. Emphasis on practical applications and research methods data collection and management. Emphasis on the assessment of risk. —S. (S.) Hertz-Picciotto

Prerequisite: Preventive Veterinary Medicine 405 or Preventive Veterinary Medicine 205 Geographic Information Systems (GIS) and spatial statistics. Students are expected to complete a term project based on their graduate research. Offered in alternate years. —W.

224. Health and Ecological Risk Analysis (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Preventive Veterinary Medicine 406 or consent of instructor. Background in statistics, 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 analysis, perception, communication, assessment and management. Emphasis on the assessment of risk. —S. (S.) Hertz-Picciotto

226. Methods for Longitudinal and Repeated Measurement Data (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 204 or consent of instructor. Mixed models for longitudinal data (LD)/repeated measurements. Mean and covariance models; General linear LD models; Random coefficients models; Linear mixed effects models for continuous outcome; Generalized linear mixed effects model for discrete outcome including binary, ordinal and count data. —F. (F.) Nguyen

229. Geospatial Information Systems for Health Professionals (4)
Lecture—2 hours; laboratory—6 hours. Emphasis on basic geographic and data management principles. Focus on software proficiency in application to analyzing/solving health problems. For graduate and professional students in epidemiology, public health, preventive veterinary medicine, health informatics with interest in spatial techniques in research. —S. (S.)/*----------------------------------------------------------------------------*/

230. Introduction to Molecular Epidemiology (3)
Lecture/discussion—3 hours. Prerequisite: course 205. Overview of the modern field of molecular epidemiology. Integrates molecular biology and traditional epidemiological research by identifying pathways, molecules and genes that influence the risk of developing disease. —S. Schmidt

231. Infectious Disease Epidemiology (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: introductory epidemiology course (e.g., course 205). Infectious disease epidemiology and prevention, with emphasis on human and veterinary diseases of global health importance. Major global health epidemics and challenges of infectious diseases, by mode of transmission. (Same course as Public Health Sciences 211.) —W. (W.) DeKierem

240. Principles of Injury Epidemiology (3)
Lecture/discussion—3 hours. Prerequisite: Review of epidemiology of human injury, including general principles, surveillance methods, behavioral factors, and prevention. Methods of evaluating research proposals, mechanisms of funding, specifying human subject considerations. —S.
251. Environmental Epidemiology (3)
Lecture—3 hours. Prerequisite: Preventive Veterinary Medicine 205; Statistics 102 or Preventive Veterinary Medicine 202. 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. -- F. Schenker

252. Social Epidemiology (2)
Lecture/discussion—2 hours. Prerequisite: course 250A. Consent of instructor. Social determinants of health; psychosocial and physiological pathways; health and social inequality; gender and racial/ethnic disparities in health; social support; social cohesion and health; social perpetuation of the problem; social factors; social ecological approaches to health intervention; interventions addressing social determinants. [Same course as Public Health Sciences 292.] — S. F. Ramo

260. Epidemiology of Chronic Diseases and Aging (3)
Lecture/discussion—3 hours. Overview of the epidemiology of chronic disease in old age. Topics include biological and social aspects of cardiovascular disease, neoplasms, osteoporosis and fractures, psychosocial factors and health in old age, dementia, functional status and prevention of disease. — W. (W)

270. Research Methods in Occupational Epidemiology (3)
Laboratory/discussion—3 hours. Prerequisite: course 250A or Preventive Veterinary Medicine 205; Statistics 102 or Preventive Veterinary Medicine 202. 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. -- S. (S) Beaumont

272. Cancer Epidemiology (2)
Recitation—1 hour; discussion—1 hour. Prerequisite: must have basic understanding of epidemiologic and statistical concepts that are covered in courses 205A, 205B, 206 (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 and control, and an introduction to the carcinogenesis and progression multi-stage model. — W. (W) Cress

290. Seminars in Epidemiology (0.5)
Seminar—0.5 hours. Faculty and students will present and lead discussions on ongoing or published epidemiologic research. [S/U grading only.]—F. W. S. [F, W, S.]

291. Seminars in Human Health Sciences Research and Clinical Epidemiology (1)
Seminar—1 hour. Critical review, evaluation, and discussion of research in health services and clinical epidemiology. Presentation of statistical, epidemiologic, and econometric methods. Students present their own research and critique the work of others. May be repeated for credit. [Same course as General Medicine 291.] [S/U grading only.]—F. W. S. [F, W, S.]

298. Group Study (1-5)
Seminar—1-5 hours. Group study in selected areas of epidemiology.

299. Research (1-12)
Research in selected areas of epidemiology. [S/U grading only.]

Evolution and Ecology

[College of Biological Sciences]
Sharon Strauss, Ph.D., Chairperson of the Department
Department Office, 2320 Storer Hall 530-752-1272; http://www.eve.ucdavis.edu

Faculty
David J. Begun, Ph.D., Professor
Graham Coop, Ph.D., Associate Professor
Jonathan A. Eisen, Ph.D., Professor (Medical Microbiology and Immunology)
Mike Foote, Ph.D., Associate Professor
Jennifer R. Gremer, Ph.D., Assistant Professor
Richard K. Grosberg, Ph.D., Professor
Academic Senate Distinguished Teaching Award

Sue L. Keen, Ph.D., Senior Lecturer, SOE
Academic Federation Excellence in Teaching Award
Artym V. Kopp, Ph.D., Professor
Charles H. Longley, Ph.D., Professor
Harris A. Lewin, Ph.D., Professor
(Nel Med: Population Health and Reproduction) Susan E. Lott, Ph.D., Assistant Professor
Brian R. Moore, Ph.D., Assistant Professor
Gail L. Patrikioli, Ph.D., Professor
Santigo Ramirez, Ph.D., Assistant Professor
Bruce H. Rannala, Ph.D., Professor
Marcel Rejmanek, Ph.D., Professor
Eric D. Sandiford, Ph.D., Professor
Johanna M. Schrader, Ph.D., Assistant Professor
Thomas W. Schoener, Ph.D., Professor
Sebastian Schreiber, Ph.D., Professor
Arthur M. Shapiro, Ph.D., Professor
Academic Senate Distinguished Teaching Award John J. Stachowicz, Ph.D., Professor
Academic Senate Distinguished Teaching Award Maureen L. Stanton, Ph.D., Professor
UC Davis Prize for Teaching and Scholarly Achievement
Sharon Y. Strauss, Ph.D., Professor
Academic Senate Distinguished Teaching Award Donald R. Strong, Ph.D., Professor
Michael Turelli, Ph.D., Professor
Peter C. Wainwright, Ph.D., Professor
Academic Senate Distinguished Teaching Award Susan Williams, Ph.D., Professor
Emeriti Faculty
James A. Doyle, Ph.D., Professor Emeritus
John H. Gillespie, Ph.D., Professor Emeritus
Milton Hildebrand, Ph.D., Professor Emeritus
Academic Senate Distinguished Teaching Award Robert W. Peac, Ph.D., Professor Emeritus
Judy A. Stamps, Ph.D., Professor Emeritus
Kenneth E. F. Watt, Ph.D., I.D., Professor Emeritus
Affiliated Faculty
Carole Ham, Ph.D., Academic Coordinator
Rat P. Randolph, Ph.D., Academic Coordinator/Lecturer
David Spiller, Ph.D., Project Scientist Emeritus

The Evolution, Ecology and Biodiversity Major Program

The major in Evolution, Ecology and Biodiversity offers courses in general biodiversity. 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. Evolution, 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 biotechnology, whereas those for the A.B. degree program allow room for more electives within the humanities and social sciences. The A.B. degree is especially appropriate for those students who wish to combine arts and sciences with a major in 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, professional careers, 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:

Preparatory Subject Matter..............41-45
Biological Sciences 2A-2B-2C........... 15
Chemistry 2A-2B........................... 10
Chemistry 8A-8B........................... 6
Mathematics 17A-17B (17C recommended) or 21A-21B (21C recommended) or Statistics 100 or 102.................. 4-8

Depth Subject Matter.......................36
Biological Sciences 101..................... 4
One course from: Evolution and Ecology 100; Geology 107; Anthropology 151 .... 3-4
One course from: Evolution and Ecology 101; Environmental Science and Policy 100; Wildlife, Fish, and Conservation Biology 151 .... 4
Additional upper division coursework in biological science to achieve a total of 36 or more units .................. 24-25
Include at least one course from each of the areas of study below.

Areas of Study:
(1) Biodiversity: Entomology 103; Evolution and Ecology 105, 108, 112, 140; Microbiology 105, Nematology 110; Plant Biology 116, 148, Plant Sciences 147, Wildlife, Fish, and Conservation Biology 110, 111, 120, 130, 134.
Note: A maximum of four units of variable-unit courses (numbered 192, 198, 199) may be applied to the upper division elective unit requirements. Courses numbered 197T are not applicable to the upper division elective unit requirements.

Total Units for the Major.................77-81

B.S. Major Requirements:

Preparatory Subject Matter..............56-66
Biological Sciences 2A-2B-2C........... 15
Chemistry 2A-2B-2C...................... 15
Chemistry 8A-8B or 118A-118B-118C ...... 6-12
Mathematics 17A-17B-17C or 21A-21B (21C recommended) .................. 8-12
Physics 7A-7B-7C ....................... 12

Depth Subject Matter.......................49
Biological Sciences 101, 105 (or 102+103), 104 .................. 10-12
Evolution and Ecology 100, 101, 102, 106, 108, 130A-130B .................. 4-8
Additional upper division coursework in biological science to achieve a total of 49 or more units, including at least a total of two...
Evolution and Ecology

**Minor Program Requirements:**

**UNITS:**

**Evolution, Ecology, and Biodiversity...18**


**Entomology 100, 101, 102, 103, 104, 107, 115, 117, 119, 120, 131, 138, 141, 147, 149, 150, 161, 168A and 310, 317, 319**

One course in Biodiversity, 3-5

Entomology 103; Evolution and Ecology 105*, 108*, 112*, 112*t, 114*, 140*, Plant Biology 116, 148*, Plant Sciences 147*, Wildlife, Fish and Conservation Biology 110, 110*t, 111, 111t, 112, 120, 120*t, 134*, 134*t; Microbiology 105, 105*t, 110

Two courses in Advanced Ecology or Evolution 6-9

Evolution and Ecology 102, 103, 107, 115, 117, 139*, 139t, 139u, 140*, 141, 147, 149, 150, 161, 168A and 310, 317, 319

Laboratory or field course: At least one of the courses taken to fulfill these requirements must include a laboratory or field component.

*Appropriate courses from the above lists are indicated with an asterisk.

**These courses cannot be taken without the corresponding lecture course. Additional courses, if necessary, from above course lists reach to 18 units.

**Major Advisers:** Students transferring to UC Davis from another institution and majoring in Evolution, Ecology and Biodiversity must consult an adviser immediately upon matriculation so that their transfer credits can be applied to the major requirements. All new students in the major should contact the Biology Academic Success Center for adviser assignment. Substitutions of course lists for major requirements are arranged through the adviser.

**Advising Center** for the major is located at the Biology Academic Success Center (BASC). 1023 Sciences Laboratory Building; 530-752-0410; http://basca.ucdavis.edu/. Pre-professional students should visit the Health Professions Advising office at http://hpa.ucdavis.edu/ for information on pre-health requirements and to subscribe to their email list.

**Teaching Credential Subject Representative:** Students planning for a teaching career should consult the School of Education in regard to preparation for certification; see the Teaching Credential/M.A. Program on page 125.

**Courses in Evolution and Ecology (EVE)**

**Lower Division**

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, aesthetes, ethics and valuation. Species richness and “success.” Biodiversity through time; monitoring, evaluation and conservation. Biomes—global, continental and Californian. Offered irregularly. GE credit: SciEng|G|VL, SL, WE.

3. **Evolution for Non-Biologists (4)** Lecture—3 hours. Introduction to evolutionary biology for the general population. Offered in alternate years. GE credit: SciEng|G|OL, SL, VL—F(Begun)

11. **Principles of Ecology (4)** 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. Offered irregularly. GE credit: SciEng|G|OL, SL, WE.

12. **Life in the Sea (3)** Lecture—3 hours. Limited enrollment. 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. GE credit: SciEng|G|SE, SL, W—S(Williams)

13. **Sex in the Natural World (3)** Lecture/discussion—3 hours. Explores the diversity, mechanisms and evolution of sexual behaviors across the kingdoms of life. Offered in alternate years. GE credit: SciEng|G|SE, SL, VL—F(Patricelli)

20. **Darwinian Medicine (3)** Lecture—3 hours. Introduction for non-biologists to the evolution of humans and pathogens that influence human biological variation, health, and disease. Offered in alternate years. GE credit: SciEng|G|OL, SL—F(Begun)

98. **Directed Group Study (1-5)** Prerequisite: consent of instructor. GE credit: SciEng|G|OL, SL, VL—F, W, S (F, W, S)


**Upper Division**

100. **Introduction to Evolution (4)** Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C; Biological Sciences 101; Mathematics 16A, 16B, 16C or the equivalent; Statistics 13 or 100 (Statistics 100 recommended). A general survey of the origins of biological diversity and evolutionary mechanisms. GE credit: SciEng|G|OL, SL, VL—F, W, S (F, W, S, Su) Begun, Coop, Ramirez


102. **Evolution and Ecology 337**

LEC: 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, intraspecific and interspecific competition; coexistence mechanisms; niches, spatial and temporal variation; stability, diversity, and productivity of food webs; applications to conservation and biodiversity, including the diversity of people, and how our choices affect and are affected by the diversity of nature. Offered in alternate years. GE credit: SciEng|G|OL, SL, WE—F, Langley

103. **Phylogeny, Speciation and Macroevolution (4)** Lecture—3 hours; laboratory—discussion—3 hours. Prerequisite: course 100. Statistical inference of evolutionary processes and patterns among the species level. Topics include estimation of phylogenies and divergence times, character homology, biogeographic history, and rates and patterns of lineage diversification, with an emphasis on the origin of species. Offered in alternate years. GE credit: SciEng|G|OL, SL, VL—F(Moore, Turelli)

104. **Community Ecology (4)** Lecture—3 hours; discussion—1 hour. Prerequisite: course 101 or Environmental Science and Policy 101. Population growth and density dependence; predation, exploitive, interference and apparent competition; coexistence mechanisms; niches, spatial and temporal variation; stability, diversity, and productivity of food webs; applications to conservation and biodiversity, including the diversity of people, and how our choices affect and are affected by the diversity of nature. Offered in alternate years. GE credit: SciEng|G|OL, SL, VL—S(Wainwright)

105. **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. Offered in alternate years. GE credit: SciEng|G|SE—S (Wainwright)

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); residence at or near Bodega Marine Lab required. Enrollment restricted to application at http://www.bml.ucdavis.edu. Explores fundamental principles in the form and function of organisms, examining how basic properties of size, shape, structure, and habitat constrain ways in which plants and animals interact and cope with their physical surroundings. Offered in alternate years. GE credit: SciEng I [QL, SE, VL, WE].

107. Animal Communication (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2B. How animals use songs, dances, colors, chemicals, electricity and vibrations to communicate. Mechanisms of signal production, and detection (sensory systems), theory of information transfer and signal design, and the role of natural selection in shaping communication. Offered in alternate years. GE credit: SciEng I [QL, SE, VL, WE].—F. Patricelli

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 the origin of angiosperms and evolutionary relationships among them based on morphological and molecular evidence. (Same course as Plant Biology 108.) GE credit: SciEng. —S. (S.) Potter

110. Running, Swimming and Flying (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. Enrollment restricted to application at http://www.bml.ucdavis.edu. Examines the bases of organism movement in terrestrial, aquatic, and aerial environments, emphasizing both the unifying principles underlying locomotion, as well as a range of strategies employed across diverse taxa. Offered irregularly. GE credit: SciEng I [QL, SE, VL, WE].

111. Marine Environmental Issues (1)
Discussion—1 hour. Prerequisite: consent of instructor. Examination of environmental issues occurring in coastal waters including the effects of climate change, overfishing, and other human impacts. Through readings and group discussions, students will develop an integrative approach to understanding the oceanographic and ecological processes. May be repeated two times for credit when topics differ. (Same course as Environmental Science and Policy 111.) GE credit: SciEng I [SE, SL, VL, WE].—I. Gaylord, H. Largier, Morgan, Sanford, Williams

112. Biology of Invertebrates (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1B, or 2B and 2C; courses in systematics, ecology, and evolution recommended. Limited enrollment. Survey of the invertebrate phyla, emphasizing aquatic forms, and focusing on morphology, development, natural history, ecology, and phylogenetic relationships emphasized in alternate years.—W. (W.) Grosberg, Sanford

112L. Biology of Invertebrates Laboratory (2)
Laboratory—6 hours. Prerequisite: Biological Sciences 1B, or 2B and 2C. Course 112 concurrently. Enrollment limited to 50 students. Field and laboratory experience with representative members of the major invertebrate phyla discussed in course 112. Emphasis on observation of natural history, ecology, and behavior of living invertebrates. Two field trips required. Offered in alternate years.—W. (W.) 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; 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. Enrollment restricted to application at http://www.bml.ucdavis.edu. Examination of the interrelationships of local marine invertebrates with a focus on adaptations to environmental and biological factors encountered on the California coast. Hands-on laboratory and laboratory-learning with an emphasis on generating and testing hypotheses. GE credit: SciEng I [QL, SE, VL, WE].—S. (S.) San- ford

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, and diversity of plants and animal life in the sea. Introduction to marine habitat diversity and human impacts on marine ecosystems. Offered in alternate years. GE credit: SciEng I [SE, SL, VL, WE].—W. Sta-chowicz

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 interactions between plants, plant populations or vegetation types and the physical and chemical aspects of the 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.)—F. (F.) Latimer, Rejmanek

119. Population Biology of Invasive Plants and 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 invasive plant species and weeds, reproduction and dispersal, seed ecology, modeling of population dynamics in invasive species, native species, and crops, and biological control laboratory. Laboratories emphasize design of competition experiments and identification of weedy species. (Same course as Plant Biology 119.) Offered in alternate years. GE credit: SciEng I [SE, VL, WE].—S. Rejmanek

120. Global Change Ecology (3)
Lecture/discussion—3 hours. Prerequisite: course 100 and 101 or equivalents. Treatment of historical evolution of the planet's major physical, chemical, and biological influences. Special focus upon changes caused by humans. Topics pertain to biodiversity, resources, conservation, and ecosystem services. Offered irregularly.—F. Su; (F.) Su; (F.) Gaylord, Strong

131. Human Genetic Variation and Evolution (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1B or 2B. Introduction to genome-wide nucleotide sequence variation in human populations and computational methods for its analysis. Topics include forensics, disease gene mapping, and studies of human evolutionary history as it impacts physical, chemical, and biological influences. Special focus upon causes changes caused by humans. Topics pertain to biodiversity, resources, conservation, and ecosystem services. Offered irregularly.—F. Su; (F.) Su; (F.) Gaylord, Strong

138. Ecology of Tropical Latitudes (5)
Lecture—3 hours; discussion—1 hour; extensive writing. Prerequisite: one course: Biological Sciences, Entomology, Wildlife, Fish, and Conservation Biology, Geography, or tropical experience, or consent of instructor. Biological, physical, and human-related aspects of ecology of low latitudes. Distribution, numbers, and relationships of tropical organisms. Problems of development and conservation in the context of ecological and evolutionary theory. Offered in alternate years. GE credit: SciEng I, Writing Experience [QL, SE, VL, WE].—S. Shapiro

140. Paleobotany (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C. Introduction to in situ standing or standing, beginning with invasion of land in the Silurian, emphasizing origin and evolution of major groups and adaptations and character composition and distribution of florae relating to plate tectonics and climatic change. Offered irregularly.

141. Principles of Systematics (3)
Lecture—2 hours; independent study. Prerequisite: Biological Sciences 1B or 1C or 2B, course 100 recommended. Historical background, biogeographic, phylogenetic, mitochondrial, and working rules of biosystematics, including International Code of Nomenclature. Offered in alternate years. GE credit: SciEng I [QL, SE, SL, VL, WE].—S. Shapiro

147. Biogeography (4)
Lecture—3 hours; term paper. Prerequisite: Biological Sciences 1A and 1B, or 2B. Movements of terrestrial and marine organisms. The role of biologic, climatic, and biologic changes in the geographic distribution of organisms. Offered in alternate years. GE credit: SciEng I [SL, VL, WE].—F. (F.) Shapiro

149. Evolution of Ecological Systems (4)
Lecture—3 hours; term paper. Prerequisite: course 101 or Environmental Science 100 (or the equivalent), and course 100 (or the equivalent). Evolution as an organizing force in natural communities. Co-adaptation in trophic and competitive relationships. Ecology of polymorphisms, clines, and speciation. Offered in alternate years. GE credit: SciEng I [SL, VL, WE].—S. Shapiro

151. Evolution of Animal Development (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101; and course 100 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. GE credit: SciEng I [SL, VL, WE].—Kopp

161. Microbial Phylogenomics—Genomic Perspectives on the Diversity and Diversification of Microorganisms (5)
Lecture—3 hours. Prerequisite: Biological Sciences 2A, 2B, or equivalent. Use of DNA and genomic sequencing in studies of the diversity of microorganisms. Diversity of microbes, phylogenetics, genome sequencing, comparative genomics, phylogenomics, lateral gene transfer, molecular ecology, metagenomics, and studies of the human microbiome. Offered in alternate years. GE credit: SciEng I [SL, VL, WE].—S. (S.) Eisen

175. Computational Genetics (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Biological Sciences 101 and Statistics 100 or 102. The use of computers to solve problems in genetics and evolution. Introduction to computer language (Python), computational statistical methods, and applications such as QTL mapping, linkage detection, estimation of rates of evolution, and gene finding. Offered irregularly.

180A. Experimental Ecology and Evolution in the Field (4)
Lecture/labatory—3 hours; fieldwork—3 hours. Prerequisite: course 100; course 101, or Environmental Science and Policy 100; Entomology 105. Experimental design in field ecology. Examination of primary literature, experimental design, independent and collaborative research, analysis of data, development of original research projects based on field experiments. (Same course as Entomology 180A.) (Deferred grading only; pending completion of sequence) Offered in alternate years. GE credit: SciEng I [QL, SE, VL, WE].—S. (S.) Shapiro

180B. Experimental Ecology and Evolution in the Field (4)
Lecture/labatory—3 hours; fieldwork—3 hours. Prerequisite: Evolution and Ecology or Entomology 180A; course 100; course 101 or Environmental Science and Policy 100; Entomology 105. Experimental design in field ecology. Examination of primary literature, experimental design, independent experimental design, experimental design, independent experimental design, independent experimental design, independent experimental design, independent experimental design, independent
and collaborative research, analysis of data, development of original research paper based on field experiments. (3) (as Entomology 180B.) (Deferred grading only, pending completion of sequence.) Offered in alternate years. GE credit: SciEng|Gl, SE, VL, WE.—S. Yang

181. Ecology and Evolution of Animal-Plant Interactions (4)
Lecture—1.5 hours; lecture/discussion—1.5 hours; term paper; extensive writing or discussion. Prerequisite: Biological Sciences 2B and 2C required; Biological Sciences 2C may be taken concurrently. Animal adaptations for eating plants, pollinating flowers, dispersing seeds. Plant adaptations to herbivore defense, attraction of mutualists; role of coevolutionary arms race, mutualists and cheaters in plant/animal speciation. Exploration through lectures, original scientific literature, discussions and term paper. Offered in alternate years. GE credit: SciEng|Gl, Gl, SE, Gl, WE.—F. Strauss

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 6 units. (P/NP grading only.) GE credit: SE.—F, W, S. (F, W, S.)

190. Undergraduate Seminar (2)
Seminar—2 hours. Prerequisite: upper division standing in the biological sciences or a related discipline. Student reports on current topics with emphasis on origin, evolution, and synthesis, and state-of-the-art research approaches. Reviews of literature and reports of undergraduate research may be included. May be repeated for credit. (P/NP grading only.) GE credit: SE.—F, F, W, S. (F, W, S.)

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 Evolution and Ecology. Internships supervised by a member of the faculty. (P/NP grading only.)—F, W, S. (F, W, S.)

194A. Research Honors (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: students who have completed 135 units and qualify for the honors program (as defined by the current catalog). Students pursue intensive research under the guidance of a faculty adviser. Students are expected to complete the full three-quarter sequence culminating in the writing of an honors thesis. (Deferred grading only, pending completion of sequence.) GE credit: SciEng|Gl, SE, Gl, WE.—F, W, S. (F, W, S.)

194B. Research Honors (2)
Lecture—6 hours. Prerequisite: students who have completed 135 units and qualify for the honors program (as defined by the current catalog). Students pursue intensive research under the guidance of a faculty adviser. Students are expected to complete the full three-quarter sequence culminating in the writing of an honors thesis. (Deferred grading only, pending completion of sequence.) GE credit: SciEng|Gl, SE, Gl, WE.—F, W, S. (F, W, S.)

194C. Research Honors (2)
Lecture—6 hours. Prerequisite: students who have completed 135 units and qualify for the honors program (as defined by the current catalog). Students pursue intensive research under the guidance of a faculty adviser. Students are expected to complete the full three-quarter sequence culminating in the writing of an honors thesis. (Deferred grading only, pending completion of sequence.) GE credit: SciEng|Gl, SE, Gl, WE.—F, W, S. (F, W, S.)

197T. Tutoring in Biological Sciences 2B (1-2)
Tutorial—3-6 hours. Prerequisite: Biological Sciences 1B or Biological Sciences 2B with a grade of B or better. Assisting the instructor by tutoring students in a Biological Sciences 2B laboratory. Tutoring is voluntary and is supervised by a Laboratory Teaching Assistant and Biological Sciences 25 Laboratory Coordinator. May be repeated three times for credit. (P/NP grading only.) GE credit: SE.—F, W, S. (F, W, S.)

Professional

390. Methods of Teaching (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: 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 pre-paring and conducting of laboratory and discussion sections. May be repeated for credit for a maximum of 8 units. (S/U grading only.)—F, W, S. (F, W, S.)

Exercise Biology

See Neurobiology, Physiology, and Behavior, on page 479.

Family and Community Medicine

See Medicine, School of, on page 428.

Feminist Theory and Research

Wendy Ho, Ph.D., Adviser
Program Office. 1219 Hart Hall 530-752-6429; http://gsws.ucdavis.edu/welcome

Graduate Study, The Gender, Sexuality and Women’s Studies Program at UC Davis offers a Designated Emphasis in Feminist Theory & Research. Currently graduate students in the following fourteen affiliated Ph.D. programs are eligible to participate: Anthropology, Comparative Literature, Cultural Studies, Education, English, French, German, Geograph-y, History, Native American Studies, Performance Studies, Psychology, Sociology, Spanish, and the Study of Religion.

The Designated Emphasis in Feminist Theory and Research affords graduate students in affiliated programs the opportunity to augment their Ph.D. in a given discipline with a specialization in Feminist Theory and Research. Typically a doctoral student in good standing may seek admission to the Designated Emphasis in Feminist Theory and Research and enroll in Designated Emphasis in Feminist Theory and Research courses. Those students in affiliated Ph.D. programs who complete the requirements of the Designated Emphasis will have this noted on their transcripts and their Ph.D. diploma will note the “Specialization 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 gender, sexuality and women’s studies; 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 or sexuality is expected to be a central component of both the student’s qualifying examination and doctoral research.

Students should consult with the Chair of the Designated Emphasis in Feminist Theory and 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. If possible, please bring a copy of the syllabus or an expanded course description to your mentor’s qualifying examination.

Graduate Adviser, Wendy Ho in 1219 Hart Hall 530-752-6429; waho@ucdavis.edu.
Fiber and Polymer Science

(College of Agricultural and Environmental Sciences)

Faculty. See under Textiles and Clothing, on page 568.

The Major Program

The Fiber and Polymer Science major is concerned with the physical, chemical, and structural properties of fibers and polymers and how these relate to fiber and polymer performance and end-use.

The Program. All students in this major take a common core of course work in chemistry, physics, and mathematics, and depth subject matter in fiber and polymer science, organic and physical chemistry, and technical writing. In the restricted electives, students select courses from areas such as computer science and mathematics, chemistry, marketing and management, material and advanced fiber and polymer science, and textiles.

Career Alternatives. The major prepares the student for a career in a wide range of industries in the areas of research and development, technical marketing and management, production, quality control, and science teaching [on completion of an additional year in the teaching credential program]. The comprehensive offering Fiber and Polymer Science graduates are in the fiber, polymer, industrial product, textile and/or chemical business. Graduates are prepared to enter the graduate program in textiles or agricultural environmental chemistry with a specialization in fiber and polymer science, fiber and materials science and polymer engineering programs at other universities.

B.S. Major Requirements:

<table>
<thead>
<tr>
<th>Courses</th>
<th>UNITS</th>
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</thead>
<tbody>
<tr>
<td>Preparatory Subject Matter</td>
<td>52-55</td>
</tr>
<tr>
<td>Chemistry 2A-2B-2C</td>
<td>15</td>
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<tr>
<td>Computer Science Engineering 15 or 30-45</td>
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</tr>
<tr>
<td>Mathematics 16A-16B-16C or 21A-21B-21C</td>
<td>9-12</td>
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<tr>
<td>Physics 7A-7B-7C or 9A-9B-9C</td>
<td>12</td>
</tr>
<tr>
<td>Statistics 13 or Plant Sciences 120</td>
<td>4</td>
</tr>
<tr>
<td>Textiles and Clothing 6 and 8 or Engineering</td>
<td>8</td>
</tr>
<tr>
<td>Engineering 45</td>
<td></td>
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<tr>
<td>Dependent Subject Matter</td>
<td>37-39</td>
</tr>
<tr>
<td>Textiles and Clothing 163, 163L</td>
<td>4</td>
</tr>
<tr>
<td>Fiber and Polymer Science 100, 150, 161, 161L, 190B, 190E</td>
<td>14</td>
</tr>
<tr>
<td>Restricted Electives</td>
<td>30</td>
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<tr>
<td>Total Units for the Degree</td>
<td>119-124</td>
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<tr>
<td>Major Adviser. Y. L. Hsieh (Textiles and Clothing)</td>
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Minor Program Requirements:

<table>
<thead>
<tr>
<th>Courses</th>
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</thead>
<tbody>
<tr>
<td>Fiber and Polymer Science</td>
<td>18</td>
</tr>
<tr>
<td>Textiles and Clothing 6 or Engineering 45</td>
<td>4</td>
</tr>
<tr>
<td>Courses selected from the following: Fiber and Polymer Science 100, 150, 161, 161L, 180A and 180B; and Textiles and Clothing 163 and 163L</td>
<td>14</td>
</tr>
<tr>
<td>Minor Adviser. Y. L. Hsieh</td>
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</tr>
</tbody>
</table>

Upper Division

100. Principles of Polymer Materials Science (3)

Lecture—3 hours. Prerequisite: Chemistry 2A-2B; Chemistry 8A-8B or Engineering 45; introductory physics. The basic principles of polymer science are presented including polymer structure and synthesis; polymerization mechanisms, polymer classes, properties, and reactions; polymer morphology, rheology, and characterization; polymer processing. [Same course as Materials Science Engineering 147.] GE credit: SciEng | QL, SE — W. (W.) Pan

110. Plastics in Society and the Environment (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 10 or introductory course in physical sciences. Basic concepts and methodologies in the study of plastics. Formation, classification, structure, properties, processing, and formulation. Their application to societal needs, and their impact on society and the environment. GE credit: SciEng or SocSci, Wrt| SE, SL, VL, WE—S. (S.) Hsieh

150. Polymer Syntheses and Reactions (3)

Lecture—3 hours. Prerequisite: Chemistry 128B or 88, and Chemistry 107A. Organic and physical chemistry aspects of polymer syntheses and reactions including polymerization mechanisms, kinetics and thermodynamics for major types of organic high polymers. GE credit: SciEng | QL, QL, SE, SL, VL, WE—S. (S.) Hsieh

161. Structure and Properties of Fibers (3)

Lecture—3 hours. Prerequisite: Textiles and Clothing 6 and Chemistry 88. The structure, properties and reactions of natural- and man-made fibers; the relations between molecular structure of fibers and their physical properties; interactions of fibers and their surroundings. GE credit: SciEng | QL, QL, SE, SL, VL, WE—F. (F.) Hsieh

161L. Textile Chemical Analysis Laboratory (1)

Laboratory—3 hours. Prerequisite: course 161 (may be taken concurrently). Laboratory methods and procedures employed in qualitative and quantitative analysis of textile fibers and auxiliaries. SciEng | GE credit: QL, QL, SE, SL, VL, WE—F. (F.) Hsieh

180A. Introduction to Research in Fiber and Polymer Science (2)

Laboratory/discussion—6 hours. Prerequisite: senior standing in major related to Fiber and Polymer Science, 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 sequence.) GE credit: SciEng | QL, SE, SL, VL, WE—F. W. S. (F. W. S.)

180B. Introduction to Research in Fiber and Polymer Science (2)

Laboratory/discussion—6 hours. Prerequisite: senior standing in major related to Fiber and Polymer Science, 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 sequence.) GE credit: SciEng | QL, SL, VL, WE—F. W. S. (F. W. S.)

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 Clothion 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 (1-5)

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.]

Graduate

250A. 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 may vary each time the course is offered. [Same course as Materials Science and Engineering 250A.—F. (F.) Hsieh, Pan, Sun

250B. 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 may vary each time the course is offered. [Same course as Materials Science and Engineering 250B.—F. (F.) Hsieh, Pan, Sun

250C. 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 may vary each time the course is offered. [Same course as Materials Science and Engineering 250C.—F. (F.) Hsieh, Pan, Sun

250D. 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 may vary each time the course is offered. [Same course as Materials Science and Engineering 250D.—F. (F.) Hsieh, Pan, Sun

250E. 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 may vary each time the course is offered. [Same course as Materials Science and Engineering 250E.—F. (F.) Hsieh, Pan, Sun

299. Research (1-12)

Independent study—3-36 hours. (S/U grading only.)

Professional

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated for credit. [S/U grading only.—F. W. S. (F. W. S.)]
Film Studies

See Cinema and Digital Media, on page 208.

First-Year Seminar Program

J. David Furlong, Ph.D., Program Director

Program Office, The Grove, Room 1350 (Surge III); http://fys.ucdavis.edu; http://fys.ucdavis.edu/student

Committee in Charge

Christiana Drake, Ph.D. (Statistics)

James Harding, Ph.D. (Plant Sciences)

Kenneth Hilt, Ph.D. (Molecular & Cellular Biology)

Karma Wallsten, Ph.D. (University Writing Program)

Courses in First-Year Seminar (FRS)

Questions pertaining to the following course should be directed to the instructor or to the First-Year Seminar Office in Undergraduate Education.

Lower Division

1. First-Year Seminar (1)

Seminar—1 hour. Open only to: students who have completed fewer than 45 quarter units; transfer students in their first academic year at UC Davis. 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 placed upon student participation in learning. Students may take more than one First-Year Seminar, but may not take more than one in any given quarter. May be repeated for credit if topic differs. —F, W, S. (F, W, S.)

2. First-Year Seminar (2)

Seminar—2 hours. Open only to: students who have completed fewer than 45 quarter units; transfer students in their first academic year at UC Davis. 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 placed upon student participation in learning. Students may take more than one First-Year Seminar, but may not take more than one in any given quarter. May be repeated for credit if topic differs. —F, W, S. (F, W, S.)

3. First-Year Seminar (1)

Seminar—1 hour. Open only to: students who have completed fewer than 45 quarter units; transfer students in their first academic year at UC Davis. 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 placed upon student participation in learning. Students may take more than one First-Year Seminar, but may not take more than one in any given quarter. May be repeated for credit if topic differs. —F, W, S. (F, W, S.)

4. First-Year Seminar (2)

Seminar—2 hours. Open only to: students who have completed fewer than 45 quarter units; transfer students in their first academic year at UC Davis. 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 placed upon student participation in learning. Students may take more than one First-Year Seminar, but may not take more than one in any given quarter. May be repeated for credit if topic differs. —F, W, S. (F, W, S.)

Food Science

(College of Agricultural and Environmental Sciences)

The Major Program

Food science is a discipline in which biological, physical, and sensory sciences are integrated for the study of foods to ensure their safety, quality, and healthful properties. The food science curriculum encompasses food chemistry and biochemistry, food safety and microbiology, food processing and preservation, and sensory and consumer sciences.

Career Alternatives. Opportunities for employment include positions in the food and allied industries, 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, microbiology, and nutrition.

B.S. Major Requirements:

Preparatory Subject Matter .......................61

University Writing Program 102F, 104A, or 104E ........................................4

Communication 1 ..................................4

Mathematics 16A-16B-16C ..........................9

Biological Sciences 2A ..............................5

Chemistry 2A-2B-2C, 8A, 8B (or more advanced series) .........................21

Physics 7A-7B-7C ................................12

Food Science and Technology 50 ............3

NUTRITION 10 (or approved substitute) ...3

Depth Subject Matter ...........................49

Biological Sciences 102, 103 ......................6

Statistics 100 ........................................4

Microbiology 101 ...................................5

Food Science and Technology 100A, 100B, 101A, 101B, 104, 104L, 110, 110L 190, 207, 207C ..................................................30

Food Science and Technology 117 or Statistics 106 ........................................4

Food Science and Technology 127 or 107 ..................................................4

Select one of the following two options:

Food Science Option

The Food Science option provides a broad exposure to food chemistry, biochemistry and food processing. Students find positions in quality assurance, product development, and food processing in the food industry.

Restricted Electives for the Food Science option .................18

The restricted electives can:

(1) Provide a broad exposure to students who would seek positions in quality assurance, product development, and processing in the food industry.

(2) Prepare students for graduate study in food science or related programs.

(3) Prepare students for professional school in the health sciences. Select courses from a master list, which is available from the advising center for the major.

Brewing Science Option

The Brewing Science option prepares students for careers in production or quality assurance within the brewing industry or other food fermentation industries (e.g., other alcoholic beverages, vinegar and cheese). The option also prepares students for graduate study in food science or related programs, and exposes the students to diverse topics, including chemistry, biochemistry, microbiology and processing.

Specific course requirements .................. 18

Food Science and Technology 102A, 102B, 109, 123 ...........................................18

Selected additional courses .....................9

Select courses from a master list available from the department Advising Center.

Total Units for the Degree ......................132

Major Adviser, A.E. Mitchell (Food Science and Technology)

Advising Center for the major is located in 1204 RMI South Building 530-752-3250.

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

(A Graduate Group)

Gary M. Smith, Ph.D., Chairperson of the Group

Group Office. 1204 RMI South Building 530-752-3250; bfhadvising@ucdavis.edu; http://www.foodscience.ucdavis.edu

Faculty. Includes members from twelve departments in the Colleges of Agricultural and Environmental Sciences and Engineering, and from the Schools of Medicine and Veterinary Medicine.

Graduate Study. The interdepartmental Graduate Group in Food Science offers programs of study leading to the M.S. degree and to the Ph.D. degree. Graduate studies stress the application of the biological, chemical, physical, and behavioral sciences to processing, preservation, quality evaluation, public health aspects, and utilization of foods. For the M.S. degree, there are five areas of specialization: chemistry-biochemistry, microbiology, engineering-technology, brewing and sensory science. Individually designed programs are also acceptable. For the Ph.D., there are four areas of emphasis: biochemistry, chemistry, microbiology/fermentation, and sensory science. Detailed information regarding graduate study is available through the Group Chairperson or the Group office.

Graduate Advisers. Contact the Food Science Graduate Group office at bfhadvising@ucdavis.edu.
Food Science and Technology

Maria L. Marzo, Ph.D., Associate Professor
Linda J. Harris, Ph.D., Specialist in Cooperative Extension
Juliana Leite Nobrega De Moura Bell, Ph.D., Assistant Professor
Bwalya Lungu, Ph.D., Lecturer (PSOE)
Michael J. Morey, Ph.D., Professor (Food Science and Technology, Biological and Agricultural Engineering)
David A. Mills, Ph.D., Professor (Food Science and Technology, Viticulture and Enology)
Alyson Mitchell, Ph.D., Professor
Nilin N. Nilin, Ph.D., Associate Professor
Charles F. Shoemaker, Ph.D., Professor Emeritus
Howard G. Schutz, Ph.D., Professor Emeritus
Barbara O. Schneeman, Ph.D., Professor Emerita
John M. Krochta, Ph.D., Professor Emeritus
Ericka L. Barrett, Ph.D., Professor Emerita
Bwalya Lungu, Ph.D., Lecturer

10. GE credit: SciEng|SE, VL.

Introduction to Brewing and Beer (3)
Prerequisite: course 102A, Chemistry 2C. Open to seniors only in Fermentation 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 scales. GE credit: SciEng | QL, SE, VL — F (W) Romberg

101. Food Chemistry Laboratory (2)
Lecture/laboratory — 2 hours. Prerequisite: course 102A, Chemistry 2C. Open to seniors only in Fermentation 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. GE credit: SciEng | QL, SE, VL — F (W) Romberg

102. Physical and Chemical Methods for Food Analysis (4)
Lecture — 2 hours; discussion — 1 hour; laboratory — 3 hours. Prerequisite: Chemistry 2C and 8B, Biological Sciences 103, course 100B. Theory and applications of physical and chemical methods for determining the constituents of foods. Modern separation and instrumental analysis techniques are stressed. GE credit: SciEng | QL, SE, VL — F (W) Mitchell

104. Food Microbiology (3)
Lecture — 3 hours. Prerequisite: Biological Sciences 2A, Biological Sciences 103, Microbiology 102, Microbiology 103L. Microbes in food safety, spoilage, and production. Food-borne disease agents and their control. Growth parameters of food spoilage agents. Destruction of pathogen and its spoilage agents. GE credit: SciEng | QL, SE, VL — F (W) Marzo

105. Introduction to Food Preservation (3)
Lecture — 2 hours; laboratory — 2 hours. Prerequisite: Chemistry 2A, Biological Sciences 2A, Statistics 109. Introduction to modern food preservation including use of chemicals and microbes, heat and energy, control of water and atmosphere, and by indirect approaches such as packaging, hygienic design and sanitation. GE credit: SciEng | QL, SE, VL — F (W) Smith, Young

55. Food in American Culture (4)
Lecture — 3 hours; discussion — 1 hour. Prerequisite: complete Subject A requirement. Relationship between food and culture; relationship between food and the influence on eating habits and the tensions between them including identity, convenience, and responsibility; multiple disciplines and genres. [Same course as American Studies 55.] GE credit: ArtsHum|SciEng, Div | W] ACCH, AH or SS, DD, WE — S (S) Billeffk

99. Special Study for Undergraduates (1-5)
Prerequisite: complete Subject A requirement. GE credit: SciEng | QL, SE, VL, W — F (W) S (S)
ity and mechanism of action illustrated by use of selected enzymes. (Former course Biochemistry and Biophysics 123L.) GE credit: SciEng | QL, SE, VL—S. (S.) G. Smith

123L Enzymology Laboratory (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 103, course 123 (concurrently). Laboratory—1 hour; procedures involved in detection, purification and characterization of enzymes. (Former course Biochemistry and Biophysics 123L) GE credit: SciEng | QL, SE, VL, WE—S. (S.) G. Smith

127. Sensory Evaluation of Foods (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: 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. GE credit: SciEng | QL, SE, WE, W—W. (W.) Guinard

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: SciEng | SE—S. (S.) Oakwood

131. Food Packaging (4)
Lecture—3 hours; discussion—1 hour. Prerequisites: Chemistry 8B, Biological Sciences 1B, Physics 7C. Class limits: 50. Students: Principles of food packaging; functions of packaging. Properties of metal, glass, paper and plastic 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. Offered irregularly. GE credit: SciEng | QL, SE—Su. (Su.)

151Y. Food Freezing (1)
Discussion—1 hour; web virtual lecture. Prerequisite: course 110A or the equivalent. Mechanisms of ice crystallization, interpretation of freezing diagrams, and modes of heat transfer. Food properties at sub-freezing temperatures, refrigeration requirements, and estimation of freezing times. Industrial systems used in freezing foods. GE credit: SciEng | QL, SE.

159. New Food Product Ideas (3)
Lecture—3 hours. Prerequisite: course 50; Biological Sciences 2A, 2B, 2C, Physics 7A, 7B, 7C, Chemistry 2A, 2B. Create, refine, test and present viable ideas for new food products. Activities include trend monitoring, consumer research, idea generation and market testing; new product development and testing, estimation of costs and development time. GE credit: SciEng | QL, SE.

160. Food Product Development (4)
Lecture—1 hour; discussion—1 hour; laboratory—6 hours. Prerequisites: courses 50, 103, 104, 110A. Product development stage of food product development including preliminary product description, prototype development, product testing, and formal presentation of a new product development. GE credit: SciEng | QL, SE, VL—S. (S.) Lange

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. GE credit: SciEng | QL, SE, VL—S. (S.) Young

192. Internship for Advanced Undergraduates (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Work experience on or off campus in the professional area of food science. (P/NP grading only) GE credit: SE.

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only) GE credit: SE.

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only) GE credit: SE.

Graduate

201. Food Chemistry and Biochemistry (4)
Lecture—4 hours. Prerequisite: undergraduate courses in organic biochemistry; undergraduate course in food chemistry is recommended. Restricted to graduate standing or consent of instructor. Advanced topics in food chemistry and biochemistry; emphasis on basic concepts and applications of food chemistry and biochemistry to food composition, properties, preservation and processing. GE credit: SciEng | SE.

202. Chemical and Physical Changes in Food (4)
Lecture—3 hours; term paper. Prerequisite: Biological Sciences 1B, 1C. Principles of chemistry and physics are applied to a study of changes in water binding properties and activity, changes in proteins, nutrients, toxic constituents, and other compounds during storage, heating, freezing, dehydrating, and concentrating of food materials. —S. (S.) Dunagan

203. Food Processing (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 110A, Physics 5C or 7C, Chemistry 107B, or consent of instructor. Principles of food engineering applied to food processing. Relationship of Newtonian and non-Newtonian fluid properties to heat and momentum transfer during food processing; controlling kinetics and quality changes of foods. —W. (W.) Nitin

204. Advanced Food Microbiology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1C, 103, course 104 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. —S. (S.) Marco

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 fermentation products, on yeast fermentations, and on genetic manipulations (including recombinant DNA techniques) of industrial microorganisms.

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 instrumental techniques of colorimetry, texturometry, and chemistry of volatile compounds to perception of appearance, texture, flavor.

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 foods.

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. Relations between lipid structure and physical properties in tissues and foods. Regulation of absorption, transport, and metabolism of lipids. Implications of dietary fats and health. —W. (W.) German

213. Flavor Chemistry of Foods and Beverages (4)
Lecture/discussion—3 hours. Prerequisite: Chemistry 8B, Viticulture and Enology 123, Viticulture and Enology 123L or course 103 or consent of instruc- tors. Students will become familiar with basic principles of flavor chemistry, analysis, and formation in fresh and processed foods. Students will be required to read and critically evaluate flavor chemistry literature. (Same course as Viticulture and Enology 213.) —S. (S.) Ebeler, Heymann

217. Advanced Food Sensory Science (3)
Lecture—3 hours. Prerequisite: course 107 (may be taken concurrently) or consent of instructor. 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. —F. (F.) O’Mahony

219. Biochemistry, Microbiology and Technology of Cheese of the World (4)
Lecture—4 hours. Prerequisite: course 119 and Biological Sciences 103 or course 100A, 123, Biological Sciences 103, Chemistry 107B, 128B or consent of instructor. Intended for graduate level students or senior undergraduate students with appropriate background in biochemistry and microbiology. Compositional and physico-chemical aspects of milk and their implications on cheesemaking; enzymatic, microbiological and physical aspects of cheese-making; cheese as a biological composite; designing cheese quality attributes; cheese aging. Cheese from all over the world will be studied and discussed. Offered in alternate years. —S. (S.) Rosenberg

227. Food Perception and the Chemical Senses (2)
Lecture—2 hours. Prerequisite: course 107B (may be taken concurrently), or 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. —W. Guinard

290. Seminar (1)
Seminar—1 hour. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)

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.)—F, W, S. (F, W, S.)

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 findings, and critical evaluation. (S/U grading only.)—S. (S.)

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
Prerequisite: graduate standing. (S/U grading only.)

Professional

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)

Food Service Management

(See under the Department of Nutrition, page 492.)

The Major Program and Graduate Study, Food Service Management, is an undergraduate major leading to 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.

Food Service Management
Forensic Science (A Graduate Group)

Robert H. Rice, Ph.D., Chairperson of the Group

Related Courses. See Nutrition.

Courses in Food Service Management (FSM)

Questions pertaining to the following courses should be directed to the instructor or to the Nutrition Department Advising office in 3202 Meyer Hall 530-752-2512.

Upper Division

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. Establishes fundamentals of 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. —S. (S.)—Frank

120L. Quantity Food Production Laboratory (2)
Laboratory—6 hours. Prerequisite: course 120. Laboratory exercises in fundamental quantity food production and service. —F. (F, S.)—Frank

122. Food Service Systems Management (3)
Lecture—3 hours. Prerequisite: Agricultural and Resource Economics 112, course 120. Principles of quantity food production management: production schedules, portion control, financial management, layout and equipment planning, evaluation of alternative systems, and computer applications. —W. (W.)—Frank

192. Internship (1-12)
Internship—3-36 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 a faculty member. (P/NP grading only)—Steinberg

197T. Tutoring in Food Service Management (1-2)
Discussion/laboratory—3 or 6 hours. Prerequisite: Dietetics or related major; completion of the 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, 1909 Galileo Ct., Suite B
Davis, CA 95618; 530-747-3922; http://forensicscience.ucdavis.edu

Faculty

Members are listed on the website.

Graduate Study. The Forensic Science Graduate Group offers the degree of MS in Forensic Science. This program, offering a Plan I Thesis 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 eight to nine core courses, totaling 24-27 units, three units of seminar, and the appropriate number of elective/research units for a total of 54 units. Students can take courses outside their specializations, 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 spring seminar course must be taken in any spring quarter before graduation. Students must also take one additional seminar course in another department or program.

Preparation. Appropriate preparation is an undergraduate degree in physical or natural sciences, engineering or a closely related field with a GPA of 3.000 or higher. Examples include Biochemistry, Chemistry, Molecular Biology, Biology, Genetics, and Environmental, Food, and Nutritional Sciences.

Graduate Advisers. Cassandra Calloway (Forensic Science Graduate Program; Environmental Toxicology), You-Lo Hsieh (Division of Textiles and Clothing), Christopher J. Hopkins (Forensic Science Graduate Program; Forensic Chemistry), Donald Land (Chemistry), Terence Murphy (Plant Biology), Ben Sacks (Population Health & Reproduction/Canid Diversity and Conservation Laboratory-Center for Veterinary Genomics), Giuseppe Rovani (Mechanical & Aeronautical Engineering), Moshe Rosenberg (Food Science and Technology), Matt Wood (Environmental Toxicology)

Courses in Forensic Science (FOR)

Graduate

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 with emphasis on problem definition, strategies for solving problems, analytical tools, and professional and ethical considerations. —F. (F) Sensabaugh

205. Microscopy and Microanalytical Methods in Forensic Science (3)
Lecture—2 hours; laboratory—1 hour. Prerequisite: consent of instructor. Restricted to students enrolled in the M.S. in Forensic Science Program; a minimum of 1 year each of biology, organic chemistry, calculus, & physics. Introduction to optical and electron microscopy. Transmission, diffraction, reflection and absorption; polarized light and polarizing microscopes. Radioactivity; image recording. SEM analysis, signal-to-noise ratios, minimum detectable levels and homogeneity. Offered in alternate years. —F. (S.) —Van Benthem

207. Advanced Spectroscopy Methods in Forensic Science (3)
Lecture—3 hours. Restricted to Forensic Science Graduate Program or consent of instructor. Discuss, evaluate and conduct advanced molecular spectra, Infrared Spectroscopy, such as chemical applications of spectroscopic methods, vibrational, rotational spectra, electronic spectra, photoelectron spectroscopy generated by various analytical instruments used in forensic science community. Offered in alternate years. —F. (F) —Wood

210. Personal Identification Methods in Forensic Science (3)
Lecture—2 hours; laboratory—3 hours. Restricted to Forensic Science Graduate Program or consent of instructor. Discuss, evaluate and conduct advanced molecular spectra, Infrared Spectroscopy, such as chemical applications of spectroscopic methods, vibrational, rotational spectra, electronic spectra, photoelectron spectroscopy generated by various analytical instruments used in forensic science community. Offered in alternate years. —F. (F) —Wood

211. Forensic Science Analytical Instrumentation (3)
Lecture/discussion—1 hour; laboratory—3 hours. Methodology and instruments used for the analysis of substances of interest in the discipline of Forensic Science. Practical experience with modern instrumental techniques & methodologies used in the advanced forensic science laboratory. Limited to students accepted 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. —F. (F) —Land

218. Technical Writing in Forensic Science (3)
Lecture—3 hours. Prerequisite: course 120. Prerequisite of the instructor required for all students not enrolled in the Forensic Science program. Restricted to graduate standing in the Forensic Science program. How to write clear, credible forensic science reports and scientific articles, that (a) serves the ends of the justice system, (b) meet their readers’ varying needs and (c) reflect well on the author. —F. (S. & F.) —Neumann

219. Analysis of Toxicants (3)
Lecture—2 hours; extensive writing or discussion—1 hour. Prerequisite: course 120. Prerequisite of the instructor required for all students not enrolled in the Forensic Science program. How to write clear, credible forensic science reports and scientific articles, that (a) serves the ends of the justice system, (b) meet their readers’ varying needs and (c) reflect well on the author. —F. (S. & F.) —Neumann

220. Analysis of Toxicants (3)
Lecture—2 hours; extensive writing or discussion—1 hour. Prerequisite: course 120. Prerequisite of the instructor required for all students not enrolled in the Forensic Science program. How to write clear, credible forensic science reports and scientific articles, that (a) serves the ends of the justice system, (b) meet their readers’ varying needs and (c) reflect well on the author. —F. (S. & F.) —Neumann

240. Homicide Crime Scene Investigation (3)
Lecture—2 hours; laboratory—3 hours. Restricted to Forensic Science Masters Program Students; enrollment is limited to 15 students per class. Processing and evaluating complex homicide scenes. Functions and activities of police agencies. Recognition, documentation, identification, and collection of evidence. Event sequence reconstruction. Evidence collection, preservation, report writing. Courtroom presentation. —F. (S. & F.) Hopkins

263. Forensic Computer Science Investigations (3)
Lecture—3 hours. Prerequisite: graduate student; consent of instructor. Restricted to students in the Forensic Science Graduate Program unless approved by instructor. Discuss the threats to the security of any kind of evidence that is captured, transmitted, or stored digitally and develop critical thinking and basic knowledge of computer forensics and digital evidence issues in the evaluation of digital evidence. —S. (S.)

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 by consent of Forensic Science Program Director. Statistical methodologies that are used by the forensic scientist, their limitations/applications in interpreting evidential results. Statistical analysis of DNA-STR results, trace evidence correlation, fingerprint statistics, population sampling and the Bayes method. Offered in alternate years. —W. (W.)
277. Forensic Genetics; Next Generation Techniques and Applications (3)
Lecture—3 hours. Prerequisite: undergraduate courses in fundamental and applied principles of genetics, biochemistry, and molecular biology, or consent of instructor. Restricted to Forensic Science Graduate students or consent of instructor. Review organization/function of the human genome, recent developments, next generation sequencing techniques including the preparation of DNA samples, properties of the new generation sequencing assay formats and biochemical reactions. Will include quality control parameter, and bioinformatic approaches. Offered in alternate years.—F

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.—[F] Denison, Rice

280. Forensic DNA Analysis (3)
Lecture—3 hours. Prerequisite: coursework in genetics and molecular biology. Graduate standing; consent of instructor required for all students not enrolled in the MS Forensics program. Foundation in theory and practice of forensic DNA analysis; past, present, and emerging technologies; legal and quality assurance issues, DNA extraction, DNA quantification, multiplex amplification of STR loci, capillary electrophoresis of amplified products, and analysis of STR typing data. [Same course as Environmental Toxicology 280.]—W (W) Von Beroldingen

281. Principles and Practice of Forensic Serology and DNA Analysis (3)
Lecture—2 hours; lecture/discussion—3 hours. Prerequisite: course/Environmental Toxicology 278 or course/Environmental Toxicology 280, or equivalent—115, 116, 117A, 117B, 118A, 118B, 119A, 119B, 119C, 120, 121, 124, 125, 130, 140, 141]—W (W) Kimsey

289. Survey in Forensic Science (3)
Lecture—3 hours. Restricted to students enrolled in the M.S. in Forensic Science Program. Analytical methods and contemporary forensic science. Cladistics laboratories in California, crime scene management, examination and analysis of human hair, forensic ballistics/trajectory reconstruction, shoe/tire print 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. F (W) Hopkins

290. Seminar in Forensic Science (1-3)
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]—F, W, S, F, S, J Hopkins

290C. Graduate Research Conference in Forensic Science (1)
Independent study—1 hour. Restricted to students enrolled in the Forensic Science Program. Individual and/or group conference on problems, progress and techniques in forensic science and research. May be repeated for credit when topic differs. Offered irregularly. [S/U grading only]—F, W, S, F, W, S, J Hopkins

293. Forensic Science Research Methodology (2)
Lecture—1.5 hour; extensive writing or discussion—0.5 hours. Restricted to students enrolled in the Graduate Forensic Science Program or by consent of the instructor. Introduction to identification, formulation, and solution of meaningful scientific problems encountered in the Forensic Science area including experimental design and/or theoretical analysis of new and prevailing techniques, theories and hypotheses. Students will present and defend their thesis research/journal article proposals. [S/U grading only]—W (W) Kimsey

299. Research in Forensic Science (1-12)
Prerequisite: consent of instructor. Restricted to students enrolled in the M.S. in Forensic Science Program. May be repeated for credit when topic differs. [S/U grading only]—F, W, S, F, W, S, J

French

(College of Letters and Science)
Noah Gwynn, Ph.D., Chairperson, Department of Foreign Languages and Literatures, 213 Sproul Hall, 530-752-1219, http://www.french.ucdavis.edu

Faculty
Jeff Fort, Ph.D., Associate Professor Claire Goldstein, Ph.D., Associate Professor Noah Gwynn, Ph.D., Associate Professor Eric Russell, Ph.D., Associate Professor Julia Simon, Ph.D., Assistant Professor Toby Warner, Ph.D., Assistant Professor

Emeriti Faculty
Claude Abraham, Ph.D., Professor Emeritus Edward M. Bloomberg, Ph.D., Professor Emeritus Simone Clay, Ph.D., Lecturer Emeritus Gerald Herman, Ph.D., Senior Lecturer Emeritus Margot R. Kaufman, Lecturer Emerita Manfred Kusch, Ph.D., Senior Lecturer Emeritus (Comparative Literature, French and Italian) Marshall Lindsay, Ph.D., Professor Emeritus Maria I. Manoliu, Ph.D., Professor Emerita Michele Praeger, Ph.D., Professor Emerita Leslie Rabine, Ph.D., Professor Emerita (French, Italian, Women and Gender Studies) Ruth B. York, Ph.D., Senior Lecturer Emerita

The Major Program
The major program assuages proficiency in all four of the language skills—speaking, understanding, reading, and writing, allowing students with an intellectual and cultural contributions of the French-speaking world through the study of its literature, traditions, and institutions.

The Program. The department encourages its students to work closely with an advanced advisor in designing a major tailored to their needs and interests within the broad requirements prescribed by the program and to avail themselves of the guidance of an expert teaching faculty. The senior honors project will involve a substantial number of students with good preparation in French participate in the university’s very popular Education Abroad Program, which maintains centers in Bordeaux, France, and other countries around the world.

Career Alternatives. Foreign language teachers, a cardiologist, a veterinarian, a naval commander at the Pentagon, a professor of Political Science, lawyers, sales representatives, journalists, a speech pathologist, a law professor, translators, a senior applications programmer, travel agents, independent business owners, a senior museum curator, nurses, financial managers, stock brokers, and an investment banker have graduated from the French Program at UC Davis. These represent only a small fraction of the career choices documented in a survey of department graduates.

A.B. Major Requirements: UNITS

Preparatory Subject Matter: 4-34
French 1, 2, 3 (or the equivalent) 0.15
French 21, 22, 23 (or the equivalent) 0.15
Linguistics 1 or 4 4.00

Depth Subject Matter: 44
French 100 4.00
French 105 4.00
French 107, 108, 127, 128 8.00

Total Units for the Major: 48-78

Major Adviser. T. Warner

Minor Program Requirements: UNITS

French

French 100 4.00


Foreign Language Requirement: 8-14
Two French linguistics and language science courses from among the following: French 105, 109, 160, 161, 162 8

under the honors program during the last two quarters of the senior year; other arrangements must be authorized by the departmental chair. Only stu-
dents who, at the end of the junior year (135 units), have attained a cumulative grade-point average of 3.500 in courses required for the major will be eligi-
able 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.

Education Abroad Program. The department of French and Francophone Literature encourages students to take
abroad in the Education Abroad Program. With
the approval of a major adviser, applicable courses
taken abroad may be accepted in the major or
minor program.

Graduate Study. The department offers programs of study and research leading to the M.A. and Ph.D. degrees in French. Candidates for the Ph.D. have
designed emphasis in African-American studies and
African Studies, Classics and Classical Reception,
Critical Theory, Feminist Theory and Research, Second Language Acquisition, and/or Studies in Performance and Culture. Inquiries may be
obtained from the graduate adviser or the depart-
ment chairperson.

Graduate Adviser. C. Goldstein

Prerequisite Credit. Credit will not normally be
owed for a course if it is the prerequisite of a course
already successfully completed. Exceptions can be
made by the department chairperson.

Courses in French (FRE)

Students offering high school language preparation as a prerequisite are required to take a placement test.

Course Placement. Students with two years of high school French normally take course 2, those
with three years take course 3, and those with four
years take course 21. Lower Division

1. Elementary French (5)
Discussion—5 hours; laboratory—1 hour. Introduc-
tion to French; development of all language
skills in a cultural context with special emphasis
on communication. Not open for credit to students who have
completed course 1A; students who have
successfully completed course 1 or 1S 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 stu-
dent’s transcript. GE credit: ArtHum | AH, WC.

2. Elementary French (5)
Discussion—5 hours; laboratory—1 hour. Prerequi-
site: course 1. Continuation of course 1. Not open for credit to students who have taken course 1A GE credit: ArtHum | AH, WC.

3. Elementary French (5)
Discussion—5 hours; laboratory—1 hour. Prerequi-
site: course 1 or 1S. Continuation of course 1.
Course is taught abroad. Not open for credit to stu-
dents who have completed course 1A or 2. GE
credit: ArtHum | AH, WC.

4. Elementary French (5)
Discussion—5 hours; laboratory—1 hour. Prerequi-
site: course 1A, 3, or 3S. Review of gram-
mar and vocabulary acquired in the elementary
sequence, as well as the study of new grammatical
structures and a continuing enrichment of vocabulary
through oral work in class, written exercises, read-
ings and compositions. Not open for credit to stu-
dents who have completed course 21S. GE credit: ArtHum | AH, OL, OL, WE—F, W, S.

5. Elementary French (5)
Discussion—5 hours; laboratory—1 hour. Prerequi-
site: course 2 or 2S. Not open for credit to students who
have taken course 1A. Continuation of course 2.
Course is taught abroad. Not open for credit to stu-
dents who have completed course 1A or 3. GE
credit: ArtHum | AH, WC.

6. Intermediate French (5)
Lecture/discussion—4 hours; laboratory—1 hour. Prerequi-
site: course 1A, 3, or 3S. Review of gram-
mar and vocabulary acquired in the elementary
sequence, as well as the study of new grammatical
structures and a continuing enrichment of vocabulary
through oral work in class, written exercises, read-
ings and compositions. Not open for credit to stu-
dents who have completed course 21. GE credit:
ArtHum | AH, OL, OL, WE.

7. Intermediate French (5)
Lecture/discussion—4 hours; laboratory—1 hour. Prerequi-
site: course 21 or 21S. Continuation of course
21 or 21S. Review of grammar and vocabu-
lar, as well as the study of new grammatical
structures and a continuing enrichment of vocabulary.
Not open for credit to students who have
completed course 22S. GE credit: ArtHum | AH, OL, OL, WE—F, W, S.

8. Intermediate French (5)
Lecture/discussion—4 hours; laboratory—1 hour. Prerequi-
site: course 21 or 21S. Continuation of course
21 or 21S. Review of grammar and vocabular,
as well as the study of new grammatical
structures and a continuing enrichment of vocabulary.
Not open for credit to students who have
completed course 22. GE credit: ArtHum | AH, OL, OL, WE—F, W, S.

9. Intermediate French (5)
Lecture/discussion—4 hours; laboratory—1 hour. Prerequi-
site: course 2 or 2S. Not open for credit to students who
have taken course 1A. Continuation of course 2.
Course is taught abroad. Not open for credit to stu-
dents who have completed course 1A or 3. GE
credit: ArtHum | AH, WC.

10. Intermediate French (5)
Lecture/discussion—4 hours; laboratory—1 hour. Prerequi-
site: course 3 or 3S. Review of gram-
mar and vocabulary acquired in the elementary
sequence, as well as the study of new grammatical
structures and a continuing enrichment of vocabulary
through oral work in class, written exercises, read-
ings and compositions. Not open for credit to stu-
dents who have completed course 23. GE credit:
ArtHum | AH, OL, OL, WE—F, W, S.

11. Intermediate French (5)
Lecture/discussion—4 hours; laboratory—1 hour. Prerequi-
site: course 23 or 23S. Continuation of course
23 or 23S. Review of grammar and vocabular,
as well as the study of new grammatical
structures and a continuing enrichment of vocabulary.
Not open for credit to students who have
completed course 24. GE credit: ArtHum | AH, OL, OL, WE—F, W, S.

12. Intermediate French (5)
Lecture/discussion—4 hours; laboratory—1 hour. Prerequi-
site: course 24 or 24S. Continuation of course
24 or 24S. Review of grammar and vocabular,
as well as the study of new grammatical
structures and a continuing enrichment of vocabulary.
Not open for credit to students who have
completed course 25. GE credit: ArtHum | AH, OL, WE.

13. Intermediate French (5)
Lecture/discussion—4 hours; laboratory—1 hour. Prerequi-
site: course 25 or 25S. Continuation of course
25 or 25S. Review of grammar and vocabular,
as well as the study of new grammatical
structures and a continuing enrichment of vocabulary.
Not open for credit to students who have
completed course 26. GE credit: ArtHum | AH, OL, WE.

Lecture/discussion—4 hours; laboratory—1 hour. Prerequi-
site: course 26 or 26S. Continuation of course
26 or 26S. Review of grammar and vocabular,
as well as the study of new grammatical
structures and a continuing enrichment of vocabulary.
Not open for credit to students who have
completed course 27. GE credit: ArtHum | AH, OL, WE.

15. Elementary French (15)
Discussion—5 hours; laboratory—1 hour. Introduc-
tion to French grammar and development of all lan-
guage skills in a cultural context with special emphasis
on communication. Course is taught abroad.
Students who have successfully completed
French 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. Not open for credit to students who have completed course 1 or 1A. GE credit: ArtHum | AH, WC.

2. Secondary French (5)
Lecture—3 hours; discussion—2 hours; term paper.
Introduction to the tradition of French cinema from its
creation by Maltese and the Lumière brothers through
New Wave (especially works of Truffaut and Godard) and more recent developments in
French and Francophone film. Taught in English.
Offered in alternate years. GE credit: ArtHum, Writ | AH, VL, WC, WE.—Fort, Warner

51. Major Works of French Literature in Translation
(4)
Lecture—2 hours; discussion—1 hour; term paper.
Readings in English translation of key works of
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 iden-
It. GE credit: ArtHum, Div | Writ, AH, WC, WE—Fort, Guynn

52. France and the French-Speaking World (4)
Lecture—2 hours; discussion—1 hour; term paper.
Taught in English. A survey of the history and culture of France and the French-speaking world, especially
Canada, the Caribbean and Africa. Study of social,
historical and cultural issues in the French-
speaking world, with particular attention to mass
media. GE credit: ArtHum, Div | Writ, AH, WC, WE—Simon

53. French as a World Language (4)
Lecture/discussion—3 hours; term paper. The lin-
guistic status of French and its function in multilingual
societies and international arenas. Linguistic-politi-
cal landscape of communities in Eurasia, Africa, and
the Americas. Sociolinguistic concepts and the
emergence of French as a world language. GE credit:
ArtHum or SocSci, Div | Writ, AH, OL, OL, WE—Russell

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

Course 100 is the prerequisite for the majority of the upper division literature courses.

100. Composition in French (4)
Lecture—3 hours; term paper. Prerequisite: course 100. GE credit: ArtHum | WC.

101. Introduction to French Poetry (4)
Lecture—3 hours. Prerequisite: course 100 or con-
sent of instructor. Analysis and evaluation of works
representing the main types of French poetry. Study of
French poetic conventions and versification. GE credit: ArtHum | AH, WC, WE.—Goldstein

102. Introduction to French Drama (4)
Lecture—3 hours. Prerequisite: course 100 or con-
sent of instructor. Analysis and evaluation of plays
representing the main types of French drama, with
emphasis on dramatic structure and techniques. GE credit: ArtHum | AH, WC, WE.—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 | WC, WE—Fort, Simon

104. Translation (4)
Lecture—3 hours; extensive writing. Prerequisite:
course 100 or the equivalent. Practice in English-
 French and French-to-English translation using a vari-
ety of non-literary materials, illustrating different
problems and styles.
105. Advanced French Grammar (4) Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 23 or the equivalent. Understanding and practice with various grammatical structures in French. Lexical-semantic, morphological, and syntactic analysis. GE credit: WRT.

105S. Advanced French Grammar (4) Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 23 or 23S. Understanding of, and extensive practice with, various grammatical structures in French. Lexical-semantic, morphological, and syntactic analysis. Taught abroad. Not open for credit to students who have taken course 105. GE credit: WE.

106. French in Business and the Professions (4) Lecture—1 hour; discussion—2 hours. Prerequisite: course 100 or consent of instructor. The French language as used in the commercial sphere. Emphasis on proper style and form in letter-writing, and in non-literary composition. Technical terminology in such diverse fields as government and world business. GE credit: WE.

107. The Making of Modern France (4) Lecture—3 hours; term paper. Prerequisite: course 23. 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, and modernism. GE credit: ArtHum | AH, WE. —Goldstein, Simon

107A. Pre and Early Modern France (4) Lecture—3 hours; term paper. Prerequisite: course 23. Introduction to pre- and early modern French culture and its political regimes. Approach to topics such as the feudal system, the rise of the monarchy, the Reformation and religious wars. GE credit: ArtHum | AH, WRT | AH, WE. —Goldstein, Simon

107B. The Making of Modern France (4) Lecture—3 hours; term paper. Prerequisite: course 23. Introduction to French culture through a historical approach to topics such as the absolute monarchy, the role of the parlements, the French revolution, and the rise of the nation state. GE credit: ArtHum | AH, WE. —Goldstein, Simon

107C. The Making of Modern France (4) Lecture—3 hours; term paper. Prerequisite: course 23 or 23S. Introduction to French culture through a historical approach to topics such as the rise of the nation-state centralization of the monarchy, and the rise of public education, colonization, class and social relationships. Taught abroad. Not open for credit to students who have completed course 107. GE credit: ArtHum | AH, WRT | AH, WE. —Goldstein, Simon

107D. Modern French Culture (4) Lecture—3 hours; extensive writing. Prerequisite: course 23. 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. GE credit: WRT | AH, WE. —Fort, 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. GE credit: ArtHum or SocSci | AH or SS. —Russell

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 methods. Major emphasis on Queneau’s Exercices de style. Practice in such stylistic modifications as inversion, antithesis, changes in tense, mood, tonality, etc. The writing of poetry. GE credit: WRT.

115. Medieval French Literature and Society (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Social and cultural life of medieval France as studied through its 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 farces. GE credit: ArtHum | AH, WRT | AH, WE. —Guynn

116. The French Renaissance (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Overview of major works and writers with particular attention to the historical context of the turbulent 16th century. Writers to be read may include Rabelais, Marot, Ronsard, Du Bellay, Balue, Marguerite de Navarre, Montaigne, and D’Aubigné. GE credit: ArtHum | AH, WRT | AH, WE. —Goldstein, Guynn

117A. Baroque and Preclassicism (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or consent of instructor. The literature and intellectual culture of the period between the Renaissance and French classicism. GE credit: ArtHum | AH, WRT | AH, WE. —Goldstein, Guynn

117B. The Great Century (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Literature, culture, and politics in the Age of Louis XIV. May be repeated one time for credit when topic differs. GE credit: ArtHum | AH, WRT | AH, WE. —Goldstein, Guynn

117C. The Age of Reason and Revolution (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100. Literature and philosophy of the French Enlightenment from such authors as Bayle, Fontenelle, Montesquieu, Voltaire, Rousseau and Diderot. GE credit: ArtHum | AH, OL, WRT | AH, WE. —Simon

118A. Private Lives and Public Secrets: The Early French Novel (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or consent of instructor. History of the French roman from the Middle Ages to the Revolution with a focus on the 18th century. GE credit: ArtHum | AH, WRT | AH, WE. —Simon

119A. The Romantic Imaginary (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Major concepts and themes of French Romanticism, such as dream and the supernatural, impossible love, exoticism, revolution, individualism, nature, the mad du siècle, Romantic modernity and imagination, the cult of the ruin. GE credit: ArtHum | WRT | AH, WRT | AH, WE. —Fort, Simon

119B. Realism, History and the Novel (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Narrative and historical codes of French realist fiction, with emphasis on the representation of history in the realistic novel, its depiction of social “realities” such as class and gender, and its relation to the historical situation of post-revolutionary society. GE credit: ArtHum | WRT | AH, WRT | AH, WE. —Fort, Simon

120. Modern French Thought (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Overview of post-Second World War French intellectual currents from existentialism and structuralism to deconstruction. Readings will include Sartre and de Beauvoir, Camus, Lévi-Strauss, Lacan, Barthes, Foucault, Derrida, Kristeva, Sollers, Coover, and Iragay. Offered in alternate years. GE credit: ArtHum | WRT | AH, WRT | AH, WE. —F. (F.) Fort

121. Twentieth Century French Novel (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Novels and theories of the novel from Proust to the Novo Román and beyond. Readings from among Gide, Sartre, de Beauvoir, Camus, Breton, Beckett, Robbe-Grillet, Sarras, Simon, Duras, Dufreny, Perec, Madiano, Guibert, Tounsi. GE credit: ArtHum | WRT | AH, WRT | AH, WE. —Fort, Warner

122. French and Francophone Film (4) Lecture/discussion—4 hours; extensive writing, fieldwork—3 hours. Prerequisite: course 100 or consent of instructor. Focus on French and Francophone cinema from the Lumière Brothers to the present. Topics may include analysis of film form and narrative, major filmmakers and film movements, and other topics. May be repeated one time for credit when topic differs. GE credit: ArtHum | AH, VL, WRT | AH, WE. —Fort, Warner

124. Post-Colonial and Francophone Literature (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Postindependence Black African and/or Caribbean and/or North American 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 one time for credit with approval of major advisor when topic differs; for example, students may take the course for repeat credit when the geographical focus (West Africa, North, African or Caribbean) or theme is substantially different from previous iterations. GE credit: ArtHum, Div | AH, VL, WRT | AH, WE. —Warner

125. French Literature and Other Arts (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Relationship between French literature and other art forms, such as painting, music, cinema, architecture, opera, from different periods. May be repeated one time for credit when topic differs. GE credit: ArtHum | WRT | AH, WRT | AH, WE. —Fort, Goldstein, Guynn

127. Paris: Modernity and Metropolitan Culture (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Focus on Paris in 19th and 20th century texts and its importance in defining the experience and art of modernity. GE credit: ArtHum | WRT | AH, VL, WRT | AH, WE. —Simon

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 one time for credit when topic differs. GE credit: WRT | AH, WE.

128S. 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. Taught abroad. May be repeated one time for credit when topic differs. GE credit: ArtHum | AH, VL, WRT | AH, WE. —Simon

130. From Page to Stage: Theatre and Theatricality (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or consent of instructor. French theatre as literature and performance. May be repeated one time for credit when topic differs. GE credit: ArtHum | WRT | AH, WE. —Guynn
133. Gender and Politics in French Literature and Culture (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Thematic, theoretical and political tendencies in contemporary French fiction. Barthes, Foucault, Duras, Guibert, considered in terms of their writing on women and gender. GE credit: ArtHum AH, WC, WE.—Guynn

140. Study of a Major Writer (4)
Lecture—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Concentrated study of works of a single author. May be repeated two times for credit if subject changes. GE credit: ArtHum AH, WC, WE.

141. Selected Topics in French Literature (4)
Lecture—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Subjects and themes such as satiric and didactic poetry of the Middle Ages, poetry of the Pleiad, theater in the eighteenth century, pre-romantic poetry, autobiography, literature and film, etc. May be repeated two times for credit when topics differ. GE credit: ArtHum AH, WC, WE.

141S. Directed Group Study (1-5)
Group study on focused topics in French literature and culture. May be repeated for credit. GE credit: P/NP grading only. —Goldstein

142. History of the French Language (4)
Seminar—3 hours; term paper. Prerequisite: course 100 or Linguistics 1. Introduction to the linguistic study of modern French, with focus on sound structure and form, inflection and derivation. GE credit: ArtHum or SocSci AH or SS, WE.—W (W) Anderson, Russell

143. Seventeenth-Century Literature: Poetry (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Introduction to the main changes in the grammatical structures of French, from Latin to contemporary usage, involving textual analysis and sociolinguistic description.—Russell

144. Eighteenth-Century Literature: Philosophy (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the works of one or several novelists and/or short-story writers of the period. May be repeated for credit when topics differ. GE credit: P/NP grading only.—Simon

145. Nineteenth-Century Literature: Fiction (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the works of one or several novelists of the period. May be repeated for credit when different topics are studied.—Simon

146. Twentieth-Century: Prose (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the works of one or several dramatists of the period. May be repeated for credit with consent of instructor when different topics are studied.—Goldstein

147. Studies in Poetry (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Concentrated 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.—Goldstein

148. Studies in the Theater (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the works of one or several playwrights of the period. May be repeated for credit with consent of instructor when different topics are studied.—Goldstein

149. Studies in Narrative Fiction (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the works of one or several dramatists of the period. May be repeated for credit with consent of instructor when different topics are studied.—Goldstein

150. Studies in Criticism (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. May be repeated for credit with consent of instructor when different topics are studied.—Goldstein

151. Studies in Film (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. May be repeated for credit with consent of instructor when different topics are studied.—Goldstein

152. Studies in Language (4)
Seminar—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Study of the works of one or several novelists of the period. May be repeated for credit with consent of instructor. GE credit: P/NP grading only. —Goldstein

153. Seventeenth-Century Literature: Poetry (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the works of one or more poets of the period. May be repeated for credit with consent of instructor. GE credit: P/NP grading only. —Goldstein

154. Eighteenth-Century Literature: Philosophy (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Not a course in philosophy, but an examination of the role of philosophers in the design and context of literary works. Study of one or more authors. May be repeated for credit.—Simon

155. Eighteenth-Century Literature: Novel (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. 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.—Goldstein

156. Nineteenth-Century Literature: Fiction (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the works of one or several novelists of the period. May be repeated for credit with consent of instructor when different topics are studied.—Goldstein

157. Twentieth-Century: Prose (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the works of one or several dramatists of the period. May be repeated for credit with consent of instructor when different topics are studied.—Goldstein

158. Twentieth-Century: Poetry (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the works of one or several poets of the period. May be repeated for credit with consent of instructor.—Goldstein

159. Twentieth-Century: Philosophy (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. May be repeated for credit with consent of instructor when different topics are studied.—Goldstein

160. Twentieth-Century: Film (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the works of one or several dramatists of the period. May be repeated for credit with consent of instructor when different topics are studied.—Goldstein

161. Twentieth-Century: Language (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the works of one or several novelists of the period. May be repeated for credit with consent of instructor when different topics are studied.—Goldstein

162. History of the French Language (4)
Lecture—3 hours; term paper. Prerequisite: course 100 or Linguistics 1. 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. Offered in alternate years. GE credit: ArtHum or SocSci AH or SS, WE.—W (W) Anderson, Russell

163. Internship—1-12
Internship—1-36 hours; term paper. Prerequisite: upper division standing and consent of instructor. Practical experience of the French language through work experience in government and/or business, culminating in an analytical term paper on a topic approved by the sponsoring instructor. (P/NP grading only.)—Goldstein

164. 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.) GE credit: AH, WC, WE.

165H. Honors Thesis—4 hours. Independent study—4 hours. 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.) GE credit: AH, WC, WE.
215. Topics in French and Francophone Film (4)  
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Aims at providing an in-depth study of selected foreign language films, their cultural context, and the socio-historical period of filmmaking. 
—Fort

224. Francophone Literatures (4)  
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of cultural productions (literature, film, visual arts) by Francophone peoples such as found in North Africa, West Africa, the Caribbean, South-East Asia, the Americas, and the metropolitan France. 
—Fort

250A. French Linguistics I (4)  
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. 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. 
—Russell

250B. French Linguistics II (4)  
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. 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. 
—Russell

251. Topics in the Linguistic Study of French (4)  
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Questions relevant to the linguistic study of French, such as language acquisition, sociolinguistics, or theoretical examination of structure. Intended for students in French Linguistics and those applying linguistic models to literature or teaching. 
—Russell

291. Foreign Language Learning in the Classroom (4)  
Seminar—3 hours; project. Prerequisite: graduate standing or consent of instructor. Overview of approaches to university-level foreign language instruction and the theoretical notions underlying current trends in classroom practices across commonly taught foreign languages. 
—Russell and Spanish I

297. Individual Study (1-5)  
Prerequisite: graduate standing or consent of instructor. 
(S/U grading only.)

298. Group Study (1-5)  
Seminar—1-5 hours. Prerequisite: graduate standing or consent of instructor. May be repeated for credit with consent of instructor. 

299. Research (1-12)  
Prerequisite: graduate standing or consent of instructor. 
(S/U grading only.)

299D. Dissertation Research (1-12)  
Prerequisite: graduate standing or consent of instructor. 
(S/U grading only.)

Professional  
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. 

309A. Teaching of French in College (2)  
Lecture/discussion—2 hours. Prerequisite: graduate standing or consent of instructor. Course designed for graduate teaching assistants and instructors to improve their ability to communicate with lower division classes at the university. May be repeated for credit with consent of instructor. 
(S/U grading only.)

309B. 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.)

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:  

Fungal Biology and Ecology.........18-20  
Plant Pathology 130, 149, 150 ............10  
Selected 7.5 hours from Technology 104, Plant Pathology 40, 135, 185, Science and Society 30, Soil Science 111; Plant Pathology 224 (available to advanced students with consent of instructor).................................7-9  

Minor Adviser. T. Gordon

Gender, Sexuality and Women's Studies  
(College of Letters and Science)  
Maxine Craig, Ph.D., Program Director
Program Office. 1200 Hart Hall
530-752-6629; http://gsw.ucdavis.edu/

Committee in Charge  
Elizabeth Constable, Ph.D.  
Maxine Craig, Ph.D.  
(Women's Studies and Women's Studies)  

Maxine Craig, Ph.D.  
(�Gender, Sexuality and Women's Studies)  

Wendy Ho, Ph.D. (Asian American Studies; Gender, Sexuality and Women's Studies)  
Rana Jaleel, Ph.D./J.D., Assistant Professor  
(Gender, Sexuality and Women's Studies)  

Suad Joseph, Ph.D. (Anthropology, Women and Gender Studies)  
Susan Kaiser, Ph.D. (Gender, Sexuality and Women's Studies; Textiles and Clothing)  
Amina Mama, Ph.D. (Gender, Sexuality and Women's Studies)  
Kimberly D. Netles-Barcelón, Ph.D. (Gender, Sexuality and Women's Studies)  

Faculty  
Elizabeth Constable, Ph.D., Associate Professor  
(Gender, Sexuality and Women's Studies)  
Maxine Craig, Ph.D., Associate Professor  
(Gender, Sexuality and Women's Studies)  

Wendy Ho, Ph.D., Senior Lecturer (Asian American Studies; Gender, Sexuality and Women's Studies)  
Rana Jaleel, Ph.D./J.D., Assistant Professor  
(Gender, Sexuality and Women's Studies)  

Suad Joseph, Ph.D., Professor (Anthropology; Gender, Sexuality and Women's Studies)  
Susan B. Kaiser, Ph.D., Professor (Gender, Sexuality and Women's Studies)  
Amina Mama, Ph.D., Professor (Gender, Sexuality and Women's Studies)  
Kimberly D. Netles-Barcelón, Ph.D., Associate Professor (Gender, Sexuality and Women's Studies)

Emeriti Faculty  
Anna Kuhn, Ph.D., Emeritus  
Judith Newton, Ph.D., Emeritus  
Leslie Rabine, Ph.D., Emeritus

The Major Program  

Gender, Sexuality and Women’s Studies is an inter-disciplinary major founded on the understanding that the social production of gender is inseparable from that of race, sexuality, class, nationality, ability and other categories of difference. Our curriculum places feminist concerns within a transnational context, while respecting the geographical and historical specificity. These frameworks inform our teaching, our research, our institutional and community practices, and the principles we bring to our classrooms. Gender, Sexuality and Women’s Studies offers a wide range of courses that use the lens of gender to examine colonialism and post-colonialism, globalization, history, sexuality, queer theory, literature, popular culture, feminism, queer studies, area studies, film fashion and food. The Program offers both an undergraduate major and minor. We also work collaboratively with other units on campus to sponsor two undergraduate minors, Sexuality Studies and Social and Ethnic Relations, and an undergraduate concentration in transnational production and consumption. 

The Program. One of the most exciting and challenging aspects of the Gender, Sexuality and Women’s Studies Program is that students, in consultation with the peer and faculty advisers, can pursue their particular academic interests and design their coursework accordingly. In devising their major plan, students will draw on courses offered in African American and African Studies, American Studies, Anthropology, Asian American Studies, Chicana/o Studies, Comparative Literature, English, French, German and Italian Studies, History, 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, class, race, ethnicity, and sexuality, the Gender, Sexuality and Women’s 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 Gender, Sexuality and Women’s Studies majors find it advantageous to pursue a double major, or to minor in another field of study. Upon successful completion of the degree requirements, students majoring in the program will graduate with a Bachelor of Arts in Gender, Sexuality and Women’s Studies.

Career Alternatives. A degree in Gender, Sexuality and Women’s Studies opens many possibilities for future employment. The program introduces students to relevant social issues, fosters critical thinking, develops strong verbal, writing and research skills and encourages social advocacy.

Pre-professional students will discover that a major in Gender, Sexuality and Women’s Studies offers useful preparatory training for medical or law school. It is particularly suitable for those interested in specializing in social policy, international development, social justice or gender-related work in a wide range of institutions and contexts. Students who plan to do practical work in counseling, clinical psychology, social services, education, media or politics will also find a major in Gender, Sexuality and Women’s Studies a strong foundation. Those who wish to pursue graduate level research in such fields as anthropology, comparative literature, cultural studies, economics, education, English, film studies, history, languages and literatures, performance studies, philosophy, political science, and sociology will also benefit from a strong Gender, Sexuality and Women’s Studies undergraduate background in critical theory, social analysis,
A.B. Major Requirements:

Studies service in the community. Students to integrate theory with hands-on practice and vide even more ideas about possible future careers. than those described above. Gender, Sexuality and Women’s Studies major requirements. Some of our alumni have developed careers other than those described above. Gender, Sexuality and Women’s Studies programs, multicultural community centers, LGBTQ organizations and other organizations designed specifically to deal with gender, social diversity and inequality, and a growing range of old and new social challenges arising in the context of globalization.

Gender, Sexuality and Women’s Studies

A.B. Major Requirements:

Preparatory Subject Matter

UNITS

Preparatory Subject Matter ............... 20

Three courses from: Women’s Studies, 50, 60, 70, 120, 123, 131, 137, 150

Two courses selected from: African American and African Studies 10, 17, American Studies 21, 30, Anthropology 2, 20, 30, Asian American Studies 1, 2, Chicano/a Studies, 10, 215, 250, Comparative Literature 12, 120, Dramatic Art 1, English 3, History 72A, 72B, 85, Native American Studies 10, 32, Political Science 7, Psychology 1, Science and Technology 1, 2, 20, 32, Sociology 2, 3, 11, 30A, 30B, Textiles and Clothing 7, Undergraduate Writing Program 19.

Women’s Studies 20, 25, 26, 40, 45, 50

Depth Subject Matter

UNITS

Women’s Studies 103, 104, 137, 190, 191

Histories and Cultures ...................... 12

Choose three courses to meet this requirement. May duplicate those used to meet other Gender, Sexuality and Women’s Studies major requirements. The list that follows represents a partial list of options; other courses may be included with the consent of the Gender, Sexuality and Women’s Studies Adviser.


Thematic Tracking Modules

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Choose one of three cluster tracks. Choose four courses that form a thematic cluster, at least two of which are Women’s Studies courses specified for the track. Courses used to meet this requirement may not duplicate those used to meet other Gender, Sexuality and Women’s Studies major requirements. Students may also develop their own thematic or interdisciplinary course cluster in consultation with the faculty adviser.

Track 1: Social Justice, Gender Politics and Activism

Requires two of the following Women’s Studies courses 102, 120, 145, 146, 148, 170, 175, 182, 187, 192, 193.


Track 2: Culture, Power, and Resources


Track 3: Sexualities, Subjectivities and Body Politics

Requires Women’s Studies 170 and one course from: 130, 136, 138, 158, 160, 174, 175, 176, 187.


Total units for the major: ............ 64

Major Adviser. All Gender, Sexuality and Women’s Studies majors and minors must consult with a faculty adviser, individually, at least once each academic year.

Minor Program Requirements:

UNITS

Gender, Sexuality and Women’s Studies

Women’s Studies 20, 50, 60, 70 or 80 ... 4


Choose one from: Anthropology 148B, Comparative Literature 135, 138, 159, English 129, 185A, 185B, History 102G, 102H, 102M, 144, 148, 158, Women’s Studies 102, 180, 182, 184 ...

Additional Electives from approved list of upper division cross-listed and Women’s Studies courses ... 12

Note: With prior consultation with an 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 Gender, Sexuality and Women’s Studies majors and minors must consult with a faculty adviser, individually, at least once each academic year.

Graduate Study

The Gender, Sexuality and Women’s Studies Program offers a designated emphasis in Feminist Theory and Research for students enrolled in the Ph.D. programs of fifteen other affiliated departments.

Courses in Women’s Studies (WMS)

Lower Division

20. Cultural Representations of Gender (4)

Lecture/discussion—4 hours. Interdisciplinary inves-
tigation of how specific cultures represent gender dif-
fERENCE. Examine a variety of cultural forms and phenomena including film, television, literature, music, popular movements, and institutions. Offered irregularly. GC credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, VL, WC, WE.

25. Gender and Global Cinema (4)

Lecture—3 hours; film viewings—3 hours. The role gender plays in film/history/culture in various geo-
ographical 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. GC credit: ArtHum, Div, Wrt|AH, VL, WC, WE.

50. Introduction to Critical Gender Studies (4)

Lecture—3 hours; discussion—1 hour. Introduction to interdisciplinary, critical gender studies. Addresses the emergence of women’s, gender and feminist studies internationally, its links to women’s move-

60. Feminist Critiques of Western Thought (4)

Lecture/discussion—4 hours. Critical introduction to major traditions of social thinking in the West from a feminist perspective. Offered irregularly. GC credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, WE.

70. Theory and History of Sexualities (4)

Lecture/discussion—4 hours. Key issues in the social construction, organization, and reproduction of sexual identities such as the interrelation of sexual identity with gender, race, ethnicity, and class, and the relation between movements for sexual liberation and the regulation of the body. GC credit: ArtHum or SocSci, Div|ACGH, AH or SS, DD, WE.

80. SpecialTopics in Women’s Studies (4)

Lecture/discussion—4 hours. Limited enrollment. In-depth examination of a women’s studies topic related to the research interest of the instructor. May be repeated for credit when topic differs. Offered irregularly.

90X. Lower Division Seminar (2)

Seminar—2 hours. Examination of a special topic in Women’s Studies through shared readings, discus-
sions, and written assignments.

91. Research Seminar in the Transnational Production and Consumption of Fashion (1-2)

Seminar—1-2 hours. Preparation for a research confer-
ence. May be repeated for credit when topic var-
ies.

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

102. Gender and Post Colonialism (4)

Lecture/discussion—4 hours; term paper. Prerequi-
site: course 50, 60. Explores changing configura-
tions of race, gender, sexuality, class and implications for gendering in one or more colonial or postcolonial regimes in the Americas and the Pacific.

GC credit: ArtHum or SocSci, Div, Wrt|AH or SS, DD, DW, WC, WE.

103. Introduction to Feminist Theory (4)

Lecture/discussion—4 hours. Prerequisite: course 50 recommended or consent of instructor. Introduction to the emergence of feminist theory and to key con-
cepts in feminist theorizing. Examination of past and current debates over sexuality, race, identity politics,
and the social construction of women's experience. GE credit: ArtHum or SocSci | AC|GH, AH or SS, DD, VL, WE.—F, S.

104. Feminist Approaches to Inquiry (4)
Lecture/discussion—4 hours. Prerequisite: course 50 recommended or consent of instructor. Feminist applications and transformations of traditional disciplinary practices; current issues and methods in feminist interdisciplinary work. GE credit: ArtHum or SocSci | AC|GH, AH or SS, DD, WE.—W (W).

130. Feminism and the Politics of Family Change (4)
Lecture/discussion—4 hours. 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 W | AC|GH, AH or SS, DD, WE.—W (W).

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. Offered irregularly. GE credit: ArtHum or SocSci, Div W | AC|GH, AH or SS, DD, WE.—W (W).

137. Feminist Interpretations of Contemporary Western Thought (4)
Lecture/discussion—4 hours. Introduction to decolonizing, deassimilating, and reinterpreting Eurocentric, postmodern, and postcolonial thought from a feminist perspective to address gender, race, sexuality, and class. Offered irregularly. GE credit: ArtHum or SocSci, Div W | AC|GH, AH or SS, DD, WE.—W (W).

138. Critical Fashion Studies (4)

139. Feminist Cultural Studies (4)
Lecture/discussion—4 hours. The histories, theories, and practices of feminist traditions within Cultural Studies. (Same as course American Studies 139.) Offered irregularly. GE credit: ArtHum or SocSci, Div W | AC|GH, AH or SS, DD, VL, WE.—W (W).

140. Gender and Law (4)
Lecture/discussion—4 hours. Exploration of women's legal status and role in historical and contemporary context, discussing a variety of legal issues and applicable feminist theories. Topics include constitutional equal protection, discrimination in employment and educational orientation, and the regulation of abortion. Offered irregularly. GE credit: SocSci, Div | AC|GH, DD, SS.

145. Women's Movements in Transnational Perspective (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 50 recommended. Class size limited to 90 students. Transnational perspectives on twentieth and twenty-first century women's movements in Western, colonial and postcolonial contexts, examining movement's forms and political orientations and relationships between women's movements and other forces for change. Offered in alternate years. GE credit: ArtHum or SocSci, Div W | AC|GH, AH or SS, DD, WE.—W (W).

148. Science, Gender, and Social Justice (4)
Lecture/discussion—4 hours; term paper. Class size limited to 20 students. Critical readings and reflection on the history of Western science, scientific institutions and the changing role of science in relation to inequalities of class, race, gender and sexuality, and global struggles for equality and justice. Offered irregularly. GE credit: ArtHum or SocSci, Div W | AC|GH, AH or SS, DD, WE.—W (W).

158. Contemporary Masculinities (4)
Lecture/discussion—4 hours. A multidisciplinary study of contemporary trends in masculinity and the economic, social, and political factors that have shaped them. Topics may include men's movements, ethnic nationalism, masculinities, and images of masculinity in popular culture. Offered in alternate years. GE credit: ArtHum or SocSci, Div W | AC|GH, AH or SS, DD, WE.—W (W).

160. Women, ‘Race’ and Sexuality in Postcolonial Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Class size limited to 90 students. Feminist analysis of race, sexuality and class in the representation of women in commercial and/or independent films. Offered in alternate years. GE credit: ArtHum, Div W | AC|GH, AH or SS, DD, WE.—W (W).

162. Feminist Film Theory and Criticism (4)
Lecture/discussion—3 hours; film-viewing—3 hours. 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 W | AC|GH, AH or SS, DD, WE.—W (W).

164. Topics in Gender and Cinematic Representation (4)
Lecture/discussion—3 hours; film-viewing—3 hours. Examination of a specific topic within the broad rubric of gender/cinema. Possible topics include Latinas in Hollywood; gender, nation, cinema; and gender and film genre. Topics vary. May be repeated two times for credit when topic differs. Offered irregularly. GE credit: ArtHum, Div W | AC|GH, AH or SS, DD, WE.—W (W).

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. Basic media production and community service. Video, audio and photography instruction; feminist community documentary; video journaling; alternative representations of fashion and women's bodies. Fundamentals of camera and microphone operation, interviewing techniques, and editing. May be repeated three times for credit when topic differs. Offered irregularly. GE credit: ArtHum or SocSci, Div W | AC|GH, AH or SS, DD, VL, WE.—W (W).

170. Queer Studies (4)
Lecture/discussion—4 hours. Prerequisite: course 70 recommended 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 W | AC|GH, AH or SS, DD, WE.—W (W).

175. Gender and Experience of Race (4)
Lecture/discussion—4 hours. Exploration of the construction of “race” and gender in comparative national historical contexts and contemporary lived experience. Study of intersections of race and gender in identity and the regulation of both in the construction, social movements and consumption shape racialized gendered identities. Offered irregularly. GE credit: ArtHum or SocSci, Div W | AC|GH, AH or SS, DD, WE.—W (W).

178A. Women Writers and the Transnational Imaginary (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Offerings by women from diverse regions and cultures, understanding in their cultural, socio-economic, and historical contexts, with each course offering a focus on women's writing in specific geographic/national locations and their diasporas: Asia. Offered irregularly. GE credit: ArtHum, Div W | AC|GH, AH, VL, WE.—W (W).

178B. Women Writers and the Transnational Imaginary (4)
Lecture/discussion—4 hours. Offerings by women from diverse regions and cultures, understanding in their cultural, socio-economic, and historical contexts, with each course offering a focus on women's writing in specific geographic/national locations and their diasporas: Africa, Latin America, and the Caribbean. Offered irregularly. GE credit: ArtHum, Div W | AC|GH, AH, VL, WE.—W (W).

178C. Women Writers and the Transnational Imaginary (4)
Lecture/discussion—4 hours. Offerings by women from diverse regions and cultures, understanding in their cultural, socio-economic, and historical contexts, with each course offering a focus on women's writing in specific geographic/national locations and their diasporas: Middle East and North Africa. Offered irregularly. GE credit: ArtHum, Div W | AC|GH, AH, VL, WE.—W (W).

178D. Women Writers and the Transnational Imaginary (4)
Lecture/discussion—4 hours. Offerings by women from diverse regions and cultures, understanding in their cultural, socio-economic, and historical contexts, with each course offering a focus on women's writing in specific geographic/national locations and their diasporas: South Asia. Offered irregularly. GE credit: ArtHum, Div W | AC|GH, AH, VL, WE.—W (W).

178E. Women Writers and the Transnational Imaginary (4)
Lecture/discussion—4 hours. Offerings by women from diverse regions and cultures, understanding in their cultural, socio-economic, and historical contexts, with each course offering a focus on women's writing in specific geographic/national locations and their diasporas: Latin America. Offered irregularly. GE credit: ArtHum, Div W | AC|GH, AH, VL, WE.—W (W).

178F. Transnational and Writing by Women of Color (4)
Lecture/discussion—4 hours. Offerings by women of color in a transnational framework, understood in their cultural, socio-economic, and historical contexts. The interrelation among gender, writing, nationalism, and transnationalism with focus on women's writing in specific geographic/national locations and their diasporas: Topics on Women Writers of Color. Offered irregularly. GE credit: ArtHum, Div W | AC|GH, AH, VL, WE.—W (W).

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 and historical analysis of gender in its intersections with race, class, sexuality, and politics. Offered irregularly. GE credit: ArtHum, Div W | AC|GH, AH, VL, WE.—W (W).

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 sociocultural and historical contexts. Offered irregularly. GE credit: ArtHum, Div W | AC|GH, AH, DD, WE.—W (W).

182. Globalization, Gender and Culture (4)
Lecture/discussion—4 hours. Critical gender analysis of globalization as a process of interconnected cultural, social and economic transformations impacted by gender, nation, class and race/ethnicity. Critical self-reflection and social observation skills. Offered in alternate years. GE credit: ArtHum or SocSci, Div W | AC|GH, AH or SS, OL, WE.—W (W).

184. Gender in the Arab World (4)

Fall 2011 and on Revised General Education (GE) AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences, AC|GH—American Cultures; DD—Domestic Diversity; VL—Visual; WC—World Cultures; WE—Writing Experience
Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Domestic Diversity; Wrt—Writing Experience
Quarter Offered: F—Fall; W—Winter, S—Spring, J—Summer; 2017-2018 offering in parentheses
185. Women and Islamic Discourses (4) Lecture/discussion—4 hours. Prerequisite: course 50 or comparable course. Introduction to the debates/discourses about women and Islam. Transformations in debates/discourses in colonial and postcolonial periods in the Middle East & South Asia. Comparative studies of family, work, low, sexuality, religion, comportment, human rights, feministic and religious movements. (Same course as Middle East/South Asia Studies 150.) Offered irregularly. GE credit: ArtHum or SocSci | AH or SS, WE.

187. Gender and Social Policy (4) Lecture/discussion—3 hours; term paper. Role of gender in the creation of social policies, especially with respect to issues brought into the policy arena by contemporary feminism. Offered in alternate years. GE credit: SocSci, Div | ACGH, DD, SS, WE.

189. Special Topics in Critical Gender Studies (4) Lecture/discussion—4 hours. In-depth examination of a women's studies topic related to the research interests of the instructor. May be repeated one time for credit when topic differs. Offered irregularly. GE credit: ArtHum or SocSci | AH or SS, WE.

190. Senior Seminar (4) Seminar—4 hours. Capstone course for senior Women's Studies majors, which focuses on current issues on feminism as they impact theory, public policy, and practice. GE credit: ArtHum or SocSci | ACGH, AH or SS, DD, WE.

191. Capstone Seminar (4) Seminar—4 hours. Revision, completion, and presentation of senior research or creative project. Creating a multimedia Web site for publishing research and creative projects. GE credit: ArtHum or SocSci, Wrt | ACGH, AH or SS, DD, WE.

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 intern positions with priority to Women's Studies majors. Supervised internship and study in positions/institutional settings dealing with gender-related problems or issues, as for example, a woman's center, affirmative action office, advertising agency, or social welfare agency. Final written report on internship experience. (P/NP grading only)

193. Feminist Leadership Seminar (2) Seminar—2 hours. Use feminist methods to critically reflect on the ethical, methodological and strategic aspects of an organization, project, campaign, movement or other social change initiative. May be repeated for credit. (P/NP grading only.) Offered irregularly. GE credit: ArtHum or SocSci | ACGH, AH or SS, DD, WE.

194HA. Senior Honors Project in Women's Studies (4-6) Independent study—12 hours. Prerequisite: senior standing, Women's Studies major, and advisor'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.] GE credit: ArtHum or SocSci | AH or SS, WE.

194HB. Senior Honors Project in Women's Studies (4-6) Independent study—12 hours. Prerequisite: senior standing, Women's Studies major, and advisor'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.] GE credit: ArtHum or SocSci | AH or SS, WE.

195. Thematic Seminar in Critical Gender and Women's Studies (4) Seminar—4 hours. Group study of a topic, issue or area in feminist theory and research involving intensive reading and writing. May be repeated for credit. Offered irregularly. GE credit: ArtHum or SocSci, Div | Wrt or SS, ACGH, DD, WE.

197. Tutoring in Women's Studies (1-4) Tutoring—3-12 hours. Prerequisite: upper division standing and consent of director. Leading small, voluntary discussion groups affiliated with a Women's Studies course. May be repeated for credit for a total of 8 units. (P/NP grading only.) Offered irregularly.

198. Directed Group Study (1-5) Prerequisite: upper division standing; consent of instructor. (P/NP grading only.) Offered irregularly.

199. Special Study for Advanced Undergraduates (1-5) Prerequisite: upper division standing; consent of instructor. (P/NP grading only.) Offered irregularly.

Graduate

200A. Current Issues in Feminist Theory (4) Seminar—4 hours. Current issues in feminist theory; techniques employed to build feminist theory in various fields. Offered irregularly.

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.

201. Special Topics in Feminist Theory and Research (4) Lecture/discussion—4 hours. Limited enrollment. 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.

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.) Offered irregularly.

299. Special Study for Graduate Students (1-12) (S/U grading only.) Offered irregularly.

299D. Dissertation Research and Writing (4) Prerequisite: courses 200A and 200B; fulfillment of course requirements for the DE in Feminist Theory and Research, advancement to candidacy. (S/U grading only.) Offered irregularly.

Professional

396. Teaching Assistant Training Practicum (1-4) Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.) Offered irregularly.

Genetics

See Molecular and Cellular Biology, on page 464; and Integrative Genetics and Genomics (A Graduate Group), on page 381.

Geographic Information Systems

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 management, public utility planning, emergency response, geomarketing, geotechnics, precision agriculture, archaeology, military, 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:

UNITS

Geographic Information Systems ............ 18

Geography

See Geography (A Graduate Group), below.

Geography (A Graduate Group)

Robert Hijmans, Ph.D., Chairperson of the Group

Group Office, Carrie Armstrong-Rupport, Student Affairs Officer; 133 Hunt Hall 530-752-4119; carropot@ucdavis.edu

http://geography.ucdavis.edu

Faculty

Gwen Arnold, Ph.D., Assistant Professor (Environmental Science and Policy)

Tom Beamish, Ph.D., Associate Professor (Sociology)

Chris Benner, Ph.D., Professor (Human Ecology)
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. 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 most 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, biodiversity, natural resource management, and technological innovations in computing and the use of geographic information systems. Students are mentored by faculty across the many colleges of the university.

Preparation. Most 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 as background for the student's research emphasis, as determined by the student's guidance committee.

Graduate Advisers. Robert Hijmans (Human Ecology), Robert Hijmans (Environmental Science and Policy), Jay Lund (Civil and Environmental Engineering). All have graduate study in geography. A number of faculty members have participated in interdisciplinary theory bridging biophysical science and social science fields. A number of faculty members have participated in interdisciplinary theory bridging biophysical science and social science fields.

Courses in Geography (GEO)

Graduate

200AN. Geographical Concepts (4)
Lecture/discussion—4 hours, term paper. Prerequisites: graduate standing in Geography or consent of instructor. Concepts and thematic content of the discipline, including contemporary research questions. A World of Cultures. Wrt=Writing Experience of geographic thought and practice is done at the beginning of the course. —F (F)

200BN. Theory & Practice of Geography (4)
Lecture/discussion—4 hours. Prerequisites: graduate standing. Class size limited to 20. Development, application, and philosophical background of the theory in discipline of geography and geographical knowledge production. Similarities and differences in theories employed in physical and human geography and cartography. Geographic contributions to interdisciplinary theory bridging biophysical sciences, social sciences, and humanities. —W (F) Gallo, Rios

200CN. Quantitative Geography (4)
Lecture—2 hours; laboratory—6 hours. Class size limited to 25 students. Provides an overview of quantitative approaches in spatial data analysis. Overview of different approaches used for inference, modeling, and prediction. Also learn how to write computer programs to implement these methods. —S (S) Hijmans
200D. Socio-Spatial Analysis in Geography (4)

Lecture/discussion—4 hours. Class size limited to 25. Introduction to methodologies of socio-spatial analysis in interviews, and ethnographic fieldwork. Students develop a critical understanding of different methodological and theoretical approaches, and their appropriate applications in overall research design. —W. (W.) Eubanks-Owens

200E. Advanced Research Design in Geography (2)

Lecture/discussion—2 hours. Prerequisite: graduate standing. Courses 200AN, 200BN, 200CN and 200DN. Class size limited to 15. Helps Ph.D. students develop their research question, design their research plan and complete a full dissertation research proposal. —F. (F.)

201. Sources and General Literature of Geography (4)

Discussion—4 hours. Prerequisite: graduate standing in geography, consent of instructor. Designed for students preparing for higher degrees in geography. May be repeated for credit in one or more of the following subfields: physical, cultural, economic, urban, historical, political, conservation, and regional geography.

210. Topics in Biogeography (3)

Lecture—2 hours; discussion—1 hour. Prerequisite: Evolution and Ecology 147 or Wildlife, Fish, and Conservation Biology 156 (may be taken concurrently). Prerequisite or consent of instructor required for undergraduates. Current topics in historical and ecological biogeography, including macroecology and areography, GIS and remote sensing, phylogeography, vegetation, and landscape ecology. Meso and microevolution; community ecology and species geography. Systematics, climate change, and conservation will be addressed. Offered in alternate years. —W. (W.) Shapiro

211. Physical Geography Traditions and Methods (3)

Lecture/discussion—2 hours; term paper. Prerequisite: introductory course in physical geography. Graduate-level standing in geography or related discipline. Discussion of the physical science tradition in geography, including key concepts and current research in climatology, geomorphology, soils geography, biogeography, climate change, watershed science, and coastal studies. Research paradigms, programs, and methods as used by physical geographers will be discussed. May be repeated three times for credit. Offered in alternate years. —F. (F.)

212. Geosatellite Technology (3)

Lecture—3 hours. Prerequisite: Civil and Environmental Engineering 114, 141, and 142; Civil and Environmental Engineering 153 recommended. Engineering, institutional, economic, and social basis for remote sensing and water resources. Examples in the context of California’s water development and management. Uses of computer modeling to improve water management. [Same course as Civil and Environmental Engineering 267.] —F. (F.) Lund

214. 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. [Same course as Population Biology 100.] —S. (S.) Shapiro

215. Ecologies of Infrastructure (4)

Seminar—4 hours. Open to graduate standing or consent of instructor. Focus on design practices and theory associated with ecological conceptions of infrastructure, including networked infrastructure, region, bioregion, regionalization, ecological engineering, reclamation ecology, novel ecosystems, and theory/articulation of landscape change. Offered in alternate years. [Same course as Landscape Architecture 215.] —Miglian

220. Topics in Human Geography (4)

Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Class size limited to 20 students. Examination of the place and theory in human geography with an emphasis on contemporary debates and concepts in social, cultural, humanistic, political, and economic geographies. Specific discussion of space, place, scale, and landscape; material and imagined geographies. Offered in alternate years. —W. (W.) Rios

230. Citizenship, Democracy, & Public Space (4)

Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Introduction to seminal works in political theory, philosophy, and the social sciences that focus on citizenship and the public sphere; development of perspective regarding restructuration of public space in a pluralistic and global culture; discussion of contemporary case studies. [Same course as Landscape Architecture 200.] —S. (S.) Rios

233. Urban Planning and Design (4)

Lecture—2 hours; discussion—2 hours. Limited to graduate students. 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 eco-social goals. [Same course as Landscape Architecture 205.] —F. (F.) Wheeler

236. Transportation Planning and Policy (4)

Lecture/discussion—4 hours. Limited enrollment. Transportation planning process at the regional level, including role of public and private partnership in shaping regional transportation planning tools, and techniques used in regional transportation planning, issues facing regional transportation planning agencies, pros and cons of potential solutions and strategies. Students taking this course previously as Transportation Planning and Policy 289 cannot repeat it for credit. Taking other Transportation Planning and Policy 289s cannot preclude taking Transportation Planning and Policy 220 for credit. [Same course as Transportation Planning and Policy 220.] Offered in alternate years. —S. Handy

241. The Economics of Community Development (4)

Seminar—4 hours. Prerequisite: graduate standing. Economic theories and methods of planning for communities. Human resources, community services and infrastructure, income, technological change, and regional growth. The community’s role in the greater economy. [Same course as Community and Regional Development 241.] —F. (F.) Kenney

245. The Political Economy of Urban and Regional Development (4)

Lecture—4 hours. Prerequisite: Community and Regional Development 157, 244, or the equivalent. How global, political and economic restructuring and demands for sustainable development are mediated by community politics; social production of urban form; role of the state in uneven development; dynamics of urban growth and regional development in California. [Same course as Community & Regional Development 245.] Offered irregularly. —W. (W.)

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 theses will precede contemporary comparative perspectives on class, race, ethnicity, citizenship, and the ethnic economy. [Same course as Community & Regional Development 246.] —S. (S.) Guzman

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 Community & Regional Development 248A and 248B. [Same course as Community & Regional Development 248.] Offered in alternate years. —S. (S.)

252. 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 as representation in literature, art, photography, cartography, cinema, and landscape architecture. [Same course as Landscape Architecture 260.] —F. (F.)

254. Political Ecology of Community Development (4)

Lecture—4 hours. Prerequisite: graduate standing. Community development from the perspective of geographical political ecology. Social and environmental outcomes of the relationships between communities and land-based resources, and between social groups. Cases of community conservation and development in developing and industrialized countries. [Same course as Community and Regional Development 244.] Offered in alternate years. —W. (W.) Galt

260. Global Political Ecology (4)

Seminar—3 hours, term paper or discussion—1 hour. Open to graduate students only or consent of instructor. Background, genesis, current debates in political ecology. Examination of political-economic and social-cultural causes of environmental change. Introduction to development theory, case studies in history of science and power/knowledge. Cases of social movements, justice, resistance, gender, race and class. Focus outside North America. Offered in alternate years. —S. Davis

270. Experimental Design and Analysis (5)

Lecture—3 hours; discussion/laboratory—2 hours. Prerequisite: Plant Sciences 120 or equivalent. Introduction to the research process and statistical methods to design and interpret experiments. —W. (W.) Dubovsky

271. Applied Multivariate Modeling in Agricultural and Environmental Sciences (4)


279. Discrete Choice Analysis of Travel Demand (4)

Lecture—4 hours. Prerequisite: Civil and Environmental Engineering 114. Behavioral and statistical principles underlying the formulation and estimation of the choice model. Practical application of discrete choice models to characterization of choice behavior, hypothesis testing, and forecasting. Emphasis on computer exercises using real-world data sets. —S. (S.)

280. Field Studies in Geography (3)

Lecture—1 hour; fieldwork—6 hours. Prerequisite: undergraduate or graduate coursework in geography. Emphasis on lab or field research. Limited to 20 students. A topic or subdiscipline of geography 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 the environmental/physical geography. May be repeated twice for credit.

281. Transportation Survey Methods (4)

Lecture—4 hours. Prerequisite: Statistics 13; Civil and Environmental Engineering 254 recommended. Description of types of surveys commonly used in transportation demand modeling, including travel and activity diaries, attitudinal, panel, computer, and stated-response surveys. Discussion of sampling,
experimental design, and survey design issues. Analysis methods, including factor, discriminant and cluster analysis. Not open for credit to students who have taken Civil and Environmental Engineering 255. [Same course as Transportation Technology and Policy 200.]—W. (W.)

286. Selected Topics in Environmental Remote Sensing (3)
Discussion—2 hours; lecture—1 hour; project. Prerequisite: consent of instructor; Environmental and Resource Sciences 186 or equivalent required; Environmental and Resource Sciences 186L recommended. In depth investigation of advanced topics in remote sensing applications, measurements, and theory. Not open for credit to students who have taken Civil and Environmental Engineering 255. [Same course as Hydrologic Science 286.] May be repeated for credit. Offered irregularly.—Ustin

290. Seminar in Geography (1-3)
Seminar—3 hours. Prerequisite: graduate standing or consent of instructor. Seminar focuses on specialized topical areas within geography, which will vary quarter to quarter. Students expected to present an oral seminar on an aspect of the general topic under discussion. May be repeated six times for credit. (S/U grading only)—F, W, S. (F, W, S.)

291. Seminar in Cultural Geography (4)
Seminar—3 hours.

293. Graduate Internship (1-12)
Prerequisite: consent of instructor. Individually designed, supervised internship, off campus, in community or institutional setting. Developed with advice of faculty mentor. May be repeated for credit. (S/U grading only)—F, W, S. (F, W, S.)

295. Seminar in Urban Geography (4)
Seminar—3 hours. W.—W.

297. Graduate Group in Geography (4)
Seminar—3 hours.

299D. Individual Study (1-12)
(S/U grading only.)

300. Seminar in Environmental Remote Sensing (3)
Discussion—2 hours; lecture—1 hour; project. Prerequisite: consent of instructor; Environmental and Resource Sciences 186 or equivalent required; Environmental and Resource Sciences 186L recommended. In depth investigation of advanced topics in remote sensing applications, measurements, and theory. Not open for credit to students who have taken Civil and Environmental Engineering 255. [Same course as Hydrologic Science 286.] May be repeated for credit. Offered irregularly.—Ustin

304. Seminar in Environmental Remote Sensing (3)
Discussion—2 hours; lecture—1 hour; project. Prerequisite: consent of instructor; Environmental and Resource Sciences 186 or equivalent required; Environmental and Resource Sciences 186L recommended. In depth investigation of advanced topics in remote sensing applications, measurements, and theory. Not open for credit to students who have taken Civil and Environmental Engineering 255. [Same course as Hydrologic Science 286.] May be repeated for credit. Offered irregularly.—Ustin

396. Teaching Assistant Training Practicum (1-12)
Prerequisite: graduate standing. May be repeated for credit. Offered irregularly.—Ustin

299D. Individual Study (1-12)
(S/U grading only.)

German

(College of Letters and Science)
Jaimey Fisher, Ph.D., Chairperson of the Department
Department Office, German and Russian 213 Sproul Hall 530752-1219; http://german.ucan.edu

Faculty
Carlee Arnett, Ph.D., Associate Professor
Jaimey Fisher, Ph.D., Associate Professor
Gail Finney, Ph.D., Professor
Distinguished Teaching Award/Academic Senate
Professional
Elisabeth Krimmer, Ph.D., Professor
Sven-Erik Rose, Ph.D., Associate Professor
Chunjie Zhang, Ph.D., Assistant Professor

Emeriti Faculty
John F. Fetter, Ph.D., Professor Emeritus
Ingeborg Henderson, Ph.D., Senior Lecturer Emerita
Academic Senate Distinguished Teaching Award
Winder McConnell, Ph.D., Professor Emeritus
Karl R. Menges, Dr.Phil., Professor Emeritus
H. Guenter Nerjes, Ph.D., Associate Professor Emeritus

Fritz Sannern-Frankenegg, Dr.Phil., Lecturer Emeritus

Affiliated Faculty
Kirsten Hanges, Ph.D., Lecturer

The Major Program
The German major explores in depth the literature and language, the culture and commerce of the German-speaking world (Germany, Austria and Switzerland). The key to the major lies in the careful balance between solid core requirements and the possibility to explore German subject areas through the lens of other disciplines, such as music, art, philosophy, history, and economics.

The Program. The department offers courses that highlight literary figures, movements and themes. These courses form the core of upper-division literature electives, but we also offer courses that discuss contemporary culture and commerce in German-speaking countries. 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 118 ................................................................. 4

Four courses chosen from upper-division offerings taught in German

Three additional upper-division units of courses selected from either 104-109 or 121-198

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 138, 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, 175
Political Science 117C, 138, 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.

Major Adviser. C. Zhang

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 Research, and Second Language Acquisition. Detailed information may be obtained by writing to the Department Chairperson or the Graduate Adviser.

Graduate Adviser. S.-E. Rose

Prerequisite Credit. Credit normally will not be given on the lower-division level for a course that is the prerequisite of a course already successfully completed.

Courses in German (GER)

Lower Division

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. Not open to students who have taken course 1A. Introduction to German grammar and development of all language skills in a cultural framework 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 stu
1A. Accelerated Intensive Elementary German (15)
Lecture/discussion—15 hours. Special 12 week accelerated, four course immersion 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. —Su. (S.) Arnett

2. Elementary German (5)
Discussion—5 hours; laboratory—1 hour. Prerequisite: course 1. Not open for credit to students who have taken a continuation of course 1 in areas of grammar and basic language skills. GE credit: ArtHum | AH, OL, WC. —W. (W.)

3. Elementary German (5)
Discussion—5 hours; laboratory—1 hour. Prerequisite: course 2. Not open to students who have taken course 1A. Completion of grammar sequence and continuing practice of all language skills through cultural texts. GE credit: ArtHum | AH, OL, WC. —S. (S.) Arnett

10. German Fairy Tales from the Grimm to Disney (4)
Lecture/discussion—3 hours; term paper. Introduction to the genre of fairy tale with a focus on the Brothers Grimm and Hans Christian Andersen in their respective political/cultural contexts. Discusses filmic adaptations by Disney, the East German DEFA and Hollywood. GE credit: ArtHum, Div, Wrt | AH, VL, WE. —Krimmer

11. Travel and the Modern World (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: completion of entry level writing requirement. Examination of travel as an essential human activity and experience of global modernity and cross-cultural encounters from the 18th to the 21st century with an emphasis on German-speaking culture. Travelogues, literature, art, memoirs, and films in English translation. (Same course as Comparative Literature 11.) GE credit: ArtHum, Div, Wrt | AH, VL, WE, —F, W, S. (F, W, S) Zhang

20. Intermediate German (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3; may be taken concurrently with course 6. Review of grammatical principles by means of written exercises; expanding of vocabulary through readings of modern texts. GE credit: ArtHum | AH, OL, W rt.

21. Intermediate German (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3. Review of grammatical principles by means of written exercises; expanding of vocabulary through modern texts that addresses social relations and cultural practices in Germany; discusses history of Germany. GE credit: ArtHum | AH, OL, W rt.

22. Intermediate German (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 3. Review of grammatical principles by means of written exercises; expanding of vocabulary through readings of modern texts. GE credit: ArtHum | AH, OL, W rt.

40. Great German Short Stories in English (4)
Lecture/discussion—3 hours; extensive writing. Major German short stories from Goethe to the end of the 18th century by Thomas Mann at the beginning of the twentieth century. Offered irregularly. GE credit: AH, OL, W rt.

45. Vampires and Other Horrors in Film and Media (4)
Lecture—2 hours; discussion—1 hour; film viewing—3 hours. History of representations of vampires and horror generally from the 19th through 21st centuries. Emphasis on transnational history of the horror genre, psychologies of horror effects, issues of race, gender, and class; intersections with prejudice, medicine, modernity. (Same course as Film Studies 45.) GE credit: ArtHum | ACGH, AH, DD, OL, VL, WC, WE. —Fish

48. Myth and Saga in the Germanic Cultures (4)
Lecture—3 hours; term paper. Knowledge of German not required. English translation from the Norse Eddas, the Volusunga and Sigurd sagas that form the Gudrun lays; literary mythology in German Romanticism culminating in Wagner’s “total art-work” concept and The Ring of the Nibelung cycle. May not be taken for credit by German majors. Offered irregularly. GE credit: ArtHum, Wrt | AH, VL, WE.

49. Freshman Colloquium (2)
Seminar—2 hours. Prerequisite: open only to students who have completed 40 or fewer quarter units of transferable college-level work. Readings, discussion and written projects treating topics such as communist-capitalist tension in German literary culture; masculinity “versus” femininity, disintegration and reconstitution of language reflecting cultural transformation; occupying post-Holocaust national guilt and individual frustration—Germany’s new European “mission.” Offered irregularly.

92. Field Work in German (1-12)
Internship—3-36 hours. Prerequisite: lower division GE credit: ArtHum, Wrt | AH, VL, WE. —Krimmer

101A. Survey of German Literature, 800-1800 (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 22 or consent of instructor. German literature from the Middle Ages to Classicism (800-1800) with an overview of major movements and authors. GE credit: ArtHum | AH, OL, VL, WC, WE —F, W, S. (F, W, S) Zhang

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 | AH. —W. (W.)

103. Writing Skills in German (4)
Lecture—3 hours; extensive writing—1 hour. Prerequisite: course 22 or consent of instructor. Practice in different kinds of writing, such as abstracts, correspondence, lecture summaries, analysis of or response to short literary texts. GE credit: ArtHum | AH, OL, W rt, —F, W, S. (F, W, S) Zhang

104. Translation (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 22 or consent of instructor. Exercises in German-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 regularly. GE credit: ArtHum | AH, OL, VL, WC, WE. —Fisher

105. The Modern German Language (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 22 or consent of instructor. Introduction to the linguistic analysis of contemporary German, including its phonology, morphology, syntax and semantics, as well as sociolinguistic considerations. Offered irregularly. GE credit: ArtHum, Wrt | AH, OL, W rt.

109A. Business German (4)
Lecture/discussion—3 hours; laboratory—1 hour. Prerequisite: course 22 or consent of instructor. Specialized language course using business-oriented information and publications as the basis for discussions, roleplay, reports, compositions and translations. Offered in alternate years. —Krimmer

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 irregularly.

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 one time for credit. Offered irregularly. GE credit: ArtHum, Wrt | AH, WC.

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. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, VL, WE.

114. From Marlene Dietrich to Run, Lola Run: German Women and Film (4)
Lecture/discussion—3 hours; extensive writing; film viewing—3 hours. Knowledge of German not required. Women in German film from the Weimar Republic to present, with special emphasis on cross-cultural encounters of gender, nation, and post-war Germany; aesthetic and filmic innovations. Offered in alternate years. GE credit: ArtHum, Wrt | AH, OL, VL, WE. —Krimmer

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 taken Jewish Studies 121. May be repeated twice for credit if topic differs. (Same course as Jewish Studies 116.) Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, OL, VL, WE. —Rose

117. After the Catastrophe: Jews and Jewish Life in Post-1945 Germany (4)
Lecture/discussion—3 hours; term paper. Jews and Jewish culture in post-1945 Germany, with special attention given to literature, historical debates, photography, film, as well as websites and other new media. Offered in alternate years. GE credit: ArtHum, Div, Wrt | ACGH, AH, DD, OL, VL, WC, WE —Fisher

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 multinational 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 irregularly. GE credit: ArtHum, Wrt | AH, WC. —Finney
118B. Weimar Culture: Defeat, the Roaring Twenties, the Rise of Nazism (4)
Lecture—3 hours; discussion—2 hours; extensive writing. Knowledge of modern European history and of Expressionism in graphic arts, literature, film, New Objectivity, Brecht and Bauhaus considered in the context of the fall of the Weimar Republic and the rise of Nazism in Germany, 1919-1933. Offered irregularly. GE credit: ArtHum, Wrt | AH, WC, WE.

118C. Germany Under the Third Reich (4)
Lecture/discussion—3 hours; term paper. Prerequisite: background in modern European history or consent of instructor. No knowledge of German required. Interdisciplinary study of German society and culture during the Third Reich (1933-45) from the perspectives of politics, history, and philosophy; study of fascist culture in literature, film, architecture, and the graphic arts; focus on everyday life in Hitler's Germany. Offered irregularly. GE credit: ArtHum, Wrt | AH, WC, WE.

118E. Contemporary German Culture (4)
Lecture/discussion—3 hours. Prerequisite: course 22 or consent of instructor. The political, economic, social, and cultural scene of Germany today. Offered irregularly. GE credit: ArtHum, Wrt | AH, WC, WE.

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 in the shift in medium and the positive and negative effects achieved by such transfers. Offered irregularly. GE credit: ArtHum, Wrt | AH, OL, VL, WC.

120. Modern German Literature (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 22 or consent of instructor. Major developments in German arts, philosophical thought, social institutions, and political history. GE credit: ArtHum | AH, OL, VL, WC, WE—Zhang

121. The Medieval Period in German Literature (4)
Discussion—3 hours; extensive writing. Prerequisite: course 22 or consent of instructor. Literary-historical and social-cultural profile of the Middle Ages. Introduction in terms of the significant epic, romance, and lyric poetry. Readings in German. Offered irregularly. GE credit: ArtHum | AH, WE.

122. Reformation and Baroque (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 22 or consent of instructor. Exemplary literary works of the 16th and 17th centuries tracing the principal lines of development and showing the reflection in literature of the social, as well as religious, scenes. Offered irregularly. GE credit: ArtHum | AH, OL, VL, WC, WE.

123. Literature of the Classical Age (4)
Discussion—3 hours; term paper. Prerequisite: course 22 or consent of instructor. A critical assessment of principal works of Goethe and Schiller within the historical and philosophical context of their times. Offered irregularly. GE credit: ArtHum | AH, WC, WE.

124. Major Movements in German Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 22 or consent of instructor. Significant movements and schools in German literary history (e.g., the medieval troubadours, Storm and Stress, the romanticists, the George Circle, the expressionists), with emphasis on the broader cultural dynamics and ideologies as they apply to individual literary works. May be repeated one time for credit when topic differs. Offered irregularly. GE credit: ArtHum | AH, WC, WE—Finney

126. Modern German Literature (4)
Discussion—3 hours; extensive writing. Prerequisite: course 22. Selections from significant works of major contemporary German writers, Mann, Kafka, Rilke, Brecht, Grass. May be repeated one time for credit with consent of adviser. Offered irregularly. GE credit: ArtHum | AH, WC, WE.

127. Major Writers in German (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 22 or consent of instructor. Examination of representative works by a major writer, set in the broader cultural context of the relevant period or movement in Germany. May be repeated one time for credit when topic differs. Offered irregularly. GE credit: ArtHum | AH, WC, WE.

129. Postwar Women Writers (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 22 or consent of instructor. Major women writers in Germany since 1945. Topics include the concept of a feminist aesthetics, East vs. West German writers, and the status of minority women writers in Germany (Jewish, Turkish-German, Afro-German). Offered irregularly. GE credit: ArtHum, Div | AH, WC, WE—Finnery

131. German Lyric Poetry (4)
Lecture—3 hours; term paper. Prerequisite: course 22 or consent of instructor. Study of the genre of lyric poetry from the late Middle Ages through Renaissance, Baroque, Classical, Romantic, and Modern periods in correlation with other literary forms and the social and cultural climate of each period. Offered irregularly. GE credit: ArtHum | AH, WC, WE—Finney

132. The German Novelle (4)
Lecture—3 hours; term paper. Prerequisite: course 22 or consent of instructor. Readings in the works of Germany's leading dramatists from the eighteenth century to the present that explore the phenomenon of love in selected medieval lyrical poems and romances of the twelfth and thirteenth century Blutzeit. Origins of courtly love, love and individualism, love and the Church, love and adultery. Offered irregularly. GE credit: ArtHum | AH, WE.

133. The German Drama (4)
Lecture—3 hours; term paper. Prerequisite: course 22 or consent of instructor. Readings in the works of Germany's leading dramatists from the eighteenth century to the present that explore the phenomenon of love in selected medieval lyrical poems and romances of the twelfth and thirteenth century Blutzeit. Origins of courtly love, love and individualism, love and the Church, love and adultery. Offered irregularly. GE credit: ArtHum | AH, WE.

141. The Holocaust and its Literary Representation (4)
Lecture—2 hours; discussion—1 hour; term paper. Knowledge of German not required. Aesthetic re- presentation and metaphorical transformation of the Holocaust in its human and historical perspectives. Offered irregularly. GE credit: ArtHum | AH, WC, WE.

142. New German Cinema (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: some knowledge of German cinema. An introduction to current German filmmaking, including the work of the major filmmakers of the 1960s-1980s such as Fassbinder, Herzog, Syberberg, Brückner, Schlöndorf, and Feuchter. Offered irregularly. GE credit: ArtHum, Div | AH, OL, VL, WC, WE—Finnery

143. Topics in German Intellectual History (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 22 or consent of instructor. Experiential analysis of principal works of Goethe and Schiller in their integrative nature (in either "General" or "Area Studies" emphasis) of the fields of major, guided by thesis advisor chosen by student. Offered irregularly. GE credit: ArtHum | AH, WC, WE.

144. Marx, Nietzsche, Freud (4)
Lecture/discussion—3 hours, term paper. Study of major texts of Marx, Nietzsche, and Freud, selected with an eye to their impact on modern political and sociological, ethical, and attitudes toward eros. Particular focus on conceptions of the self and the individual's relationship to society. Offered in alternate years. Same course as Humanities 144. GE credit: ArtHum, Wrt | AH, WC, WE—Rose

160. Love in the Middle Ages (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 22 or consent of instructor. Analysis of the phenomenon of love in selected medieval lyrical poems and romances of the twelfth and thirteenth century Blutzeit. Origins of courtly love, love and individualism, love and the Church, love and adultery. Offered irregularly. GE credit: ArtHum | AH, WC, WE—Arnett

168. Multiculturalism in German Literature (4)
Lecture/discussion—3 hours; term paper or discussion—1 hour. Prerequisite: course 22 or consent of instructor. Examples of German Literature from the High Middle Ages to the present that explore the "encounter with the other" (geesal color, different beliefs and cultures, and inner-German minorities). Offered irregularly. GE credit: ArtHum, Div | AH, OL, VL, WC, WE—Arnett

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 irregularly. (Same Course as Film Studies 176A) GE credit: ArtHum, Wrt | AH, OL, VL, WC, WE—Fisher

185. The Age of Bismarck (4)
Discussion—3 hours; term paper. Prerequisite: course 22 or consent of instructor. 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 irregularly. GE credit: ArtHum | AH, WC, WE.

192. Field Work in German (1-12)
Internship—3-3.6 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 student proficiency in the German language. May be repeated up to 12 units of credit with consent of instructor. (P/NP grading only.) Offered irregularly.

194HA. Honors Program (3)
Independent study—2 hours, term paper. Prerequisite: open only to majors with a 3.500 minimum GPA in at least 135 graduation units. Research of an integrative nature [in either "General" or "Area Studies" emphasis] of the fields of major, guided by thesis advisor chosen by student. Offered pending completion of course sequence. (P/NP grading only.)

194HB. Honors Program (3)
Independent study—2 hours, term paper. Prerequisite: open only to majors with a 3.500 minimum GPA in at least 135 graduation units. Writing of Honors Thesis on topic selected by student in consultation with thesis adviser. (P/NP grading only. Deferred grading only, pending completion of course sequence.)

197T. Tutoring in German (1-4)
Tutorial—3-12 hours. Prerequisite: consent of German Program Director. Tutoring in undergraduate courses including leadingship 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.)
Global and International Studies

Global and International Studies (College of Letters and Science)
The interdisciplinary minor in Global and International Studies will enable students to learn about global and international issues at UC Davis, as well as 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 UC Davis Study Abroad.

The minor is overseen by a Program Committee. For more information, see http://minor.ucdavis.edu.

Minor Program Requirements:

Global and International Studies ....... 23-25

Arts and Humanities Emphasis:
One course from: Anthropology 4, 20, International Relations 1, Political Science 3 or Sociology 5 ................. 4
One upper division UC Davis general course on global international studies ........... 3-4
See program adviser for a list of approved courses.

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 for thematic course clusters in global and international studies.

Suggested course clusters include:
(1) Country or region-specific courses:
Western Europe; Russian and East/Central Europe; Asia and the Pacific; Latin and South America; Africa and the Middle East; Jewish Studies; specific countries.

(2) Courses clustered around a thematic field in global and international studies: people and nationalities; the individual and society; arts, language, literature and culture.

Study Abroad and International Internships.
The course cluster requirement may be met in one of two ways: (1) completion of a minimum of 16-17 units in the course cluster emphasis by taking approved UC Davis upper division courses in the area of global/international studies and/or approved upper division courses taken while participating in UC Davis Study Abroad or another approved study abroad program, or (2) completion of 12 units of course work in UC Davis accredited international internship, plus UC Davis courses sufficient to total 16-17 units. Students must meet with the GIS adviser and complete a Course Cluster Worksheet to demonstrate subject interrelatedness.

Restrictions. No more than two courses from a single UC Davis Department may be offered in satisfaction of the minor.

Global Language Study. Students are strongly encouraged to study a foreign language, particularly the language of the country in which and about which they intend to study. However, only upper division coursework may be used to fulfill requirements for the minor.

Global Disease Biology

(Global College of Agricultural and Environmental Sciences) Department of Plant Pathology
Program Office, 152 Hutchison Hall
530-754-7277

Master Adviser: Jolan H.J. Leveau, Ph.D., Professor (Plant Pathology)

Committee in Charge
Patricia A. Conrad, D.V.M, Ph.D., Professor (Pathology, Microbiology and Immunology)
Satya Dandekar, Ph.D., Professor (Medical Microbiology and Immunology)
Thomas Gardner, Ph.D., Professor (Plant Pathology)
David M. Rizzo, Ph.D., Professor (Plant Pathology)
Dori Borjeson, D.V.M, Ph.D., Professor (Pathology, Microbiology and Immunology)
Joie Watson, D.V.M, Ph.D., Professor (Medicine and Epidemiology)
Michael S. Wilkes, M.D., M.P.H., Ph.D., Professor (Internal Medicine)

Faculty
Faculty includes members of the Departments of Plant Pathology, on page 514; Veterinary Medicine, School of, on page 583; Medicine, School of, on page 428.

The Major Program
The Global Disease Biology (GBD) major offers students the opportunity to study disease and its relationship to the health of people, animals, plants, and the environment. The program uses an integrated approach to advance student understanding of the concept(s) of disease, the societal and personal impacts of past, present and future diseases, and the science behind disease discoveries, causes, evolution, diagnosis, treatment, and prevention. The program recognizes the interconnectedness of people, animals, plants, and the environment and aims to identify and address the fundamental causes of poor health around the world. Managing global disease problems requires a multifaceted, holistic approach to address the full spectrum of human, animal, plant, and environmental health risks (also known as a One Health approach). Throughout a series of core courses, issues related to human, animal, and plant health, along with tools available to solve these problems, will be introduced to provide students with real-world scenarios in which they can apply and advance their creative and critical thinking skills. The major prepares graduates with the knowledge, leadership skills and experiences required to excel in professions associated with global health, the environment, food safety and security, biological safety and security, and health policy. For more information, see http://gdb.ucdavis.edu.

The Program. The Global Disease Biology major provides students with broad preparatory scientific coursework, global disease biology core classes, flexibility in upper division electives, and a strong research experience. Global Disease Biology core classes are introduced in the first year and focus on concepts that cut across human, animal, and plant diseases offering a unifying ecological perspective on disease and health in a way that complements the core undergraduate courses currently offered on disease and health. 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 UC Davis Study Abroad.

The minor is overseen by a Program Committee. For more information, see http://minor.ucdavis.edu.

Minor Program Requirements:

B.S. Major Requirements:

Preparatory Subject Matter .............. 60-62
Global Disease Biology 90 ................... 3
Science and Society 13 .................. 3
Biological Sciences 2A-2B-2C ........... 15
Chemistry 2A-2B-2C, and 8A-8B or 118A-118B ....... 11-12
General Physics 7A/7B .................... 8
Mathematics 17A-17B-17C ................. 12

Depth Subject Matter ...................... 46-49
Biological Sciences 101, 103 .............. 7
Evolution and Ecology 100 ............... 4
Microbiology 101 .......................... 5
One course from Statistics 13, 100; Plant Sciences 120 ......................... 4
Pathology, Microbiology & Immunology 129Y .................................. 3
VM Medicine and Epidemiology 158 ........ 3
Global Disease Biology 101, 102 .......... 8
Two courses from Plant Pathology 120:
Pathology, Microbiology & Immunology 127, 128; Microbiology 162, Entomology 153, 156/156t; Global Disease Biology 103 .......... 6-9
Global Disease Biology 187 ................ 3
Global Disease Biology 189 ............... 3

Restricted Electives ......................... 25
Focused specially upper division courses as outlined in the student’s major proposal (from course 187) with approval of major adviser.

Total Units for the Degree ............... 125-134

Recommended
Biological Sciences 101D ................ 1
Global Disease Biology 189D .............. 1

Minor Program Requirements:

A minor in Global Disease Biology may complement student’s major program. Some courses have required prerequisites not included as part of the minor, and students should plan accordingly.

Global Disease Biology ................ 20-22
Science and Society 13 .................. 3
Pathology, Microbiology & Immunology 129Y .................................. 3
VM Medicine and Epidemiology 158 ........ 3
Global Disease Biology 101, 102 .......... 8
One course from: Plant Pathology 120;
Pathology, Microbiology & Immunology 127, 128; Microbiology 162, Entomology 153, 156/156t; Global Disease Biology 103 .......... 3-5

Minor Program Adviser: TBA

Advising Center for the minor is located in 152 Hutchison Hall 530-754-7277.
Courses in Global Disease Biology (GDB)

Lower Division

90. Introduction to Global Disease Biology (1)
Seminar — 1 hour; fieldwork — 1 hour. Introduction to the Global Disease Biology major, research and international opportunities, and potential career paths in human, animal, and plant health. Communication, ethics and the nature of science. (P/NP grading only)—F. (F.) Rizzo

Upper Division

101. Epidemiology (4)
Lecture — 2 hours; laboratory — 3 hours; discussion — 1 hour. Prerequisite: Science and Society 13; Biological Science 2A, 2B, 2C, Statistics 13, 100 or Plant Sciences 120. Principles and practice of epidemiology as applied to human, animal, and plant populations. Examination of the prevention and treatment of diseases affecting humans, animals, and plants. Case studies will illustrate the merits of a unified approach to promoting health at local, regional, and global scales. GE credit: SciEng| OL, SE, SL.

102. Disease Intervention and Policy (4)
Lecture — 3 hours; discussion — 1 hour; project. Prerequisite: course 101, Science and Society 13; Biological Sciences 2A, 2B, 2C; Pathology, Microbiology and Immunology 129Y; VM-Medicine and Epidemiology 158. Examination of the prevention and treatment of diseases affecting human, animal, and plants. Case studies will illustrate the merits of a unified approach to promoting health at local, regional, and global scales. GE credit: SciEng| OL, SE, SL.—S. (S.) Rizzo

103. The Microbiome of People, Animals, and Plants (3)
Lecture — 3 hours. Prerequisite: Biological Science 2A, 2B, 2C. Examination of the structure and function of microbial communities that live inside and on host organisms. Introduction to general concepts of the microbiome and microbiota, and their relationship to host health and disease. GE credit: SciEng| OL, SE.—F. (F.) Cook, Leveau

187. Global Disease Biology Seminar (3)
Seminar — 1 hour; discussion — 1 hour; term paper. Prerequisite: junior standing, course 90, Science and Society 13. Open to Global Disease Biology majors. Seminar leading to development of the research proposal and academic plan for the Global Disease Biology major.—F. (F.)

189. Global Disease Biology Senior Research (3)
Independent research — 3 hours. Prerequisite: senior standing, courses 90, 187; course 189 concurrently taken. First time course 189 is taken, Science and Society 13. Restricted to Global Disease Biology majors only. Senior research experience in Global Disease Biology major project. May be experimental, library research, or some other creative activity. May be repeated one time for credit while research is conducted over two quarters; second quarter used to finish research paper.—F, W, Su. (F, W, S, Su.)

190. Global Disease Biology Research Discussion (1)
Discussion — 1 hour. Prerequisite: courses 90, 187, Science and Society 13; course 189 required concurrently. Restricted to junior standing; Global Disease Biology majors only. Course helps prevent or solve problems; further students’ research activity. Independent advising and assistance on research proposal. (P/NP grading only)—F, W, S. (F, W, S.)

Health Informatics (A Graduate Group)

Formerly Medical Informatics (A Graduate Group)

Michael Hogarth, M.D., Professor (Department of Internal medicine and Department of Pathology and Laboratory Medicine)

Group Office. UC Davis Health System
Health Informatics Program 2450 48th St., Suite 2800, Sacramento, CA 95817 916-734-8710; healthinfomatics@ucdavis.edu

Faculty

Nicholas Anderson, Ph.D., Assistant Professor (Pathology and Laboratory Medicine)

Aaron Bair, M.D., M.S.C., Associate Professor (Emergency Medicine)

Matt Bishop, Ph.D., Professor (Computer Science)

Dorita Birt, M.D., Assistant Professor (Emergency Medicine)

Robert Cardillo, M.D., Ph.D., Professor (Pathology and Laboratory Medicine)

Mark Carroll, M.P.H., Health Sciences Assistant Clinical Professor (Pathology and Laboratory Medicine)

Mary Christopher, D.V.M., Ph.D., Professor (Pathology, Microbiology, and Immunology)

Cristina Davis, Ph.D., Assistant Professor (Mechanical and Aerospace Engineering)

Fred Gaum, M.D., Ph.D., Professor (Neurology)

Bernard Hamann, Ph.D., Professor (Computer Science)

Calvin Hirsch, M.D., F.A.C.P, Professor (Internal Medicine and Public Health Sciences)

Anthony Jaretz, M.D., Associate Professor (Family and Community Medicine)

Hersh Jan, M.D., Associate Physician (Internal Medicine)

Kanjit Jahl, M.D., Ph.D., F.A.C.P, Associate Clinical Professor of Medicine (Internal Medicine)

Tae Youn Kim, Ph.D., R.N., Associate Professor (Nursing)

Patrice Koehl, Ph.D., Associate Professor (Computer Science)

Krish Krishnan, Ph.D., Associate Professor (Pathology and Laboratory Medicine)

Richard Levenson, M.D., Professor (Pathology and Laboratory Medicine)

Scott MacDonald, M.D., Associate Physician (Internal Medicine)

James Marcin, M.D., M.P.H., Associate Professor (Pedicatries)

Thomas Nesbitt, M.D., M.P.H., Professor (Family and Community Medicine)

Hien Nguyen, M.D., M.A.S, Assistant Professor (Emergency Medicine)

K. Anthony Seibert, Ph.D., Professor (Radiology)

Hendry Taw, M.D., M.S., Associate Professor (Psychiatry)

Heather Young, Ph.D., R.N., G.N.P., F.A.A.N., Associate Vice Chancellor (Nursing)

Emeriti Faculty

Richard Walls, Ph.D., Professor Emeritus (Computer Science)

Graduate Study. The Group currently offers an M.S. degree in Health Informatics. The program is primarily designed for clinicians (M.D., D.O., D.V.M., V.M.D., M.P.H., Pharm. D., R.N., others) and healthcare IT professionals 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 clinicians and healthcare IT 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. Proficiency in a programming language is required. Applicants with extensive computer science or information technology background but little knowledge of clinical information would need to gain considerable practical experience in dealing with clinical information to be competitive in applying to the program.

Graduate Advisers. M. Carroll (Pathology and Laboratory Medicine)

Courses in Health Informatics (MHI)

Graduate

202. Computer-Based Patient Records (4)
Lecture/discussion — 3 hours. 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 model, health system standards and terminologies; security, privacy and confidentiality; workflow modeling; data visualization; legal; decision support; public health; and evidence-based practice.—S. (S.) Odor

207. Decision Support Systems (4)
Lecture/discussion — 2 hours. Prerequisite: consent of instructor. Explores decision support systems for medical application. Topics include medical decision making, uncertainty, review of existing decision support systems, knowledge engineering, data mining, and knowledge based systems.—W. (W.) Greene

208. Medical Informatics in Web-Based Enterprise Computing (4)
Lecture — 2 hours; discussion — 2 hours. Introduction to the decision making processes and technologies that are involved in developing Web-based distributed enterprise applications in medicine. Focus on the Informatician’s role as a team member.—S. (S.) Carroll

209. Data Acquisition and Analysis (4)
Lecture — 2 hours; discussion — 1 hour; laboratory — 3 hours. Examines the nature, acquisition, and analysis of medical data. Data ranges from physiology to clinical symptoms, electrical potentials, sounds, text, images (still and motion), and data from nuclear acid and protein expression and sequencing instruments.—F. (F.) Hagarth

210. Introduction to Health 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, HL7, Security, and HIPAA.—F. (F.) Hagarth

211V. 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.—S. (S.) Yellowlees

212. Computer Security in Health Informatics (4)
Lecture — 3 hours; project. Prerequisite: course 210; 202; 209. Critical thinking about basic concepts in computer security and privacy. How the computer
security and privacy impact health informatics, ranging from electronic health records to telemedicine to security and privacy impact health informatics, ranging only.)—W. (W.)

289A. Special Topics in Medical Informatics; Data Acquisition (1-5)
Lecture — laboratory. Prerequisite: consent of instructor. Special topics in Data Acquisition. May be repeated for credit when topic differs.

289B. Special Topics in Health Informatics; Seminars in Clinical Translational Informatics (1-5)
Seminar — 1 hour. Seminars in current clinical translational informatics research topics. Guest presenters and faculty led discussion.—F, W, S. (F, W, S.) Anderson, Nicholas

289F. Database and Knowledge Management (4)
Lecture — discussion — 3 hours; term paper. Prerequisite: consent of instructor. Class size limited to 20 students. Course objectives include understanding the informatics techniques for data capture, information management, and knowledge generation that a student will use throughout their career. May be repeated for credit.—W (W.) Hargrave, Gebbie

289G. Special Topics in Health Informatics; Biostatistics (4)
Lecture — 3 hours; laboratory — 3 hours. Prerequisite: consent of instructor. Special topics in Biostatistics. Evaluation in Methods and Statistics in Biomedical Informatics. Research design and analysis with special emphasis on Biomedical Informatics.—F, S. (F, S.) Odor

289H. Modeling Biological Systems (4)
Lecture — 3 hours; laboratory — 1 hour. Class size limited to 20 students. Create awareness of how modern computer graphics have led to VR-Sim-Rob applications, and how they are modifying the teaching of medicine and in some cases the diagnosis and treatment of patients.—W. (W.) Odor

290. Seminar in Medical Informatics (1)
Seminar — 1 hour. Restricted to 20 students. Discussion of current graduate research and topics in Health Informatics. Oral presentations of individual study.—W (W.) Odor

299. Research in Health Informatics (1-12)
Independent research in Health Informatics. (S/U grading only.)—W, F, S. (F, W, S.)

Hebrew
See Classics, on page 212.

Hindi
See Classics, on page 212.

History
(College of Letters and Science)
Department Office, 2216 Social Sciences and Humanities Building 530-752-9241; http://history.ucdavis.edu

Faculty
Ali Anaschali, Ph.D., Associate Professor Mario Biagioli, Ph.D., Professor David Biale, Ph.D., Professor

UC Davis Prize for Teaching and Scholarship Achievement

Beverly Bossler, Ph.D., Professor Ian Campbell, Ph.D., Assistant Professor Diana Davis, Ph.D., Professor Carrie Decker, Ph.D., Associate Professor Gregory Downs, Ph.D., Associate Professor Edward Dickinson, Ph.D., Professor Omnia El Shaikly, Ph.D., Associate Professor A. Katie Harris, Ph.D., Associate Professor Ellen Hartigan-O’Connor, Ph.D., Associate Professor Quinn Javers, Ph.D., Assistant Professor Rachel Jean-Baptiste, Ph.D., Associate Professor Ari Kelman, Ph.D., Professor Kyu H. Kim, Ph.D., Associate Professor Justin Leroy, Ph.D., Assistant Professor Lisa Materson, Ph.D., Professor Sally McKee, Ph.D., Professor Susan G. Miller, Ph.D., Professor Kathryn S. Olnsted, Ph.D., Professor Academic Senate Distinguished Teaching Award Lorena Oropeza, Ph.D., Associate Professor Academic Senate Distinguished Teaching Award Eric Rauchway, Ph.D., Professor Academic Senate Distinguished Teaching Award Rachel St. John, Ph.D., Associate Professor Michael Saler, Ph.D., Professor Academic Senate Distinguished Teaching Award Marian Schlabach, Ph.D., Assistant Professor Sudipta Sen, Ph.D., Professor John Smolenski, Ph.D., Associate Professor Stylianos Spyrakidis, Ph.D., Professor Academic Senate Distinguished Teaching Award Rachael St. John, Ph.D., Professor Daniel Stolzenberg, Ph.D., Associate Professor Kathleen Stuart, Ph.D., Associate Professor Baki Teventz, Ph.D., Associate Professor Cecilia Tit, Ph.D., Assistant Professor Charles Walker, Ph.D., Professor Academic Senate Distinguished Teaching Award Louis S. Warren, Ph.D., Professor Adam Ziemek, Ph.D., Assistant Professor

Emeriti Faculty
Arnold J. Bauer, Ph.D., Professor Emeritus Robert Borger, Ph.D., Professor Emeritus Cynthia L. Brantley, Ph.D., Professor Emerita David Brody, Ph.D., Professor Emeritus Joan Cadden, Ph.D., Professor Emeritus Daniel H. Callahan, Ph.D., Professor Emeritus Robert O. Crummey, Ph.D., Professor Emeritus Manfred P. Fleischer, Ph.D., Professor Emeritus William W. Hagen, Ph.D., Professor Emeritus Thomas H. Holloway, Ph.D., Professor Emeritus Norman B. Landau, Ph.D., Professor Emeritus Susan W. Mann, Ph.D., Professor Emerita Ted W. Margadant, Ph.D., Professor Emeritus Barbara Metcalf, Ph.D., Professor Emerita Don C. Price, Ph.D., Professor Emeritus Ruth E. Rosen, Ph.D., Professor Emerita Academic Senate Distinguished Teaching Award Alan S. Taylor, Ph.D., Professor Emeritus UC Davis Prize for Teaching and Scholarship Achievement Richard N. Schwab, Ph.D., Professor Emeritus Wilson Smith, Ph.D., Professor Emeritus Clarence Walker, Ph.D., Professor Emeritus UC Davis Prize for Teaching and Scholarship Achievement F. Ray 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 the “deep past” and the more recent past.

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 seminars to undertake independent work, and to study the history of historical thought as part of the major. Students preferring collaborative engagement in research and writing are encouraged to follow Plan II.

Career Alternatives. A degree in history is excellent preparation for a professional career such as teaching, law, journalism, public administration, or business management. Professional schools in these and related fields (including the health professions) 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. .............................. 20
(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: General History .............................................................. 60-61
Four upper division courses from one of the fields of concentration listed below.………… 16
Two upper division courses from one of the other fields of concentration listed below.…… 16
Two upper division courses from a field or fields other than those chosen to satisfy the two preceding requirements .......... 8
One additional upper division course chosen from any of the fields. ......................... 4
One course from the following: History 101 or 102 or 103 (in field of concentration) ...... 4
One of the courses taken to fulfill the above requirements must deal with pre-modern history.

Total Units for the Major—Plan I: General History ........................................................ 60-61

Depth Subject Matter—Plan II: Research Focus ............................................................... 42
Four upper division courses from one of the fields of concentration listed below. Includes a two-quarter sequence of courses. .......... 16
Three upper division courses from one of the other fields listed below. .................... 12
History 101 or 102 or 103 (in field of concentration) ........................................ 5
History 103 in field of concentration (in exceptional circumstances, a student may, with the permission of an adviser, take the seminar in another field) .................. 5
One of the courses taken to fulfill the above requirements must deal with pre-modern history.

Total Units for the Major—Plan II: Research Focus ........................................................... 62

Fields of Concentration
(b) United States History: History 102K, 102L, 102M, 120, 169A, 169B
History and Philosophy of Science. Courses from the History and Philosophy of Science program may count toward major, History and Philosophy of Science 130A fulfills upper division requirements in the pre-industrial Europe. History and Philosophy of Science 130B, 150, and 180 fulfill upper division requirements in either the U.S. or Modern Europe 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, 183A, and 185A) as well as History and Philosophy of Science offerings.

Consult the History and Philosophy of Science program for a more detailed description of course offerings in the 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 at least 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 theses in a concentration of courses on a specific topic. Students may also, in consultation with and with the consent of the instructor, define other theses in a concentration of courses on a specific topic.

UNITS

History 362

Honors and Honors Program: A student becomes eligible for graduation with honors by meeting the major requirements (usually 3.00 GPA) and course requirements established by the College of Letters and Science. To qualify for high or highest honors, students must also complete the History Department honors with a GPA of 3.50 or above and write a thesis that meets the criteria for high or highest honors. Students apply to participate in the department honors program during the latter part of their junior year. Admission to the program is based on GPA, a thesis proposal, examples of previous writing, and the recommendation of a faculty member who is willing to sponsor the student's honors project, interviews, and faculty recommendations. Students admitted into the program must complete the History 104A, 104B, and 104C sequence of honors courses, which requires the completion of a senior honors project 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 should discuss their plans with a 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 required courses 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 history major courses (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 UC Davis Study Abroad Program, and (c) the course should be in the field of History. Students may present copies of the course work, syllabus, and writing assignments to the department's liaison person with the Study Abroad office for approval.

Note: students who wish to receive credit for courses taken abroad under programs other than UC Davis Study Abroad may petition the Undergraduate Program Committee to do so.

Teaching Credential Subject Representative. See the Teaching Credential/M.A. Program page 125.

Preparing for Careers in Teaching. History majors can pursue rewarding careers in teaching. To ensure your undergraduate coursework prepares you for a subject matter competency test, please contact the History Project at 3052-5438 or http://historyproject.ucdavis.edu/

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 contacting the Graduate Adviser.

Graduate Advisers. See the department's website for updated information.

American History and Institutions. This University requirement can be satisfied by passing any one of the following courses in History: 17A, 17B, 72A, 72B, 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 taken as electives or for a specific major or minor field of study. Students are urged to consult the History Project at 3052-5438 or http://historyproject.ucdavis.edu/

History 362

Course Offered: Fall, Winter, Spring, Summer.

Fall 2011 and on Revised General Education (GE) Arts and Humanities; Science and Engineering; Social Sciences; Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Domestic Diversity; Wrt—Writing Experience
108. World History, c. 1350-1850 (4) Lab—3 hours; discussion—1 hour. Major topics in world history from the 14th century to the beginning of the 19th century. Topics will vary by major and include oceans as systems of human communication and conflict; the global consequences of "industrial revolutions" in Europe and Asia, etc. GE credit: Hist/Arum or SocSci, Wrt| AH or SS, WC, WE.

10C. World History Ill (4) Lab—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 and the superpowers; the spread of the nation-states; and process of globalization. GE credit: Hist/Arum or SocSci, Wrt| AH or SS, WC, WE.

11. History of the Jewish People in the Modern World (4) Lab—3 hours; discussion—1 hour. Histories and cultures of the Jews since 1492. Topics include: the making of Jewish diasporas, roots of antisemitism, the Holocaust in images and texts, changing ideas of the self, Jews in America, contemporary visions of the Jewish past. Offered in alternate years. GE credit: Hist/Arum or SocSci, Div, Wrt| AH or SS, OL, VL, WC, WE.

12. Food and History (4) Lab—3 hours; discussion—1 hour. Survey of the ways humans have fed themselves from the dawn of humanity to the present. Transformation of plants and animals into food, cooking into cuisine, and ceremonializing into etiquette. GE credit: Hist/Arum or SocSci, Div, Wrt| AH or SS, OL, VL, WC, WE. —McKee, Resendez

15. Introduction to African History (4) Lab—3 hours; discussion—1 hour. Examination of the transformation of the continent and its peripheries to current conditions in Africa. Includes the early development of African civilizations, the slave trade and its abolition, 20th century colonization, and African independence. GE credit: Hist/Arum or SocSci, Div, Wrt| AH or SS, WC, WE.

17A. History of the United States (4) Lab—3 hours; discussion—1 hour. The experience of the American people from the Colonial Era to the end of the Cold War. Not open for credit to students who have completed course 17C. GE credit: Hist/Arum or SocSci, Div, Wrt| ACGH, AH or SS, DD, WE. —F. W. S. (F, W. S.)

17B. History of the United States (4) Lab—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: Hist/Arum or SocSci, Div, Wrt| ACGH, AH or SS, DD, WE. —F. W. S. (F, W. S.)

72A. Women and Gender in America, to 1865 (4) Lab—3 hours; discussion—1 hour. History of women and gender in America through 1865, emphasizing intersections of gender, race, class, and sexuality. Topics include intermarriage, slavery, witchcraft, meanings of motherhood, war, domestic labor, moral reform, women’s rights, migrations, the effects of commercialization and industrialization. GE credit: Hist/Arum or SocSci, Div, Wrt| ACGH, AH or SS, DD, WE.

72B. Women and Gender in America, 1865-Present (4) Lab—3 hours; discussion—1 hour. History of women and gender in America since 1865, emphasizing intersections of gender, race, class, and sexuality. Covers emancipation, migration, immigration, war, media, same-sex and opposite-sex relation ships, and the birth control, suffrage, labor, civil rights, feminism, and anti-feminist movements. GE credit: Hist/Arum or SocSci, Div, Wrt| ACGH, AH or SS, DD, WE.

80. The History of the United States in the Middle East (2) Lab/discussion—2 hours. History of the United States in the Middle East from 1900 to the present. Examination of U.S. foreign relations toward the Middle East, their regional ramifications and domes tic repercussions. GE credit: Hist/Arum or SocSci | AGR. AGH or SS, WC, WE.


98. Directed Group Study 1-5 (P/NP grading only.) Offered irregularly.

99. Special Study for Undergraduates 1-5 (P/NP grading only.) Offered irregularly.

Upper Division

101. Introduction to Historical Thought and Writing (5) Lecture/discussion—4 hours; term paper. Study of the history of historical thought and writing, analysis of critical and speculative philosophies of history and evaluation of modes of organization, interpretation, and style in historical writing. Offered in alternate years.

102A. Undergraduate Proseminar in History; Ancient (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Ancient. May be repeated for credit.

102B. Undergraduate Proseminar in History; Medieval (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Medieval. May be repeated for credit. Offered in alternate years.

102D. Undergraduate Proseminar in History; Modern Europe to 1815 (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Modern Europe to 1815. May be repeated for credit.

102E. Undergraduate Proseminar in History; Europe Since 1815 (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Europe since 1815. May be repeated for credit.

102F. Undergraduate Proseminar in History; Modern Europe to 1815 (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Modern Europe to 1815. May be repeated for credit.

102G. Undergraduate Proseminar in History; China Since 1800 (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. China since 1800. May be repeated for credit. Offered in alternate years.

102H. Undergraduate Proseminar in History; China Since 1800 (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. China since 1800. May be repeated for credit. Offered in alternate years.

102I. Undergraduate Proseminar in History; Britain (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Britain. May be repeated for credit. Offered in alternate years.

102J. Undergraduate Proseminar in History; Latin America Since 1810 (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Latin America since 1810. May be repeated for credit. Offered in alternate years.

102K. Undergraduate Proseminar in History; American History to 1787 (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. American History to 1787. May be repeated for credit. Offered in alternate years.

102L. Undergraduate Proseminar in History; United States, 1787-1896 (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. United States, 1787-1896. May be repeated for credit. Offered in alternate years.

102M. Undergraduate Proseminar in History; United States Since 1896 (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. United States since 1896. May be repeated for credit. Offered in alternate years.

102N. Undergraduate Proseminar in History; Japan (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Japan. May be repeated for credit. Offered in alternate years.

102O. Undergraduate Proseminar in History; Africa (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Africa. May be repeated for credit. Offered in alternate years.

102P. Undergraduate Proseminar in History; Christianity and Culture in Europe, 50-1850 (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Christianity and Culture in Europe, 50-1850. May be repeated for credit. Offered in alternate years.

102Q. Undergraduate Proseminar in History; Education Abroad Program (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Education Abroad Program in Europe, 50-1850. May be repeated for credit. Offered in alternate years.

102R. Undergraduate Proseminar in History; Muslim Societies (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Muslim Societies. May be repeated for credit. Offered in alternate years.

102S. Undergraduate Proseminar in History; Education Abroad Program (5) Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Education Abroad Program in Europe, 50-1850. May be repeated for credit. Offered in alternate years.
topics in the various fields of history. Education Abroad Program. May be repeated for credit. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt| AH or SS, WE.

102X. Undergraduate Proseminar in History (5)
Seminar—3 hours; term paper. Limited enrollment. Designated primarily for students interested in reading, discussion, research, and writing in selected topics in the various fields of history. Comparative History, selected topics in cultural, political, economic, and social history that deal comparatively with more than one geographic field. May be repeated for credit.

103. Topics in Historical Research (4)
Discussion—3 hours; individual consultation with instructor. 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. Offered irregularly. GE credit: WE.

104A. Introduction to Historical Research and Interpretation (4)
Seminar—3 hours; term paper. Prerequisite: acceptance into History Department Honors Program. Directed individual research aimed at preparing students to select appropriate topics and methodologies for a senior honors essay and to situate their topics within a meaningful, broad context of historical interpretations. Culminates in the submission of a full prospectus for an honors essay. GE credit: WE.—F. E. Anooshahr

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.) GE credit: WE.—W.

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.) GE credit: WE.—S.

105. Teaching History (4)
Lecture—3 hours; term paper. Teaching of American and world history at the K-12 level. Emphasis on introducing college students to the multiple ways in which history is taught, and on understanding how history education is determined. GE credit: ArtHum or SocSci | ACGH, AH or SS.

108. Global Environmental History (4)
Lecture/discussion—3 hours; project. Global, comparative study of how environmental change, human perceptions of nature, and manipulations of nature have changed over time. Primary focus post-1500, emphasis on critically analyzing many common ideas of environmental change. Not open for credit to students who have taken History 109A. GE credit: ArtHum or SocSci | AH or SS.

109A. Global Environmental History (4)
Lecture/discussion—3 hours; project. Global, comparative study of how environmental change, human perceptions of nature, and manipulations of nature have changed over time. Primary focus post-1500, emphasis on critically analyzing many common ideas of environmental change. GE credit: ArtHum, or SocSci | AH or SS.

109B. Environmental Change, Disease and Public Health (4)
Lecture/discussion—3 hours; term paper. Analysis of environmental changes from pre-history to the present and their role in the distribution, virulence and public health; many of these changes have been driven by human action and transformations of pathogens have accelerated under globalization. GE credit: SciEng or SocSci, Div | SE or SS, SL.

110. Themes in World History (4)
Lecture—3 hours; term paper. Prerequisite: upper division standing. Issues and topics in world history. May emphasize the interaction of diverse regions of the world as well as common patterns of historical change. May be repeated for credit if topic and/or instructor varies. GE credit: ArtHum or SocSci, Div, Wrt| AH or SS, WE.

110A. Colonialism and the Making of the Modern World (4)
Lecture—3 hours; term paper. History of the modern world, focusing on struggles between Europeans and colonized peoples; the global formation of capitalism; the creation of nation-states; and the constitution of bourgeois bodies and racial selves in modern societies. Offered irregularly. GE credit: ArtHum or SocSci, Div, Wrtl | AH or SS, WE.

110B. History of the Modern World, 1800 to the Present (4)
Lecture—3 hours; term paper. History of Morocco, Algeria, Tunisia and Libya (the Maghrib), 1800 to the present. Topics include conquest and pacification, reform movements, the rise of nationalisms, decolonization, state capitalism, economic liberalization, Islamism, democratization and human rights, the interplay of history and memory. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrtl | AH or SS, WE.

111A. History of Jews in the Islamic World (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 communities). May be repeated one time for credit. GE credit: ArtHum or SocSci, Div, Wrtl| AH or SS, WE.

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, the Holocaust, Diaspora). May be repeated one time for credit. GE credit: ArtHum or SocSci, Div, Wrtl | AH or SS, WE.

112C. History of Jews in the Muslim World (4)
Lecture—3 hours; term paper. History of Jewish communities in the lands of Islam from the time of the Prophet Muhammad to the present day. GE credit: SocSci | AH or SS, WE.

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 forces, and the nature of Israel’s multicultural society. GE credit: ArtHum or SocSci, Div, Wrtl | AH or SS, WE.

115A. History of West Africa (4)
Lecture—3 hours; term paper. Prerequisite: course 15 recommended. Introductory survey of the history of West Africa and/or the Congo region from the earliest times to the present. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrtl | AH or SS, WE.

115B. History of East and Central Africa (4)
Lecture—3 hours; term paper. Prerequisite: course 15 recommended. Introductory survey of the history of east and central Africa from earliest times to the present. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrtl | AH or SS, WE.

115C. History of Southern Africa (4)
Lecture—3 hours; term paper. Prerequisite: course 15 recommended. Introductory survey of the history of Southern Africa (including South Africa) from earliest times to the present. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrtl | AH or SS, WE.

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 European Colonialism in Africa. A comparison of British, Belgian, French, and Portuguese colonial efforts and impacts. GE credit: ArtHum or SocSci, Div, Wrtl | AH or SS, WE.

115E. The African Slave Trade (4)
Lecture—3 hours; writing—1 hour. History of the African Slave trades, from the early Egyptian and Saharan trades in the pre-modern period to the trans-Atlantic trade (15th-19th century) and the contemporary trafficking of humans. GE credit: ArtHum or SocSci, Div, Wrtl | AH or SS, WE.

Lecture—3 hours; term paper. History of Morocco, Algeria, Tunisia and Libya (the Maghrib), 1800 to the present. Topics include conquest and pacification, reform movements, the rise of nationalisms, decolonization, state capitalism, economic liberalization, Islamism, democratization and human rights, the interplay of history and memory. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrtl | AH or SS, WE.

116. African History: Special Themes (4)
Lecture—3 hours; term paper. Prerequisite: course 15 recommended. Themes of African history, such as African states and empires, slave trade, relations of Ethiopia to the rest of Africa, Bantu origins and migrations, and French policy of Assimilation and Association. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WE.

119. World War I (4)
Lecture—3 hours; extensive writing. The First World War and the settlement that followed from 1914-1919. Causes, conduct, and consequences of the war including military, political, economic, social, and cultural factors, with special emphasis on connections between the home front and the battlefield. Offered in alternate years. GE credit: SS, WE.

120. World War II (4)
Lecture—3 hours; extensive writing. The Second World War from 1931 to 1945 in all of its theaters. Causes, conduct, and consequences of the war including military, political, economic, social, and cultural factors, with special emphasis on the interactions between the home front and the battlefield. Offered irregularly. GE credit: SocSci | SS, WE.

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 or SocSci, Wrtl | AH or SS, WE.

121B. Medieval History (4)
Lecture/discussion and panel presentations—3 hours. European history from the Crusades to the Renaissance. GE credit: ArtHum or SocSci, Wrtl | AH or SS, WE.

121C. Medieval History (4)
Lecture/discussion and panel presentations—3 hours. European history from the Crusades to the Renaissance. GE credit: ArtHum or SocSci, Wrtl | AH or SS, WE.

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 translations and primary works. May be repeated for credit. Offered irregularly. GE credit: ArtHum or SocSci | AH or SS, WE.

125. Topics in Early Modern European History (4)
Laboratory/discussion—3 hours; term paper. 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. Offered irregularly. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE.

130A. Christianity and Culture in Europe: 1600-1850 (4)
Lecture—3 hours; written report or research paper. A survey of the intellectual, cultural and political reformation of society in the aftermath of the Wars of Religion. "Secularization" will be discussed in the context of the Enlightenment and Romanticism. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

131A. Early Modern European History (4)
Lecture—3 hours; written reports. Western European history from about 1350 to about 1500. Offered irregularly. GE credit: ArtHum or SocSci | AH or SS, WC, WE. —Stuart

131B. European History During the Renaissance and Reformation (4)
Lecture—3 hours; term paper. Survey of European society, politics, and culture from the late 15th through the early 16th centuries, with particular focus on the Italian and Northern Renaissance, on the Protestant Reformation, and the Catholic Counter Reformation. Offered in alternate years. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE. —Harris

131C. The Old Regime: Absolutism, 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. Offered in alternate years. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE. —Campbell

132. Crime and Punishment in Early Modern Europe (4)
Lecture—3 hours; term paper. Deviance and crime in early modern Europe, contrasting 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. Offered in alternate years. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE.

133. The Age of Ideas (4)
Lecture—3 hours; written reports. The Enlightenment and its background in the seventeenth century. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

134A. The Age of Revolution (4)
Lecture—3 hours; written reports. Ideas and institutions during the French Revolution and the Napoleonic era. Offered irregularly. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

135A. History of Science to the 18th Century (4)
Lecture/discussion—3 hours; term paper. 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 culmination of the seventeenth century scientific revolution. Offered irregularly. GE credit: ArtHum or SocSci | AH or SS, WC, WE. —Stolzenberg

135B. History of Science, 18th to 20th Centuries (4)
Lecture/discussion—3 hours; term paper. Survey of the historical development of scientific thought in geology, biochemistry, 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. Offered irregularly. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

136. Scientific Revolution (4)
Lecture/discussion—3 hours; term paper. History of science in Western Europe (1400-1750). Investigates the changing definitions of science in the theology of Copernicus, Galileo and Newton. Considers the evolution of new ideas about nature, experiment, observation, and scientific theory. Offered irregularly. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE.

138A. The Rise of the Russian Empire, 1304-1825 (4)
Lecture—3 hours; term paper. Expansion of the Russian state in Muscovite and imperial eras. 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 completed course 137B. Offered irregularly. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE. —Campbell

138B. Reform and Revolution in Tsarist Russia, 1825-1917 (4)
Lecture—3 hours; term paper. Processes of state reform and social change in the 19th century; failure of reform and collapse of the Russian Empire; the revolutions of 1917. Offered in alternate years. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE.

138C. Russian History: The Rise and Fall of the Soviet Union, 1917 to the Present (4)
Lecture—3 hours; term paper. 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 or SocSci, Div | AH or SS, WC, WE.

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 irregularly. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

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, how it changed with technological breakthroughs and population; and role of medicine in attitudes toward poverty, women, race, disease. Offered irregularly. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

140. The Rise of Capitalism in Europe (4)
Lecture—3 hours; term paper. 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 free-market industrial revolution; interplay of social, political, cultural, and economic history. Offered irregularly. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

141. France Since 1815 (4)
Lecture—2 hours; term paper. Offered in alternate years. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE.

142A. History of the Holocaust (4)
Lecture—3 hours; term paper. Topics include comparative genocide, medieval and modern antisemitism, modern German history, the rise of Nazism, Jewish life in Europe before the Nazi period, and the fate of the Jewish communities and other persecuted groups in Europe from 1933-1945. Offered in alternate years. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE.

142B. The Memory of the Holocaust (4)
Lecture—3 hours; term paper. Examination of the literary, philosophical, theological and artistic responses to the Holocaust in European Jewish thought. Exploration of how memory is constructed, by whom and for what purposes. Offered in alternate years. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE.

143. History of Eastern Europe and the Balkans (4)
Lecture—3 hours; essays. History of the Baltic, Danubian, and Balkan lands since the 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. Offered in alternate years. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE.

144A. History of Germany since 1789 (4)
Lecture/discussion—3 hours; extensive writing. History of the German lands in the age of the French Revolution; 19th-century liberalism, nationalism, and industrialization; the World Wars; National Socialism and the Holocaust; east and west after 1945; The Cold War; the reunification scene. (Not open for credit to students who have completed former course 144.) Offered in alternate years. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE.

145. War and Revolution in Europe, 1789-1918 (4)
Lecture—3 hours; term paper. Survey of revolutionary movements, international crises, and wars in Europe from the French Revolution to World War I. Offered in alternate years. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE.

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 or SocSci, Div | AH or SS, WC, WE.

146B. Europe in the Twentieth Century (4)
Lecture—3 hours, term paper. Survey of the history of Europe since 1939. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE.

147A. European Intellectual History, 1800-1870 (4)
Lecture—3 hours; term paper. European thought in the early industrial era. Seventeenth-century cultural works, from romanticism to scientism; 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, Div | AH or SS, WC, WE.

147B. European Intellectual History, 1870-1920 (4)
Lecture—3 hours; term paper. Cultural and intellectual watershed of the late nineteenth and early twentieth centuries. Emergence of modern art and literature; psychoanalysis and the new social sciences. Focus on the work of Baudelaire, Wagner, Nietzsche, Freud, Weber and Kafka. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE.
147C. European Intellectual History, 1920-1970 (4)
Lecture—3 hours; term paper. European thought and culture since World War I. Coverage includes: literature and politics; Communism and Western Marxism; Fascism; Existentialism; Structuralism; Feminism. Particular attention to Brecht, Hitler, Sartre, Camus, Beckett, Marcuse, Foucault, Woolf and de Beauvoir. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

148A. Women and Society in Europe: 1500-1799 (4)
Lecture—3 hours; term paper. 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. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

148B. Women and Society in Europe: 1789-1920 (4)
Lecture—3 hours; term paper. 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. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

148C. Women and Society in Europe: 1914-Present (4)
Lecture—3 hours; term paper. The history of 20th-century Europe from the perspective of women and the family, and of sexual and gender relations. Emphasis on the impact of women of major events and movements on cultural development, e.g., World War I, fascism, Soviet communism, World War II, the welfare state, feminism, and mass culture. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

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 siecle. Address 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 | AH or SS, WC, WE.

151A. England: The Middle Ages (4)
Lecture—3 hours; term paper. Origins of England to the accession of the Lancastrians. 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 Wyclif. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.

151B. England: The Early Modern Centuries (4)
Lecture—3 hours; term paper. 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 parliament; thought, arts, and literature in the times of More, Shakespeare, Hobbes, Wren, and Newton. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.

151C. Eighteenth-Century England (4)
Lecture—3 hours; term paper. English history from the Glorious Revolution to the French Revolution. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.

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. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

159. Women and Gender in Latin American History (4)
Lecture—3 hours; extensive writing. Roles of women and men in the history of Latin America, with an emphasis on the construction of gender with racial and class categories. Introduction to the theoretical premises of women’s and gender history. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

160. Spain and America in the 16th Century (4)
Lecture—3 hours; term paper. 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 or SocSci, Div, Wrt | AH or SS, WC, WE.

161. Human Rights in Latin America (4)
Lecture—3 hours; term paper. History of the origins, denial and protection of Human Rights in Latin America. Emphasis on dictatorships, political violence, social resistance, democracy, justice, accountability, truth commissions, memory. Offered in alternate years. (Same course as Human Rights 161.) GE credit: ArtHum or SocSci | AH or SS, VL, WC, WE.

162. History of the Andean Region (4)
Lecture/discussion—3 hours; written and/or oral reports. History of the Andean region that now comprises modern Peru, Bolivia, and Chile, from the beginning of human settlement to the present. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

163A. History of Brazil (4)
Lecture—3 hours; written reports. The history of colonial and imperial Brazil from 1500 to 1889. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

163B. History of Brazil (4)
Lecture—3 hours; written reports. The history of the Brazilian republic from 1889 to the present. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

164. History of Chile (4)
Lecture—3 hours; term paper. Emphasis on the history of Chilean political economy from 1930 to the present. Various strategies of development (modernization, Marxism, Neo-Liberalism), the rise of mass politics, the course of foreign policies, the relationship of international capitalism to domestic production. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

165. Latin American Social Revolutions (4)
Lecture—3 hours; term paper. Major social upheavals since 1900 in selected Latin American nations; similarities and differences in cause, consequence, and consequence. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

166A. History of Mexico Since 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. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

166B. History of Mexico Since 1848 (4)
Lecture/discussion—3 hours; written and/or oral reports. History of Mexico from 1848 to the present. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

167. Modern Latin American Cultural and Intellectual History (4)
Lecture—3 hours; term paper. Introduction to the cultural and intellectual history of modern Latin America including architecture, painting, music, literature. Offered irregularly. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.

168. History of Inter-American Relations (4)
Lecture—3 hours; written reports. Diplomatic history of Latin America's interactions with Latin American relations, relations with the United States, participation in international organizations, and communism in Latin America. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC, WE.

169A. Mexican-American History (4)
Lecture/discussion—3 hours; written and/or oral reports. Economic, social, religious, cultural and political development of the Mexican and Mexican-American population of the Southwestern United States from the Spanish Conquest to the present. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

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. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.

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 thought and culture, and imperial rivalry. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.

170B. The American Revolution (4)
Lecture—3 hours; term paper. Analysis of the Revolutionary epoch with emphasis on the structure of British colonial policy, the rise of revolutionary movements, the War for Independence and its consequences, and the Confederation period. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, WE.

170C. The Early National Period, 1789-1825 (4)
Lecture—3 hours. Political and social history of the American republic from the adoption of the Constitution through the War of 1812 and its consequences. Offered in alternate years. GE credit: ArtHum or SocSci | ACGH, AH or SS, DD, WE.

171A. Jacksonian America (4)
Lecture—3 hours; term paper. 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. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.

171B. Civil War and Reconstruction (4)
Lecture—3 hours; term paper. Examination of the political and social history of the United States from the Compromise of 1850 to the end of Reconstruction, 1867. Causes of the Civil War and the problems of reconstruction after the war. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | ACGH, AH or SS, DD, WE.

171F. The Civil War in American Film (1)
Discussion—1 hour; film viewing. Prerequisite: course 171B. Viewing and discussion of films with short writing assignments. (P/NP grading only) Offered irregularly. GE credit: AH or SS.

171D. Selected Themes in 19th Century American History (4)
Lecture—3 hours; term paper. 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 one time for credit. Topics will vary. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt | ACGH, AH or SS, WE.

172. American Environmental History (4)
Lecture—3 hours; term paper. Prerequisite: course 171A. Examination of changing relations between people and nature in the area of the current United States from pre-Columbian times to the present. Topics include ecological change; perceptions of nature; social conflicts over “proper” uses of nature; environmental movement. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt | ACGH, AH or SS, WE.
173. Becoming an American: Immigration and American Culture (4)
Lecture—3 hours; term paper. 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 immigration has created a multicultural society. Offered alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, WE.

174A. The Gilded Age and Progressive Era: United States, 1870-1917 (4)
Lecture—3 hours; term paper. Includes Southern redemption, Western incorporation, electoral corruption, labor movements, Populism, Progressivism, women’s suffrage, U.S. international expansion, and immigration restriction. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, WE.

174D. America in War, Prosperity and Depression: Discussion (1)
Discussion—1 hour; short papers. Prerequisite: course 174A concurrently. Intensive discussion of topics and readings for course 174A. (P/NP grading only.) Offered irregularly.

174F. World War and Depression: United States, 1917-1945 (4)
Lecture—3 hours; term paper. 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 government regulation of the economy, welfare capitalism, and class, racial, ethnic, and gender conflicts. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, WE.

174B. America in War, Prosperity and Depression: Discussion (1)
Discussion—1 hour; short papers. Prerequisite: course 174B concurrently. Intensive discussion of topic and readings for course 174B. (P/NP grading only.) Offered irregularly.

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; anticomunist crusade; civil rights; feminist and environmentalist movement; New Left; counterculture; Vietnam; Watergate; and the moral majority. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, WE.

175D. Selected Themes in 19th Century American History (4)
Lecture—3 hours; term paper. 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 one time for credit when topic differs. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, WE.

175D. Selected Themes in 20th Century American History: Discussion (1)
Discussion—1 hour. Prerequisite: course 175D concurrently. Intensive discussion of topics and readings for course 175D. (P/NP grading only.) Offered irregularly.

175E. American Intellectual History (4)
Lecture—3 hours; term paper. 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 or SocSci, Wrt|ACGH, AH or SS, WE.

176A. 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 nineteenth century with emphasis on work, leisure, urbanization, and the family. Social reform movements and changes in cultural values. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, WE.

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. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, WE.

177A. History of Black People and American Race Relations, 1450-1860 (4)
Lecture—3 hours; term paper. History of black people in the United States from the African background up to Reconstruction. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, WE.

177B. History of Black People and American Race Relations, 1860-Prepresent (4)
Lecture—3 hours; term paper. History of black people and race relations from 1860-present. Emphasis on Civil War, Reconstruction, Segregation, Accommodation, black nationalism, urbanization, and civil rights. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, WE.

178A. Race and American, 1492-1845 (4)
Lecture—4 hours. Racial formation during the Age of Discovery, the Colonial Period, Early National and Antebellum periods up to the Civil War. Not open for credit to students who have completed course 178B. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|AcGH, AH or SS, DD, WE.

178B. Race and American, 1845-Prepresent (4)
Lecture—3 hours; term paper. Racial Formation in the Post Civil War. United States from 1860 to the present. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, WE.

179. Asian American History, 1850-Prepresent (4)
Lecture—3 hours; term paper. The historical experience of people of Asian origin in the United States from the mid-nineteenth century to the present. Migration, labor, community formation, race relations, women and gender, popular culture. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, DD, WE.

180AN. American Political History, 1789-1896 (4)
Lecture—3 hours; term paper. Growth of American politics from the birth of the republic to the end of the nineteenth century. Development of political parties, 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 irregularly. GE credit: ArtHum or SocSci, Wrt|ACGH, AH or SS, WE.

180BN. American Political History, 1896-Prepresent (4)
Lecture—2 hours; term paper. Politics in the United States from 1896 to the present. Topics include race and partisan politics; communism and anti-communism; the New Deal and the centralization of government; and the social and political presidency. Not open for credit to students who have completed course 180A or 180C. Offered irregularly. GE credit: ArtHum or SocSci, Wrt|ACGH, AH or SS, WE.

181. Religion in American History to 1890 (4)
Lecture—2 hours; term paper. American religious history from colonization through the Gilded Age. Topics include religious diversity in America; native American religion; Protestant evangelism; gender and religion; religious change in American religion; religion in the Civil War; and religion’s response to modernization. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt|ACGH, AH or SS, WE.

182. Gender and Justice in American History (4)
Lecture/discussion—3 hours; term paper. Intersection of gender and law in North America from the colonial period through the twentieth century. Topics include witchcraft, suffrage, child custody, protective labor laws, regulation of sexuality. Analysis of legal change, trials, and cultural influences. Offered irregularly. GE credit: ArtHum or SocSci, Wrt|ACGH, AH or SS, DD, WE.

183A. 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 Greater Southwest and the Mexican War, the Mormons, mining discovery, and the West during the Civil War. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, WE.

183B. The Frontier Experience: Trans-Mississippi West (4)
Lecture—3 hours; written and/or oral reports. Spread of the mining kingdom, the range cattle industry, Indian-military relations, inter-tribal accommodation, the Great Plains and Rocky Mountain Regions and political organization of the West. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, WE.

184. History of Sexuality in America (4)
Lecture—3 hours; extensive writing. History of sexuality in America from pre-European through the late twentieth century. Topics include birth control, marriage, sexual violence, prostitution, inter-racial relationships, heterosexuality and homosexuality, the feminist, gay, and lesbian liberation movements, AIDS, commercialization of sexuality. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|ACGH, AH or SS, WE.

185A. History of Science in America (4)
Lecture—3 hours; research paper. Survey of the European background. Study of American scientific institutions, ideas, persons, processes in science, and of relationships between society and science from colonial times to present. Offered irregularly. GE credit: ArtHum or SocSci, Wrt|AH or SS, WE.

185B. History of Technology in America (4)
Lecture—3 hours; research paper. Study of American technology, emphasizing biographical approach to historical understanding of technological change, creative processes, institutions, ideas, and relationships between technology and society from colonial times to present. Offered irregularly. GE credit: ArtHum or SocSci, Wrt|AH or SS, WE.

188. America in the Cold War (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Tumult and upheaval in American politics, culture, and society 1961-1969. Civil rights; Vietnam; the draft and the anti-war movement; rock and roll and the counterculture; modern feminism; modern conservatism; student movements; urban unrest and insurrection. Offered in alternate years. GE credit: SocSci|ACGH, DD, SS, WE.

189. California History (4)
Lecture—3 hours; term paper. California history from the pre-colonial period to the present including dis-possesion of California’s Indians, political economy of the Spanish and Mexican periods, Gold Rush effects, industrialization, World War II, Water politics, World War II, Proposition 13, and the emergence of the Silicon Valley. Not open for credit to students
who have completed two courses of course 189A, 189B, 189C. Offered in alternate years. GE credit: ArtHum or SocSci, Div | Wrt | AH or SS, DD, WE.

190A. Middle Eastern History I: The Rise of Islam, 600-1000 (4)
Lecture—3 hours; extensive writing. Middle Eastern history from the rise of Islam to the disintegration of the Abbasid and Umayyad empires. The political, social, religious, and cultural aspects of the Middle Eastern Islamic world. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

190B. Middle Eastern History II: The Age of the Crusades, 1001-1400 (4)
Lecture—3 hours; extensive writing. 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 | AH or SS, WC, WE.

190C. Middle Eastern History III: The Ottomans, 1400-1730 (4)
Lecture—3 hours; term paper. Middle Eastern history focusing on Safavid Iran, Ottoman Empire on the borderlands of Byzantine Anatolia through its expansion into Europe, Asia, and Africa, creating a new cultural synthesis including the Arabs, Jews, Christians, Islamic, Mongol, Persian, Slavic, and Turkish traditions. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

190D. Middle Eastern History IV: Safavids Iran, 1300-1720 (4)
Lecture—3 hours; term paper. Middle Eastern history focusing on Safavid Iran (present-day Iran, Iraq, Afghanistan, up to Georgiap), beginning with the origins of the dynasty as a powerful religious family, to the establishment of the Empire, focusing on Social, Religious, Economic, and Political History. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

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. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

191B. High Imperial China (4)
Lecture—3 hours; term paper. Political disunion and the influence of Buddhism and Europeanization under the great dynasties of T'ang, Sung, and Ming with analysis of society, culture and thought. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

191C. Late Imperial China (4)
Lecture—2 hours; discussion—1 hour; two long papers. Prerequisite: course 9A or upper division standing recommended. Patterns and problems of Chinese life 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 lower-class experience. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

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 recommended. The decline and fall of the Chinese Empire, with particular attention to the social and political disintegration, and the response of government officials, intellectuals, and ordinary people to the increasing pressures of Western imperialism. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

191E. The Chinese Revolution (4)
Lecture—2 hours; discussion—1 hour; extensive writing. Prerequisite: upper division standing recommended. Analysis of Chinese political transformation from Confucian empire into Communist state. Emphasis on emergence and triumph of peasant revolution. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

191F. History of the People's Republic of China (4)
Lecture—2 hours; discussion—1 hour; extensive writing. Prerequisite: upper division standing recommended. Comprehensive analysis of recent Chinese history, including land reform, the Cultural Revolution, the post-Mao era, and the consequences of the new economic policies of the 1980s. Not open for credit to students who have completed course 190C. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

191G. Special Topics in Chinese History to 1800 (4)
Lecture—3 hours; extensive writing. Prerequisite: course 9A recommended. Topics in the history of China from the beginning of the imperial period through the high Qing dynasty. Topics may be framed chronologically (e.g., the Qianlong dynasty), thematically (e.g., Trade in early Chinese history), may be repeated one time for credit when topic differs. Offered irregularly. GE credit: AH, WC, WE.

191H. Special Topics in Chinese History after 1800 (4)
Lecture—3 hours; extensive writing. Prerequisite: course 9A recommended. Topics in the history of China since 1800. Topics may be framed chronologically (e.g., The Opium War, 1842-1945) or thematically (e.g., The Modern Evolution of Chinese Law). May be repeated one time for credit when topic differs. Offered irregularly. GE credit: AH, WC, WE.

191I. Sex and Society in Modern Chinese History (4)
Lecture—3 hours; term paper. Role of sex, gender, and family relations in the development of Chinese politics, society, and personal life in the modern period. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

192. Internship in History (1-12)
Prerequisite: enrollment dependent on availability of intern positions. May be repeated by major for credit. Supervised internship and study as historian, archivist, curator, or in another history-related capacity, in an approved organization or institution. [NP grading only] Offered irregularly.

193A. History of the Modern Middle East, 1750-1914 (4)
Lecture—3 hours; term paper. Prerequisite: course 6 recommended. Transformation of state and society 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, and labor movement groups. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, VL, WC, WE.

193B. History of the Modern Middle East from 1914 (4)
Lecture—3 hours; term paper. The Middle East from the turn of the 20th century to the present. Themes include the legacy of imperialism, cultural renaissance, the World Wars, nationalism, modernization, Islamic revival, gender, revolutionary movements, politics of oil and war, and cultural modernism, exile and diaspora. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, VL, WC, WE.

193C. The Middle East Environment: Historical Change and Current Challenges (4)
Lecture/discussion—3 hours; project. Examines Middle East environment and human use of nature over last 10,000 years. Introduction to desert ecology, environmental history and current environmental problems. Case Studies of Egypt, Maghreb countries, Arabian peninsula/Gulf countries, desertification, water, indigenous knowledge, and national parks. GE credit: ArtHum or SocSci | AH or SS.

193D. History of Middle Iran, From 1850 to Present (4)
Lecture—3 hours; term paper. Prerequisite: course 6 recommended. Modern Iran from the mid 19th century to the present. Themes include the legacy of imperialism, cultural renaissance, the World Wars, nationalism, modernization, Islamic revival, gender, revolutionary movements, politics of oil and war. Offered in alternate years. GE credit: SocSci, Div, Wrt | AH or SS, VL, WC, WE.

194A. Aristocratic and Feudal Japan (4)
Lecture—3 hours; term paper and/or discussion. Broad survey of the cultural, social, religious, and political aspects of Japanese history from mythological times through the sixteenth century emphasizing comparison of the organizations, values, and beliefs associated with the aristocratic and feudal periods. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE.

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 seventeenth through the nineteenth centuries emphasizing the development of those patterns of thought and political organization with which Japan met the challenge of the nineteenth-century Western expansionism. Offered in alternate years. GE credit: ArtHum or SocSci, Div | AH or SS, WC, WE.

194C. Modern Japan (4)
Lecture—3 hours; term paper and/or discussion. Survey of the cultural, social, economic, and political aspects of Japanese history in the twentieth century emphasizing labor and social movements, militarism and the Pacific war, and the emergence of Japan as a major economic power. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

194D. Business and Labor in Modern Japan (4)
Lecture—3 hours; term paper. Survey of labor and management relations in Japan from the mid-eighteenth century to the present. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

194E. Education and Technology in Modern Japan (4)
Lecture—3 hours; term papers. Survey of education and technology in Japan from the mid-eighteenth century to the present. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

195B. History of Modern Korea (4)
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: upper division standing recommended. History of Modern Korea, From Yi dynasty period to present. Covers the 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 or SocSci, Div, Wrt | AH or SS, VL, WC, WE.

196A. Medieval India (4)
Lecture—3 hours; discussion—1 hour; written reports. Survey of history of India in the millennium preceding arrival of British Raj in 1857, focusing on interaction of the civilizations of Hinduism and Islam and on the changing nature of the state. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, VL, WC, WE.
1968. Modern India (4)
Lecture—3 hours; discussion—1 hour; written reports. Survey of cultural, social, economic, and political aspects of Indian history from arrival of the British in the eighteenth century to formation of new independent states—India, Bangladesh, and Pakistan. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt| | AH or SS, WC, WE.

197T. Tutoring in History (2)
Discussion—1 hour; laboratory—3 hours. Prerequisite: enrollment as a History major with senior standing and permission of the instructor. Tutoring of students in lower division courses. Weekly meetings with instructors in charge of courses. Written reports on methods and materials required. May be repeated one time for credit. No final examination. (P/NP grading only.) Offered irregularly.

198. Directed Group Study (1-5)
Prerequisite: consent of instructor; upper division standing. (P/NP grading only.) Offered irregularly.

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.) Offered irregularly.

Graduate
201A. Sources and General Literature of History; Ancient (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. Ancient. May be repeated for credit when different subject area is studied.

201B. Sources and General Literature of History; Medieval (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. Medieval. May be repeated for credit when different subject area is studied. Offered in alternate years.

201C. Sources and General Literature of History; Renaissance and Reformation (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. Renaissance and Reformation. May be repeated for credit when different subject area is studied. Offered in alternate years.

201D. Sources and General Literature of History; Early Modern Europe (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. Early Modern Europe. May be repeated for credit when different subject area is studied. Offered in alternate years.

201E. Sources and General Literature of History; Europe Since 1815 (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. Europe since 1815. May be repeated for credit when different subject area is studied. Offered in alternate years.

201F. Sources and General Literature of History; China to 1880 (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. China to 1880. May be repeated for credit when different subject area is studied. Offered irregularly.

201G. Sources and General Literature of History; China Since 1880 (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. China since 1880. May be repeated for credit when different subject area is studied. Offered in alternate years.

201H. Sources and General Literature of History; Britain (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. Britain. May be repeated for credit when different subject area is studied. Offered in alternate years.

201I. Sources and General Literature of History; United States Since 1865 (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. United States since 1865. May be repeated for credit when different subject area is studied. Offered in alternate years.

201J. Sources and General Literature of History; American History to 1787 (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. American History to 1787. May be repeated for credit when different subject area is studied. Offered in alternate years.

201K. Sources and General Literature of History; United States, 1787-1896 (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. United States, 1787-1896. May be repeated for credit when different subject area is studied. Offered in alternate years.

201L. Sources and General Literature of History; Medieval East (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Addresses various theoretical and methodological approaches to the study of the Modern Middle East. Survey Modern Middle East historiography in light of theoretical innovations such as post-Orientalism, World Systems theory, and postcolonial theory. May be repeated for credit when different subject area is studied. Offered in alternate years.

201M. Sources and General Literature of History; Modern Japan (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. Modern Japan. May be repeated for credit when different subject area is studied. Offered in alternate years.

201N. Sources and General Literature of History; Cross-Cultural Women's History (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. Cross-Cultural Women's History. May be repeated for credit when different subject area is studied. Offered in alternate years.

201O. Sources and General Literature of History; History of Science and Medicine (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. History of Science and Medicine. May be repeated for credit when different subject area is studied. Offered in alternate years.

201P. Sources and General Literature of History; Jewish History (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. Jewish History. May be repeated for credit when different subject area is studied.

201Q. Sources and General Literature of History; Advanced Topics in World History (4)
Seminar—3 hours; term paper. Prerequisite: consent on instructor. Designed primarily for students preparing for higher degrees in history. Advanced topics in World History. May be repeated for credit when different subject area is studied. Offered in alternate years.

201R. Sources and General Literature of History; Comparative History (5)
Seminar—3 hours; term paper. Limited enrollment. Designed primarily for history majors. Intensive reading, discussion, research, and writing in selected topics in the various fields of history. Comparative History, selected topics in cultural, political, economic, and social history that deal comparatively with more than one geographic field. May be repeated for credit when different subject area is studied. Offered in alternate years. GE credit: WE.

202A. Major Issues in Historical Interpretation; Ancient (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Fundamental issues and debates in the study of history. Ancient. Readings, papers, and class reports. May be repeated for credit when a different subject area is studied. Offered in alternate years.

202B. Major Issues in Historical Interpretation; Medieval Europe (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Fundamental issues and debates in the study of history. Medieval Europe. Readings, papers, and class reports. Offered in alternate years.

202C. Major Issues in Historical Interpretation; Modern Europe (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Fundamental issues and debates in the study of history. Modern Europe. Readings, papers, and class reports. May be repeated for credit when a different subject area is studied. Offered in alternate years.

202D. Major Issues in Historical Interpretation; India (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Fundamental issues and debates in the study of history. India. Readings, papers, and class reports. May be repeated for credit when a different subject area is studied. Offered in alternate years.

202E. Major Issues in Historical Interpretation; Africa (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Fundamental issues and debates in the study of history. Africa. Readings, papers, and class reports. May be repeated for credit when a different subject area is studied. Offered in alternate years.

202F. Major Issues in Historical Interpretation; China (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Fundamental issues and debates in the study of history. China. Readings, papers, and class reports. May be repeated for credit when a different subject area is studied. Offered in alternate years.

202G. Major Issues in Historical Interpretation; Japan (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Fundamental issues and debates in the study of history. Japan. Readings, papers, and class reports. May be repeated for credit when a different subject area is studied. Offered in alternate years.

202H. Major Issues in Historical Interpretation; Middle East (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Fundamental issues and debates in the study of the Middle East. Readings, papers, and class reports. Offered in alternate years.

202I. Major Issues in Historical Interpretation; World Systems Theory (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Fundamental issues and debates in the study of World Systems theory. Readings, papers, and class reports. Offered in alternate years.

202J. Major Issues in Historical Interpretation; World Cultures (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Fundamental issues and debates in the study of World Cultures. Readings, papers, and class reports. Offered in alternate years.

202K. Major Issues in Historical Interpretation; Writing Experience (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Fundamental issues and debates in the study of Writing Experience. Readings, papers, and class reports. May be repeated for credit when a different subject area is studied. Offered in alternate years.
202H. Major Issues in Historical Interpretation; United States (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing; fundamental issues and debates in the study of history. United States. Readings, papers, and class reports. May be repeated for credit when a different subject area is studied. Offered in alternate years.

202I. Major Issues in Historical Interpretation; Latin America (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing; fundamental issues and debates in the study of history. Latin America. Readings, papers, and class reports. May be repeated for credit when a different subject area is studied. Offered in alternate years.

203A. Research Seminar (4)
Seminar—3 hours; tutorial—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.—F. (F.)

203B. Research Seminar (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.]—W. (W.)

203C. Research Seminar (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.]—W. (W.)

204. Historiography (4)
Seminar—3 hours; term paper. Major issues in the philosophy and methodology of history.—F. (F.)

221. Medieval History (4)
Seminar—3 hours. Prerequisite: courses 121A, 121B, 121C recommended. Topics in the history of medieval and early Renaissance Europe. Offered irregularly.

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 one time for credit. Offered irregularly.

261. Latin American History (4)
Seminar—3 hours. Prerequisite: two courses in Latin American history; reading knowledge of Spanish or Portuguese. Offered irregularly.

271A. United States History (4)
Seminar—3 hours; term paper. Prerequisite: course 201A 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 by the end of the second quarter. May be repeated for credit. [Deferred grading only, pending completion of sequence.] Offered irregularly.

271B. United States History (4)
Seminar—3 hours; term paper. Prerequisite: course 201A 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 by the end of the second quarter. May be repeated for credit. [Deferred grading only, pending completion of sequence.] Offered irregularly.

291A. Chinese History (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor. Research on topics to be chosen by the students for the preparation of a writing-intensive length papers. May be repeated for credit. [Deferred grading only, pending completion of sequence.] Offered irregularly.

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.] Offered irregularly.

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. Offered irregularly.

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.] Offered irregularly.

298. Group Study (1-5)

299. Research (1-12)
(S/U grading only.)

299D. Individual Study (1-12)
(S/U grading only.)

Professional

389. Introductory Seminar for Teaching Assistants (1)
Seminar—1 hour. Prerequisite: must be enrolled in course 300. An introduction to the broad comparative and theoretical issues of teaching methods and techniques in history. [S/U grading only.]

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.]

History and Philosophy of Science

History and Philosophy of Science: 24
Philosophy 30
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. 20
(a) History: 102, 125A, 135A, 138, 139A, 139B, 185A, 185B, 188A, 188B
(b) Philosophy: 107, 108, 110, 111; 112
(c) Science and Technology Studies: 20, 130A, 130B, 131, 150, 180.

Minor Adviser, 101 Young Hall, matsadvising@ucdavis.edu.

Horticulture and Agronomy

(A Graduate Group)

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., Professor (Viticulture and Enology)
Kassim Al-Khalili, Ph.D., Professor (Plant Sciences)
Diane M. Beckles, Ph.D., Associate Professor (Plant Sciences)
Alan B. Bennett, Ph.D., Professor (Plant Sciences)
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)
E. Charles Brummer, Ph.D., Professor (Plant Sciences)
Daria Cantu, Ph.D., Assistant Professor (Viticulture and Enology)
Abhayaa M. Dandekar, Ph.D., Professor (Plant Sciences)
Jorge Dubovsky, Ph.D., Professor (Plant Sciences)
Jan Dvorak, Ph.D., Professor (Plant Sciences)
Valerie T. Eviner, Ph.D., Associate Professor (Plant Sciences)
Albert J. Fischer, Ph.D., Professor (Plant Sciences)
Amelie Gaudin, Ph.D., Assistant Professor (Plant Sciences)
Paul L. Gepts, Ph.D., Distinguished Professor (Plant Sciences)
Matthew E. Gilbert, Ph.D., Assistant Professor (Plant Sciences)
Thomas M. Gradziel, Ph.D., Professor (Plant Sciences)
Robert Hjimans, Ph.D., Associate Professor (Environmental Science and Policy)
William Horwath, Ph.D., Professor (Land, Air and Water Resources)
Kentararo Inoue, Ph.D., Professor (Plant Sciences)
Louise E. Jackson, Ph.D., Professor (Land, Air and Water Resources)
Marie A. Jasinski, Ph.D., Associate Professor (Plant Sciences)
Judy Jernstedt, Ph.D., Professor (Plant Sciences)
Steven J. Knopp, Ph.D., Professor (Plant Sciences)
Emilio A. Luca, Ph.D., Professor (Plant Sciences)
J. Heinrich Lieth, Ph.D., Professor (Plant Sciences)
Mark A. Matthews, Ph.D., Professor (Viticulture and Enology)
Maël Melotto, Ph.D., Assistant Professor (Plant Sciences)
Richard W. Michelmore, Ph.D., Distinguished Professor (Plant Sciences)
David B. Neale, Ph.D., Professor (Plant Sciences)
Sharman O'Neil, Ph.D., Professor (Plant Biology)
Daniel Patler, Ph.D., Professor (Plant Sciences)
Jeffrey S. Ross-Barra, Ph.D., Associate Professor (Plant Sciences)
Daniel E. Runcie, Ph.D., Assistant Professor (Plant Sciences)
current applied research within agronomy, crop improvement, crop production, postharvest biology.

203. Research Perspectives in Horticulture

Lecture—1 hour; lecture/discussion—2 hours. Prerequisite: Plant Biology 111 and 112, or Environmental Horticulture 102. Following lectures/discussions of scientific methodology, students develop research proposals aided by class room 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. —W. (W) Melotto, Zwiemieck

251. Modeling Horticultural Systems (4)

Lecture—3 hours, laboratory—3 hours. Prerequisite: Plant Sciences 142, calculus, or consent of instructor. Development and application of models. Emphasis on physiological and ecological models, with examples from areas of student interest. Applications to horticultural systems. Offered in alternate years. —W. (W) Lieth

290. Seminar (1–3)

Seminar—1 hour. Prerequisite: graduate standing at UCD. Seminars presented by invited speakers, students, or faculty on selected topics in horticulture. (S/U grading only).—S. (S) J.

298. Group Study (1–5)


299. Research (1–12)

Prerequisite: consent of instructor. Research. May be repeated for credit. (S/U grading only).—F, W, S, S. (F, W, S, S.)

Human Anatomy

See Courses in Cell Biology and Human Anatomy (CHA), on page 433.

Human and Community Development

See Human Ecology, on page 374.

Human Development

(Graduate Program) (College of Agricultural and Environmental Sciences)

Faculty

See Human Ecology, on page 374.

The Major Program

Human development requires the development process in humans throughout the life cycle. Biological, cognitive, and personality/sociocultural aspects of development are studied.

The Program.

Human development majors complete a group of preparatory courses in anthropology, general biology, genetics, history, philosophy, physiology, psychology, and statistics. Upper division students can design their programs in consultation with a faculty member to emphasize their particular interest. For instance, students can study the cognitive, social, and biological aspects of human development while emphasizing child or adult development.

Internships and Career Alternatives. At least one practicum course is required. A second practicum or supervised internship can be used to fulfill the restricted elective requirement for the major. In addition, students have interned in schools, early childhood education or senior centers, hospitals, rehabilitation programs, and veteran affairs agencies.

Fall 2011 and on Revised General Education (GE): AH = Arts and Humanities; SE = Science and Engineering; SS = Social Sciences; AC = American Cultures; DD = Domestic Diversity; OL = Oral Skills; GL = Quantitative; SL = Scientific; VL = Visual; WC = World Cultures; WE = Writing Experience

Pre-Fall 2011 General Education (GE): AH = Arts and Humanities; SE = Science and Engineering; SS = Social Sciences; DD = Domestic Diversity; WC = World Cultures; WE = Writing Experience

Quarter Offered: F = Fall; W = Winter; S = Spring; Su = Summer; 2017-2018 offering in parentheses

Human Anatomy

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centers, probation offices, group foster homes, men's
mental health clinics, or as tutors for handicapped or
bilingual students. Human development students
fill a wide variety of positions in preschools, elemen-
tary 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 bio-
logical aspects of human development can apply to
medical school or pursue training for positions in the
medical field. Human development prepares stu-
dents 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 Develop-
ment must be in good academic standing. Students
must complete the following courses with a com-
bined 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 13V or Psychology 41
or Sociology 46A and 46B
One course from: Anthropology 1, 2 or 15
One course from: Biological Sciences 2A, 10,
10V; Microbiology 10; Molecular and
Cellular Biology 10; or Neurobiology,
Physiology. Biology 10, 12 or 107
Students must have achieved a 2.000 GPA in any
required upper-division courses taken prior to declar-
ing the major.

All courses satisfying the Preparatory Subject Matter,
Depth Subject Matter, Restricted Electives and
English requirement must be taken for a letter grade.

B.S. Major Requirements:

Preparatory Subject Matter ........... 38-48
Two courses from: Anthropology 1, 2 or
15 ................................................. 2-8
One course from: Biological Sciences 2A, 10,
10V, Microbiology 10, or Neurobiology,
Physiology, and Behavior 12 .................3-5
One course from: Molecular and Cellular
Biology 10 or Biological Sciences 101t ...(4)
One course from: History 17A, 17B, 72A,
72B, or Political Science 1 ................. 4
Two courses from: Philosophy 5, 15, 30, 31,
32, or 38 ......................................... 8
One course from: Neurobiology, Physiology,
and Behavior 10, 101, or Psychology
101 .................................................... 4
Psychology 1 ......................................... 4
One course from: Psychology 41 or
Sociology 46A and 15V or Statistics 10 or
13 or 13V ........................................ 4-9
Depth Subject Matter ................. 50-54
Life Span: Human Development 100A, 100B,
100C .................................................. 12
Research Methods: Human Development
120 ...................................................... 4
Biological Processes: one course from:
Biological Sciences 101t, Human
Development 117, Nutrition 111AV, or
Psychology 121 .................................... 3-4
Social-Cultural Processes: one course from:
Human Development 102, 110, 130, or
160 .................................................... 4
Clinical Processes: one course from:
Human Development 101, 103, 132, 161 or
163 .................................................... 4
Practicum: Human Development
140-140L, or 141 or 142 ..... 4-6
Restricted Electives ................. 19-20
Five additional upper division courses
(19- 20 units) chosen from among Human
Development courses or from a list of
restricted electives in consultation with
faculty adviser. May include one only
practicum course.

At least one of the courses from the Depth
Subject groups or Restricted Electives listed
above must focus on childhood/adolescence
(101, 102, 103, 110, 130, 132)
and one on adulthood/aging (117, 143,

English Composition Requirement ........ 12
Three courses in English Composition from the
following list:

English 3, University Writing Program 1,
18, 19, 101, 102A, 102, 102A, 102B,
102C, 102F, 102G, 102H, 102I, 102K,
102L, 104A, 104B, 104C, 104D, 104E,
104F, 104I, Communication 1,
Comparative Literature 1, 2, 3, 4, or
Native American Studies 5

At least one course must be selected from:
University Writing Program 101, 102A H,
104AF.
The Upper Division Composition Exam does not satisfy
the requirement.

Advanced Placement English score of 4 or 5 which
satisfies English 3 and/or University
Writing Program 1 will satisfy one of the three
required courses.

Total Units for the Major .................. 92-105
One Biological Sciences 101 cannot be used to
satisfy both the Preparatory Subject Matter
and the Depth Subject Matter Requirements.

Major Adviser. Lisa Miller

Minor Program Requirements:
The Department of Human and Community Development offers two minors.

Aging and Adult Development ............ 18-20
Three of following courses:

Human Development 100C, 117, 143, 160,
161, or 163 .............................. 12
(2 courses from the Human Development
110; Exercise Biology 117,
Psychology 121, 123, 126, 130, or
155 ............................................. 6-8

Minor Adviser. L. Miller, B. Ober

Human Development 100C, 110 or 101, or
Psychology 101 or 102L ........................................ 4

Minor Adviser. L. Miller, B. Ober

Graduate Study. Graduate study is available
through a Master of Science degree in child develop-
ment, and a PhD in human development. See also Graduate Studies, on page 121.

Courses in Human Development (HDE)

Questions pertaining to the following courses should
be directed to the instructor or to the Human and Community Development Advising Center in 1303 Hart Hall 530.752.2244.

Lower Division

12. Human Sexuality (3)
Lecture—3 hours. Vocabulary, structure/function
of reproductive systems, pre-natal development;
pregnancy and childbirth; development
of sexuality; rape and sexual assault; birth con-
trol; sexually transmitted diseases; homosexuality;
establishing/maintaining intimacy; sexual dysfunc-
tions; communication; enhancing sexual interaction,
cultural differences in attitudes towards sexuality. GE

19. Internship (1-12)
Internship—3-36 hours. Prerequisite: field work
experience or at least one course (e.g., course
100A, 100B, 140) required to fieldwork
assignment; consent of instructor. Supervised intern-
ship, off campus and on campus, in community and institutional setting. May be repeated for credit for a total of 12 units or if involves supervised
(38)
including natural history, ecology and evolution of life span; description of basic demographic
techniques and analytic methods. (Same course as Entomology 117.) GE credit: SciEng, Wrt|JE, SL,
WE. —F (W) Carey

120. Research Methods in Human Development (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Statistics 13 or 13V or Education 114 or Psychology 41 or Sociology 46A and 46B. Scientific process, research designs, and experimental controls; APA manuscript preparation; scientific writing; statistical analysis and interpretation of results; laboratory exercises to collect data, analyze and interpret results, and write scientific papers. GE credit: SocSci, Wrt|JE, WE. —E. S. (F), S. Jiu, Nishina

121. Psychological Assessment (4)
Lecture—4 hours. Prerequisites: courses 100A or 100B; Statistics 13 or 13V or Psychology 41 or Sociology 46A and 46B. Current issues and methodology related to the process of psychological assessment with children. Offered irregularly.

130. Emotionally Disturbed Children (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 100A and 100B, or Psychology 140; consent of instructor. Discussion of psychosis, neurosis, behavior disorders, and learning difficulties in children. —W (W) Choe

132. Individual Differences in Cognition (4)
Lecture—4 hours. Prerequisite: Psychology 1; course 100A or 100B; Statistics 13 or 13V. Individual differences in cognition, including learning disabilities and giftedness. Education implications and neurodevelopmental substrates of individual differences in cognition. Offered irregularly.

140. Communication and Interaction with Young Children (2)
Lecture—2 hours. Prerequisite: course 100A; concurrent enrollment in course 140L required; consent of instructor. Discussion of perception and communication in infancy, toddlerhood, and preschool years, emphasizing the role of relationships in creating a growth-promoting environment for young children. Includes: peer relationships, emotional understanding and self regulation, attachment, communication and school readiness. —F, W, S. (W, S) Chen

140L. Laboratory in Early Childhood (3-5)
Laboratory—6-15 hours; laboratory/discussion—3 hours. Prerequisite: course 140, must be taken concurrently for first 3 units of credit; students must contact Center for Child and Family Studies to receive consent of instructor. Limited enrollment. Application of theories of learning and development to interaction with infants, toddlers, and preschoolers at Early Childhood Laboratory. Applied skills in communication, guidance and curriculum. May be repeated two times for credit. (P/NP grading only.) —F, W, S (F, W, S) Chen

141. Field Study With Children and Adolescents (4-6)
Lecture—2 hours, fieldwork—6-12 hours. Prerequisites: 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. —F, S, F (F, W, S)

142. Field Study with Emotionally Disturbed Children and Adolescents (4-6)
Discussion—1.5 hours, fieldwork—6-12 hours. Prerequisite: course 130 (may be taken concurrently); consent of instructor. Field study with children who are identified as emotionally disturbed, including those with internalizing and externalizing behavioral problems. May be repeated for credit for a total of 12 units following consultation with and consent of instructor.

143. Field Studies of the Elderly (4-6)
Discussion—2 hours; field work—6-12 hours. Prerequisite: course 100C or 100D may be taken concurrently; consent of instructor. Apply theory and research on adult development and aging, work with older adults in a variety of settings, and develop skills relevant to conducting a small research project. —W (W) Miller, Ober

160. Social Aspects of Aging (4)
Lecture—4 hours. Prerequisite: course 100C. How the social context affects adult development and aging. Emphasis on demography, social policy, culture, and adaptation. Historical and contemporary issues. Offered in alternate years. GE credit: Div. —F (F)

161. Applied Cognition and Aging (4)
Lecture/discussion—4 hours. Prerequisite: Psychology 1; course 100C. Principles from cognition and aging and these to real-world concerns in areas including education, technology, job performance, and health. Considers physical and social changes in later life that impact functioning. Offered in alternate years. GE credit: SoSce, Wrt|JE, SS, WE. —S. (S) Miller

163. Cognitive Neuropsychology in Adolescents and Aging (4)
Lecture—discussion—4 hours. Prerequisite: Psychology 1; course 100C. Recommended. Theories, methods, and findings concerning the relationship between cognitive processes and brain functioning. Readings, lecture, and class discussions cover research on normal younger and older adults, neuro-psychological case studies, and selected patient groups (e.g., amnesia, schizophrenia, Alzheimer’s disease). Offered in alternate years. —F (F) Ober

190C. Introductory Research Conference (1)
Discussion—1 hour. Prerequisite: involvement in ongoing research; consent of instructor. Instructors lead discussions with undergraduate students who involve themselves in research projects. 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.) —F, W, S, S. (F, W, S)

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: upper division standing and consent of instructor. Supervised internship off and on campus, in community, and institutional settings. (P/NP grading only.) —F, W, S, S. (F, W, S)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate

200A. Early Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing; basic biology or physiology; one upper division course in psychology or a related field; one upper division or graduate course in developmental psychology (may be taken concurrently). Theory and research on the biological, social, cognitive, linguistic, and cultural aspects of development from conception to the age of five years. —F (F) Belsky, Chen, Hibbel

200B. Middle Childhood and Adolescence (4)
Lecture/discussion—3 hours; discussion—1 hour. Prerequisite: graduate standing; basic biology or physiology; one upper division course in psychology or related fields. Theory and research on biological, cognitive, social, and cultural influences on behavioral development from age five years until late adolescence. —W (W) Choe, Guyer, Nishina

200C. Development in Adulthood (4)
Lecture/discussion—4 hours. Theory and research focusing on social, personality, cognitive, and biological development from early to late adulthood. Emphasis is on theory development and continuity and change. —S. (S) Miller, Ober

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 adolescence, pubertal transitions, and social/family contexts and processes. Emphasis on multi-level mechanisms underlying adolescent behavioral and emotional development. Offered in alternate years.

204. Developmental Neuroscience and Adolescent Psychopathology (4)
Lecture—4 hours. Prerequisite: graduate standing in Human Development, Psychology, Education, Neuro-science or consent of instructor. Introduction to human developmental neuroscience. Understanding of adolescence and its characterization as a time of risky and unhealthy behavior and vulnerability to onset of mental disorder as well as issues around plasticity of the adolescent brain and prevention/intervention. Offered in alternate years. —W (W) Gruen

205. Path Analysis, Factor Analysis, and Structural Equation Modeling (4)
Lecture—4 hours. Prerequisite: Psychology 204B or equivalent graduate courses in statistics or permission of the instructor; familiarity with multiple regression and the basics of matrix algebra. Graduate standing in HDGG, Psychology, Sociology, Education, or a related social science, or permission of the instructor. Introduction of basic concepts, principles, and applications of structural equation modeling including path analysis, factor analysis, multiple-group modeling, and latent growth curve modeling. Offered in alternate years.

207. Topics in Applied Cognitive Aging (4)
Lecture/discussion—2 hours. Prerequisite: graduate standing in Human Development Graduate Group, Psychology, Education, or a related social science, or consent of the instructor. Apply principles from cognitive aging to real-world concerns in areas such as education, technology, job performance, and health. Examine how physical and social changes occurring in later life impact functioning. Offered in alternate years. —F. Miller

210. Theories of Behavioral Development (3)
Seminar—4 hours. Prerequisite: consent of instructor. An overview of mechanisms of organismic development and the implications of developmental biology for the analysis of behavioral ontogeny; consideration of parallels between organismic theoretical schools (e.g., social learning, Piagetian) as scientific theories. Offered in alternate years.

211. Physiological Correlates of Behavioral Development (4)
Seminar—4 hours. Prerequisite: consent of instructor. An overview of mechanisms of organismic development and the implications of developmental biology for the analysis of behavioral ontogeny; consideration of parallels between organismic theoretical schools (e.g., social learning, Piagetian) as scientific theories. Offered in alternate years.

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. Overview of qualitative and quantitative approaches to empirical inquiries in the social sciences, with a focus on theory and research methods in biological growth and cognitive and social/emotional development from prenatal period throughout life. —W (W) Liu

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
Offered in alternate years.

Researchers, practitioners, and policy makers.

family functioning and individual well-being. The

ments will be addressed.

ods, and current research on the nature and devel-

ing surveys, peer nominations/sociometrics, experi-

will be discussed. Emphasis on methodology, includ-

group levels. Ethnicity and cross-cultural research

Adolescence (4)

240. Peer Relationships During

Fall 2011 and on Revised General Education (GE): AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; AGCH—American Cultures; DD—Diverse Diversity; DL—Global Skills; DL—Quantitative; SL—Scientific; VL—Visual; WC—World Cultures; WE—Writing Experience

Department Advising Office. Contact the Group office.

Graduate Adviser. Contact the Group office.

Human Ecology

Formerly Human and Community Development (College of Agricultural and Environmental Sciences)

Luis E. Guzman, Ph.D., Community and Regional Development Program, Chairperson of the Department

Lisa Miller, Ph.D., Human Development and Family Studies Program, Vice-Chairperson of the Department

Department Advising Office. 1315 Hart Hall 530-754-4109; http://human-development.ucdavis.edu

Human Development (A Graduate Group)

Katherine J. Conger, Ph.D., Group Chairperson

Group Office. 1315 Hart Hall 530-754-4109; http://human-development.ucdavis.edu

Faculty

Len Abbeduto, Ph.D., Professor (Psychiatry and Behavioral Sciences and Director, M.I.N.D. Institute)

Joy Belsky, Ph.D., Distinguished Professor (Human Ecology)

Zhe Chen, Ph.D., Professor (Human Ecology)

Daniel E. Chee, Ph.D., Assistant Professor (Human Ecology)

Katherine J. Conger, Ph.D., Professor (Human Ecology)

Nancy Erbstein, Ph.D., Assistant Researcher (Human Ecology)

Emilio Ferrer, Ph.D., Professor (Psychology)

Lorena Garcia, M.F.H., Dr.F.H., Assistant Professor (Public Health Sciences)

Kevin Gee, Ph.D., Assistant Professor (Education)

Beth Goodlin-Jones, Ph.D., Associate Professor (Psychiatry, M.I.N.D. Institute)

Gail Goodman, Ph.D., Professor (Psychology)

Katharine Graf Estes, Ph.D., Associate Professor (Psychology)

Amanda Glynn, Ph.D., Professor (Human Ecology, Center for Mind and Brain)

Randy Hagerman, M.D., Professor (M.I.N.D. Institute)

Robin L. Hansen, M.D., Professor (Pediatrics)

Paul Hastings, Ph.D., Professor (Psychology)

David Hess, Ph.D., Associate Clinical Professor (Psychiatry-M.I.N.D. Institute)

Leah Hibbel, Ph.D., Associate Professor (Human Ecology)

Ladson Hinton, M.D., Professor (Psychiatry and Behavioral Sciences)

Suad Joseph, Ph.D., Professor (Anthropology)

Penelope Knapp, M.D., Professor (Psychiatry, M.I.N.D. Institute)

Siwee Lui, Ph.D., Professor (Human Ecology)

McDonald, Craig, M.D., Professor (Physical Medicine Rehabilitation)

Lisa Miller, Ph.D., Professor (Human Ecology)

Peter Mundy, Ph.D., Professor (Education, M.I.N.D. Institute)

Adrienne Nishina, Ph.D., Associate Professor (Human Ecology)

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Lenna Ontai, Ph.D., Associate Specialist in Cooperative Extension (Human Ecology)

Susan Rivera, Ph.D., Professor (Psychology, Center for Mind and Brain)

Richard W. Robins, Ph.D., Professor (Psychology)

Sally Rogers, Ph.D., Professor (Psychiatry, M.I.N.D. Institute)

Julie Schweitzer, Ph.D., Associate Professor (Psychiatry, M.I.N.D. Institute)

Phillip Shaver, Ph.D., Professor (Psychology)

Martin Smith, Ph.D., Specialist in Cooperative Extension (Human Ecology)

Emily Solari, Ph.D., Assistant Professor (Education)

Marjorie Solomon, Ph.D., Associate Professor (Psychiatry and Behavioral Sciences; M.I.N.D. Institute)

Tamar Swaab, Ph.D., Associate Professor (Psychology)

Ross A. Thompson, Ph.D., Professor (Psychology)

Susan Timmer, Ph.D., Clinical Specialist (Pediatrics)

Yuko Uchikoshi Tontovich, Assistant Professor (Education)

Brian Trainer, Ph.D., Associate Professor (Psychology)

Kali Trzesniewski, Ph.D., Associate Specialist in Cooperative Extension (Associate Director of Research for statewide 4-H Youth Development Program; Human Ecology)

Anthony Urtiza, Ph.D., Psychologist (Pediatrics)

Karen Watson-Gegoe, Ph.D., Professor (Education)

Distinguished Graduate Mentoring Award

Affiliated Faculty

Kristin Alexander, Ph.D., Associate Professor (California State University, Sacramento)

Keith Widaman, Ph.D., Professor (UC Riverside, Psychology)

Graduate Study. The interdisciplinary and inter-departmental Graduate Group in Human Development 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. Recipients of the degree will be prepared to teach, to conduct research, and to be actively involved in public service in human behavioral development.

Applicants seeking admissions and fellowships consideration must submit all materials by our priority December 15 deadline. The final admissions deadline is March 1. See our website for more details.

Graduate Adviser. Contact the Group office.

Human Ecology

Formerly Human and Community Development (College of Agricultural and Environmental Sciences)

Luis E. Guzman, Ph.D., Community and Regional Development Program, Chairperson of the Department

Lisa Miller, Ph.D., Human Development and Family Studies Program, Vice-Chairperson of the Department

UC Riverside, Psychology

Graduate Study. The interdisciplinary and inter-departmental Graduate Group in Human Development 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. Recipients of the degree will be prepared to teach, to conduct research, and to be actively involved in public service in human behavioral development.

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Graduate Adviser. Contact the Group office.

Human Ecology

Formerly Human and Community Development
nity to conduct research projects relevant to the study of human rights. The minor is sponsored by the Religious Studies Program.

Program Objectives
In addition to completing Religious Studies 90 or 134, students must take two additional core courses and two from the Elective Course list. Students must select courses from at least three different departments or programs to satisfy minor requirements.

Minor Program Requirements:

**UNITS**

**Human Rights** .......................................20

Religious Studies 90 or 134 ..........................4
Choose two core courses from the following*: History 142A, Religious Studies 131, Sociology 104, Spanish 159†..............8

Women’s Studies 102, 140, 170, 182 ...........................8
* With prior permission of the Interdisciplinary Minor in Human Rights adviser, students may substitute one course from the list of electives as a core course.
† When taught as “Witnessing in Latin America: Trauma, Violence and Memory.”

Advising, Religious Studies Program office, 213 Sprout Hall 530/752-1219

**Courses in Human Rights (HMR)**

**Lower Division**

1. Human Wrongs/Human Rights (4)

Lecture—3 hours; discussion—1 hour. Introduction to Human Rights and the problems they seek to address. Using key episodes of inhumanity like slavery, genocide, and apartheid, examines the role of international movements for social justice led to the emergence of the international Human Rights system. GE credit: ArtHum or SocSci | AH or SS, WC, WE—F (F) Weight

**Upper Division**

120A. Art, Architecture, and Human Rights (4)

Lecture/discussion—4 hours. Prerequisite: consent of instructor. Study of human rights as they relate to art, architecture, and cultural heritage. Examines museums, art collections, heritage management, their relation to the cultural prerogatives of communities and indigenous groups, and protection of cultural heritage during war and conflict. (Same course as Art History 120A.) Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE—F (F). Weight

130. Special Topics in Human Rights (4)

Lecture/discussion—3 hours; term paper. Prerequisites: course 90, 134 recommended. Thematic study of human rights. Topics may include contemporary or historical issues in the promotion, protection, and violation of human rights; human rights and the arts; religion, literature and possible topical areas. No credit for students who have completed Religious Studies 90. (Same course as Religious Studies 134) May be repeated for credit when topic differs. GE credit: ArtHum or SocSci | AH or SS, DD, VL, WC. —W (W) Weight

134. Human Rights (4)

Lecture/discussion—3 hours; term paper or discussion—1 hour. Prerequisite: upper division standing. Comparative and critical study of the modern phenomenon of genocide from religious, ethical and historical perspectives. (Same course as Religious Studies 131.) GE credit: ArtHum or SocSci, Div | Wrt | AH or SS, VL, WC, WE—F (W). Weight

136. Human Rights in the Middle East (4)

Lecture/discussion—3 hours; term paper. Study of the experience of Human Rights in the modern Middle East, with special attention to the Human Rights issues raised by events of Arab Spring; Palestine-Israel conflict; history of genocide, mass killing and totalitarianism in the region. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE—F (W). Weight

161. Human Rights in Latin America (4)

Lecture—3 hours; term paper. History of the origins, denial and protection of human rights in Latin America. Emphasis on dictatorships, political violence, social resistance, democracy, justice, accountability, truth commissions, memory. (Same course as History 161.) Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, VL, WC, WE—F (W). Weight

198. Directed Group Study (1-4)

Prerequisite: consent of instructor. Group study on focused topics in human rights. May be repeated for credit. (P/NP grading only)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. Opportunity for advanced undergraduate students to work with a faculty member in a focused manner on a topic or topics of human rights. May be repeated for credit. (P/NP grading only)

Graduate

200A. History, Theory and Criticism of Human Rights (4)

Seminar—3 hours; term paper. Prerequisite: graduate or consent of instructor. Restricted to graduate students. Introduces the advanced study of Human Rights and the theoretical and practical elaboration of the international Human Rights system. Seminar will engage with criticism of Human Rights and develop research and teaching within disciplinary and interdisciplinary frameworks. (Same course as Study of Religion 231E.) Offered in alternate years. —W (W) Weight

200B. Memory, Culture, and Human Rights (4)

Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Restricted to graduate students. Explores the multiple convergences among memory, culture, and human rights. Discusses diverse approaches to how societal actors in different historical, cultural, and national settings, construct meanings of past political violence, intergroup conflicts, and human rights struggles. (Same course as Cultural Studies 210.) Offered in alternate years. —F (F).
Humanities

[College of Letters and Science]
Eric L. Russell, Ph.D. (French and Italian)

Program Office, 213 Sproul
530-752-1219; http://humanities.ucdavis.edu

Committee in Charge
Seeta Chaganti, Ph.D. (English)
Liza Grandia, Ph.D. (Native American Studies)
Noah Guynn, Ph.D. (French and Italian)
John Slater, Ph.D. (Spanish and Portuguese)

The Program of Study
The Humanities program is an undergraduate and graduate curriculum emphasizing innovative approaches to ideas that matter. Courses offered through the program are interdisciplinary in scope and aim to develop critical thinking and writing skills in three principal areas: major figures, works, and genres in world cultures; major themes in world literatures; and relationships between history, society, and culture.

Courses in Humanities (HUM)
Lower Division
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, technology, and popular arenas. Attention to provocative implications for contemporary society. May be repeated one time for credit if topic differs. GE credit: ArtHum | AH.

2. Global Humanities Forum (4)
   Lecture—3 hours; extensive writing. Introduction to humanities topics and methodologies; analysis of major figures, works, and genres in world arts and literatures, with emphasis on relationships between history, society, and culture. May be repeated one time for credit if topic differs. GE credit: ArtHum | AH, WC, WE.

2A. Global Humanities Forum (4)
   Lecture—3 hours; extensive writing. 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, technology, and popular arenas. Attention to provocative implications for contemporary society. May be repeated one time for credit if topic differs. GE credit: ArtHum | AH, WC, WE.

2B. American Humanities Forum (4)
   Lecture—3 hours; extensive writing. Introduction to humanities topics and methodologies; analysis of major figures, works, and genres in American arts and literatures, with emphasis on relationships between history, society, and culture. May be repeated one time for credit if topic differs. GE credit: ArtHum | AH, WC, WE.

3. Medicine and Humanities (4)
   Lecture—discussion—3 hours; extensive writing. Prerequisite: 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: ArtHum or SocSci, Wrt | AH or SS, WE.

4. Animals and Human Culture (2)
   Lecture—2 hours. The meaning of human relations with animals studied across a variety of historical periods and cultures and from a variety of humanistic perspectives. GE credit: ArtHum, Wrt | AH.

5. 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. GE credit: ArtHum, Wrt | AH, WE, F.

6. Travel and Travel Literature (4)
   Lecture/discussion—3 hours; extensive writing. Prerequisite: Subject A requirement. History of travel from the age of 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 | AH, WC, WE.

8. Introduction to Perspectives on Narrative (4)
   Lecture/discussion—3 hours; extensive writing. Prerequisite: satisfaction 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 | AH, WE.

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. GE credit: ArtHum, Wrt | AH, WC.

9D. Don Quixote and the Modern World Discussion (2)
   Discussion—2 hours. Prerequisite: course 9 concurrently. Small group discussions and preparation of short papers for course 9. GE credit: ArtHum | AH, WC, WE.

13. Witches: 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 early modern Europe; 17th-century New England and the Salem witch trials; and fairies. GE credit: ArtHum, Div, Wrt | AH, WC, WE — Krimmer

15. Language and Identity (4)
   Lecture/discussion—3 hours; extensive writing. Introduction to topics related 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. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WE.

60. Narrative and Argumentative Approaches to QL: 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) among which individuals, communities and institutions define themselves in American society, by applying principles of argumentation theory to the narratives where those issues are embedded. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WE.

92. Internship (1-12)
   Internship—3-36 hours. Internships in fields where students can practice their skills. May be repeated one time for credit. (P/NP grading only.)

Upper Division
144. Marx, Nietzsche, Freud (4)
   Lecture/discussion—3 hours; term paper. Study of major texts of Marx, Nietzsche, and Freud, 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. (Same course as German 144.) GE credit: ArtHum, Wrt | AH, WE.

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 | AH, WE.

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.)

299. Individual Study (1-12)
   Prerequisite: consent of instructor. Restricted to graduate students. Individual study for the designated emphasis in human rights. (S/U grading only.) May be repeated for credit.

Hydrologic Sciences (A Graduate Group)
Gregory Pasternack, Ph.D., Chairperson of the Group
Group Office, 1152 Plant and Environmental Sciences Building 330752-1669; http://hsg.ucdavis.edu

Faculty
Fabian Bombardelli, Ph.D., Assistant Professor (Civil and Environmental Engineering)
William Casey, Ph.D., Professor (Chemistry)
Randy Dahlgren, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Helen Dahlike, Ph.D., Assistant Professor
Gregory Pasternack, Ph.D., Chairperson of the Group
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Fall 2011 and Revised General Education (GE) Catalog
ArtHum = Arts and Humanities; ScIl = Science and Engineering; SocSci = Social Sciences; DomDv = Domestic Diversity; Vlt = Visual; WC = Writing Experience
Pre-Fall 2011 General Education (GE): ArtHum = Arts and Humanities; ScIl = Science and Engineering; SocSci = Social Sciences; DomDv = Domestic Diversity; Vlt = Writing Experience
Quarter Offered: F=Fall, W=Winter, S=Spring, Su=Summer; 2017-2018 offering in parentheses
Courses in Hydrologic Sciences (HYD)
Graduate

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 sciences involved in the program. Students prepare a paper and presentation in their area of research interest. May be repeated two times for credit. (S/U grading only)—F (F) Grimmer

205. Continuum Mechanics of Natural Systems (4)
Lecture/discussion—4 hours. Prerequisite: Mathematics 210 and 226, 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 strain tensors. Same course as Biological Systems Engineering 205.

210. Vadose Modeling and Characterization (3)
Lecture—1.5 hours; laboratory—3 hours; discussion—0.5 hours. Prerequisite: Soil Science 107, 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 flow, parameter optimization, diffusive and convective transport in gaseous and liquid phases. Offered in alternate years.—S (S) Hopmans

243. Water Resource Planning and Management (3)
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. Conjunctive use of surface water and groundwater. Water quality management. Irrigation planning and operation models. Same course as Biological Systems Engineering 243.

245. Climate Change, Water and Society (4)
Lecture—4 hours. Class size limited to 25 students. Integration of climate science and hydrology with policy to understand hydroclimatology and its impact upon natural and human systems. Assignments: readings, take-home examination on climate and hydrologic science, paper that integrates climate concepts into a research prospectus or review article. (Same course as Atmospheric Science 245 and Ecology 245.)—F (F) Fogg, Ullrich

252. Hillslope Geomorphology and Sediment Budgets (4)
Lecture—3 hours; fieldwork—3 hours. Prerequisite: course 141 or Geology 35 or Civil and Environmental Engineering 142 or consent of instructor. Exploration of theoretical and empirical foundations of sediment production on hillslopes using computer models and field experiments to promote an understanding of how watersheds evolve naturally and with human impacts. Offered irregularly.—S (S) Pastechnick

254Y. Ecohydrodynamics (3)
Web virtual lecture—1 hour; discussion—1 hour; extensive problem solving. Use of 2D hydraulic modeling to predict water flow, assessment by exploring flow-dependent hydraulic patterns at multiple spatial scales and extrapolating results with empirical and analytical functions to evaluate geographic resilience of functions. Offered in alternate years.—F (F) Pastechnick

256. Geomorphology of Estuaries and Deltas (4)
Lecture—3 hours; fieldwork—3 hours. Prerequisite: course 141 or Geology 35 or Civil and Environmental Engineering 42 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 irregularly.—F (F) 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.—S (S) 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. Offered in alternate years.—S (S) Puente

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.—F (F) Fogg

274. Practice of Groundwater Flow and Transport Modeling (3)
Lecture—2 hours; lecture/laboratory—0.5 hours; lecture/discussion—0.5 hours. Prerequisite: course 269, Civil and Environmental Engineering 272B, or Civil and Environmental Engineering 272C. Selecting and building groundwater flow and transport models. Planning, preparation, execution, presentation, and review of modeling projects. Review of methods, assumptions, and limitations of groundwater models; practicing with MODFLOW, MT3D, associated GUI, and with other groundwater modeling software of choice. Offered in alternate years.—S (S) Harper

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 excursions, local averaging; scale of fluctuation; non-Gaussian and irregular random fields; geostatistical applications.

286. Selected Topics in Environmental Remote Sensing (3)
Discussion—2 hours; lecture—1 hour; project. Prerequisite: consent of 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. (Same course as Geography 286) May be repeated for credit. Offered irregularly.—S (S) Usdin

290. Seminar in Hydrologic Science (1)
Seminar—1 hour. Prerequisite: graduate standing and background in Hydrologic Science, consent of instructor. Seminars 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)—S (S)

298. Group Study (1-5)
Prerequisite: graduate standing and consent of instructor. (S/U grading only)—F, W, S, F, W, S

299. Research (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only)—F, W, S, F, W, S

Emeriti Faculty
Charles Goldman, Professor Emeritus
Theodore Hisao, Ph.D., Professor Emeritus
Jeffrey Mouny, Ph.D., Professor Emeritus (Geology)
Distinguished Professor Emeritus
Miguel Marino, Ph.D., Distinguished Professor Emeritus
Paul Sabatier, Ph.D., Professor Emeritus
Richard Snyder, Ph.D., Biometeorologist Specialist
Thomas Harter, Ph.D., Cooperative Extension Specialist
Kenneth Tate, Specialist in Cooperative Extension (Plant Sciences)
Stephen Grattan, Ph.D., Water Relations Specialist
Bryan Weare, Ph.D., Professor Emeritus

Affiliated Faculty
Roger Bales, Ph.D., Professor
Philip Duffy, Ph.D., Adjunct Associate Professor
Stephen Grattan, Ph.D., Professor Emeritus (Geology)
Richard Snyder, Ph.D., Biometricologist Specialist
Wesley Wallender, Ph.D., Professor Emeritus
Minghua Zhang, Ph.D., Adjunct Professor

Graduate Study. The Graduate Group in Hydrologic Sciences is a multidisciplinary program offering M.S. and Ph.D. degrees. Course work is available from many programs, including Hydrologic Sciences, 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 physical sciences. Basic to the program are core courses in fluid dynamics, hydrologic phenomena, hydrodynamics; hydrogeochemistry, hydrologic techniques, and hydrologic policy. Identifiable 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, linear algebra and differential equations is recommended and will be required before completion of graduate work. Additional courses in applied statistics, 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 disciplines.

Graduate Adviser. Peter Hernes, Ph.D., and Carlos Puente, Ph.D.

Graduate Admissions Adviser. Mark E. Grimmer, Ph.D.
Hydrology

[College of Agricultural and Environmental Sciences]

Faculty. See under Department of Land, Air and Water Resources, on page 392, Hydrology Section.

The Major Program

Hydrology is the study of the occurrence, distribution, circulation, and loss of water and waterborne materials in the environment of the 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 $10-100 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 with 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 covers the basic principles and fundamental tools that students must match their interests and career goals. Transfer students 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 (Fish and Wildlife, Agricultural Research, 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 agencies employ hydrologists to include California's Departments of Water Resources, Conservation, 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:

Preparatory Subject Matter

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrologic Science 103N or Engineering 103</td>
<td>4</td>
</tr>
<tr>
<td>Civil and Environmental Engineering 114</td>
<td>4</td>
</tr>
<tr>
<td>Statistics 130A and 130B</td>
<td>4.6</td>
</tr>
<tr>
<td>Hydrologic Science 134, 141, 142, 144, 151</td>
<td>21</td>
</tr>
<tr>
<td>Soil Science 107, 108</td>
<td>5</td>
</tr>
<tr>
<td>Select one of Hydrologic Science 150, Agricultural and Resource Economics 47, Environmental Science and Policy 161, 166N</td>
<td>3.4</td>
</tr>
<tr>
<td>Select three of Hydrologic Science 110, 124, 143, 146; Civil and Environmental Engineering 143, Applied Biological Systems Technology 165</td>
<td>9-13</td>
</tr>
</tbody>
</table>

Restricted Electives

- To supplement or expand areas of student interest selected with approval of adviser

Total Units for the Major: 129-148

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 in environmental issues. The interested student should have completed preparatory coursework in calculus (Mathematics 16B), chemistry (Chemistry 2A; Chemistry 2B recommended), physics (Physics 7A), and biology (Biological Sciences 2A). 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.

Hydrology Science

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrologic Science 103N or Engineering 103</td>
<td>4</td>
</tr>
<tr>
<td>Hydrologic Science 134, 141, 142, 144</td>
<td>21</td>
</tr>
<tr>
<td>Hydrology Science 150, Agricultural and Resource Economics 47</td>
<td>3.4</td>
</tr>
<tr>
<td>Hydrologic Science 110, 124, 143, 146; Civil and Environmental Engineering 143, Applied Biological Systems Technology 165</td>
<td>9-13</td>
</tr>
</tbody>
</table>

Watershed Science

The Hydrology Program of the Department of Land, Air and Water Resources offers the minor in Water Resources. 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 preparatory coursework in calculus (Mathematics 16B), chemistry (Chemistry 2A; Chemistry 2B recommended), physics (Physics 7A), and biology (Biological Sciences 2A). Course work in the minor provides fundamental skills and knowledge on science and management of water resources in the context of current water resources and ecological problems.

Minor Program Requirements:

Watershed Science

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrologic Science 141 or Environmental Science and Management 100</td>
<td>4</td>
</tr>
<tr>
<td>Soil Science 100 or 110</td>
<td>4.5</td>
</tr>
<tr>
<td>Hydrologic Science 144 or Soil Science 107</td>
<td>4</td>
</tr>
<tr>
<td>Hydrologic Science 124, or Hydrologic Science 121</td>
<td>4</td>
</tr>
<tr>
<td>Hydrologic Science 143, Environmental Science and Management 144, or Environmental Science and Policy 151</td>
<td>3.4</td>
</tr>
<tr>
<td>Hydrologic Science 150, Environmental Science and Management 121, or Environmental Science and Policy 161</td>
<td>3.4</td>
</tr>
</tbody>
</table>

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 Veihmeyer Hall or in 1150 Plant and Environmental Sciences Building 53292, 1603.

Lower Division

10. Water, Power, Society (3)

- Lecture—2 hours; laboratory—2 hours. Prerequisite: upper division standing in College of Agricultural and Environmental Sciences. Forty-hour course designed to meet the requirements of Federal OSHA regulation CFR 1910.120. Covers the health, regulatory, processing and safe handling issues/problems associated with working with hazardous materials. (P/NP grading only.)

11. Water, Power, Society (3)

- Lecture—2 hours; laboratory—2 hours. Prerequisite: upper division standing in College of Agricultural and Environmental Sciences. Forty-hour course designed to meet the requirements of Federal OSHA regulation CFR 1910.120. Covers the health, regulatory, processing and safe handling issues/problems associated with working with hazardous materials. (P/NP grading only.)
dealing with soil and plant aspects of irrigation and drainage. Soil-water principles including water movement, plant-water interactions, water use by crops, also irrigation systems and water quality. Not open for credit to students who have completed Water Science 110. Offered in alternate years. GE credit: SciEng | SE, SL—S. (S.) Goldhammer, Grattan

124. Plant-Water-Soil Relationships (4) Lecture—3 hours; discussion—1 hour. Prerequisite: one upper division course in soil science, such as Soil Science 114 or upper division course in plant science or plant biology, such as Plant Biology 111; or consent of instructor. Principles of plant interactions with soil and atmospheric water environments and practical applications to crop management (e.g., irrigation) and plant eco-physiology (e.g., drought). Not open for credit to students who have completed Water Science 104. GE credit: SciEng | QL, SE, SL—S. (S.) Shackel

134. Aquatic Geochemistry (6) Lecture—4 hours; laboratory—3 hours. Prerequisite: Chemistry 2B. Chemistry of natural waters; dielectric properties of water; thermodynamic and mass-action relations; metal hydrols; acid-base equilibria; metal coordination chemistry; solubility calculations; electron-exchange reactions; sorptive partitioning; ion exchange; and dissolved organic matter. GE credit: SciEng | SE, SL—S. (S.) Hennes, Panikh

141. Physical Hydrology (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 9B, Mathematics 21B; course 100 recommended. Introduction to the processes that constitute the hydrologic cycle; an emphasis on a quantitative description of the following processes: precipitation, infiltration, evaporation, transpiration, and ground water runoff. Water projects, role of federal government and state/federal relationships. Basic water quality acts, endangered species act, water transfers and current water issues. GE credit: SocSci | AGCH, SS—W. (W.) Cahill

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. Offered in alternate years. GE credit: SciEng | QL, SE, SL—W. Posternack

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 ecology courses recommended. Ecosystem and landscape assessment with emphasis on hydrology and salinization of water storage and development. Spatial analysis of environmental risk assessment including ecological risk assessment, natural resource management. Spatial database structures, scripting, data models, and error analysis in GIS. Offered in alternate years. (Same course as Applied Biological Systems Technology 182.) GE credit: SciEng | QL, SE, SL—W. (W.) Hijmans

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 related to hydrologic science. Internship supervised by a member of the faculty. (P/NP grading only)—F, W, S. (F, S.)

198. Directed Group Study (1-5) (P/NP grading only)—F, W, S. (F, S.)

199. Special Study for Advanced Undergraduates (1-5) Prerequisite: senior standing. (P/NP grading only)—F, W, S. (F, S.)

Immunology (A Graduate Group)

Charles Bevins, M.D., Ph.D., Chairperson of the Group
Group Office, 5217 Vet Med 3A; 530-754-0103; http://immunology.comed.ucdavis.edu/

Faculty
Iannis Adamopoulos, Ph.D., Assistant Professor (Rheumatology, Allergy and Clinical Immunology)
Paul Ashwood, Ph.D., Associate Professor (Microbiology, and Immunology)
Stephen Barthold, D.V.M., Ph.D., Professor (Center for Comparative Medicine and Pathology, Microbiology and Immunology)
Nicole Baumgarth, D.V.M., Ph.D., Professor (Center for Comparative Medicine and Pathology, Microbiology and Immunology)
Andreas Baumler, Ph.D., Professor (Microbiology, and Immunology)
Charles Bevins, M.D., Ph.D., Professor (Microbiology, and Immunology)
Christopher L. Bowls, M.D., Associate Professor (Gastroenterology)
Kihyo Cho, Ph.D., Associate Adjunct Professor (Surgery)
Sean Collins, Ph.D., Associate Professor (Microbiology and Molecular Genetics)
Lillian Cruz-Orenge, Ph.D., Assistant Professor (Anatomy, physiology & cell biology)
Satisf Dandekar, Ph.D., Professor and Chair (Microbiology, and Immunology)
Melanie Gareau, Ph.D., Assistant Professor (Anatomy, Physiology & cell biology)
Laurel J. Gershwin, D.V.M., Ph.D., Professor (Pulmonary and Critical Care Medicine)
Leigh G. Griffiths, Vet.MB, MRCVS, Ph.D., Associate Professor (Veterinary Medicine and Epidemiology)
Angela Haczku, M.D., Ph.D., Professor (Pulmonary and Critical Care Medicine)
Richard W. Harper, M.D., Ph.D., Associate Professor (Pulmonary and Critical Care Medicine)
Volkmar Heinrich, Ph.D., Associate Professor (Biomedical Engineering)
Daniel Hwang, Ph.D., Adjunct Professor (Nutrition)
Kirk C. Klassen, Ph.D., Professor (Animal Science)
Kim W. Lam, M.D., Ph.D., Professor and Chief (Hematology and Oncology)
Pam Lein, Ph.D., Professor (Molecular Biosciences)
Patrick S. Leung, Associate Adjunct Professor (Rheumatology, Allergy and Clinical Immunology)
Jamal S. Lewis, Ph.D., Assistant Professor (Biomedical Engineering)
Shirley Luckhart, Ph.D., Professor (Microbiology, and Immunology)
Emmanuel Maverakis, M.D., Assistant Professor (Dermatology)
Kim McAllister, Ph.D., Professor (Neurology & Neurosurgery, Physiology, and Behavior)
Stephen J. McSorley, Ph.D., Associate Professor (Center for Comparative Medicine and Anatomy and Physiology and Cell Biology)
Lisa A. Miller, Ph.D., Associate Professor (Anatomy, Physiology and Cell Biology)
William J. Murphy, Ph.D., Professor (Dermatology)
Lorena Navarro, Ph.D., Assistant Professor (Microbiology and Immunology)
Robert T. O’Donnell, M.D., Ph.D., Professor (Hematology and Oncology)
John Peters, Ph.D., Associate Professor-in-Residence (Internal Medicine)
Kent E. Pinkerton, Ph.D., Professor and Director (Anatomy, Physiology and Cell Biology)
Distinguished Teaching Award—Graduate/Professional
David Pleasure, M.D., Ph.D., Professor (Neurology and Pediatrics)
Katherine S. Ralston, Ph.D., Assistant Professor (Microbiology and Molecular Genetics)
Siba Raychaudhuri, M.D., Clinical Assistant Professor and Chief Rheumatologist (Sacramento VA Medical Center)
Colin Reardon, Ph.D., Assistant Professor (Anatomy, Physiology and Cell Biology)
Grace L. Rosenquist, Ph.D., Assistant Adjunct Professor (Neurobiology, Physiology, and Behavior)
Jeroen Saeij, Ph.D., Associate Professor (Biomedical Engineering)
Jay Solnick, M.D., Ph.D., Professor (Center for Comparative Medicine and Medical Microbiology and Immunology)
Colin Reardon, Ph.D., Assistant Professor (Anatomy, Physiology and Cell Biology)
Ellen E. Sparger, D.V.M., Ph.D., Associate Adjunct Professor (Medicine and Epidemiology)
Athena Soulka, Ph.D., Assistant Professor (Dermatology)
Charles R. Steenstra, Ph.D., 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 (Dermatology)
Suzanne S. Teuber, M.D., Professor (Rheumatology, Allergy and Clinical Immunology)
Joe V. Torres, Ph.D., Professor (Microbiology, and Immunology)
Renée M. Tsolis, Ph.D., Associate Professor (Microbiology, and Immunology)
Joseph M. Tuszynski, M.D., Ph.D., Professor (Hematology 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)
Renn Wu, Ph.D., Professor (Anatomy, Physiology and Cell Biology)
Heike Wulff, Ph.D., Associate Professor (Pharmacology)
Susan Yuan, Ph.D., Associate Adjunct Professor (Nutrition)
Huaqiong Zhou, Ph.D., Assistant Professor (Animal Science)

Graduate Study. The Graduate Group in Immunology offers an interdisciplinary program of study in an exciting field of biology and medicine leading to the M.S. and Ph.D. degrees. Participating faculty from various Schools and Departments at UC Davis provides research opportunities in diverse areas of applied immunology. Areas of focus include infection and immunity (including host response regulation to parasites, viruses and bacteria), nutrition and immunity, autoimmune, immune regulations, immunology, cancer therapy and immune mediators and their uses for diagnosis and treatment.

Preparation. Applicants for candidacy to these programs should have completed undergraduate preparation in the sciences, 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) microbiology specializing in bacteriology, virology, parasitology, medical microbiology; (b) zoological specialties (cell biology, endocrinology, embryology, protozoology, histology, cytology, physiology); (c) medical specialties (anatomy, pharmacology, clinical pathology, reproduction, hematopathology, epidemiology); (d) biochemistry/biophysics specialties (biologically active molecules, control mechanisms); (e) genetic specialties (developmental genetics, population genetics, cytogenetics, molecular genetics).

Graduate Adviser. See the graduate program website at http://immunology.commed.ucdavis.edu/people/

Courses in Immunology (IMM)

Additional courses are available and listed under the individual sponsoring departments. Contact the Group Office for further information.

Graduate

201. Introductory Immunology (4)
Lecture—4 hours. Prerequisite: graduate standing. Enrollment limited to 30 students. Comprehensive introduction to the principles of immunology. —F. (F.) Miller

201L. Advanced Immunology Laboratory Rotations (4)
Laboratory/discussion—12 hours. Laboratory assignment in two research laboratories. Individual research problems with emphasis on methodological/ procedural experience and experimental design. Student writes a project outline and gives oral presentations, which may be repeated two times for credit. (S/U grading only.) —F. (F.) McSorley

202L. Advanced Immunology Laboratory Rotations (5)
Laboratory/discussion—15 hours. Laboratory assignment in two research laboratories. One four-week and one six-week assignment in immunology research laboratories. Individual research problems with an emphasis on methodological/procedural experience and experimental design. May be repeated two times for credit. (S/U grading only.) —W. (W.) McSorley

203. Cancer Immunology (2)
Lecture—1 hour; term paper. Covers concepts in cancer biology, progression and immune evasion. It will also cover topics such as: immune surveillance, innate effector mechanisms and current concepts in immune therapy. Offered in alternate years. —S. Murphy

204. Topics in Innate Immunity (2)
Extensive writing or discussion—1 hour; performance instruction—1 hour. Prerequisite: course 201 or equivalent; course 293 preferred. Restricted to first- or second-year GGI and MGG students; others with permission of instructor; enrollment limited to 18 students. Covers current topics in the field of innate immunity through student seminar presentations and critical evaluations of the literature. Concepts include: pathogen recognition, intercellular communication, specialized cellular function and effector/signaling molecules. Offered in alternate years. —So. Bevis

210. Topics on Neuroimmunology and Neuroinflammation (1)
Seminar—1 hour. Prerequisite: consent of instructor. Topics will include a broad range of frontiers in neuroimmunology and neuroinflammation. Research articles in current literature will serve to provide in-depth discussions of experimental approaches, technical aspects of experimental techniques, data interpretation, and other relevant aspects of each topic. (S/U grading only.) —F. (F.) Soulka

211. Immunotoxicology Seminar (2)
Seminar—2 hours. Prerequisite: graduate standing in Pharmacology/Toxicology, Immunology, Physiology, or Biochemistry. Seminar presentations dealing with principles of xenobiotic effects on immune system functions and specific examples of drugs and environmental chemicals exerting toxic effects on the immune system. (S/U grading only.)

214. Recent Concepts in Immunology (4)
Lecture/discussion—4 hours. Prerequisite: Pathology, Immunology, and Microbiology 126 or consent of instructor. Innate and acquired immunity as defense mechanisms against disease. Mechanisms regulating the distinct cell types driving these responses and current concepts in the literature. —W. (W.) Baumgart

216. Comparative Clinical Immunology (4)
Lecture/discussion—4 hours. Prerequisite: Pathology, Microbiology, and Immunology 126 or consent of instructor. Clinical immunity in animals and man. Pathogenesis of representative infectious diseases, hypersensitive reactions, and autoimmunity. Emphasis on specific and non-specific immune effector mechanisms to combat infections or mediate pathology. Not open for credit to students who have completed course 294A. Offered in alternate years. —G. Salmon

218. 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 genetics, and receptor signaling. Immune and non-immune actions. Overlapping/ redundant functions (referred to as the “cytokine network”).

219. 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.

Independent Study Program

Information. Chairperson, Committee on Courses of Instruction; c/o Academic Senate Office 5307522231

The Independent Study Program provides an opportunity for upper division students to design and pursue 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 reasonably 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 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;
3. Complete a project 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 Calendar, 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 Letters and Science]

The Major Program

The Individual Major, an integrated program composed of courses from two or more disciplines, is designed by the student and is subject to approval by faculty advisers and appropriate college committees. This major enables a student to pursue a specific 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

The Individual Major in this College has been suspended indefinitely.

Program Office. 150 Mirk Hall 5307520102
http://www.caes.ucdavis.edu/students/current/advising

Fall 2011 and on Revised General Education (GE) AE—Arts and Humanities; DE—Science and Engineering; SS—Social Sciences; AGCM—American Cultures; DD—Domestic Diversity; OL—Oral Skills; VL—Visual; WC—World Cultures; WE—Writing Experience
Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Domestic Diversity; Wrt—Writing Experience
Quarter Offered: F=Fall, W=Winter, S=Spring, Su=Summer; 2017-2018 offering in parentheses

Required for Immunology Graduate Students every year until they have passed their qualifying exam. May be repeated for credit. (S/U grading only.) —F. (F.) Mavericks

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 emphasis includes innate and adaptive mucosal immunity, the gastrointestinal tract, the lung, lymphocyte trafficking, and mucosal vaccination. Offered in alternate years. —W. (W.) Shacklett
College of Letters and Science
Program Office, 200 Social Sciences and Humanities Building (Undergraduate Education and Advising office); http://www.ls.ucdavis.edu/
Students

Committee in Charge
John Teming, Ph.D., Chairperson (Physics)
Adeiwale Adeogun, Ph.D. (African American and African Studies)
Prahl Burman, Ph.D. (Statistics)
Diana Davis, Ph.D. (History)
Sara Perroult, Ph.D. (University Writing Program)

Student Proposal. A student who wishes to propose an individual major must submit the proposal to the Faculty Committee on Individual Majors in the College of Letters and Science prior to reaching 120 units. The proposal must be submitted by the end of the fourth week of the quarter. This proposal will consist of (1) an essay, identifying the specific educational and professional objectives, including an indication of whether the objectives cannot be met within existing majors; (2) a list of courses planned to complete the major, and (3) faculty advisor recommendations. It is critical that students contact a college counselor in the Dean’s Office for consultation and development of the proposal.

Preparatory Subject Matter………(variable)
Lower division courses basic to the program or needed to satisfy prerequisites for upper division requirements.

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 program must be taken from courses provided by the College of Agricultural and Environmental Sciences.

Unrestricted Electives …………(variable)

Total Units for the Major 45-54

Master Adviser. Thomas Gordon, Ph.D. (Plant Pathology)

College of Biological Sciences
Program Office, Biology Academic Success Center; 1023 Sciences Laboratory Building; 530-752-0410

Student Proposal. A student who wishes to propose an individual major must submit the proposal to the Committee on Undergraduate Student Petitions prior to reaching 120 units. It is important for the student to make arrangements to speak with an adviser in the Biology Academic Success Center early in the development of his/her major as no individual major will be approved after a student has completed 120 units.

A.B. and B.S. Major Requirements:

Preparatory Subject Matter………(variable)
Lower division courses basic to the program or needed to satisfy prerequisites for upper division requirements.

Depth Subject Matter 45-54
Upper division units must include:
(a) Interrelated and complementary courses from two or more departments which provide a unified pattern and focus;
(b) At least 30 units from Letters and Science teaching departments or programs;
(c) No more than 10 units in courses numbered 194H, 198, and 199; and
(d) For the B.A. degree, a maximum of 80 units toward the major; for the B.S. degree, a maximum of 110 units toward the major.

Total Units for Degree 180

Major Advisers (selected by student), Principals Advisers: a faculty member in a teaching department or program in the College of Letters and Science, or a faculty member from a secondary area of interest. The Committee for tentative acceptance into an honors program.

Honors Program. By the fourth week of the last quarter of the junior year, students potentially eligible for highest or highest honors at graduation (see College section), may petition the Individual Majors Committee for tentative acceptance into an honors program.

Final admission will depend upon the Committee’s approval of a senior thesis prospectus that has been agreed upon by the student and faculty adviser. The prospectus must be presented to the Committee by the end of the fourth full week of instruction of the first quarter of the senior year. Graduation with high or highest honors will be conditional upon both the maintenance of the required grade point average and the satisfactory completion of the senior thesis project. Students who anticipate doing a senior honors thesis should allow up to three units of independent study in the program during each of two quarters in the senior year as course options.
210. Horizontal Gene Transfer (3)
Lecture/discussion—3 hours. Prerequisite: background in basic microbiology and genetics required; introduction to molecular biology, biotechnology and microbial and animal/plant genetics recommended. Transfer of genes between unrelated organisms in nature. Dissipation of foreign DNA from genetically engineered organisms, including plants and animals. Mechanisms by which genes are transferred horizontally, and between kingdoms. — W.

211. Concepts in Human Genetics and Genomics
Lecture/discussion—3 hours. Prerequisite: course 201A or the equivalent; course 201B, 201C or the equivalent recommended. Pass One restricted to graduate students enrolled in the Human Genetics Focus Group; Pass Two restricted to graduate students enrolled in Genetics Graduate Group; after that, open enrollment for graduate students up to 12 students, then undergraduates. Human genomic organization; genetic structure of populations; non-genomic cloning, application of linkage, association, and haplotypes; quantitative trait loci analyses; integrative genetic studies of gene expression; DNA repair mechanisms in genetic disease; mutation analyses; epigenetics; mitochondrial disease; gene manipulation and therapy. Offered in alternate years. — W.

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. Accurate manipulations of molecular markers, plant transformation, hybrid production, disease resistance, and novel output traits. (Same course as Plant Sciences 220.) — W. (W.) Neale

223. Gene Therapy (3)
Lecture/discussion—3 hours. Prerequisite: Genetics 201C, Molecular and Cellular Biology 214, or equivalent. Gene therapy from basic concepts to clinical applications. Topics include the human genome and genetic variation, genetic diseases, methods to manipulate gene expression, viral and non-viral delivery vectors, history and progress of gene therapy, case studies, and ethical issues. (Same course as Pharmacology & Toxicology 225.) — S. (S.) Anderson

250. Functional Genomics: From Bench to Bedside (3)
Lecture/discussion—3 hours. Prerequisite: course 201A, Molecular and Cellular Biology 214, or equivalent. Functional genomics on gene discovery, characterization and exploitation. Integrative cloning, application of linkage, association, and haplotypes; quantitative trait loci analyses; integrative genetic studies of gene expression; DNA repair mechanisms in genetic disease; mutation analyses; epigenetics; mitochondrial disease; gene manipulation and therapy. Offered in alternate years. — W.

252. Seminar in Human Genetics and Genomics (1)
Seminar—1 hour. Topics of current interest in genomics and epigenomics. May be repeated for credit. Offered in alternate years. (S/U grading only.) — F.

292. Seminar in Genomics and Epigenomics (1)
Seminar—1 hour. Topics of current interest in genomics and epigenomics. May be repeated for credit. Offered in alternate years. (S/U grading only.) — F.

293. Seminar in Animal Genetics (1-3)
Seminar—1-3 hours. Prerequisite: course 201A or consent of instructor. Emphasis on recent advances in the field of animal genetics. May be repeated for credit up to five times if topic differs. Topics of current interest in human genetics and genomics. Offered in alternate years. — F.

294. Seminar in Human Genetics (2)
Seminar—2 hours. Prerequisite: course 201A and consent of instructor. Current topics in human genetics will be examined in student-conducted seminars and discussion format. May be repeated for credit up to five times if topic differs. Topics of current interest related to the structure, modification and expression of genes. Offered in alternate years. — F.

295. Seminar in Molecular Genetics (1-3)
Seminar—1-3 hours. Prerequisite: course 201A or consent of instructor. Topics of current interest related to the structure, modification and expression of genes. Offered in alternate years. — F.

296. Scientific Professionalism and Integrity (2)
Lecture—1 hour; seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Review of basic skills required of contemporary scientists. Topics include scientific report writing, scientific ethics, grant writing, seminar presentations, and time management. Emphasis on responsibilities of scientists to factually and thoughtfully communicate results. — F.

297. Seminar in Plant Genetics (1-3)
Seminar—1-3 hours. Prerequisite: course 201A or consent of instructor. Current topics in plant genetics will be examined in student-conducted seminars and discussion format. May be repeated for credit up to five times if topic differs. Topics of current interest related to the structure, modification and expression of genes. Offered in alternate years. — W.

298. Group Study (1-5)
Seminar—1-3 hours. Prerequisite: course 201A or the equivalent. May be repeated for credit up to 3 times or 9 units if approved by the instructor. Emphasis on recent advances in the field of animal genetics. May be repeated for credit up to five times if topic differs. Topics of current interest related to the structure, modification and expression of genes. Offered in alternate years. — F.

299. Research (1-12)
(S/U grading only.) — F, W, S, F, W, S.

Professional

300. Methods in Teaching Genetics (1-3)
Lecture/discussion. Prerequisite: graduate standing and consent of instructor. Practical experience in the methods and problems of teaching genetics. Includes analysis of texts and supporting material, discussion of teaching techniques, preparing for and conducting discussion or laboratory sections, formulating examinations under supervision of instructor. May be repeated for credit up to 3 times or 9 units if approved by the instructor. Emphasis on recent advances in the field of animal genetics. May be repeated for credit up to five times if topic differs. Topics of current interest related to the structure, modification and expression of genes. Offered in alternate years. — F.

301. Professional Seminar in Genetics (1)
Seminar—1 hour. Topics of current interest in evolutionary, population, and developmental genetics. May be repeated for credit. (S/U grading only.) Offered in alternate years. — S.

290A. Graduate Student Conference in Genetics (1)
Conference—1 hour. Restricted to Genetics Graduate Group students. Student-given seminars on topics in genetics, with critiques by instructor and peers. May be repeated for credit. (S/U grading only.) — F, W, S. (F, W, S)

291. Seminar in History of Genetics (2)
Seminar—2 hours. Prerequisite: Biological Sciences 101. The development of modern genetic theories beginning with Mendel. — F. (F) Quirós

Integrative Pathobiology (A Graduate Group)

Patricia Pesavento, D.V.M., Ph.D., Chairperson of the Group
Brian Murphy, D.V.M., Ph.D., Co-chairperson of the Group


Faculty
Verena Alfert, D.V.M., Ph.D., Professor (Pathobiology, Microbiology and Immunology)
Kyriacos Athanassios, Ph.D., Assistant Professor and Chair (Biomedical Engineering)
Robert Atwill, D.V.M., M.P.V.M., Ph.D., Professor (Population Health and Reproduction)

Danika Bannasch, D.V.M., Ph.D., Professor (Population Health and Reproduction)
Chris Banker, Ph.D., Assistant Professor (Pathology, Microbiology, and Immunology)
Andreas Baumbier, Ph.D., Professor (Microbiology and Immunology)
Peter A. Barry, Ph.D., Assistant Professor (Pathology and Oncology)
Nicole Baumgarth, D.V.M., Ph.D., Professor (Pathology, Microbiology, and Immunology)

Jordi L. Barjess, D.V.M., M.P.V.M., Ph.D., Professor (Pathology, Microbiology, and Immunology)
Walter M. Boyce, D.V.M., Ph.D., Professor (Pathology, Microbiology, and Immunology)
Robert J. Brosnan, D.V.M., Ph.D., Professor (Surgical and Radiological Sciences)
Barbara A. Burne, D.V.M., Ph.D., Professor (Pathology, Microbiology, and Immunology)

Kermit Carraway, Ph.D., Professor (Biochemistry and Molecular Medicine)
Hongwu Chen, Ph.D., Associate Professor (Cancer Center, Basic Sciences)
Xinbin Chen, B.V.M., Ph.D., Professor (Surgical and Radiological Sciences)
Simon Cherry, Ph.D., Professor (Biomedical Engineering)

Bruno B. Chomel, D.V.M., Ph.D., Professor (Population Health and Reproduction)
Brett Chomay, Ph.D., Assistant Professor (Pathology and Laboratory Medicine)
Lea R. Coffey, D.V.M., Ph.D., Assistant Professor (Pathology, Microbiology, and Immunology)

Patricia A. Conrad, D.V.M., Ph.D., Professor (Pathology, Microbiology, and Immunology)

Beate Crossley, D.V.M., Ph.D., M.P.V.M., Professor (Department of Medicine and Epidemiology)
James S. Cullor, D.V.M., Ph.D., Professor (Population Health and Reproduction)
Satty Dankedar, Ph.D., Professor (Microbiology and Immunology)

Wenbing Deng, Ph.D., Associate Professor (Biochemistry and Molecular Medicine)

Peter Dickinson, D.V.M., Ph.D., Assoc. Professor (Neurology/Neurosurgery)

Coral Erickson, Ph.D., Distinguished Professor Emeritus (Molecular and Cellular Biology)

Thomas B. Farver, Ph.D., Professor (Population Health and Reproduction)
Carrie Finno, D.V.M., Ph.D., Assistant Professor (Population Health and Reproduction)

Rodrigo Gallardo, D.V.M., Ph.D., Assistant Professor (Population Health and Reproduction)
Damin Genetos, B.A., M.S., Ph.D., Assistant Professor (Anatomy, Physiology and Cell Biology)

Laurel J. Gershwin, D.V.M., Ph.D., Professor (Pathology, Microbiology, and Immunology)

Paramita Ghosh, Ph.D., Associate Professor (Biochemistry and Molecular Medicine)

Ralph D. Green, M.D., Ph.D., Professor (Medical Pathology and Laboratory Medicine)

Fuzheng Guo, Ph.D., Assistant Professional Researcher (Neurology/Neurosurgery)

James H. Jones, D.V.M., Ph.D., Professor (Surgical and Radiological Sciences)

Amy Kapatin, B.S., D.V.M., M.S. Associate Professor (Surgical and Radiological Sciences)

Kevin Keel, D.V.M., Ph.D., Associate Professor (Pathology, Microbiology, and Immunology)

Imran Khan, Ph.D., M.B.A., Associate Adjunct Professor (Pathology and Laboratory Medicine)

Kit S. Lam, M.D., Ph.D., Professor (Hematology/Oncology)

Michael Laimore, D.V.M., Ph.D., Professor and Dean (Pathology, Microbiology and Immunology)

Kent Leach, Ph.D., Professor (Biomedical Engineering)

Jianjiang Li, M.D., Ph.D., Professor (Radiation Oncology)

Kent K.C. Lloyd, D.V.M., Ph.D., Professor (Anatomy, Physiology and Cell Biology)

Su Hao Lo, Ph.D., Professor (Biochemistry and Molecular Medicine)
Calleen Sweeney, Ph.D., Professor (Biochemistry and Molecular Biology)
Jane E. Sykes, Ph.D., Professor (Medicine and Epidemiology)
Fern Tabin, V.M.D., Ph.D., Professor (Anatomy, Physiology and Cell Biology)
Alice F. Taram, Ph.D., Professor (Pediatrics)
Sara Thomasy, D.V.M., Ph.D., Associate Researcher (Surgical and Radiological Sciences)
Jose V. Torres, Ph.D., Professor (Microbiology)
Nam Tran, Ph.D., Assistant Professor (Department of Pathology and Laboratory Medicine)
Renjie M. Tsallis, Ph.D., Professor (Microbiology and Immunology)
Francisco Uzal, D.V.M., Ph.D., Professor, of Clinical Diagnostic Pathology (Pathology, Microbiology, and Immunology)
Laura Van Winkle, Ph.D., Adjunct Professor (Anatomy, Physiology and Cell Biology)
William Vernaux, D.V.S., Ph.D., Associate Professor (Pathology, Microbiology and Immunology)
Sebastian Wachtmann-Hogiu, M.D., Associate Professor (Pathology)
Ajin Wang, Ph.D., Assistant Professor (Surgery)
Johanna I. Watson, D.V.M., Ph.D., Associate Clinical Professor and Chair (Medicine and Epidemiology)
Bart Weimer, Ph.D., Professor (Population Health and Reproduction)
Robert H. Weiss, M.D., Professor (Internal Medicine, Division of Nephrology)
Dennis W. Wilson, D.V.M., Ph.D., Professor (Pathology, Microbiology & Immunology)
Erik R. Wisner, D.V.M., Professor (Surgical and Radiological Science)
Kevin Woolard, D.V.M., Ph.D., Assistant Professor (Pathology, Microbiology and Immunology)
Jian Wu, M.D., Ph.D., Assistant Adjunct Professor (Internal Medicine)
Renn W. Wu, Ph.D., Professor (Internal Medicine)
Clare Yellowle, Ph.D., Professor (Anatomy, Physiology and Cell Biology)
Chengyi Zhou, Ph.D., Associate Professor (Biochemistry and Molecular Medicine)

Graduate Study. The Graduate Group in Integrative Pathobiology offers the M.S. and Ph.D. degrees for graduate study in disciplines concerned with disease processes. The group’s focus is the study of the causes and nature of disease processes in animals and humans, with major emphasis on the mechanisms responsible for the development of diseases at the level of organ systems, the cell, or subcellular mechanisms. The group brings a wide array of scientific knowledge to this study, so that students with divergent interests can be accommodated in programs designed for individual needs. Beyond core courses selected from disciplines such as anatomy, bacteriology, genetics, immunology, parasitology, pathology, physiology, and virology, course programs are intentionally flexible.

Preparation. This program is primarily for students who have a professional medical degree, e.g., D.V.M., M.D., D.D.S. Students without a professional degree will be considered if they have an especially strong background in basic biomedical sciences.

Graduate Adviser. Jeffrey Stott (Pathology, Microbiology, and Immunology)

**International Agricultural Development**

(College of Agricultural and Environmental Sciences)

International Agricultural Development is an interdisciplinary major in the Plant Sciences department.

**Faculty.** Includes members from various departments across colleges.

**B.S. Major Requirements:**

**Preparatory Subject Matter**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Sciences 101</td>
<td>3</td>
</tr>
<tr>
<td>Economics 115A</td>
<td>4</td>
</tr>
<tr>
<td>Agricultural Resource Economics 147</td>
<td>3</td>
</tr>
<tr>
<td>Plant Sciences 110A, 110C, 110L, 112, 130</td>
<td>5</td>
</tr>
<tr>
<td>International Agricultural Development 103</td>
<td>4</td>
</tr>
<tr>
<td>International Agricultural Development 170</td>
<td>6</td>
</tr>
<tr>
<td>Sociology 170 or Community and Regional Development 141 or 162</td>
<td>2</td>
</tr>
<tr>
<td>Community and Regional Development 142 or 149 or 152</td>
<td>4</td>
</tr>
<tr>
<td>Political Science 123 or Sociology 145A or Anthropology 126A or 126B</td>
<td>3</td>
</tr>
</tbody>
</table>

**Foreign Language Requirement**

Students must complete three sequenced quarters (15 units) of courses in one foreign language or its equivalent. Passing a foreign language proficiency examination, a score of 4, 5, or 6 on a foreign language Advanced Placement examination (except Latin), or a score of 550 on the SATII: Subject Test will also satisfy this requirement.

**Internship Requirement**

Students must complete at least two units of internship. Internships can be chosen in consultation with an adviser. Internship requirement waived for students enrolled in UC Education Abroad Program.

**Areas of Specialization**

**Agricultural Production Option**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Sciences 2A and 2B</td>
<td>10</td>
</tr>
<tr>
<td>Chemistry 2A and 2B</td>
<td>10</td>
</tr>
<tr>
<td>Animal Sciences 118, 124, 136A, 136B, 143, 144, 145, 146</td>
<td>15</td>
</tr>
<tr>
<td>Avian Sciences 121, Entomology 110, 135, Environmental Horticulture 100, 133, Environmental Science and Management 100, Hydrology 124</td>
<td>30</td>
</tr>
<tr>
<td>Restricted Electives: Courses selected in consultation with an adviser</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>44-45</td>
</tr>
</tbody>
</table>

**Mathematics Option**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics 168</td>
<td>3</td>
</tr>
<tr>
<td>Sociology 1 or Anthropology 2</td>
<td>4-5</td>
</tr>
</tbody>
</table>

**International Agricultural Development**

Documents and resources related to International Agricultural Development can be found on the department's website. For more information, please visit the website or contact the department directly.
for the major is located in 1220 Advising Center (Plant Sciences).

Total Units for Major: 116-134

Internals (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.)—F, W, S. (F, W, S.)

160. Agroforestry: Global and Local Perspectives (3)

Lecture/discussion—3 hours. Prerequisite: Plant Sciences 2 or Biological Sciences 1C or 2C. Plant Sciences 142 or 150 or Biological Sciences 28 or a general ecology course. Traditional and evolving use of trees in agricultural ecosystems; their multiple roles in environmental services 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 previously taken Agricultural Management and Rangeland Resources 160. (Former course Agricultural Management and Rangeland Resources 160.) Offered in alternate years. GE credit: SciEng (QI, SL, VL, -S). (S.) Shafi

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.—F. (F.)

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.)—F, W, S. (F, W, S.)

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.)—F, W, S. (F, W, S.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. Directed group study. (P/NP grading only.)—F, W, S. (F, W, S.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. Special study for advanced undergraduates. (P/NP grading only.)—F, W, S. (F, W, S.)

Graduate

200N. Philosophy and Practice of Agricultural Development (5)

Lecture/discussion—5 hours; term paper. Introduces key elements of philosophy and practice of agricultural development in less developed countries; major paradigms of development; historical context within which these paradigms operate; various development techniques and initiatives originating from agricultural production capacity-building and management. Not open for credit to students who have completed former course 202. —F. (F.)

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, and for proposing government policies to increase small farm production and improve farmer and national welfare.—W. (W.)

202N. Analysis and Determinants of Farming Systems (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Plant Sciences 150 or the equivalent. Unifying concepts of cropping systems in temperate and tropical climatic zones; agroecosystems stability, diversity and sustainability; management strategies, resource use efficiency and their interactions, role of animals, their impact on energy use efficiency, nutrient cycling, and providing food and power. Not open for credit to students who have completed former course 200. —S. (S.)

203N. Project Planning and Evaluation (4)

Discussion—1 hour; workshop—3 hours. Prerequisite: courses 200N or former course 202), 201, 202N (or former course 200N) Interdisciplinary setting for application of student skills and specialization to a “real world” development project. Focus on team-building and effective 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. —S. (S.)

290. Seminar in International Agricultural Development (1-3)

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.)—F, W, S. (F, W, S.)

291. Topics in International Agricultural Development (1-3)

Internship—3-36 hours. Prerequisite: participation in H. Humphreys Fellow Program or consent of instructor. Individually designed supervised internship, off or on campus, in community, business or institutional setting. Developed with advice of faculty mentor and Humphreys Coordinator. (S/U grading only.)—F, W, S. (F, W, S.)

298. Directed Group Study (1-5)

Prerequisite: consent of instructor. Directed group study. (S/U grading only.)—F, W, S. (F, W, S.)

299. Research (1-12)

Prerequisite: consent of instructor. Research. (S/U grading only.)—F, W, S. (F, W, S.)

Professional

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. Teaching assistant training practicum. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)

International Agricultural Development (A Graduate Group)

Kate Scow, Ph.D., Professor (Land, Air, and Water Resources) Chairperson of the Group.

Group Office. 1220 Plant and Environmental Sciences Building, 530-752-1715; http://iad.ucdavis.edu

Faculty

Kassim Al-Khatib, Ph.D., Professor (Plant Sciences)
Sharif Aly, Ph.D., Associate Professor (Population Health and Reproduction)
Roger Baldwin, Ph.D., Associate Cooperative Extension Specialist (Wildlife, Fish, and Conservation Biology)
Diane M. Barrett, Ph.D., Specialist in Cooperative Extension (Food Science and Technology)
Daniel Putnam, Ph.D., Cooperative Extension Specialist, Agronomist and Lecturer (Plant Sciences)

Pamela C. Ronald, Ph.D., Professor (Plant Pathology)

Robert D. Sainz, Ph.D., Professor (Animal Science)

Richard Sexton, Ph.D., Professor (Agricultural and Resource Economics)

Rajinder Paul Singh, Ph.D., Professor (Biological and Agricultural Engineering)

Lucas Silva, Ph.D., Professional Researcher (Land, Air, and Water Resources)

Michael F. Smith, Ph.D., Professor (Human Ecology)

Christine Stewart, Ph.D., Assistant Professor (Nutrition)

Daniel A. Sumner, Ph.D., Professor (Agricultural and Resource Economics)

Tom Tomich, Ph.D., Professor and Director (Sustainable Agriculture Research and Education Program)

Gary Trexler, Ph.D., Associate Professor (School of Education)

Mark Van Harn, M.S., Lecturer (Plant Sciences)

Chris van Kessel, Ph.D., Professor (Plant Sciences)

Stephen Yost, Ph.D., Adjunct Professor (Agricultural and Resource Economics)

Karen Watson-Creege, Ph.D., Professor (School of Education) Distinguished Graduate Mentoring Award

Joshua Viers, Ph.D., Associate Research Scientist (Agricultural and Resource Economics)

Aram A. Yengoyan, Ph.D., Professor (Anthropology)

Tilahun D. Yilma, Ph.D., Professor (Anthropology)

Minh Ha, Ph.D., Professor (Agriculture and Resource Economics)

Ermias Keberab, Ph.D., Professor (Animal Science)

Timothy K. Hartz, Ph.D., Specialist in Cooperative Extension and Lecturer (Plant Science)

Robert Hijmans, Ph.D., Professor (Plant Sciences)

William Horvath, Ph.D., Professor

Timothy K. Hartz, Ph.D., Specialist in Cooperative Extension and Lecturer (Plant Science)

Bryan M. Jenkins, Ph.D., Professor (Biological and Agricultural Engineering)

Marion Jenkins, Ph.D., Doctoral Research Engineer (Civil and Environmental Engineering)

Katrina Jessoe, Ph.D., Assistant Professor (Agricultural and Resource Economics)

Lucia Kaiser, D.V.M., Ph.D., Professor (Plant Sciences)

Ermias Keberab, Ph.D., Professor (Animal Science)

Kathryn G. Dewey, Ph.D., Program Director

Program Office. 3253 Meyer Hall

Faculty

Lindsay H. Allen, Ph.D., R.D., Professor (Human Development)

Monique Borgerhoff Mulder, Ph.D., Research Professor (Anthropology)

Michael R. Carter, Ph.D., Professor (Agricultural and Resource Economics)

Caroline Chantry, M.D., Professor (Pediatrics)

Kathryn G. Dewey, Ph.D., Distinguished Professor (Nutrition)

Agricultural and Resource Economics

E. Dean MacCannell, Ph.D., Professor Emeritus (Human Ecology)

Alexander F. McCanna, Ph.D., Professor Emeritus (Environmental Design)

Richard E. Plant, Ph.D., Professor Emeritus (Plant Sciences)

Graduate Study. The International Agricultural Development M.S. degree program prepares students for careers in global agricultural and rural development, especially, but not exclusively, of developing and less-industrialized regions. This is an interdisciplinary program designed to provide students with knowledge and skills that will enable them to implement, facilitate, and manage programs that enhance agricultural development, resource management, and rural life. Students are prepared to realize biological and technological improvement in agricultural and natural systems to facilitate social innovation. Training in International Agricultural Development includes both breadth and depth components. Breadth components, required of all M.S. students, aim to establish an understanding of the issues in international development as they relate to agriculture and the environment. These include the history and philosophy of development, leadership and management techniques, fundaments of farming systems, and agicultural economics. Students acquire depth in their own areas of specialization within the agricultural and social sciences. The areas include agricultural and resource economics, agricultural engineering, agronomy, animal science, anthropology, aquatic culture, avian science, community development, ecology, economics, entomology, environmental design, environmental toxicology, forensic science, gender, geography, horticulture, nutrition, plant pathology, plant biology, plant protection and pest management, political science, preventive veterinary medicine, range science, sociology, soil science, sustainable agriculture, vegetable crops, viticulture, and water science.

Practical and on-site experience with development issues is encouraged and facilitated by guidance from the group’s faculty members, who possess a wide range of experience in international development.

Graduate Adviser. Contact the Group office.

**International and Community Nutrition**

Kathryn G. Dewey, Ph.D., Program Director

Program Office. 3253 Meyer Hall

Faculty

Daniel Putnam, Ph.D., Cooperative Extension Specialist, Agronomist and Lecturer (Plant Sciences)

Pamela C. Ronald, Ph.D., Professor (Plant Pathology)

Robert D. Sainz, Ph.D., Professor (Animal Science)

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Caroline Chantry, M.D., Professor (Pediatrics)

Kathryn G. Dewey, Ph.D., Distinguished Professor (Nutrition)

Lio C. H. Fernald, Ph.D., Associate Professor (Public Health Nutrition, Community Health & Human Development, UC Berkeley)

Leah Hibbel, Ph.D., Assistant Professor (Human Development)

Robert J. Hijmans, Ph.D., Professor Emeritus (Agricultural and Resource Economics)

Lovell S. Jarvis, Ph.D., Professor (Agricultural and Resource Economics)

Bo I. Lonnerdal, Ph.D., Distinguished Professor (Nutrition)

Travis J. Lybbert, Ph.D., Associate Professor (Agricultural and Resource Economics)

Christine P. Stewart, Ph.D., Assistant Professor (Nutrition)

Emeriti Faculty

Kenneth H. Brown, M.D., Distinguished Professor Emeritus

Betty J. Burri, Ph.D., Adjunct Professor Emerita

Louis E. Grivetti, Ph.D., Professor Emeritus

Charles H. Halsted, M.D., Professor Emeritus

Lourdes Marie K. Kapper, Ph.D., Professor Emeritus

Lucia L. Kaiser, Ph.D., Specialist in Cooperative Extension

Janet King, Ph.D., Professor Emerita

Fernando E. Viteri, M.D., Ph.D., Professor Emeritus

Affiliated Faculty

Katie P. Adams, Ph.D., Assistant Project Scientist (Nutrition)

Joanne E. Arsenault, Ph.D., MPH, R.D., Associate Project Scientist (Nutrition)

Reina Engle-Stone, Ph.D., Assistant Research Nutritionist (Nutrition)

Marjorie J. Haskell, Ph.D., Associate Researcher (Nutrition)

Sonja Y. Hess, Ph.D., Associate Researcher (Nutrition)

Kevin D. Laugero, Ph.D., Assistant Adjunct Professor (Nutrition)

Susana L. Matias, Ph.D., Assistant Project Scientist (Nutrition)

Elizabeth L. Prado, Ph.D., Assistant Project Scientist (Nutrition)

Charles B. Stephensen, Ph.D., Adjunct Professor (Nutrition)
International Commercial Law (A Graduate Group)

Daniel I. Simmons, J.D., Chairperson of the Group
Beth Greenwood, J.D., Associate Dean, Interna-
tional Programs, UC Davis School of Law

Group Office, International Law Programs, School of Law,
UC Davis, Folsom Hall, Suite 1008, 400 Folsom Drive
Davis, CA 95616; ili@ucdavis.edu
http://www.law.ucdavis.edu/international

Faculty

Courses are taught by School of Law faculty from
UC Davis and other University of California law
schools, the Graduate School of Management,
Departments of Economics and Agricultural
Resource Economics. Additionally, outstanding prac-
titioners from private practice and government—law-
yers, economists, bankers, businessmen—have
acted as adjunct faculty to provide an applied per-
spective through lectures, simulations and case stud-
ies.

Graduate Study

The Graduate Group in International Commercial Law
offers a program of study and research leading to the
LL.M. degree through a summer-only program. Students
are required to take 40 quarter units of study over two,
three, four, or five summers. The classes are taught
in an intensive format of 20 hours per week during
two days of lecture in the morning, two hours in the
afternoon. Candidates begin the program by examining
the fundamentals of the U.S. legal system with special
emphasis on business and trade law. They complete
the Orientation in U.S. Law program, two of the special-
ized programs in international commercial law and
the American Legal System Research Seminar.

In addition, participants take intensive elective

International Commercial Law (A Graduate Group)
387

Fall 2011 and on Revised General Education (GE) Requirements:
AGC-UC: A-Humanities; DD-Physical Sciences; DL-Language; DL-Quantitative; SL-Scientific; VL-Visual; WC-World Cultures; WE-Writing Experience

Pre-Fall 2011 General Education (GE) Requirements:
AH-Visual; Arth-Arts and Humanities; ScGn-Science and Engineering; SocSc-Social Sciences; DivD-Diversity; Wt-Writing Experience
Quarter Offered: F-Winter, S-Spring, SU-Summer, 2017-2018 offering in parentheses

International Commercial Law (A Graduate Group)
387

 courses in international nutrition (Nutrition 219A,
Community Nutrition, receive a Ph.D. in their major field, with specific rec-
the Program Director. Upon graduation, students
from other programs. The program focuses on both theoretical
and practical issues concerning the identification, treatment, and prevention of human nutritional prob-
lems in low-income countries and in disadvantaged
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 and com-
munity nutrition, (3) complete additional core
courses in international nutrition (Nutrition 219A,
219B, 258) and selected courses in the related disci-
plines of epidemiology, statistics, and social and
behavioral sciences, and (4) conduct their disserta-

Preparation

International applicants must submit satisfactory evi-
dence of completion of a degree program or equiva-

tent involving academic legal training at an
credited educational institution. Applicants from
the United States who have obtained a bachelor’s degree plus a J.D. L.L.B., or equivalent degree from
an accredited United States law school. A period of
law practice or legal experience and/or advanced
legal studies is preferred but not required.

Graduate Advisers, Beth Greenwood (Internation-
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 special session. For more information,
contact the International Law Programs at 530-752-
6081 or intlaw@ucdavis.edu.
Graduate

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, Constitu-
tion, separation of powers, federalism, federal and
state powers and immunities. Includes judicial review, jurisdiction, standing to sue, federalism, federal and state powers and immuni-
ties, and the separation of powers among branches of the federal government.
205. Introduction to Constitutional Law (4)
Lecture/discussion—20 hours. Prerequisite: Law
school education or the equivalent. Principles, doc-
tines and controversies regarding the structure and
division of powers in American government. Includes judicial review, jurisdiction, standing to sue, federalism, federal and state powers and immuni-
ties, and the separation of powers among branches of the fed-
eral government.
205A. Overview of US Constitutional Law (2)
Lecture/discussion—20 hours. Prerequisite: Law
school education or equivalent. Principles, doc-
tines and controversiess regarding the structure and
division of powers in American government. Includes judicial review, jurisdiction, standing to sue, federalism, federal and state powers and immuni-
ties, and the separation of powers among branches of the fed-
eral government.
205B. Constitutional Law—Protection of Individual Rights (2)
Lecture/discussion—20 hours. Prerequisite: Law
school education or equivalent. Principles, doc-
tines and controversies regarding the structure and
division of powers in American government. Includes judicial review, jurisdiction, standing to sue, federalism, federal and state powers and immuni-
ties, and the separation of powers among branches of the fed-
eral government.
202B. Contracts Performance (2)
Lecture/discussion—20 hours. Prerequisite: Law
school education or equivalent. Examines issues of
performing promises that are enforceable and possi-
bale breach of promissory obligations in both com-
mercial and noncommercial transactions. Inquiry is made into the means by which traditional doctrine
adjusts to changing social demands. Offered irregularly.
202B5. Contracts Performance (2)
Lecture/discussion—20 hours. Prerequisite: Law
school education or equivalent. Course 202A or
202A5. Contracts Performance (2)
Lecture/discussion—20 hours. Prerequisite: Law
school education or equivalent. Examines issues of
performing promises that are enforceable and possi-
bale breach of promissory obligations in both com-
mercial and noncommercial transactions. Inquiry is made into the means by which traditional doctrine
adjusts to changing social demands. Offered irregularly.
203. Civil Procedure (2)
Lecture/discussion—20 hours. Prerequisite: Law
school education or the equivalent. Study of the fun-
damental and recurrent problems in civil actions
including the methods used by federal and state courts
to resolve civil disputes.
204. International Joint Ventures (3)
Lecture/discussion—20 hours. Prerequisite: Law
school education or equivalent. Course 201. Interna-
tional business and legal transactions. Legal planning, problem solving, decision making and
negotiations related to the break-up and dissolu-
tion of a major international joint venture. U.S. laws
including finance, tax, bankruptcy, labor, antitrust,
environmental, corporate structures and intellec-
tual property.

Preparation

International applicants must submit satisfactory evi-
dence of completion of a degree program or equiva-

tent involving academic legal training at an
credited educational institution. Applicants from
the United States who have obtained a bachelor’s degree plus a J.D. L.L.B., or equivalent degree from
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6081 or intlaw@ucdavis.edu.
Graduate

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Includes structure of the U.S. government, Constitu-
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ties, and the separation of powers among branches of the federal government.
205. Introduction to Constitutional Law (4)
Lecture/discussion—20 hours. Prerequisite: Law
school education or the equivalent. Principles, doc-
tines and controversies regarding the structure and
division of powers in American government. Includes judicial review, jurisdiction, standing to sue, federalism, federal and state powers and immuni-
ties, and the separation of powers among branches of the fed-
eral government.
205A. Overview of US Constitutional Law (2)
Lecture/discussion—20 hours. Prerequisite: Law
school education or equivalent. Principles, doc-
tines and controversiess regarding the structure and
division of powers in American government. Includes judicial review, jurisdiction, standing to sue, federalism, federal and state powers and immuni-
ties, and the separation of powers among branches of the fed-
eral government.
205B. Constitutional Law—Protection of Individual Rights (2)
Lecture/discussion—20 hours. Prerequisite: Law
school education or equivalent. Principles, doc-
tines and controversies regarding the structure and
division of powers in American government. Includes judicial review, jurisdiction, standing to sue, federalism, federal and state powers and immuni-
ties, and the separation of powers among branches of the fed-
eral government.
212. Introduction to Negotiation (2) Lecture/discussion—20 hours. Prerequisite: Law school education or the equivalent. Introduction to theoretical and empirical approaches to negotiation for the purposes of making deals and resolving legal disputes.

212S. Introduction to Negotiation (2) Lecture/discussion—20 hours. Prerequisite: Law school education or the equivalent. Introduction to theoretical and empirical approaches to negotiation for the purposes of making deals and resolving legal disputes.

214. Advanced Negotiation (2) Lecture/discussion—20 hours. Prerequisite: Law school education or the equivalent. Principals and empirical approaches to advanced negotiations including negotiation framework, models, styles, multiple party/issue negotiations and settlements.

215. Business Associates (4) Lecture/discussion—20 hours. Prerequisite: course 201; law school education or the equivalent. Legal rules and concepts applicable to business associations including general partnerships, joint ventures, limited partnerships, limited liability entities, and sole proprietorships.

215S. Business Associates (4) Lecture/discussion—20 hours. Prerequisite: Law School education or equivalent; course 201. Legal rules and concepts applicable to business associations including general partnerships, joint ventures, limited partnerships, limited liability entities, and sole proprietorships, offered irregularly.

216. ADR and Business Transactions (2) Lecture/discussion—20 hours. Prerequisite: course 201; law school education or the equivalent. Legal problems arising from 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.

217. Alternative Dispute Resolution (2) Lecture/discussion—20 hours. Prerequisite: Law school education or the equivalent. Introduces students to a wide variety of alternative dispute resolution procedures, with an in-depth emphasis on negotiation, mediation and arbitration.

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 (2) 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.

227. Criminal Procedure (2) Lecture/discussion—20 hours. Prerequisite: Law school education or equivalent. Federal constitutional limits on government authority to gather evidence and investigate crime. Includes Fourth Amendment limits on search, seizure, and arrest; Fifth Amendment privilege against self-incrimination; Sixth Amendment right to counsel.

228A. Mergers and Acquisitions Law (2) Lecture/discussion—20 hours. Prerequisite: Law School education or equivalent. Practical approach to mergers and acquisitions with an in-depth look at the planning, negotiation and completion of mergers and acquisitions.

228AS. Mergers and Acquisitions Law (2) Lecture/discussion—20 hours. Prerequisite: Law School education or equivalent. Practical approach to mergers and acquisitions with an in-depth look at the planning, negotiation and completion of mergers and acquisitions.

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.

239. Mediation (2) Lecture/discussion—20 hours. Prerequisite: Law school education or the equivalent. Introduction to the mediation process. Development of communication skills, the disputes, to understand why mediations succeed or fail, and understand the advantages and limitations of mediation as a method of resolving disputes.

242. Private International Law and Security Law (2) Lecture/discussion—20 hours. Prerequisite: course 201; Law School education or equivalent. Operating law across national borders; emphasis on methods of resolving international disputes. International aspects of jurisdiction, choice of law, judgment enforcement, forum choice, process service, taking of evidence, foreign sovereign immunity, extraterritorial regulation of antitrust, securities; other national laws.

242S. Private International Law and Security Law (2) Lecture/discussion—20 hours. Prerequisite: course 201; Law School education or equivalent. Operating law across national borders; emphasis on methods of resolving international disputes. International aspects of jurisdiction, choice of law, judgment enforcement, forum choice, process service, taking of evidence, foreign sovereign immunity, extraterritorial regulation of antitrust, securities; other national laws.

247. Banking Law (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.

249. Comparative Law (1) Lecture/discussion—10 hours. Prerequisite: course 201; law school education or the equivalent. 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 family, inheritance, trusts, and contracts, the cross-fertilization of laws and difficulties commonly associated with importing foreign law into new territory.

250. International Trade Law (3) Lecture/discussion—20 hours. Prerequisite: course 201; law school education or the equivalent. An investigation of international trade laws and practices, including international trade in goods and services, e-commerce, 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 in alternate years.

251. United States Litigation Issues (1) Lecture/discussion—10 hours. Prerequisite: course 201; law school education or the equivalent. Prevention and resolution of disputes. Emphasis on preparation for a trial in the United States. Includes the study of pre-trial motions, jury selection, opening statements, rules of evidence, closing arguments, and the selection of appropriate strategies.

262. Antitrust (1) Lecture/discussion—10 hours. Prerequisite: course 201; law school education or the equivalent. Historical and institutional background to antitrust law in the United States. The statutory framework including price fixing, limits on distribution, monopolization and mergers, and reporting requirements.

270. Financing International Transactions (3) Lecture/discussion—20 hours. Prerequisite: course 201; 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 on international investment.

274. Intellectual Property (2) Lecture/discussion—20 hours. Prerequisite: course 201; law school education or the equivalent. Intensive study of intellectual property law. Including copyright, trademark and patent law and unfair competition.

274S. Intellectual Property (2) Lecture/discussion—20 hours. Prerequisite: Law School or equivalent; course 201. Intensive study of intellectual property law. Including copyright, trademark and patent law and unfair competition.

283. Contract Remedies (2) Lecture/discussion—20 hours. Prerequisite: Law School education or equivalent. Covers a range of remedies for contract breach: remedies under common law and equity, liquidated damages clauses, remedies for mistake and unconscionability as well as breach of contract for the Sale of Goods under UCC Article II.

283S. Contract Remedies (2) Lecture/discussion—20 hours. Prerequisite: Law School education or equivalent; course 202A, 202B or equivalent. Covers a range of remedies for contract breach: remedies under common law and equity, liquidated damages clauses, remedies for mistake and unconscionability as well as breach of contract for the Sale of Goods under UCC Article II.

285. Environmental Law (2) Lecture/discussion—20 hours. Prerequisite: Law School education or the equivalent. Introduction to federal and state environmental law. Historical development of environmental law; the role of courts, the legislature and the executive branch in the development and implementation of environmental policy. Review of major statutes.

289. Licensing Academy in Intellectual Property & Technology (4) Lecture/discussion—20 hours. Prerequisite: course 201. Law School education or equivalent. Introduction to intellectual property as it relates to current forms of legal protection and how new innovations fit into these models, including public-private technology transfer, patents, institutional objects, technology transfer offices, startups, and licenses.

290. American Legal System Research Seminar (1) Seminar—5 hours. Prerequisite: course 201; Law School education or equivalent. American legal system and its structure. Legal research methodologies and presentation with attention to analysis, synthesis, organization, and editing techniques common to legal writing. (S/U grading only.)

291C. International Commercial Law Seminar (4) Lecture/discussion—20 hours. Prerequisite: course 201; Law School education or equivalent. Advanced seminar on a current topic in International Commer-
cial Law. Offered at the University of Cologne in Cologne, Germany for two weeks each summer. May be repeated three times for credit when topic differs.

292. International Commercial Law Seminar (1-4)
Lecture/discussion—20 hours. Prerequisite: Law school education or equivalent. Advanced seminar in a current topic in International Commercial Law. Topic will change each year the course is offered. May be repeated two times for credit when topic differs.

292S. International Commercial Law Seminar (1-4)
Lecture/discussion—20 hours. Prerequisite: Law school education or equivalent. Advanced seminar in a current topic in International Commercial Law. Topic will change each year the course is offered. May be repeated two times for credit when topic differs.

299. Advanced Research in Legal Problems (1-4)
Prerequisite: course 201; law school education or the equivalent. Permission of supervising instructor. Student individualized research projects under faculty supervision. (S/U grading only.)

International Relations

See Political Science, on page 520.

International Science Studies

This interdisciplinary minor in International Science Studies will introduce College of Agricultural and Environmental Sciences students to global issues, which affect their major disciplines in the current world, and also provide an opportunity to gain first-hand experience abroad when appropriate. The goal of this minor is to enable our college students to develop greater international competence and to enhance their employability.

The minor assumes that the student will have a major in the sciences, and that courses taken under one of the three tracks in the minor will contribute depth to the existing major or establish depth in a selected additional field of study. Students will be expected to work closely with an academic adviser in developing an intellectually coherent program of the study. A minimum of 18 units of upper division work is required. Only a single course can be counted toward both major and minor and no course can be used to satisfy the requirements of more than one minor.

Minor Program Requirements:

<table>
<thead>
<tr>
<th>UNITs</th>
<th>International Science Studies.................... 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global issue course requirement .................. 7-8</td>
<td></td>
</tr>
<tr>
<td>Focusing on broad range of global issues and their impacts on ecological, environmental resources and biodiversity, in addition to international policy and economics. Beyond the courses taken under each track, choose two out of the three courses listed below:</td>
<td></td>
</tr>
<tr>
<td>(1) Atmospheric Science 116</td>
<td></td>
</tr>
<tr>
<td>(2) Plant Sciences 150</td>
<td></td>
</tr>
<tr>
<td>(3) Agricultural and Resource Economics 115B</td>
<td></td>
</tr>
<tr>
<td>Select one of the following tracks ...... 16-17</td>
<td></td>
</tr>
<tr>
<td>Education Abroad Program courses taught overseas and relevant international internship activities will count towards the minor. Requirement with adviser’s approval. For each track, students can take a maximum of three units from EAP courses, with a valid transcript, and three units from relevant international internship activities. The international internship activities would require a pre-approved study plan with the academic adviser before the maximum of three units can be awarded. Language and culture related courses are encouraged, but not required for the minor.</td>
<td></td>
</tr>
<tr>
<td>(1) Ecological, environmental, and energy studies track: Select 16-17 units from Anthropology 103, Agricultural and Resource Economics 147, Atmospheric Science 116, 133, Environmental Science and Management 100, 121, 124, 120, 30, Environmental Science and Policy 100, 116, 151, Evolution and Eco 147, Soil Science 109, Hydrology 143</td>
<td></td>
</tr>
<tr>
<td>(2) Policy and management focus track: Select 16-17 units from Agricultural and Resource Economics 115A/B, Agricultural and Resource Economics 138, International Relations 190, Community and Regional Development 156, 180, International Agricultural Development 160, 162, 170, Environmental Science and Policy 102, 175</td>
<td></td>
</tr>
<tr>
<td>Minor Adviser, Shu-Hua Chen (Land, Air and Water Resources) 530-752-1822, <a href="mailto:schachen@ucdavis.edu">schachen@ucdavis.edu</a></td>
<td></td>
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</tbody>
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Internship

See Internship Program, below; and UC Washington Center (UCDC), on page 578.

Internship Program

Marcie Kirk Holland, Director The Internship and Career Center; 2nd Floor, South Hall 530-752-2855 http://icc.ucdavis.edu

Program Areas

Agricultural and Environmental Sciences, Career Recruiting Programs, Engineering and Physical Sciences, Masters, Ph.D.s and Postdocs, Health and Biological Sciences, International Programs 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 Note. The notation briefly describes the nature and location of the internship experience. Questions pertaining to 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 Passed/Not Passed 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.

A.B. Major Requirements:

<table>
<thead>
<tr>
<th>UNITS</th>
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<tbody>
<tr>
<td>Preparatory Subject Matter .............. 0-27</td>
</tr>
<tr>
<td>Italian 1, 2, 3, 4, 5, and 9 (or the equivalent) ................. 0-27</td>
</tr>
</tbody>
</table>

Depth Subject Matter .............. 36

Italian 101 and 105 ................. 8
Seven additional courses in Italian, literature, cinema, and culture ............. 28
Must include at least one course from two of the following literary periods (taught in Italian):
| (a) Early Italian Literature: Italian 112, 113, 114, 145, if applicable |
| (b) Renaissance and Baroque Italian Literature: Italian 115A, 115B, 115C, 115D, 141, 145, if applicable |
| (c) Modern and Contemporary Italian Literature: Italian 118, 119, 120A, 120B, 131, 142, 145, if applicable |

Fall 2011 and on Revised General Education (GE) AEH—Arts and Humanities; SEE—Science and Engineering; SS—Social Sciences; ACGH—American Cultures; DD—Domestic Diversity; DLS—Oral Skills; Q—Quantitative; VLS—Scientific; VL—Visual; W—Writing Experience

Pre-Fall 2011 General Education (GE): AR—Arts and Humanities; SCI—Science and Engineering; SOC—Social Sciences; DIV—Domestic Diversity; WRT—Writing Experience

Quarter Offered: F=Fall, W=Winter, S=Spring, Su=Summer; 2017/2018 offering in parentheses
Total Units for the Major.................. 36-63

390

Italian

Recommended

Upper division General Education courses in Italian may fulfill this requirement with approval from the major adviser. The remaining five upper-division elective courses may include, but are not limited to, additional Italian literature or culture taught in Italian, that is taught in English, and/or upper-division elective courses in related fields, such as Italian and Italian American Cinema (Italian 150, Italian/ Film Studies 121, 122), and other courses in Italian Studies taught in other departments and programs, subject to approval by the major adviser. All upper division courses are to be chosen in consultation with the major adviser.

Total Units for the Major............ 36-63

Minor Adviser. M. Heyer-Caput

Minor Program Requirements:

UNITS

Italian .................................................. 20

Italian American Cinema (Italian 150, Film Studies 121, 122), and other courses in Italian Studies taught in other departments and programs, subject to approval by the major adviser.

Three additional upper division courses in Italian literature, cinema, and culture...... 12

One course chosen from two of the following three areas.

(a) Early Italian Literature: Italian 112, 113, 114, 145, if applicable

(b) Renaissance and Baroque Italian Literature: Italian 115A, 130B, 150C, 150D, 141, 145, if applicable

(c) Modern and Contemporary Italian Literature: Italian 118, 119, 120A, 120B, 121, 142, 145, if applicable

The remaining two upper-division elective courses may include, but are not limited to, additional Italian literature or culture taught in Italian, such as Italian 104 and Italian 128, and Italian culture and film courses taught in English, such as Italian 150, Italian/Film Studies 121, Film Studies 120, subject to approval by the minor adviser.

Minor Adviser. M. Heyer-Caput

Honors and Honors Program. Candidates for high or highest honors in Italian must write a senior thesis under the direction of a faculty member. For this purpose, honors candidates must enroll in Italian 194h (3 units) or Italian 194s (3 units). Normally, a student will undertake the honors project during the first two quarters of the senior year; other arrangements may be authorized by the department chair. All students who, at the end of the junior year (135 units), have attained a cumulative 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 Italian are in addition to the regular requirements for the major in Italian.

Education Abroad Program. The department of French and Italian strongly encourages students to study abroad in the Summer Abroad Program (Rome), the Quarter Abroad Program (Florence), or the Education Abroad Program. Applicable courses are accepted for credit in the major or the minor program.

Teaching Credential Subject Representative. See the Major Adviser above; see the Teaching Credential/M.A. Program on page 125.

Prerequisite Credit. Credit will not normally be given for a course if it is a prerequisite of a course already successfully completed. Exceptions can be made only by the major adviser.

Quarter Abroad Program. The UC Davis Quarter Abroad Program and the Italian Program offer an exciting Italian Language and Culture Program in Florence, Italy. While studying abroad in Florence, students will earn 23-28 UC Davis quarter units and will experience the richness and vitality of Italian and European culture. Participants fulfill three-quarters of all Italian language study, some rigorous and film courses, integrate into the Florentine community through meaningful internships (with transcript notation), and explore electives in areas such as art history, photography, and food and society.

There is no language requirement, and all registered UC Davis students with 2,000 GPA and above, good academic standing, and good disciplinary standing are eligible to apply.

For more information, please contact Professor Margherita Heyer-Caput at mheyercaput@ucdavis.edu or see https://studyabroad.ucdavis.edu/program/quarterabroad/italy.html.

Courses in Italian (ITA)

Lower Division

Students offering high school language preparation as a prerequisite must take a placement test.

1. Elementary Italian (5)

Discussion—5 hours; laboratory—1 hour. Introduc- tion to Italian grammar and development of all lan- guage skills in a cultural context with special emphasis on communication. Not open for credit to stu- dents who have completed the first year language classes. GE credit: ArtHum | AH, WC. —F, S. (F, S.) Heyer-Caput

2. Elementary Italian (5)

Discussion—5 hours; laboratory—1 hour. Introduc- tion to Italian grammar and development of all lan- guage skills in a cultural context with special emphasis on communication. Course is taught abroad. May be repeated for up to 6 units of credit. Not open for credit to students who have completed the first year language classes. GE credit: ArtHum | AH, WC. —F, S. (F, S.) Heyer-Caput

2S. Elementary Italian (5)

Discussion—5 hours; laboratory—1 hour. Review of language skills in a cultural context with special emphasis on communication. Practice in the speaking of Italian. Course is taught abroad. May be repeated for up to 6 units of credit. Not open for credit to students who have completed the first year language classes. GE credit: ArtHum | AH, WC. —F, S. (F, S.) Heyer-Caput

3. Elementary Italian (5)

Discussion—5 hours; laboratory—1 hour. Prerequi- site: course 2 or 2S. Continuation of course 2 or 2S. Review of grammar and vocabulary, and practice of all language skills through cultural texts. Course is taught abroad. Not open for credit to students who have taken course 1A or 3. GE credit: ArtHum | AH, WC. —F, S. (F, S.) Heyer-Caput

4. Intermediate Italian (4)

Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 3 or 3S. 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. GE credit: WC.

4S. Intermediate Italian (4)

Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 3 or 3S. 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. GE credit: WC.

5. Intermediate Italian (4)

Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 4 or 4S. Review of grammar and syntax through written exercises and readings of short prose works, and written exercises. Intended to prepare students to read, understand, and discuss modern Italian. GE credit: WC.

5S. Intermediate Italian (4)

Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 4 or 4S. Review of grammar and syntax; readings of short prose works, and written exercises. Intended to prepare students to read, understand, and discuss modern Italian. Course is taught abroad. Not open for credit to stu- dents who have completed course 5. GE credit: WC. —F, S. (F, S.) Heyer-Caput

8A. Italian Conversation (3)

Discussion—3 hours. Prerequisite: course 3 or the equivalent. Course designed to offer practice in speaking Italian. May be repeated up to 1 time for credit. (P/NP grading only.) GE credit: WC. —F, S. (F, S.)

8AS. Italian Conversation (3)

Discussion—3 hours. Prerequisite: course 3 or the equivalent. Practice in the speaking of 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 3. (P/NP grading only.) GE credit: WC.

8B. Italian Conversation (3)

Discussion—3 hours. Prerequisite: course 8A. Course designed to offer practice in speaking Italian. (P/NP grading only) GE credit: WC.

8BS. Italian Conversation (3)

Discussion—3 hours. Prerequisite: course 8A. Practice in the speaking of 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.) F, S. (F, S.) Heyer-Caput

9. Reading Italian (4)

Lecture/discussion—3 hours; term paper. Prerequi- site: course 5. Reading and discussion of modern Italian prose, including selections from creative, sci- entific, and journalistic writings. Introduction to contemporary Italian literature and culture. Strengthening the student's command of the Italian language. GE credit: ArtHum | AH, WC.

9S. Reading Italian (4)

Lecture/discussion—3 hours; term paper. Prerequi- site: course 5 or 5S. Reading and discussion of mod- ern 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 Italian language. Course is taught abroad. Not open
50. Studies in Italian Cinema (4)
Lecture—2 hours; discussion—1 hour, term paper.
Lower division standing. Introduction to Italian cinema through its genres. Focus is on cinema as a reflection of the political, economic, and social conditions of Italian history. Film will be studied as an artistic medium and as a form of mass communication. Offered irregularly. Arthum; Wrt| AH, WC, WE.—Heyer-Capat

90X. Lower Division Seminar (1-2)
Seminar—1 hour; discussion—1 hours; term paper. Prerequisite: lower division standing and consent of instructor. Examination of a special topic in Italian language or culture (such as Italian culture seen through film, Italian feminism, literature, and non-literary texts of different styles. Analysis of linguistic problems and elements of style contained in the translation material. GE credit. AH, WC.—Gomez

101. Advanced Conversation, Composition, and Grammar (4)
Lecture—3 hours; extensive writing. Prerequisite: course 9 or 9s or the equivalent. Instruction and practice in expository writing in Italian, with emphasis on advanced grammar, organization, and vocabulary building. Course will be taught in Italian. Not open for credit to students who have completed course 101. GE credit: Arthum| AH, OL, WC, WE.—Heyer-Capat

104. Italian Translation and Style (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or 9s; 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. GE credit. AH, WC.—Gomez

105. Introduction to Italian Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or 9s; 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| AH, OL, WC.—Heyer-Capat

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 sociopolitical institutions. To be taught in English. GE credit: Arthum or SocSci| AH, OL, SS, VL, WC, WE.—Grossi

108. 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 immigration; immigration and race relations; the media and popular culture. Taught in English. GE credit: Arthum or SocSci, Div, Wrt| AH, OL, SS, VL, WC, WE.—S. S. Heyer-Capat

109. 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 immigration; immigration and race relations; the media and popular culture. Taught in English. This course will be taught abroad. Not open for credit to students who have completed course 108. GE credit: Arthum or SocSci, Div, Wrt| AH, OL, SS, VL, WC, WE.—S. S. Heyer-Capat

112. Medieval and Renaissance Poetry: St. Francis to Petrarch (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or 9s or the equivalent; 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, Petrarch, Cavalcanti, the Sicilian School, the Sweet New Style Poets, and other authors. GE credit: Arthum| AH, OL, WC, WE.

113. Dante Alighieri: Divina Commedia (Inferno, Purgatorio, Paradiso) (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or 9s or consent of instructor. Study of Dante Alighieri’s Divina Commedia, and its role in the development of Italian language and literature. Emphasis will be placed on reading the whole poem within the historical context of the Middle Ages. GE credit: Arthum| AH, OL, WC, WE.

114. Boccaccio, Decameron, and the Renaissance Novella (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or 9s or the equivalent; 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. GE credit: Arthum| AH, OL, WC, WE.

115A. Studies in the Cinquecento (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or 9s or consent of instructor or the equivalent. Analysis of key texts from the high moment of the Italian Renaissance. The political and aesthetic legacy of humanism will be foregrounded in relationship to the works of Raffaello, Ariosto, Machiavelli, Aretino, Castiglione, and Tasso. GE credit: Arthum| AH, OL, WC.—Schiesari

115B. Italian Literature of the Renaissance and the Baroque: From Cellini to Marino (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 115A. Further examination into the loss of an ideal. Emphasis on the conflicts in Michelangelo and Tasso leading to Marino, with an excur- sus on Galilei and the formation of a modern literary standard. GE credit: Arthum| OL—Schiesari

115C. Italian Drama from Machiavelli to Tasso (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or 9s or consent of instructor. Development 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 sociopolitical institutions. To be taught in English. Not open for credit to students who have completed course 107. GE credit: Arthum or SocSci| AH, OL, SS, VL, WC, WE.—S. S. Heyer-Capat

115D. Early Modern Italian Lyric (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or 9s or the equivalent. Examination of the poetic tradition influenced by Petrarch.

117. Dante Alighieri, Divina Commedia (Inferno, Purgatorio, Paradiso) (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or 9s; 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, Petrarch, Cavalcanti, the Sicilian School, the Sweet New Style Poets, and other authors. GE credit: Arthum| AH, OL, WC, WE.

118. Italian Literature of the Eighteenth Century (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or 9s or consent of instructor. Development of modern Italian literature. Emphasis on the work of Goldoni, Battinelli, Sartori, Parmini, Affieri and Vico. GE credit: Arthum| AH, OL, WC, WE.—Heyer-Capat

119. Italian Literature of the Nineteenth Century (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or 9s or consent of instructor. Romanticism in Italy, including Manzoni, Verga, and Verismo. GE credit: Arthum| AH, OL, WC, WE.—Heyer-Capat

20A. 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, Moravia, Pavese, and Vittorini. GE credit: Arthum| Wrt| AH, WC, WE.—Heyer-Capat

20B. 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| AH, WC, WE.—Heyer-Capat

21. New Italian Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 1 and upper-division standing, or consent of instructor. Italian cinema of the 21st century in the context of profound cultural and social changes in Italy since World War II. Productions by representative directors such as Amelio, Giordano, Moretti, Muccino are included. Knowledge of Italian not required. (Same course as Film Studies 121.) GE credit: Arthum, Div, Wrt| AH, OL, VL, WC, WE.—Heyer-Capat

21B. New Italian Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 1 and upper-division standing, or consent of instructor. Italian cinema of the 21st century in the context of profound cultural and social changes in Italy since World War II. Productions by representative directors such as Amelio, Giordano, Moretti, Muccino are included. Knowledge of Italian not required. (Same course as Film Studies 121.) GE credit: Arthum, Div, Wrt| AH, OL, VL, WC, WE.—Heyer-Capat

21C. New Italian Cinema (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 9 or 9s or consent of instructor. In- depth study of a particular topic in Italian Culture. Topics: Italian Cities, Church and State, the “Southern Question”; Fascism and Resistance; Multicultural Italy. May be repeated one time for credit when topic differs. GE credit: Arthum| AH, OL, WC, WE.—Bassi

131. Autobiography in Italy (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9 or 9s or consent of instructor. Development of representations of selfhood with particular attention to generic conditions, the contes- tional tradition and the problem of women’s self- representation. Authors studied may included Petrarch, Tasso, Casanova, Moretti, Zerilli, Moretti, Aleramo and Prima Levi. GE credit: Arthum| AH, OL, WC, WE.—Heyer-Capat, Schiesari

398. Italian Literature in English: Boccaccio, Petrarch and the Renaissance (4)
Lecture/discussion—3 hours; term paper. Petrarch and Boccaccio and their relations to the Middle Ages and the Renaissance; the Renaissance, with Consideration of the relation between gender and genre in such poets as Petrarch, Bembo, della Casa, Tasso, Marino, Giosi, Moretti, Vicari, Franco, Isabella di Morra. GE credit: Arthum| AH, WC, WE.—Schiesari

Fall 2011 and on Revised General Education (GE) AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences, AGCH—American Cultures; DD—Diverse Domestic; OL—Oral Skills; QL—Quantitative; SL—Scientific; VL—Visual; WC—World Cultures; WE—Writing Experience Pre-Fall 2011 General Education (GE): Arthum-Arts and Humanities; SciEng-Science and Engineering; SocSci-Social Sciences; Div—Diverse Domestic; Wrt—Writing Experience Quarter Offered: F—Fall; W—Winter; S—Spring; Su—Summer; 2017-2018 offering in parentheses.
Japanese

particular attention to the works of Lorenzo de' Medici, Leonardo da Vinci, Machiavelli, Ariosto, Michelangelo, and Tasso. GE credit: ArtHum | AH, OL, WC, WE.

140. Italian Literature in English Translation: Dante, Divine Comedy (4)
Lecture/discussion—3 hours; term paper. Prerequisite: any course in GE Literature, or consent of instructor. List: Reading of Dante Alighieri's Divine Comedy, through the otherworldly realms of Inferno, Purgatorio, and Paradiso. GE credit: ArtHum, Wrt | AH, OL, WE, WC.

141. Gender and Interpretation in the Renaissance (4)
Lecture/discussion—3 hours; term paper. Prerequisite: completion of entry level writing requirement. Critical analysis of Renaissance texts with primary focus on issues such as human dignity, education and gender politics; "high" and "low" culture and its relation to literary practices. [Same course as Comparative Literature 138] GE credit: ArtHum, Div, Wrt | AH, WE, WC. —Schiessar

142. Masterpieces of Modern Italian Narrative (4)
Lecture—1.5 hours; discussion—1.5 hours; term paper. Prerequisite: either English 3, Comparative Literature 2, or History 4C. Analysis of major works of Italian narrative fiction from unification of Italy to present. Students will learn to use representative methods and concepts which guide literary scholarship. Consideration of works within European social and cultural context. Offered in alternate years. GE credit: ArtHum, Wrt | AH, WE, WC. —Heyer-Caput

145. Special Topics in Italian Literature (4)
Lecture/discussion—4 hours. Prerequisite: course 9 or 9S or consent of instructor. Study of special topics and themes in Italian literature, such as comic literature, epic poetry, pre-twentieth century theater, fascism, futurism, women and literature, and the image of America, etc. May be repeated for credit when topic differs. GE credit: ArtHum, Wrt | AH, OL, VL, WE, WC.

145S. Special Topics in Italian Literature (4)
Lecture/discussion—4 hours. Prerequisite: course 9 or 9S or consent of instructor. Study of special topics and themes in Italian literature, such as comic literature, epic poetry, pre-twentieth century theater, fascism, futurism, women and literature, and the image of America, etc. Course is taught abroad. May be repeated for credit. Not open for credit to students who have completed course 145. GE credit: ArtHum, Wrt | AH, OL, VL, WC, WE. —F (F)

150. Studies in Italian Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: consent of instructor. Introduction to Italian cinema through its genres. Focus on cinema as a reflection or comment on modern Italian history. Film as an artistic medium and as a form of mass communication. GE credit: ArtHum, Div, Wrt | AH, VL, OL, WC, WE, F (F)

190X. Upper Division Seminar (1-2)
Seminar—1-2 hours; laboratory—1-2 hours. Prerequisite: upper division standing and consent of instructor. Limited enrollment. Examination of a special topic in Italian language or culture through shared readings, discussions, written assignments or special activities such as film screening or laboratory work. May not be repeated for credit. GE credit: ArtHum | AH, WE, WC.

192. Italian Internship (1-12)
Internship—3-36 hours. Prerequisite: upper division standing and consent of instructor. Participation in government and business activities to gain work experience and to develop a better knowledge of Italian language and culture. (P/NP grading only). 192S. Italian Internship (1-12)
Internship—3-36 hours. Prerequisite: upper division standing, consent of instructor and UC Davis program director or chairperson of Italian Department. Participation in community service, teaching, graduate, and business activities to gain work experi-

Japanese

See East Asian Languages and Cultures, on page 243.

Jewish Studies

[College of Letters and Science]
Diane L. Wolf, Ph.D., Program Director
Program Office. 2216 Social Sciences and Humanities Building http://jewishstudies.ucdavis.edu

Committee in Charge
David Biale, Ph.D. (History)
Jenny Kaminer, Ph.D. (German and Russian)
Zeev Maoz, Ph.D. (Political Science)
Sven-Erik Rose, Ph.D. (German)
Diane Wolf, Ph.D. (Sociology)

The Program of Study

The Program in Jewish Studies offers students the opportunity to explore Jewish history, communities, literature, religion, and culture in a comparative per-

Minor Program Requirements:

Jewish Studies..............................20

One course from: Jewish Studies 10 or Religious Studies 21 or 23 ..................................4
Four upper division courses selected from: Comparative Literature 147, English 171A, German 116, 117, 141, Hebrew 100A, 100B, 100C, History 112A, 112B, 112C, 113, 142A, 142B, Jewish Studies 101, 110, 111, 112, 120, 121, Political Science 135, 136, Sociology 174. (F • W. • Q) 16
Advising. Jewish Studies Program office; 530/754-7007; jst@ucdavis.edu

Courses in Jewish Studies (JST)

Lower Division

10. Introduction to Jewish Cultures (4)
Lecture—3 hours, term paper. Introduces Jewish cultures created over the past 2,000 years using examples from less-familiar communities such as India, China, and Ethiopia. Topics include the tensions between homeland/diaspora and questions of identity, nationality, age, and religion. Offered irregularly. GE credit: SocSci, Div, Wrt | SS, WC, WE.

Upper Division

101. Topics in Jewish Thought (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 10 or Religious Studies 23 or consent of instructor. Selected topics in Jewish thought in historical and social perspectives. This course traces the historical development of topics in Jewish thought such as Messianism, or focuses on one specific historical period, such as modern Jewish thought. May be repeated for credit when topic differs. Offered irregularly. GE credit: ArtHum, Div, Wrt | AH, WC, WE. —W. (W.)

110. Selected Topics in Jewish Literature (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one lower division literature or Jewish Studies course or consent of instructor. Literature written about the Jewish experience, treated in its historical and social context. Examines literature written in one
language, such as English, Hebrew, or Yiddish, or a theme, such as gender or modern identities, as expressed in different literary traditions. May be repeated for credit when topic differs. Offered irregularly. GE credit: AnthHum, Div, Wtr | AH, WC, WE. — W/F.

111. Israel 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 religion, state, national, 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 irregularly. GE credit: AnthHum, Div, Wtr | AH, WC, WE.

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 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 open for credit to students who have completed Humanities 121. Offered irregularly. GE credit: AnthHum, Div, Wtr | AH, WC, WE.

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 twice for credit if topic differs. Offered irregularly. (Same course as German 116.) GE credit: AnthHum, Div, Wtr | AH, OL, WC, WE.

120. The Cinema and the American Jewish Experience (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: Religious Studies 23 or consent of instructor. Examination of American cinema to reveal how Jewish identity is expressed and submersed, tracing the relations between religion, identity, race, politics, and art. Not open for credit to students who have completed Humanities 122. Offered irregularly. GE credit: AnthHum, Div, Wtr | AH, WC, WE.

121. Oral History and Jewish Life (4)
Lecture/discussion—3 hours; term paper. Oral history class, course work, 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. Not open for credit to students who have completed Humanities 123. Offered irregularly. GE credit: SocSci, Wtr | SS.

Land, Air and Water Resources
(College of Agricultural and Environmental Sciences)
Randy Southard, Chairperson
Department Office, 1110 Plant and Environmental Sciences Building 530-752-1130; http://lawr.ucdavis.edu

Faculty—Soils and Biogeochemistry
Office, 1110 Plant and Environmental Sciences Building 530-752-1130

Randy Dahlgren, Ph.D., Professor (Soil Biogeochemistry) Academic Senate Distinguished Teaching Award
Rebecca Renee Hernandez, Ph.D., Assistant Professor
William R. Horwath, Ph.D., Professor (Soil Biogeochemistry)
Benjamin Z. Houlton, Ph.D., Associate Professor (Biogeochemistry)
Louise Jackson, Ph.D., Professor and Specialist in Cooperative Extension (Soil Science)
Alexandra Navrotzky, Ph.D., Professor (Chemical Engineering and Materials Science, Land, Air and Water Resources)
Sanjai Parikh, Ph.D., Associate Professor (Soils and Biogeochemistry)
Jorge Rodrigues, Ph.D., Associate Professor
Kate M. Scow, Ph.D., Professor (Soil Science)
Randal J. Southard, Ph.D., Professor (Soil Genesis/Morphology)
Paul Ullrich, Ph.D., Asst. Professor (Atmospheric Science/Climate and Global Change)

Emeriti Faculty
Conrad J. Bahre, Ph.D., Professor Emeritus
Caroline S. Bledsoe, Ph.D., Professor Emeritus
Richard G. Burau, Ph.D., Professor Emeritus
Emanuel Epstein, Ph.D., Professor Emeritus
Robert G. Flocchini, Ph.D., Professor Emeritus
André E. Läuchli, Ph.D., Professor Emeritus
Roland D. Meyer, Ph.D., Specialist in Cooperative Extension Emeritus
H. Michael Reisenauer, Ph.D., Professor Emeritus
James H. Richards, Ph.D., Professor Emeritus
Dennis E. Rollins, Ph.D., Professor Emeritus
Wendy K. Silk, Ph.D., Professor Emerita (Hydrologic Science)
Michael J. Singer, Ph.D., Professor Emeritus
Harry O. Walker, Ed.D., Senior Lecturer Emeritus
Robert J. Zasowski, Ph.D., Professor Emeritus

Affiliated Faculty
Daniel Geisseler, Ph.D., Assistant Specialist in Cooperative Extension
A. Toby O’Green, Ph.D., Specialist in Cooperative Extension

Faculty—Atmospheric Science
Cort Anastasio, Vice Chairperson
Office, 1110 Plant and Environmental Sciences Building 530-752-1130

Cort Anastasio, Ph.D., Professor (Atmospheric Science)
Shu-hua Chen, Ph.D., Associate Professor (Regional Scale Meteorologist)
Ian Faloona, Ph.D., Associate Professor (Atmospheric Science)
Richard D. Grotchahn, Ph.D., Professor (Atmospheric Science)
Terrence R. Nathan, Ph.D., Professor (Atmospheric Science)
Kyaw Tha Paw U, Ph.D., Professor (Atmospheric Science)
Anthony S. Wexler, Ph.D., Professor (Mechanical and Aerospace Engineering, Civil and Environmental Engineering, Land, Air and Water Resources)

Emeriti Faculty
Thomas A. Cahill, Ph.D., Professor Emeritus
John J. Carroll, III, Ph.D., Professor Emeritus
G. Stuart Pettygrove, Professor Emeritus
Ruth Reck, Ph.D., Professor Emeritus
Roger H. Shaw, Ph.D., Professor Emeritus
Marilyn L. Shelton, Ph.D., Professor Emeritus
Richard L. Snyder, Ph.D., Specialist in Cooperative Extension Emeritus

Affiliated Faculty
Travis O’Brien, Ph.D., Assistant Adjunct Professor

Faculty—Hydrology
Susan Ustin, Vice Chairperson
Office, 1110 Plant and Environmental Sciences 530-752-1130
Helen Dahlke, Ph.D., Assistant Professor (Integrated Hydrologic Sciences/Hydrologic Modeler)
Graham E. Fogg, Ph.D., Professor Emeritus (Hydrogeology)
Mark E. Grismer, Ph.D., Professor (Hydrologic Science, Biological and Agricultural Engineering)
Peter J. Hennes, Ph.D., Professor (Hydrologic Science)
Jan W. Hopmans, Ph.D., Professor (Vadose Zone Hydrology)
Yufang Jin, Ph.D., Assistant Professor
Gregory B. Pastorack, Ph.D., Professor (Wetland Hydrology)
Carlos E. Puente, Ph.D., Professor (Hydrology)
Samuel Sandoval Solis, Ph.D., Assistant Professor
Hydrologic Sciences/CE Specialist in Water Management
Susan Ustin, Ph.D., Professor (Environmental Sciences)

Emeriti Faculty
David A. Goldhammer, Ph.D., Lecturer Emeritus
Donald W. Grimes, Ph.D., Lecturer Emeritus
Theodore C. Huaxu, Ph.D., Professor Emeritus
Allen W. Knight, Ph.D., Professor Emeritus
Miguel A. Maritó, Ph.D., Professor Emeritus
Donald R. Nielsen, Ph.D., Professor Emeritus
Frank E. Robinson, Ph.D., Lecturer Emeritus
Lawrence J. Schmink, Ph.D., Specialist in Cooperative Extension Emeritus
Verne H. Scott, Ph.D., Professor Emeritus
Wesley W. Wallender, Ph.D., Professor Emeritus

Affiliated Faculty
Stephen Gratton, Ph.D., Lecturer (Hydrologic Science) and Specialist in Cooperative Extension
Thomas Harter, Ph.D., Specialist in Cooperative Extension
Doug Mackay, Ph.D., Adjunct Professor (Hydrologic Science)
Daniele Zaccaria, Ph.D., Assistant Specialist in Cooperative Extension (Hydrologic Sciences)
Minghua Zhang, Ph.D., Adjunct Professor (Hydrologic Science)

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 Science and Management, and Water Science; see http://lawr.ucdavis.edu/academic_programs.htm.

Graduate Study. Graduate work is offered in the areas of Atmospheric Science, Hydrologic Sciences, and Soils and Biogeochemistry. For detailed information, call 530-752-1669 or see http://lawr.ucdavis.edu/academic_programs.htm.

Courses. See courses listed under Atmospheric Science, Hydrologic Sciences, Hydrology, Environmental and Resource Sciences, Environmental Science and Management, and Soil Science. See also the websites listed above.
Landscape Architecture

College of Agricultural and Environmental Sciences
(Department of Human Ecology)

Steven E. Greco, Chairperson
Landscape Architecture and Environmental Design

Program Office, 131 Hunt Hall
530-752-3907;
http://humanecology.ucdavis.edu/lda

Faculty
Elizabeth Boult, M.L.A., Continuing Lecturer
David de la Pena, Ph.D., Assistant Professor
Steven E. Greco, Ph.D., Professor
Eric Larsen, Ph.D., Associate Research Scientist
Jeff Loux, Ph.D., Associate Adjunct Professor
Brett Milligan, M.L.A., Assistant Professor
N. Claire Napawan, M.L.A., Assistant Professor
Lorence Oki, Ph.D., Associate Specialist in Cooperative Extension
Patsy Eubanks Owens, M.L.A., Professor
Michael Rios, Ph.D., Associate Professor
Sheryl Ann Simpson, Ph.D., Assistant Professor
Stephen Wheeler, Ph.D., Professor

Emeriti Faculty
Mark Francis, M.L.A., Professor Emeritus
Dean MacCannel, Ph.D., Professor Emeritus
Heath Massey, M.F.A., Professor Emerita
E. Byron McCully, B.S.L.A., Continuing Lecturer Emeritus
Edward S. McNiel, M.L.A., Senior Lecturer, SOE 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 and shape 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 Landscape Architecture Accreditation Board (LAAB) which is the only organization professionally sanctioned to grant landscape architectural accreditations in the United States. The program was last reviewed in 2012.

The Program. The curriculum balances creativity and visual and spatial skills with technological expertise and a thorough background in physical, social, and visual and spatial skills with technological related fields. Preparation for graduate school or career development may be pursued in a variety of settings, including land-use and site planning, resource management, bioregionalism, landscape design, landscape ecology, conservation planning, resource management, bioregionalism, and regenerative planning. Graduates pursue more focused interests, expanding their professional expertise and/or conducting advanced research in landscape architecture or related disciplines.

Courses in Landscape Architecture (LDA)

Lower Division

1. Introduction to Environmental Design (4)
   Lecture—3 hours; discussion—1 hour; term paper.
   Introduction to the role of design professionals in contributing to the built environment at a range of scales. Introduction to basic methods used by design professionals to evaluate, design, plan, and manage landscapes. Design and planning of landscapes and buildings.
   GE credit: SocSci, Wrt|AH or SE, VL, WE—F (S) Boult

2. Place, Culture and Community (4)
   Lecture—4 hours; 2 hours, discussion—2 hours; exposure to cultural landscape design and historic landscapes. Design and planning of landscapes and buildings.
   GE credit: SocSci, Wrt|ACGH, SS, VL, WC, WE—W (W) Owens

3. Sustainable Development: Theory and Practice (4)
   Lecture—2 hours; discussion—2 hours; exposure to sustainable development principles and practices. Design and planning of landscapes and buildings.
   GE credit: SocSci, Wrt|ACGH, SS, VL, WC, WE—W (W) Owens

Depth Subject Matter

Landscape Architecture 160, 161, 170, 171...56
Landscape Architecture 1, 2, 3, 21, 30, 50, 60, 70...32

Restricted Electives
Select 20 units of upper division courses with advisor.

Total Units for the Major
158

Graduate Study
Graduate-level landscape architecture courses are available to students pursuing graduate programs. Students are directed toward landscape management, planning, and design issues. A Graduate Academic Certificate in Landscape Architecture and Environmental Design is an option for any graduate student. See https://gradstudies.ucdavis.edu/programs/graduate-academic-certificate.

Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Diverse Diversity; Wrt—Writing Experience
Quarter Offered: F—Fall, W—Winter, S—Spring, Su—Summer; 2017/2018 offering in parentheses

Career Alternatives.
Graduates may find jobs in private landscape architectural firms or public agencies, non-profit organizations, 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:

Preparatory Subject Matter: 76-79

English Writing: 4

Communication: 4

Biological Sciences: 2A, 2B, 10

Environmental History: 10, 101, 102

Geography: 10, 101, 102

History: 10, 101, 102

Mathematics: 1A, 1B, 2A, 2B

Physics: 1A, 1B, 2A, 2B

Psychology: 10, 101, 102

Sociology: 10, 101, 102

3. Sustainability: Design and Practice (4)
   Lecture—3 hours; discussion—2 hours; exposure to sustainable development principles and practices. Design and planning of landscapes and buildings.
   GE credit: SocSci, Wrt|ACGH, SS, VL, WC, WE—W (W) Owens

Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Diverse Diversity; Wrt—Writing Experience
Quarter Offered: F—Fall, W—Winter, S—Spring, Su—Summer; 2017/2018 offering in parentheses

Fall 2011 and on Revised General Education (GE): AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; Div—Diverse Diversity; VL—Visual; WC—World Cultures; Wrt—Writing Experience

More information is available through the Academic Advising Center.

Nina Claire Napawan
Graduate Advising Center. See Sharla Cheney, 135 Hunt Hall, 530-754-8628, schenity@ucdavis.edu

Advising Center.

Edward S. McNiel, M.L.A., Senior Lecturer, SOE Emeritus

Emeriti Faculty
Mark Francis, M.L.A., Professor Emeritus
Dean MacCannel, Ph.D., Professor Emeritus
Heath Massey, M.F.A., Professor Emerita
E. Byron McCully, B.S.L.A., Continuing Lecturer Emeritus
Edward S. McNiel, M.L.A., Senior Lecturer, SOE 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 and shape 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 Landscape Architecture Accreditation Board (LAAB) which is the only organization professionally sanctioned to grant landscape architectural accreditations in the United States. The program was last reviewed in 2012.

The Program. The curriculum balances creativity and visual and spatial skills with technological expertise and a thorough background in physical, social, and visual and spatial skills with technological related fields. Preparation for graduate school or career development may be pursued in a variety of settings, including land-use and site planning, resource management, bioregionalism, landscape design, landscape ecology, conservation planning, resource management, bioregionalism, and regenerative planning. Graduates pursue more focused interests, expanding their professional expertise and/or conducting advanced research in landscape architecture or related disciplines.

Courses in Landscape Architecture (LDA)

Lower Division

1. Introduction to Environmental Design (4)
   Lecture—3 hours; discussion—1 hour; term paper.
   Introduction to the role of design professionals in contributing to the built environment at a range of scales. Introduction to basic methods used by design professionals to evaluate, design, plan, and manage landscapes. Design and planning of landscapes and buildings.
   GE credit: SocSci, Wrt|AH or SE, VL, WE—F (S) Boult

2. Place, Culture and Community (4)
   Lecture—4 hours; 2 hours, discussion—2 hours; exposure to cultural landscape design and historic landscapes. Design and planning of landscapes and buildings.
   GE credit: SocSci, Wrt|ACGH, SS, VL, WC, WE—W (W) Owens

3. Sustainable Development: Theory and Practice (4)
   Lecture—2 hours; discussion—2 hours; exposure to sustainable development principles and practices. Design and planning of landscapes and buildings.
   GE credit: SocSci, Wrt|ACGH, SS, VL, WC, WE—W (W) Owens

of sustainable development at a number of scales (site, building, neighborhood, city, region, and nation) through lectures, student projects, walking tours. GE credit: SocSci, Wrt|ACGH, SS, VL, WE—S (S) Wheeler

10. World Regional Geography (3)
   Lecture—3 hours. Major geographic regions of the world, physical and human geography of each region; interactions between the people and the environment; culture and landscape; major resources, physical environments; population distribution and major cities. GE credit: AH or SS, WC—S (S) Greco

21. Environmental Design Visualization (5)
   Lecture—3 hours; laboratory/discussion—3 hours. Prerequisite: course 1; can be taken concurrently with course 1. Pass One is restricted to Pre-Landscape Architecture and Sustainable Environmental Design majors. Idea expression through graphic media and drawing techniques for visual representa- tion of the built environment, including conventional drafting and expressive techniques. Introduction to computerized graphics techniques. GE credit: ArtHum|AH, VL, VL—F (F) Boult

   Studio—8 hours; two all-day field trips. Prerequisite: course 21. Restricted to Pre-Landscape Architecture and Landscape Architecture majors only. Landscape architectural communication explored through the computer. Includes computerized drafting, drawing, rendering, desktop publishing, and photorealistic simulation. —F (F) Greco

30. History of Environmental Design (4)
   Lecture—3 hours; discussion—1 hour. History of Environmental Design across disciplines, including landscape architecture, planning, community and urban design. GE credit: ArtHum|Wrt|AH, VL, WE—W (W) Boult

50. Site Ecology (4)
   Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Sciences 28. Pass One restricted to Pre- Landscape Architecture and Sustainable Environmental Design 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 devoted to field exercises in local ecosystems. GE credit: SciEng|SE, VL, WE—S (S) Greco

60. Landform and Grading Studio (6)
   Studio—8 hours; extensive field trips. Prerequisite: Pre- requisition: course 70. Pass One restricted to Pre-Landscape Architecture majors. Introduction of landform and topography as landscape medium and utilization of grading and drainage to design meaningful and functional spaces. Introduction to site analysis, site planning, and the conventions of grading & drainage, including contour manipulation and physical model building. GE credit: SciEng|AH or SE, OL, VL—S (S) Napawan

61. AutoCAD for Landscape Architects (4)
   Lecture—2 hours; laboratory—4 hours. Pass One restricted to Pre-Landscape Architecture, Sustainable Environmental Design, and Landscape Architecture majors. Introduction of computer-aided drafting (CAD) techniques and their application to landscape design. Drawing setup, layer control, basic drafting and editing commands, dimensioning and text styles, symbol libraries, and display commands used in the creation of landscape architectural drawings. Offered irregularly.

70. Introduction to Spacemaking (3)
   Lecture—3 hours; laboratory—3 hours. Prerequisite: course 21. Pass One restricted to Pre-Landscape Architecture and Sustainable Environmental Design majors. Introduction to basic principles of design towards the creation of space. Introduction to design methodologies and skills necessary to define, manipulate, and represent the built environment. Workshops in 2D computer graphic techniques and
160. Design and Build Studio (6) 
Studio—8 hours; extensive problem solving; fieldwork. Prerequisite: course 1, 2, 3, 21, 30, 50, 70. Restricted to Landscape Architecture majors. Introduction to the spatial and design construction of small-scale projects. Hands-on approach to learning and understanding wood, concrete, and stone and methods in landscape construction, and the application of technical skills (including detailing, cost estimation, and specifications). GE credit: ArtHum or SciEng | AH, OL, VL — F (F).

161. Technology 3: Professional Practice and Construction Documents (4) 
Studio—8 hours. Prerequisite: course 171. Open to Landscape Architecture majors only. Legal and professional aspects of landscape architecture, including the development of construction documents (drawings and specifications), proposal writing, fee calculations, project management, cost estimation, and insurance. GE credit: VL/F.

170. Site Planning and Design Studio (6) 
Studio—8 hours. Prerequisite: course 170. Open to Landscape Architecture majors. Application of place-making and problem-solving skills to local landscape sites. Analysis of social and environmental conditions in the field. Lectures link design projects to contemporary theories and practices. Includes workshops in digital drafting. GE credit: ArtHum or SciEng | AH, OL, VL — F (F).

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 thought applied to interpretation and change of designed environment. Not open for credit to students who have taken course 185. Offered in alternate years.

180B. 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.

180F. Special Topics in Landscape Architecture: Landscape and Regional Land Planning (2) 
Lecture—2 hours. Prerequisite: upper division standing. Theories, laws, and practices of community planning. Creation of livable and sustainable communities and natural landscapes, Smart growth, new urbanism, neo-traditional town planning, transit-oriented, and sustainable communities. Traditional master planning vs. participatory planning and design approaches. GE credit: SS.

180L. 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 by which landscapes regenerate and sustain life (both human and non-human) and culture over time. GE credit: SL.

180J. Special Topics in Landscape Architecture: Community Participation in Design (2) 
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. GE credit: SciEng | Div.

180K. Special Topics in Landscape Architecture: Social Factors in Landscape Architecture (2) 
Lecture—2 hours. Prerequisite: Psychology 155 and upper division standing. Understanding the psychological aspects of landscape as they relate to landscape architecture. Discussion of needs of various user groups of a land area. Introduction to past occupancy evaluations. GE credit: SciEng | Div, SS.

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, and community gardens. Current issues associated with design and management of the public environment of cities.

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 including new urbanism, planned unit development, mixed use, pedestrian and transit-oriented development. Issues of open space and community form.

180N. Special Topics in Landscape Architecture: Current 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.

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.

180Q. Historic Preservation (2) 
Lecture—2 hours. Prerequisite: upper division standing. Priority given to Landscape Architecture majors. Roots and present focus of historic preservation.
181A. Postmodern Landscapes Design and Planning Studio (3)
Studio—6 hours; one field trip required. Prerequisite: course 170; course 180A concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180A. Offered in alternate years.

181C. Art of the Environment Design and Planning Studio (3)
Studio—6 hours; one field trip required. Prerequisite: course 170; course 180C concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180C.

181F. Landscape Ecology Design and Planning Studio (3)
Studio—6 hours. Prerequisite: course 170; 180F must be taken concurrently. Priority given to Landscape Architecture majors. Design theory and methods to real-world projects in ecology. Ecological principles and their application in biological conservation, ecotourism, restoration, and landscape planning, design, and management. Field trip required. GE credit: SciEng OL VL SE.

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 urban planning and 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 redevelopement projects. Field trip required. GE credit: VL.

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.

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.

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.

181K. Social Factors in Landscape Architecture Design and Planning Studio (3)
Studio—6 hours; one field trip required. Prerequisite: Psychology 155, course 170, 180K concurrently. Priority to Landscape Architecture majors. Application of design theory and methods to real-world projects. Familiarizes students with the major concepts in environmental psychology as they relate to landscape architecture; to discuss the needs of various user groups; and past occupancy evaluations. GE credit: DD OL VL.

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.

181M. Urban and Community Design: Design and Planning Studio (3)
Studio—6 hours; one field trip required. Prerequisite: course 170; course 180M concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180M.

181N. Planting 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 180N.

181O. Current Issues Design and Planning Studio (3)
Studio—6 hours; one field trip required. Prerequisite: course 170; course 180O concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to real-world projects associated with course 180O.

181P. Special Topics in Landscape Architecture: Water in Community Planning and Design Studio (3)
Studio—6 hours. Prerequisite: courses 50 and 61 (or equivalent courses with consent of instructor); course 170; course 180P concurrently. Priority given to Landscape Architecture majors. Application of design theory and methods to community and site scale projects associated with course 180P.

181Q. Special Topics in Landscape Architecture: Historic Preservation Studio (3)
Studio—6 hours. Prerequisite: junior standing in the Landscape Architecture program; course 180Q to be taken concurrently. Methods and tools currently used by professional preservation architects and planners, including inventory and evaluation methods and traditional planning and design approaches. Field trip required.

200. Citizenship, Democracy, & Public Space (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Introduction to seminal works in political theory, philosophy, and the social sciences that focus on citizenship and the public sphere; development of critical perspective regarding restructurings of public space in a pluralistic and global culture; discussion of contemporary case studies. (Same course as Geo 200.)

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.

202. Methods in Design and Landscape Research (4)
Seminar—4 hours; field trip required. Prerequisite: student must be a senior. Prerequisites: LAB 123, 241 (or equivalent); graduate standing or consent of instructor. Real-world designed environment situations where creative activity and/or basic research is the primary project. May be repeated for credit for a total of 12 units.

205. Urban Planning and Design (4)
Lecture—2 hours; discussion—2 hours. Limited to graduate students. 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. (Same course as Geography 233.)—F (F W S)

210. Advanced Landscape Architecture Studio (4)
Laboratory—8 hours. Prerequisite: course 113 or the equivalent; graduate standing or consent of instructor. Exposes students to real-world, designed-environment situations where creative activity and/or basic research is the primary product. Advanced landscape problems will be utilized at the site, urban or rural scale.

215. Ecologies of Infrastructure (4)
Seminar—4 hours. Open to graduate standing or consent of instructor. Focus on design practices and theory associated with ecological conceptions of infrastructure, including networked infrastructure, region, bioregion, regionalization, ecological engineering, reclamation, ecology, and theory/articulation of landscape change. (Same course as Geography 215.) Offered in alternate years.—Milligan
Landscape Restoration

[College of Agricultural and Environmental Sciences]
This minor is of particular interest to students majoring in Wildlife, Fish, and Conservation Biology. Environmental Science and Management, Landscape Architecture, Biological Sciences, Evolution and Ecology, Plant Biology and Sustainable Environmental Design. Biological Sciences 2C 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:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Units</th>
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<tbody>
<tr>
<td>Plant Sciences 144</td>
<td>Select one of Environmental Science and Policy 155, 156, 157</td>
<td>4</td>
</tr>
<tr>
<td>Plant Sciences 150</td>
<td>Select one of Environmental Horticulture 100, 130, 133, Plant Biology 119, Plant Sciences 176</td>
<td>3-4</td>
</tr>
<tr>
<td>Soil Science 10 or 100</td>
<td>Soil Science 10 or 100</td>
<td>3-5</td>
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<tr>
<td>Environmental Horticulture 160 and 160L</td>
<td>Environmental Horticulture 160 and 160L</td>
<td>4</td>
</tr>
<tr>
<td>Environmental Science and Policy 155L</td>
<td>Select one of Environmental Horticulture 150, Environmental Science and Policy 155L</td>
<td>2-4</td>
</tr>
<tr>
<td>Landscape Architecture 180F, 180H, 180I, Plant Sciences 130, Wildlife, Fish, and Conservation Biology 155</td>
<td>Plant Sciences 101</td>
<td>1-3</td>
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</tbody>
</table>

Minor Adviser: T.P. Young (Plant Sciences)

Advising Center is located at 1224 Plant and Environmental Sciences 530-752-7738.

Latin

See Classics, on page 212.

Latin American and Hemispheric Studies

[College of Letters and Science]
Charles F. Walker, Ph.D., Program Director

Program Office, Hemispheric Institute on the Americas, 1277 Social Sciences and Humanities Building 530-752-3046

Committee in Charge
Jelmer Eerkes, Ph.D., Professor (Anthropology)
Liza Grandia, Ph.D., Associate Professor (Native American Studies)
Luis Guarnizo, Ph.D., Professor (Human and Community Development)
Efrin Hamilton, Ph.D., Assistant Professor (Sociology)
Robert Irwin, Ph.D., Professor (Spanish and Portuguese)
Robert Newcomb, Ph.D., Professor (Spanish and Portuguese)
Betina Ng’weno, Ph.D., Associate Professor (African American & African Studies)
Pablo Ortiz, Ph.D., Professor (Music)
Marc Schenker, Ph.D., Professor (Medicine & Public Health)
Charles Walter, Ph.D., Professor (History)

The minor in Latin American and Hemispheric Studies offers students the opportunity to explore connections throughout the Western Hemisphere from an array of perspectives across multiple academic fields.

The minor is made up of six courses, arranged in three tiers: Basic (one lower division course on the history of Latin America), Core (two introductory upper division courses chosen from a designated list of fields other than History); and Elective (three additional upper division courses from a designated list of courses that focus primarily on Latin American and/or Hemispheric issues). Students are strongly encouraged to develop proficiency in Spanish or Portuguese, either through coursework (such as completion of Spanish 24 or 33), or through life experience such as study abroad.

Minor Program Requirements:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Units</th>
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<tbody>
<tr>
<td>History 7A</td>
<td>Basic Courses</td>
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</tr>
<tr>
<td>History 7B</td>
<td>One course from: Latin American and Hemispheric Studies</td>
<td>4</td>
</tr>
<tr>
<td>History 7C</td>
<td>One course each from: History 7A, 7B, 7C Core courses</td>
<td>8</td>
</tr>
</tbody>
</table>

Minor Adviser: HIA program coordinator in 1277 Social Sciences and Humanities Building (530-752-3046) or Charles Walker in 1279 Social Science and Humanities Building (530-752-3046)

Law, School of

Kevin Johnson, J.D., Dean
Madhavi Sunder, J.D., Associate Dean; Academic Affairs
Hollis L. Kulwin, J.D., Senior Assistant Dean; Student Affairs
Kristen Mercado, J.D., Assistant Dean; Admissions and Financial Aid
Brett C. Burns, Senior Assistant Dean; Administration

Dean’s Office, 1011 Martin Luther King, Jr. Hall 530-752-0243; http://www.law.ucdavis.edu

Faculty
Afra Afsharipour, J.D., Professor
Karima Bennourou, J.D., M.A., Professor
Kelly Behe, J.D., Lecturer
Ashutosh Bhagwat, J.D., Professor
Mario Biagioli, M.F. A., M.A., Ph.D., Professor
Edward J. Imwinkelried, J.D., Professor
Anupam Chander, J.D., Professor
Andrea C. Chandrasekher, J.D., M.A., Ph.D., Acting Professor
Gabriel Chin, J.D., Professor
Holly S. Cooper, J.D., Lecturer
William Dodge, J.D., Professor
Christopher S. Elmendorf, J.D., Professor
Floyd F. Fenney, LL.B., Professor
Katherine Florey, M.F.A., Professor
Richard Frank, J.D., Professor
Lawrence Green, J.D., Lecturer
Angela Harris, M.A., J.D., Professor
Jasmine Harris, J.D., Professor
Robert W. Hillman, J.D., Professor
David Horton, J.D., Acting Professor
John Patrick Hunt, J.D., Acting Professor
Lisa Ikeno, J.D., Professor
Edward J. Imwinkelried, J.D., Professor
Elizabeth E. Joh, J.D., Professor
Margaret Z. Johns, J.D., Senior Lecturer

Fall 2011 and on Revised General Education (GE) AA=Arts and Humanities; SS=Science and Engineering; SS=Social Sciences; OL=Oral Skills; QL=Quantitative; SL=Scientific; VL=Visual; WC=World Cultures; WE=Writing Experience
Pre-Fall 2011 General Education (GE): ART=Arts and Humanities; SCI=Science and Engineering; SOC=Social Sciences; DOM=Domatic Diversity; WRT=Writing Experience Quarter Offered: F=Fall, W=Winter, S=Spring, Su=Summer; 2017-2018 offering in parenthesis
202. Contracts (5)
Discussion—5 hours. Examines sorts of promises that are enforced and the nature of protection given by promissory obligations in both commercial and non-commercial transactions. Inquiry is made into the means by which traditional doctrine adjusts or fails to keep up with changing social demands.

203. Civil Procedure (5)
Discussion—5 hours. A study of the fundamental and recurrent problems in civil actions including the methods used by federal and state courts to resolve civil disputes.

204. Torts (5)
Discussion—5 hours. Familiarizes students with legal rules, concepts and approaches pertinent to the recovery for personal injuries, property damages and harm done to intangible interests.

205. Constitutional Law I (4)
Discussion—4 hours. The principles, doctrines and controversies regarding the basic structure of and case law which defines, limit, and provide defenses to individual liability for the major criminal offenses.

206. Criminal Law (3)
Discussion—3 hours. Study of the bases and limits of criminal liability. Concepts of the constitutional, statutory, and case law rules which define, limit, and provide defenses to individual liability for the major criminal offenses.

207. Legal Research and Writing I (2)
Discussion/laboratory—2 hours. This fall semester course taught by Wydick Fellowship Program faculty is an integrated legal research and writing skills course. Basic legal research resources and strategies are introduced and practiced.

208. Legal Research and Writing II (2)
Discussion—2 hours. Focuses on persuasive writing and oral advocacy. Students will complete integrated research and writing assignments, including a complaint, a strategic defense office memorandum, a motion to dismiss in federal court, and an appellate brief, with oral arguments by all students.

Second and Third Year Courses
(c) Constitutional Law: 216A, 218, 240, 288, 288A
(e) Estate Planning: 214, 223, 221
(g) Family Law: 225, 242, 272, 435
(n) Legal Theories and Ethics: 220T, 237, 250, 258, 259, 284, 286C, 286D
(p) Procedure and Jurisdiction: 242, 246, 257, 275, 281, 283, 297
(s) Taxation: 214, 220, 220T, 247, 2478, 255, 271, 271A
(t) Clinical Programs—Externships: 425, 430, 445, 450, 455, 460, 470
(u) Clinical Programs—In-House Clinics: 420, 435, 440, 480, 485
(v) Individual and Group Study: 411, 411B, 416, 417, 418, 419, 495, 499

200A. Introduction to the Law of the United States
Discussion—2 hours. History and fundamental principles of the United States legal system. Important current legal issues, developments and trends. Required for LL.M. students who have not attended a U.S. law school. Fall semester only.

200BT. Introduction to US Legal Methods A (3)
Lecture/discussion—3 hours. Course is designed to provide background skills necessary to succeed in both law school and legal practice. Students gain an introductory working knowledge of the US legal method which includes learning various forms of legal writing and speaking.

207A. Legal Research (LLM) (1)
Discussion—1 hour. Restricted to L.L.M. students only. A description of the evolution and use of sources of law and secondary authority.

207B. Advanced Legal Research (2)
Seminar—2 hours. Restricted to 35 students. Will introduce students to advanced legal research tools and techniques used in practice, including efficient computer research techniques.

208A. Legal Research and Writing II (LLM) (2)
Discussion—2 hours. Persuasive writing and oral advocacy. LLM section students complete integrated research and writing assignments, including a complaint, a strategic defense office memorandum, a motion to dismiss in federal court, and an appellate brief, with oral arguments by all students.

209A. Patent Law (3)
Discussion—3 hours. Prerequisite: course 274 or consent of instructor. Covers all essential aspects of patent law: patentable subject matter, novelty, utility, nonobviousness, enablement, prosecution, infringement, and remedies.

209AT. Patent Prosecution and Practice (2)
Discussion—2 hours. Prerequisite: course 274 or consent of instructor. Essential aspects of patent prosecution: the role of the patent practitioner, claims and specification drafting, requirements, and strategy, appeals and post-grant proceedings, American Institute of Patentors’ organization, portfolio development and strategy, and litigation considerations.

209CT. Patentable Subject Matter: Genes, Methods, and Software (2)
Seminar—2 hours. Prerequisite: course 274, 209A. An in-depth look at recent cases and debates behind genetic patenting, software, biotechnology models, diagnostic methods, and others. Reviews the crucial and rapidly evolving field of patent law which affects some of the most important high-tech industries.
210T. Innovation and Technology Transfer Seminar (2)
Seminar—2 hours. Prerequisite: course 209A or 274, recommended but not required. Restricted to 15 students. From biomedicine to cleantech, public institutions are playing leading roles in developing cutting-edge technologies. Explores the law and policy of publicly-supported innovation and technology transfer.

210. Reforming the Police and Criminal Justice (2)
Seminar—2 hours. Focus on major current issues: policing in low-income neighborhoods; use of deadly force; modernizing the work of prosecutors and defense counsel. Class limit: 25 students.

210A. Policing Seminar (2)
Seminar—2 hours. Restricted to 10 students. What are the expectations and roles of the police in a democratic society? We need order maintenance and crime control, but to assume these tasks the police sometimes intrude upon interests considered fundamental to free societies.

210B. Sociology of Criminal Procedure (2)
Seminar—2 hours. Limited enrollment. What are the expectations and roles of the police in a democratic society? We need order maintenance and crime control, but to assume these tasks the police sometimes intrude upon interests considered fundamental to free societies.

210C. Sexual Assault and the Law (2)
Seminar—2 hours. Criminal law of sexual assault, traditional and modern offenses, and proposals for reform. Discussion of procedural developments, victim's counsel, evidentiary reform, and ADL. And the implications for civil law, tort liability, Title VI, Title IX, and civil liability of perpetrators.

210D. Wrongful Convictions (2)
Seminar—2 hours. Course will explore the magnitude and complexity of the wrongful convictions, their causes and remedies under existing law, and possible fixes (reforms). It will emphasize relevant legal rules (Criminal Procedure, Evidence, Post-Conviction Review).

211. Negotiations (2)
Discussion—2 hours. Limited enrollment. Skills course teaches theoretical and empirical approaches to negotiation strategy for the purposes of making deals and resolving disputes. Students participate in simulations to hone their negotiation skills, and write analytical papers.

211A. Advanced Negotiations Strategy and Client Counseling (3)
Discussion—3 hours. Prerequisite: consent of instructor. Application course; must apply and secure professor approval to enroll; will involve participating in discussions and a series of simulations; your classmates will be counting on you to actively participate and be well prepared for every simulation; do not apply to take this course unless you are willing and able to participate fully and can accept constructive feedback; if you anticipate missing more than two class sessions, do not apply to take this course. Understand the dynamics of interviewing and counseling process. Designed to be relevant to a broad spectrum of negotiation problems that are faced by legal professionals.

211BT. International Business Negotiations (3)
Laboratory/discussion—3 hours. Course is structured around a simulated negotiation exercise with students from a similar class at Stanford Law School. Students will experience the development of a business transaction over an extended negotiation in a context that replicates actual legal practice.

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 patient care.

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 explore the phenomenon of transnationality and how it affects the power of nationstates, acting alone or together, to prosecute certain crimes.

213T. Terrorism and International Law (2)
Seminar—2 hours. International terrorism remains a pressing concern. Devising effective remedies for responding to it within the bounds of the law is critical. Therefore, the new generation of international lawyers needs to be familiar with the relevant law and standards.

214. 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 associational 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. Provides a broad survey of the legal rules and concepts applicable to business associations, both public and closely held.

216A. Law and Religion (2)
Discussion—2 hours. Restricted to 20 students. Federal constitutional law relating to religion; the interpretation and application of the Free Exercise Clause and the Establishment Clause of the First Amendment.

217. Telecommunications Law (3)
Discussion—3 hours. Economic and administrative regulation of telephony, radio and television broadcasting, and communication satellites such as the Thuraya 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 regulation.

218. Constitutional Law II (4)
Discussion—4 hours. Not open to students who have completed course 218A or 218B. Principally covers the First Amendment and the Equal Protection Clause.

218A. Constitutional Law II—Equal Protection (2)
Discussion—2 hours. Students who have previously taken course 218, or who plan to take course 218 for 4 units in Spring 2011, may not take this course. Students enrolled in this course will be given priority registration spring semester 2011 to enroll in course 218B. Focuses on the Equal Protection Clause of the Fourteenth Amendment.

218B. Constitutional Law II—First Amendment (2)
Discussion—2 hours. Students who have previously taken course 218 or who plan to take course 218 for 4 units in Spring 2011 may not take this course. Students not required to take course 218A in order to take this course. Principally covers the free speech clause of the First Amendment.

218D. Constitutional Theory Seminar (2)
Seminar—2 hours. Provides students with a broad understanding of the shape of modern constitutional theory, and the ability to understand the implications of that theory for concrete historical and modern constitutional disputes.

218T. California Constitutional Law (2)
Discussion—2 hours. Reviews, interpretive meta-rules for constitutional construction, structure and institutions at state government, civil liberties under the Declaration of Rights, the impact of race in California society, and criminal law.

218T. Selected Topics in Constitutional Law (2)
Seminar—2 hours. Examines two core themes of Constitutional Law I and Federal Jurisdiction: federalism and separation of powers. Concentrates on habeas corpus and the Eleventh Amendment as vehicles for examining the constitutional themes in greater depth.

218TA. Separation of Powers (2)
Discussion—2 hours. Study of the separation of powers in our federal government by focusing on certain historical events and their impact on constitutional law.

218B. War of Law (3)
Discussion—3 hours. Surveys the law of armed conflict as it applies to today’s battlefields.

219. Evidence (4)
Discussion—4 hours. Covers rules regarding the admissibility of testimonial and physical evidence, 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 evidentiary rules.

219A. Advanced Evidence (3)
Discussion—3 hours. Prerequisite: course 219. Limited to six students; selected by professor. Interested students complete an application form; available in the Law Registrar’s Office. Credit is contingent upon attending all classes and participating in all exercises. Participation is crucial to the success of the course, as students will be working in teams of three. Do not take this course unless you are willing and able to participate fully and can accept criticism.

Public interest lawyers often spend much time in the courtroom. Prosecution, defense, and legal aid offices usually do not have resources to train lawyers in trial work. Seeks to help remedy this deficiency by helping develop witness interrogation skills. (S/U grading only)

220. Federal Income Taxation (4)
Discussion—3 hours. Surveys the federal income tax system, with consideration of the nature of income, when and to whom income is taxable, exclusions from the tax base, deductions and credits, and tax consequences of property ownership and disposition.

220A. Federal Income Taxation (3)
Discussion—3 hours. Surveys the federal income tax system, with consideration of the nature of income, when and to whom income is taxable, exclusions from the tax base, deductions and credits, and tax consequences of property ownership and disposition.

220B. Tax and Distributive Justice (3)
Discussion—3 hours. Advanced tax course designed to introduce students to issues of tax policy, with particular emphasis on tax distribution (i.e., who or what should pay taxes in society) and tax incidence (i.e., who or what pays the tax and who receives the tax benefits (taxpayers)).

220BT. Law of Banking and Financial Institutions (2)
Discussion—2 hours. Guide to dual regulatory system, and an understanding of banks and other financial institutions, such as thrifts, credit unions, industrial banks, finance companies, and money transmitters, as well as large versus community banks.

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 taxation, gains and losses from property transactions, the timing of income and deductions, and the impact of people subject to tax on particular items of income.

220T. State and Local Taxation (3) Discussion—3 hours. Introduction to fundamentals of state and local taxation. Beginning with historical and constitutional principles, students will analyze recent developments in state and local taxation and their impact on client representation.

221. Trusts, Wills and Decedents’ Estates (3) Discussion—3 hours. Study of the law of decedent’s estates with particular focus on wills and trusts. Students will follow an estate planning client and draft actual estate plan documents. A series of related topics will be explored.

222. Critical Race Theory Seminar (3) Discussion—2 hours. Prerequisite: 211. Course 221 Limited enrollment. Seminar provides a critical perspective of the legal and social principles affecting African Americans and other minorities in the legal system. Topics covered include the intersection of race, gender, class, and other identities in the law.

222A. 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, and the intersection of multicultural and transnational identity issues, affirmative action, and civil rights.

222T. Property Law & Race (2) Seminar—2 hours. Seminar explores the extent to which property law (common law, federal, state, and local statutes, and administrative regulations) historically and currently shapes conceptions of race, racial groups, and racial relations.

233. Asylum and Refugee Law (2) Seminar—2 hours. Course surveys U.S. and international law concerning refugees and asylum-seekers. This class will question the meaning of persecution, the definition of “particular social groups” in U.S. law, protections for gender-related violence, statutes concerning women and asylum, and U.S. foreign policy.

235. Administrative Law (3) Discussion—3 hours. Explores the role of government agencies and their relationship with constitutional and statutory law. Topics covered include administrative agencies, rule-making, and enforcement of the securities acts.

236. Securities Regulations (2) Discussion—3 hours. Prerequisite: course 215. Covers the regulation of securities, both federal and state, and their impact on the economy.

237. Legal History (2) Discussion—2 hours. Traces the development of common law from its origins in medieval England through the twentieth century.

238. Special Topics in Legal Theory: Ancient Athenian Law (2) Seminar—2 hours. Observes the extent to which the law of ancient Athens was different from our own and was far less formal. How did it work? Why did it work? Why have political and legal theorists misunderstood Athens for so long and what can we learn from that failure?

239. Representing Clients in Mediation (3) Discussion/laboratory—3 hours. Restricted to 24 students. Interactive course focuses on the skills of mediation and communication.

240. Elections and Political Campaigns (2) Discussion—2 hours. Limited enrollment. Covers selected constitutional and statutory aspects of federal and state elections, including campaign finance, initiatives, and other topical issues.

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 law and constitutional law has developed in the United States.

241T. Voting Rights Seminar (2) Seminar—2 hours. Seminar addresses current issues in the protection of voting rights, particularly the voting rights of racial and ethnic minorities.

242. Conflict of Laws (2) Discussion—2 hours. Study of how law operates across national and international borders. Topics include choice of applicable law in transactions involving multiple jurisdictions, recognition of judgments, and the exercise of jurisdiction.

242S. Special Session Conflict of Laws (2) Discussion—2 hours. Study of transactions with multiple 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 (or 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.

243A. Secured Transactions (3)
Discussion—3 hours. Secured transactions are transactions where a lender takes an interest in debtor’s property as “collateral,” or security, for repayment of a loan. Covers secured transactions in personal property such as auto and bank loans against business inventory.

243CT. Advanced Bankruptcy Practice (2)
Discussion—2 hours. Course will cover corporate chapter 11 and its alternatives and analyze different professionals’ roles. Selection of venue and formation of strategic objectives will also be discussed.

245. Corporate and White Collar Crime (3)
Discussion—3 hours. The law of conspiracy, corporate ownership and control, new trends in white-collar crime, money laundering, and other business and environmental crimes and associated defenses.

245B. Death Penalty Seminar (2)
Seminar—2 hours. Limited enrollment. Offers overview of the constitutional law governing the death penalty in the United States.

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 (2)
Discussion—2 hours. Prerequisite: course 220. Study of the federal income tax treatment of partnerships and partners; including entities classified as partnerships.

247A. International Aspects of U.S. Taxation (3)
Discussion—3 hours. Prerequisite: course 220. Completion or current enrollment in a course covering the domestic taxation of corporations is suggested but not required. Corporate tax may be taken concurrently. Examine the U.S. income tax laws and policies related to the taxation of foreign income of U.S. persons and U.S. income of foreign person.

247B. Corporate Tax (2)
Discussion/laboratory—2 hours. Examination of the federal income tax relationship between corporations and their owners. Covers the transfer of funds into a corporation on formation and the re-transfer of money and property from the corporation to its shareholders.

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. Limited enrollment. Review concepts in international law, conflicts of law, cyberspace, and federal jurisdiction to address the growing multi-jurisdictional conflicts created by the Internet. Examine European efforts at crafting intra-Europe jurisdictional rules, as well as other international jurisdiction treaty projects such as those at the Hague.

248B. International Human Rights (3)
Discussion—3 hours. Discusses modern human rights as legal rights as a system through an examination of its historical origins and precursors and a review of its international legal backdrop, including the character and scope of international law, the UN Charter and the UN System.

248BT. Human Rights in the Former Soviet Union: Legal Tools for Repression and Redress: Peace法学 Seminar—2 hours. This course first provides a historical context for the current political and human rights situation in the Former Soviet Union. It then analyzes the legal mechanisms and strategies that some of the Former Soviet Union’s countries and governments employ to repress their own citizens. Finally, the class examines the ways in which citizens use the law to seek relief from remedies for the repression of their rights.

248CT. United Nations Human Rights Practicum (3)
Discussion—3 hours. Students will engage in intensive research and writing in the field of international human rights, the workings of the United Nations human rights system, and gain experience working with UN documents, individual cases in the field and with theoretical reports.

248ET. Transitional Justice and Memory Politics in the Asia-Pacific (2)
Seminar—2 hours. Transitional justice (legacies responses to wrongdoings of repressive predecessor regimes) can help resolve “memory questions” that plague the relations and societies in many Asia-Pacific states. Together we will examine relevant roles of governments, novel institutions, the judiciary, and civil society.

248D. Globalization and the Law (3)
Discussion—3 hours. Globalization of people, finance, goods, services, and information puts pressure on the nation-state form. In a world of diasporas and multinational corporations, what does citizenship mean? In the absence of a world government, can we grapple with problems that now take on a global form? We will canvass a number of different approaches, including the technocratic coordination of the Basel Accord on capital adequacy; the World Trade Organization regime universalizing substantive legal standards related to intellectual property; the Internet governance regime offered by ICANN, a California not-for-profit corporation; private and state-based efforts to support global health financing; and the Kyoto Protocol’s cap-and-trade system for responding to climate change.

248G. Legal Spanish for Lawyers (2)
Seminar—2 hours. Prerequisite: must satisfy one of the following: undergraduate degree in Spanish; a minor in Spanish with experience living in a Spanish-speaking household and achieving proficiency; or passing an exam. Designed for law students who are native Spanish-speakers or who have achieved proficiency in Spanish through study or experiences in a Spanish-speaking country.

248T. Advanced International Law (2)
Discussion—2 hours. Review books of international law; Hugo Grotius and Judge Rosalyn Higgins. Themes include peaceful resolutions of disputes, law of war and peace, and international legal process.

248TA. Human Rights in Post Soviet Central Asia: Legal Tools For Repression and Redress (2)
Discussion—2 hours. Limited enrollment. Provides a historical context for the current political and human rights situation in Central Asia.

248TC. International Economics Law (3)
Discussion—3 hours. This course will examine the architecture of international economic system, with a focus on both trade and investment.

248TT. Theories of International Law (2)
Discussion—2 hours. International law, once critiqued as powerless and ineffective, is now challenged as a robust tool to resolve the various forms of international legal liability, including natural law, positivism, realism, liberalism, constructivism, fairness, legal process, and world public order.

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 major legal systems. We will also consider issues of extraterritoriality, the rejection of the European Convention on Human Rights, the workings of the United Nations human rights system, and gain experience working with UN documents, individual cases in the field and with theoretical reports.

249A. Aoki Legal Scholarship Seminar (3)
Seminar—3 hours. Course is for students participating in the Aoki Center for Race and Nation Studies’ Immigration Law Journal. Students will research, and write a note on a topic related to immigration. The expectation is production of papers of publishable quality.

249B. Writing Requirement Workshop (2)
Seminar—2 hours. Students who have written a course paper or an independent study paper and would like to take papers to the next level, producing a work of publishable quality. (SU grading only.) GE credit: WE

250. Asian American Jurisprudence (3)
Discussion—3 hours. Legal, social, and political discussion of 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.

251T. Labor Law I (2)
Discussion—2 hours. Restricted to students who previously took Labor Law in Fall 2008 may not enroll in Labor Law I. Survey of the legislative, administrative, and judicial regulation of labor relations under federal law.

251B. Labor Law II (2)
Discussion—2 hours. Prerequisite: course 251T preferred; not required. Survey of the legislative, administrative, and judicial regulation of labor relations under federal law.

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 transactions and disputes that cut across national boundaries.
254. Housing Law (2)
Discussion—2 hours. Survey course covers legal and policy issues related to developing, preserving and protecting affordable, safe and accessible housing and sustaining viable, diverse communities.

254A. Law and Rural Livelihoods Seminar (3)
Seminar—3 hours. Provides broad overview of law as it relates and applies to rural people and places.

254T. Practicum in Rural Community Advocacy (3)
Seminar—3 hours. Limited enrollment. Provides an opportunity to learn about Participatory Action Research (PAR) methods and community-based lawyering in the context of rural community development and advocacy. Using these skills and knowledge to serve rural Californians.

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 other litigation issues. 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 planning, regulation, and related issues 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 procedure; the legislature as an institution; lobbying; statutory interpretation, legislative-executive relations; and the legislature's constitutional powers and limitations.

257A. Legislative Internship Seminar (2)
Seminar—2 hours. Theories and principles of statutory and constitutional interpretation. Original intent vs. living constitution; permissible kinds of evidence for determining legislative intent; canons of construction; external and contextual sources should be interpreted similarly to legislative enactments.

257B. Statutory Interpretation (3)
Discussion—3 hours. Elective course for Environmen

258. Professional Responsibility (2)
Discussion—2 hours. The American Bar Associa
tion's Model Rules of Professional Conduct and the Code of Judicial Conduct, which are tested on the Multistate Professional Responsibility Exami
nation, and the California Rules of Professional Conduct, which are tested on the California Bar Examination. Issues affecting the legal profession, including lawyers' ethical duties and responsibilities to clients, the courts, third parties, and the legal system.

258A. Legal Ethics and Corporate Practice (3)
Discussion—3 hours. Focus on corporate practice to explore the ethical responsibilities of lawyers.

258BT. Mindfulness and Professional Identity (2)
Seminar—2 hours. Introduction to the practice of meditation and connect it with readings about the legal profession in three key areas.

258DT. Setting Up and Maintaining Solo Law Practice (1)
Lecture/discussion—1 hour. Introduction/overview of how to start a successful solo practice.

258ET. Utility of Law School and Careers in the Law (1)
Discussion—1 hour. Despite improvements in the economy, some observers continue to question whether law school is a viable option for college graduates. The class will consider the controversy and expose students to legal careers in the legal profession. (S/U grading only.)

259. Feminist Legal Theory (3)
Discussion—3 hours. Provides an overview of femi
nist 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 communities in the context of current scholarly and political debates about fundamentalism, democracy, equality, secularism, universalism, and multiculturalism. This is a limited enrollment sem
inar.

259B. Women’s Human Rights (2)
Seminar—2 hours. Overview of international legal and institutional system for the protection of women’s human rights from an academic perspective and the view of the practitioner. Includes the (CEDAW), violence against women, reproductive rights, economic rights, and more.

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 stu
dents the opportunity to consider how feminist theory may be used to inform law-making.

260. Employment Discrimination (3)
Discussion—3 hours. Examine federal laws prohibit
ing employment discrimination including Title VII of the Civil Rights Act of 1964, the Equal Pay Act, the Age Discrimination in Employment Act, the Ameri

260A. Employment Law (3)
Discussion—3 hours. Provides an overview of employment law, labor law and employment discrimi
nation law and aims to serve as a foundation for understanding related law and policy (statutory and common law) that surround the employer-employee relationship.

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 jus
tice, ethical issues, decision making, bias, and criti
cal examination of the strengths and weaknesses in our current judicial system.

262. Antitrust (3)
Discussion—3 hours. Focus of the course is the fed
eral antitrust laws, concentrating on basic substan
tive areas of the Sherman and Clayton Acts.

262AT. US Antitrust Law and Indian Competition Law: A Comparative Perspective (2)
Lecture/discussion—2 hours. Fundamentals of Indian Competition Law and US Antitrust Law in a comparative perspective. This course will help Ameri
can students, interested in future corporate law careers, to develop effective strategies for better managing cross border deals in India.

262S. 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.

262T. Regulated Industries (2)
Discussion—2 hours. Examines regulation of busi
ness in sectors, traditionally described as “common carrier” and “utility” industries, where because of the market failures normal competitive mechanism will not protect consumers from exercises of market power.

263A. Trial Practice I (3)
Discussion—2 hours; laboratory—1 hour. Prerequi
site: course 219, may be taken concurrently. Limited enrollment. Introduction to the preparation and trial of cases, featuring lectures, videotapes, demonstrations, assigned readings and forensic drills. Labora
tory held on Tuesday, Wednesday, and Thursday evening.

264. Water Law (3)
Discussion—3 hours. Properties of right in surface waters, including riparian rights, prior appropria
tion, and public rights of use water bodies; environ
mental constraints on development; groundwater rights and management; federal alloca
tion and control of water resources; legal aspects of interstate allocation.

264A. Ocean and Coastal Law (3)
Discussion—3 hours. Introduction to the goals and challenges of coastal and ocean policy, the compli
cated web of public and private interests in coastal lands and ocean waters; regulation of coastal devel
opment, property and international fisheries man
agement; and preservation of ocean resources.

265. Natural Resources Law Seminar (2)
Seminar—2 hours. Prerequisite: course 225 or 256 recommended, but not required. Limited enrollment. In-depth coverage of two foundational principles of natural resources law: public trust doctrine and pri
vate property rights protected under the Takings Clause of the U.S. and many state constitutions.

266A. Cyberlaw (2)
Discussion—2 hours. Emerging legal issues crucial to the conduct of business in cyberspace. Discussion of the evolution and current administration of the Internet and the World Wide Web.

267. Civil Rights Law (3)
Discussion—4 hours. Civil rights for remedies violations under the primary United States civil rights statutes. Specifically, covers actions for constitutional and statutory violations under 42 USC §1983, affir
mative defenses, and abstention doctrines.

267B. Civil Rights Seminar (2)
Seminar—2 hours. Limited enrollment. 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 Commissions on Civil Rights is a bipartisan, independent agency established by the Civil Rights Act. It is directed to investigate complaints alleging depri
vations 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 Presi
dent and to Congress. The role that the USCCR has played and continues to play in America’s legislative, political, and legal framework, and the national and international policies on equality, fairness and justice in the context of civil and human rights. Satisfies Advanced Legal Writing Requirement.

267T. Suing the Government: Civil Rights, Torts, Takings, and More (2)
Discussion—2 hours. Explores the basic require
ments of suing government, including sovereign immunity, particular schemes for litigating against government (Federal Tort Claims Act, APA, False Claims Act, etc.), direct constitutional claims and the procedural pitfalls and remedies available against government.

269A. Basic Finance for Lawyers (2)
Discussion—2 hours. Prerequisite: students with a non-law basic finance course will not be admitted, except with consent of instructor. Basic techniques of analysis that are part of the core curriculum in a good business school, as well as material necessary for understanding and advising your clients and for understanding other business-related law school courses.
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 in a good business school are studied. Purpose is to give you background necessary for understanding business clients and for understanding other business-related law courses.

269AT. The Financial Crisis: Law & Policy and Inequality (2)
Seminar—2 hours. Examines the regulation of financial intermediaries. The stated goal of regulation is to enhance systemic stability and to protect consumer protection. We will ask whether there is an imbalance between systemic stability and consumer protection before the crisis of 2008.

269C. Corporate Finance (3)
Discussion—3 hours. Prerequisite: course 215 or concurrent enrollment recommended. Focus on how corporations raise money, stocks and bonds, etc.; how deals are structured and why corporations use one strategy instead of another.

269D. Seminar on Financial Regulation (2)
Seminar—2 hours. Introduction to the legal and regulatory issues presented by contemporary capital markets.

269E. Public Finance: Theory and Practice (2)
Seminar—2 hours. Students will be introduced to the basic concepts of public finance, the underlying law governing public finance: in particular state law, federal law and federal securities law.

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.

270A. Life-Cycle Transactions and Drafting (3)
Discussion—3 hours. Class focuses on analysis of contract drafting design for various types of transactions and actual transactional documents typically encountered.

270C. Special Session International Business Transactions (2)
Discussion—2 hours. A consideration of 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.

271. Nonprofit Organizations and Drafting (3)
Discussion—4 hours. Prerequisite: course 215 or consent of instructor. Restricted to 13 students. Legal rules and concepts applicable to nonprofit organizations.

271A. Nonprofit Organizations: State and Local Governance Issues (2)
Discussion—2 hours. Prerequisite: course 215 (may be taken concurrently) or consent of instructor. State and local laws applicable to nonprofit organizations. Course content covers internal and external legal structures, charitable trust operation and governance, dissolution, fiduciary obligations of trustees and officers and directors, management and investment obligations vis-a-vis trust assets, cy pres, rights of members of social clubs, trade associations and labor unions, enforcement of obligations and rights by the attorney general and others, and regulation of charitable solicitation. Topics may include local property tax and other tax exemptions, nonprofit accounting issues public/private partnerships and Federal antitrust and constitutional constraints.

271B. Nonprofit Organizations: Tax Exemptions and Taxation Focus (2)
Discussion—2 hours. Prerequisite: course 215 or consent of instructor. Course 220 recommended. Conceptual basis and substantive law criteria for the federal and state income tax exemption of nonprofit organizations. Different circumstances and activities which will result in income taxation or financial sanction, including qualifications for exempt status, the nondistribution constraint, the inurement and private benefit concepts, limitations on campaign activities, permissible lobbying expenditures, the unrelated business income tax, the deduction for charitable contributions, intermediate sanctions, the differences between private foundations and public charities, special excise taxes, the exemption application process and reporting and disclosure requirements. Topics may include non-profit accounting issues, local property tax and other local tax exemptions, and public/private partnerships.

271T. Nonprofit Organizations-Key Legal Topics (2)
Discussion—2 hours. Legal issues raised in operating and governing a nonprofit organization, primarily a public charity.

272. Family Law (3)
Discussion—3 hours. An introduction to the legal regulation of family and personal relationships.

273A. Education Policy and the Law (3)
Discussion—3 hours. Topics include civil rights, inequality and the “right” to an education, bilingual education, school finance litigation, educational access, No Child Left Behind Act, Common Core Standards and charter schools. For students interested in educational policy and social regulatory policy.

274. Intellectual Property (3)
Discussion—3 hours. Provides a broad survey of intellectual property concepts and current case law developments in the areas of copyright and patents for a broad set of individuals.

274A. International Intellectual Property (2)
Discussion—2 hours. In September 2007, the World Intellectual Property Organization adopted a development agenda that body’s mandate, placing the concerns of the poor at the center of international intellectual property law and policy.

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 trademarks, patents, trade secrets, idea protection, unfair competition, and copyright.

274BT. Law of Trade Secrets and Restrictive Covenants (2)
Discussion—2 hours. Focus is on the law of trade secrets, including the Uniform Trade Secret Act (UTSA), restrictive covenants not to compete, and current case law developments in the areas of employee mobility and raids, and corporate espionage.

274CT. Knowledge Commons, Collaborative Authorship, Open Access (2)
Seminar—2 hours. Focuses on the increasingly global diffusion and success of collaborative forms of cultural and technoscience production rooted in copyright-based licenses.

274D. Intellectual Property in Historical Context and Case Studies (2)
Seminar—2 hours. How the legal system has adapted to earlier periods of rapid change by creating, delimiting, and expanding intellectual property rights (IPRs). Required paper satisfies advanced writing requirement.

274ET. Intellectual Property, Human Rights & Social Justice (2)
Seminar—2 hours. Course will examine the implications of copyright and patents for a broad set of social justice values, with particular emphasis on the interaction between intellectual property law and human rights law on the global stage.

274FT. Censorship in the Global Age (2)
Seminar—2 hours. Course examines from a globalized perspective a broad range of censorship issues, drawing from established cases and practices. This seminar attempts to identify a globally consistent set of theories that have gained traction in relevant regional or international debates.

274G. Race, National Identity and Intellectual Properties (2)
Seminar—2 hours. Drawing upon methods taken from critical race theory, critical/cultural studies, and rhetoric this course addresses the relationships between intellectual property and processes racial/national identity formation in the US, particularly as exemplified in legal, popular cultural, and political texts.

274T. Theory and History of Intellectual Property (2)
Seminar—2 hours. Seminar traces development of intellectual property law in the U.S. and Europe because it is not possible to understand the logic and shape of current Intellectual Property concepts outside of their messy history.

275. Complex Litigation (2)
Discussion—2 hours. Issues that frequently arise in large complex litigation involving multiple parties and multiple claims.

275A. Intellectual Property Agreement Drafting for Biotech & Pharma
Seminar—2 hours. Prerequisite: upper-division Business Law course or Intellectual Property course;.priority given to students that have completed course 274. Covers the negotiation and drafting of intellectual property agreements common in the biotechnological and pharmaceutical arena.

276. Juvenile Justice Seminar (2)
Seminar—2 hours. Legal and philosophical bases of a separate juvenile justice process for crimes committed by minors; police investigation, apprehension, and diversion; probation intake and detention; juvenile court hearing and disposition; juvenile corrections. The role of counsel at each phase of the process is examined.

277. Native American Law (3)
Discussion—3 hours. Seminar focuses on legal relations between Native American tribes and the federal and state governments.

277T. Indian Gaming Law Seminar (2)
Seminar—2 hours. Examines unique historical, political and legal context in which Indian tribes operate casinos, including impacts on tribal sovereignty, relations between tribes, states and local governments and changing relationships among the tribes themselves members, with particular reference to experience of California.

278. Pretrial Skills (2)
Discussion—2 hours. Limited enrollment. This course uses role-playing exercises, videotaped simulations, and related projects to introduce students to lawyering skills basic to the practice of law, including client interviewing, witness interviewing and discovery, including depositions.

279. Public Sector Labor Law (2)
Seminar—2 hours. Limited enrollment. Prerequisite: course 215 or consent of instructor. Application of private sector labor law doctrines to the public sector. Emphasis on the four California public sector statutes and the impact of constitutional law on public employees. Class presentation and seminar paper required. Satisfies advanced writing requirement.

280. Advanced Legal Writing: Analytical & Persuasive Writing (2)
Seminar—2 hours. Prerequisite: consent of instructor. Develop essay writing skills and performance test drafting typically employed on the bar examination. (S/U grading only.)

280AT. Legal Analysis (2)
Discussion—2 hours. Selected enrollment by permission of professor; 2L's only. Focuses on skills critical to law school success, and ultimately, bar exam success. (S/U grading only.)
293T. Public Interest Lawyering, Civil Rights and Employment Law (2)
Seminar—2 hours. Prerequisite: course 260, 260AT. Advanced course covers employment law issues through the lens of public interest lawyers and their constituencies.

294A. Law and Popular Culture (2)
Seminar—2 hours. This course examines works of popular culture, films, and legal texts. 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.

295A. Trademark and Unfair Competition Law (2)
Discussion—2 hours. Prerequisite: course 274 recommended, not required. 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.

295T. Brands and Trademarks (2)
Seminar—2 hours. Explores the challenges brands pose to traditional trademark law. Taking a close, interdisciplinary look at branding: from the business school to the entertainment industry. Focus on management to semantic analyses of brand meaning to art criticism of brand advertisements.

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.

296T. Entertainment Law (2)
Discussion—2 hours. Explores the many facets of Entertainment Law.

297. Alternative Dispute Resolution (3)
Discussion—3 hours. Limited enrollment. Introduces students to a wide variety of alternative dispute resolution procedures, with an emphasis on negotiation, mediation, and arbitration.

297A. Federal Arbitration Act Seminar (2)
Seminar—2 hours. Trace the development of commercial arbitration law, with a special emphasis on horn button contemporary issues like consumer and employment arbitration, the separability doctrine, preemption of state law, and the arbitrability of statutory claims.

297B. International Commercial Arbitration (3)

298. Sociology of the Legal Profession Seminar (2)
Seminar—2 hours. Limited enrollment. Comprehensive look at the organization, operation, and ideology of the legal profession.

400A. Study Abroad—University College Dublin, Ireland (13)
Independent study. Students must apply and be accepted into the International Study Abroad Program. Semester away study abroad at the University College Dublin, Ireland. Enhance knowledge of international legal regimes and obtain a global legal educational experience. (S/U grading only.)

400B. Study Abroad—University of Cophagen, Denmark (12)
Independent study. Students must apply and be accepted into the International Study Abroad Program. Semester study abroad at the University of Cophagen, Denmark. Enhance knowledge of international legal regimes and obtain a global legal educational experience. (S/U grading only.)

400C. Study Abroad—China University of Political Science and Law (12)
Independent study. Students must apply and be accepted into the International Study Abroad Program. Semester away study abroad at the China University of Political Science and Law. Enhance knowledge of international legal regimes and obtain a global legal educational experience.

400D. Study Abroad—University of Lausanne, Switzerland (12)
Independent study. Student must apply and be accepted into the International Study Abroad Program. Seminar at the University of Lausanne, Switzerland. Enhance knowledge of international legal regimes and obtain a global legal educational experience. (S/U grading only)

400S. Critical Topics in Environmental Law in a Comparative Perspective (2)
Seminar—2 hours. Enrollment by application only. Intensive, two-week program provides an opportunity for U.S. and international law students to study environmental law by examining and comparing European Union and U.S. environmental law policies and regulatory regimes. (S/U grading only)

408. Community Education Seminar (3)
Seminar/clinic—3 hours. Limited enrollment. Trains students to educate the community about basic legal rights and responsibilities. Students attend an initial four-hour orientation, followed by weekly seminars that will prepare students to teach in a local high school at least once a week. Paper or journal required, to be determined by instructor. (S/U grading only.)

409. Environmental Law Moot Court Competition
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. Appellate Advocacy I (2)
Discussion/labatory. Limited enrollment. Basic appellate practice and procedure. Beginning instruction in oral advocacy skills and an opportunity to practice these skills in front of a moot court. (S/U grading only.)

410B. Appellate Advocacy II (Moot Court) (2)
Practice—2 hours. Limited enrollment. Continuation of course 410A. Focuses on the development of effective appellate brief writing skills and the refinement of oral advocacy skills. (S/U grading only.)

411. Journal of International Law and Policy (1-2)
The Journal is a biannual journal produced by King Hall Negotiations Board. Members are nominated by their individual Trial Practice I adjuncts. The writing of a law review article under the editorial supervision of editors of the Journal is required. Office hours (including but not limited to Bluebooking and cite-checking) are required. 1 or 2 units, maximum 3 total units. In the spring semester, credit is obtained only upon achieving status as a member of the Journal. Credit required. May satisfy advanced legal writing requirement. (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 accepts papers on a spectrum of issues that fall within the intersection of business and the law. May be repeated twice for credit. (S/U grading only)

412. Carr Intracase Trial Advocacy Competition (1)
Lecture. Limited enrollment. Named after the late Justice Frances Carr, this competition is open to second- and third-year students. A preliminary round is followed by a quarter-finals and a final round. Students participate in mock trials presided over by judges and critiqued by experienced litigators. (S/U grading only)

413. Interschool Competition (1-3)
Prerequisite: consent of appropriate faculty adviser. Participation in interschool moot court and lawyer- ing skills competitions. Enrollment is limited to stu- dentsw actually representing the School in the interschool competitions. Competition must be author- ized by the appropriate faculty adviser. The faculty adviser may condition the award of academic credit for any particular competition on the performance of such additional work as the faculty adviser may determine to justify the credit. May satisfy advanced legal writing requirement. (S/U grading only)

414. Moot Court Board (1)
Prerequisite: courses 410A-410B. Limited enrollment. Members of the Moot Court Board may receive one credit for each semester of service on the board, up to a maximum of two. Credit awarded only after certification by Moot Court Board and approval of the faculty advisers to Moot Court Board. (S/U grading only)

414A. Negotiations Board (1)
Variable—1 hour. Prerequisite: consent of instructor. Members of the King Hall Negotiations Board assist in the administration of the King Hall Negotiation Team by performing a variety of tasks under the supervision of the course instructor. One unit of credit for each semester of service on the board, up to a maximum of two units per academic year. Credit is awarded only after approval by the instruc- tor. (P/NP grading only)

415. Trial Practice Honors Board (1)
Members of the Trial Practice Honors Board adminis- ter the Frances Carr competition. Members are nom- inated by their individual Trial Practice I adjuncts. Students receive one credit for serving on the Board, awarded upon approval of the faculty adviser. (S/U grading only)

416. Law Review Writer (1-3)
The writing of a law review article under the editor- ship or supervision of editors of the UC Davis Law Review. Office hours (including but not limited to Bluebooking and cite-checking) are required. 1 or 2 units, maximum 3 total units. In the spring semester, credit is obtained only upon achieving status as a member of the UC Davis Law Review, which requires that the student has made substantial progress towards completing an editorial article. Credit is awarded only after certification by the editor in chief and approval of the faculty advisers. One unit of credit is earned the first two units are earned the second semester upon nomination and acceptance of nomination to the Editorial Board. One unit is earned second semester if only a member- ship draft and office papers are completed. May be repeated for credit. (S/U grading only)

417A. Law Review Editor (1-2)
Prerequisite: consent of instructor. Editors must have completed an editorial article and must perform editorial duties (a substantial commitment). Credit is awarded only after completion of both semesters. (S/U grading only; deferred grading only, pending completion of sequence)

417B. Law Review Editor (1-2)
Prerequisite: consent of instructor. Editors must have completed an editorial article and must perform editorial duties (a substantial time commitment).
406. Immigration Law Clinic (4)
Clinical Activity—4 hours. Prerequisite: prior or concurrent enrollment in course 292; consent of instructor. Each student is required to enroll for two semesters, receiving four units each semester for a total of eight units. Provides legal representation to indigent non-citizens in removal proceedings before U.S. Immigration Courts, the Board of Immigration Appeals, and federal courts, including the Ninth Circuit Court of Appeals. (Deferred grading only, pending completion of sequence.)

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 office of a legislator 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 contracted with their interpretation and enforcement. Journals are required. (S/U grading only.)

450. Environmental Law Externship (2-6)
Clinical activity—2-6 hours. Prerequisite: course 285 or consent of instructor. Practical experience in environmental law. Students will work in an approved government, nonprofit 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.

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 two 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 practicum requirement for the Public Interest Law Program. (S/U grading only.)

465. Intellectual Property Externship (2-6)
Clinical activity. Prerequisite: course 293 and Comparative Public Services recommended. Opportunity to work for government, academic, and nonprofit entities. (S/U grading only.)

470. Administration of Criminal Justice Externship (2-12)
Clinical activity—2-12 hours. Prerequisite: completion of, or concurrent enrollment, in courses 219 and 227, course 263A recommended. Limited enrollment. 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 exempt: observation, interviewing, research, counseling, motion practice, and trials under State Bar rules. May be repeated up to 12 units of credit. (S/U grading only.)

475. Washington UC-DC Law Program (10)
Clinical activity—10 hours. Open to 2L and 3L students. Uniquely collaborative externship program in Washington, D.C., combining academic with full-time field placement offering students an unparalleled opportunity to learn how federal statutes, regulations, and policies are made, changed, and understood in the nation’s capital. (S/U grading only.)
499S. Special 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 project 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.

499SA. 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 project 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.

Linguistics

(College of Letters and Science)
Vaidhee Ramanathan, Ph.D., Chairperson of the Department

Faculty
Raul Ararovich, Ph.D., Associate Professor
Santiago Barreda, Ph.D., Assistant Professor
Robert J. Bayley, Ph.D., Professor
David Corina, Ph.D., Professor
Patrick Farrell, Ph.D., Assistant Professor
John A. Hawkins, Ph.D., Professor
Julia Menard-Warwick, Ph.D., Associate Professor
Almerindo E. Ojeda, Ph.D., Professor
Vaidhee Ramanathan, Ph.D., Assistant Professor

Emeriti Faculty
Wilbur A. Brenner, Ph.D., Professor Emeritus
Maria I. Manolli, Ph.D., Professor Emerita
David L. Olmsted, Ph.D., Professor Emeritus
Marcia Schleppregg, Ph.D., Professor Emerita
Gwendolyn Schwabe, M.A., Senior Lecturer Emerita
Maximo Torreblanca, Ph.D., Professor Emeritus
Lenora A. Timm, Ph.D., Professor Emerita

Affiliated Faculty
James L. Davis, M.A., Lecturer
Janet Lane, M.A., 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 pedagogy; 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 of these 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:

Preparatory Subject Matter ................. 4-24
Linguistics 1 ......................................... 4
Foreign language, one course beyond the 15-unit requirement of the College of Letters and Science in the same language used to fulfill the core requirement.......... 0-20

Depth Subject Matter ......................... 44
Linguistics 103A, 103B, 111, 113 ............. 16
Any three Linguistics courses from among those numbered from 110 to 159 ........... 12
One Linguistics course from among those numbered from 160 to 199 ........... 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

Minor Adviser. G. Zellou

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.

UNITS

Linguistics 1, 103A, 103B .................. 12
One course from: Linguistics 111, 112, 121, 131, 141, 151, 152 ................... 4
Additional units selected from upper division Linguistics courses and other upper division courses listed in the minor requirements in consultation with an adviser ....... 8

Linguistics for Language Teachers .......... 24
Linguistics 1, 106, 165 ...................... 12
English 105 ........................................ 4
Linguistics 160 or 163 ..................... 4
Linguistics 172 or Education 151 .......... 4

Minor Adviser. Same as Major adviser
Courses in Linguistics (LIN)

Lower Division

1. Introduction to Linguistics (4)

2. AY/Linguistics (1)
Lecture—2 hours; discussion—2 hours. An introduction to the study of language; its nature, diversity, and structure. GE credit: ArtHum or SocSci, Wrt|AH or SS, F, W, S. (F, W, S.)

3. Global English and Communication (4)
Lecture—2 hours; discussion—2 hours. English as a global language and its uses in intercultural communication. Cultural, historical, and political dimensions of varieties of English spoken around the world. Experiential grounding in strategies for increasing interpretive and verbal communicative competence for a globalized world. (Same course as Communication S.) GE credit: ArtHum or SocSci, AH or SS, OL. WC. —W. (W.) Farrell, Ramanathan, Merdad-Warwick

4. Language and Society (4)
Lecture—2 hours; discussion—1 hour. Introduction to the study of language; its nature, diversity, and structure. GE credit: ArtHum or SocSci, Wrt|AH or SS, F, W, S. (F, W, S.)

5. Global English and Communication (4)
Lecture—2 hours; discussion—2 hours. English as a global language and its uses in intercultural communication. Cultural, historical, and political dimensions of varieties of English spoken around the world. Experiential grounding in strategies for increasing interpretive and verbal communicative competence for a globalized world. (Same course as Communication S.) GE credit: ArtHum or SocSci, AH or SS, OL. WC. —W. (W.) Farrell, Ramanathan, Merdad-Warwick

6. Language and Society (4)
Lecture—2 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 and social consequences of language contact. GE credit: SocSci, Div, Wrt|ACGH, DD, SS, WE. —W. Bayley, Ramanathan

7. Academic Writing for Undergraduate ESL Students (3)
Lecture—2 hours; discussion—2 hours. Structure of academic oral communication, critical thinking, and persuasion in classroom discourse in American English and in cross-cultural perspective. GE credit: ArtHum or SocSci | AH or SS, OL. —W. Su. (F, W, Su.) Takaaki

8. Oral English for Undergraduate ESL Students (3)
Lecture/discussion—4 hours. Open to non-native speakers of English with priority enrollment to international 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 for credit. (P/NP grading only.)—W. S. (W. S.)

9. English Structures and Strategies in Academic Writing (4)
Lecture/discussion—4 hours. Prerequisite: course 23. Open to students from language backgrounds other than English. This course 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. GE credit: ArtHum or SocSci, Wrt|AH, SS, W, S, F, W, S, W. (F, W, W.)

10. Topics in Language and Linguistics (4)
Lecture—3 hours; term paper. Prerequisite: course 1 recommended; 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 with topic differs. Offered in alternate years. —S. (S.)

11. Introduction to Phonological Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 103A recommended. Contemporary phonological theory with emphasis on syntactic structure, metrical structure, phonetic morphology, interaction, and typological variation in these areas, from the perspective of optimality-theoretic approaches. GE credit: ArtHum | AH. —W. (W.) Barreda, Zellou

12. Phonetics (4)
Lecture—3 hours; term paper. Prerequisite: course 1. Detailed examination of articulatory and acoustic phonetics. GE credit: SciEng | SE. —F. (F.) Barreda, Zellou

13. Text Processing and Corpus Linguistics (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. GE credit: ArtHum | AH. —S. (S.) Anarovich

14. Introduction to Syntactic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 103B. Introduction to syntactic theory, primarily through the examination of a major theory of syntax, emphasizing theoretical reasoning, argumentation, and problems of theory building in syntax. GE credit: ArtHum | AH. —F. (F.) Anarovich, Farrell

15. Semantics (4)
Lecture—3 hours; term paper. Prerequisite: course 103B. The linguistic study of meanings of words and phrases. Meanings expressed by lexical items and derivational and inflectional morphology. Contribution of argument structure, quantification, and coordination to meaning. GE credit: ArtHum | Wrt | AH. —F. (F.) Ojeda

16. Languages of the World (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Anthropology 4. Survey of the world’s languages, their geographical distribution and classification, both genetic and typological. Illustrative descriptions of several major languages from different geographical areas; pidgins and creoles, lingua francas and other languages of widespread use. Not open for credit to students who have completed course 50. GE credit: ArtHum or SocSci, Wrt | AH or SS, WC. —S. (S.) Hawkins
151. Historical Linguistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 103A. Description and methods of the historical study of language; the development of method and internal reconstruction; sound change, morphological change, syntactic change, semantic change. Offered in alternate years. GE credit: ArtHum | AH. —S. (S.) Farrell, Hawkins

152. Language Universals and Typology (4)
Lecture—3 hours; term paper. Prerequisite: course 103B. Investigation into common features of all human languages and the classification of languages in terms of their structural features. Introduction to universals of universal grammar. Detailed discussion of non-Indo-European languages and comparison with English. Offered in alternate years. GE credit: ArtHum, Writ | AH. —S. (S.) Farrell, Hawkins

160. American Voices (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Anthropology 4 or upper division standing recommended. Explores the forms of American English; traditional notions of regional dialects and increasingly important social dialects, reflecting age, class, gender, race, ethnicity, and sexual orientation. The influence of language attitudes or perceptions of dialectal speakers; dialect in media, education, and literature. GE credit: SocSci, Div, Writ | SS, WE. —F, W. (F, W.)

163. Language, Gender, and Society (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or Anthropology 4. Investigation of real and putative (stereotyped) gender-linked differences in language structure and usage, with a consideration of some social and psychological consequences of sex-related behaviors. The influence of gender on language, but other languages are also discussed. GE credit: SocSci, Div, Writ | ACCH, DD, SS, WE. —W. (W.) Timmer, Menard-Warwick

165. Introduction to Applied Linguistics (4)
Lecture—3 hours; discussion—1 hour. Applications of linguistic principles and the analysis of language-related issues in the world. Exploration of a range of language-related problems including issues related to language learning and teaching issues concerning language and gender, race, class, and the media. GE credit: SocSci | SS, WE. —W. (W.) Ramanan

166. The Spanish Language in the United States (4)
Lecture—3 hours; term paper. Prerequisite: course 1 or Spanish 111N, and Spanish 23 or the equivalent. Linguistic features of the varieties of the Spanish language spoken in the United States; phonology, morphology, syntax, vocabulary. Focus on the relationship between United States Spanish and the varieties of Spanish from other Latin American and Iberian settings, with focus on tutoring. Impact of sociolinguistic factors (e.g., gender, ethnicity). Fieldwork requirement. GE credit: SocSci, Div, Writ | SS, WE. —F, W. (F, W.) Ojeda

170. Computational Linguistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or consent of instructor. Understanding the nature of language enabling computer modeling of linguistic abilities. Relationships between human cognition and computer representations of cognitive processing. Nonlyric discussion. Offered to students who have completed course 7. GE credit: SciEng or SocSci | SE or SS. —W. (W.) Ojeda

180. Second Language Learning and Teaching (4)
Lecture/discussion—4 hours. Prerequisite: course 1 or equivalent. Psycholinguistic and sociolinguistic theories of second language learning. Connections between theoretical perspectives and pedagogical practices in foreign and second language settings, with focus on tutoring, impact of sociolinguistic factors (e.g., gender, ethnicity). Fieldwork requirement. GE credit: SocSci, Div, Writ | SS, WE. —F, W. (F, W.) Menard-Warwick

182. Multilingualism (4)
Lecture/discussion—4 hours. Limited enrollment. Issues in multilingualism from a global perspective, e.g., multilingual communities; multilingualism and identity (gender, ethnicity, nationality); language ideology and attitudes; education and sociopolitical policies surrounding multilingualism; acquisition of multilingualism; discursive practices of multilinguals. GE credit: ArtHum, SocSci, Div, Writ | SS, WC, WE. —S. (S.) Ramanathan, Timmer

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 museums, government, 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 program. Guided research, under the direction of a faculty member approved by the Program Director. Applied toward a senior honors thesis. May be repeated for credit for up to 6 units. (P/NP grading only.)—F, W. (F, W.) S. (S.)

197T. Tutoring in Linguistics (1-4)
Independent study—1-4 hours. Prerequisite: upper division standing, consent of instructor, and consent of department chairperson. Leading small voluntary discussion groups affiliated with one of the department's regular courses. May be repeated for credit. (P/NP grading only.)—W. (W.) S. (F, W. S.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)—W. (W.) S. (F, W. S.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)

Graduate

200A. Foundations of Linguistics I (4)
Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing. Survey of fundamental issues raised by pregenerative linguistics in the twentieth century, with emphasis on issues crucial to applications of linguistics. Not open for credit to students who have completed course 203A.—F. (F)

200B. Foundations of Linguistics II (4)
Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing. Survey of fundamental issues raised by pregenerative linguistics, with emphasis on issues crucial to applications of linguistics. Not open for credit to students who have completed course 203B. —W. (W.)

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. —S. (S.)

205A. 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. —F, W. (F, W.)

205B. 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. —F, W. (F, W.)

205C. 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. —F, W. (F, W.)

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. —F, W. (F, W.)

211. Advanced Phonological Theory and Analysis (4)
Lecture—2 hours; term paper. Prerequisite: course 112. Critical examination of current phonological theories. Offered in alternate years. —S. (S.) Barreda, Zelouf

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. —W. (W.) Barreda, Zelouf

213. Advanced Syntactic Theory and Analysis (4)
Lecture—3 hours; term paper. Prerequisite: course 131. Critical survey of contemporary theories of syntax. Offered in alternate years. —S. (S.) 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. —W. (W.) 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. —S. (S.)

252. Romance Linguistics (4)
Lecture—3 hours; term paper. Prerequisite: course 151. Examination of the development of the Romance languages from proto-Romanian 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. —S. (S.)

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 sociolinguistics in general, and in particular areas of structural change in language. Offered in alternate years. —S. (S.)

263. Discourse Analysis: Text in Context (4)
Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing. Introduction to and application 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/rheme, given/new, anaphora, discourse markers, and other lexical/grammatical features. —F. (F) Menard-Warwick
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 intersection between linguistic and social theories in the language-state relation and the performance of identity. Ideological sources of language differentiation; nation-building and linguistic difference. Practical issues in teaching second language; multilingualism; ecofeminism; queer theory. May be repeated for credit one time when topic differs. Offered in alternate years—F. (F) Menard-Warwick, Timm

265. Language, Performance, and Power (4)
Seminar—3 hours; term paper. Restricted to graduate standing or consent of instructor. Exploration of the intersection between linguistic and social theories in the language-state relation and the performance of identity. Ideological sources of language differentiation; nation-building and linguistic difference. Practical issues in teaching second language; multilingualism; ecofeminism; queer theory. May be repeated for credit one time when topic differs. Offered in alternate years—F. (F) Shibamoto-Smith

275. Neurobiology of Language (4)
Lecture—3 hours; term paper. Survey of historical and modern conceptions of the neurobiology of language. Aphasia, functional neuroimaging, functional neuroanatomy of human language. Offered in alternate years. —F. (F) Corinna Wagenknecht

280. Theory of Second Language Acquisition (4)
Lecture/discussion—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Covers theoretical perspectives that direct or have directed research in second language acquisition; explores the relationship between linguistics and language teaching and deals with the individual variables that influence second language learning. —F. (F) Menard-Warwick

Lecture—3 hours; term paper. Prerequisite: course 280. Research methods in second language research; evaluation of research designs and methods of data collection; feasibility of research questions and hypotheses and design of study with thought to various kinds of data. —W. (W.) Bayley

282. Individual and Social Aspects of Bilingualism (4)
Lecture—3 hours; term paper. Broad overview of bi- and multilingualism, with focus on theoretical and descriptive research; topics covered range from language processing in bilinguals to code-switching in language as political issue in multilingual states. —S. (S.) Bayley, Menard-Warwick, Ramanathan

283. Politics of Bi and Multilingual Literacies (4)

289. Pedagogical Applications of Second Language Acquisition Theory (4)
Seminar—3 hours; term paper. Prerequisite: course 280. Pedagogical implications of various theories of second language acquisition, facilitation of language acquisition in classroom settings, and techniques for conducting classroom-based research in language learning. —S. (S.)

297. English as a Second Language Teaching/Tutoring (1-4)
Tutoring—1–4 hours. Prerequisite: course 300, 301, or 302 (may be taken concurrently). Teaching classes for ESL graduate students. Aiding the ESL undergraduate composition classes; tutoring foreign graduate student Teaching Assistants in pronunciation. Does not fulfill requirement toward the M.A. degree. May be repeated for credit. [S/U grading only]—F. W. S. (W. S.)

298. Directed Group Study (1-5)
Prerequisite: graduate standing. [S/U grading only]—S. (S.)

299. Research (1-12)
[S/U grading only]—F. W. S. (W. S.)

Professional

300. Language Pedagogy (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing in Linguistics or consent of instructor; concurrent enrollment in course 297 recommended. Methods of teaching second languages to non-native speakers, stressing particularly recent linguistic meth- odology and techniques, as related to teaching and tutoring in the UC Davis ESL program. —F. (F) Menard-Warwick

301. Teaching Academic Literacy (4)
Seminar—3 hours; tutorial—14 hours; project; prac- tice. Prerequisite: graduate standing; course 300 or consent of instructor. Methods of teaching advanced academic literacy in a second language, with focus on ESL composition. Lesson development, teaching and tutoring in the UC Davis ESL program. —W. (W.) Ramanathan

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 clinic. Each student also designs and reports on a classroom research project.

305. Second Language Literacy and Technology (4)
Lecture/discussion—1.5 hours; web electronic dis- cussion—1.5 hours. Prerequisite: course 2, or equiv- alent coursework/ experience in second language pedagogy; consent of instructor; graduate students only. Limited enrollment. Exploration of literacy the- ory and critical pedagogy in relation to new instruc- tional and communication technologies. Practicum experience in teaching second language literacy; reflection on connections between theory and prac- tice. —S. (S.) Menard-Warwick

310. Language Pedagogy for Teacher Educators (4)
Seminar—3 hours; tutorial; project; fieldwork. Prerequisite: admission to Ph.D. program in Linguistics or Foreign Languages, or permission of instructor; significant language teaching experience. Current issues in second language pedagogy, with a focus on current research and development in ESL pedagogy. Prerequisites of the major field. May be repeated up to 12 units for credit. —F, W, S, [F, W, S] Menard-Warwick, Ramanathan

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. [S/U grading only]—F. W. S. (F. W, S.)

Linguistics (A Graduate Group)

Robert J. Bayley, Chairperson of the Group

Group Office. 462 Kerr Hall 530/752 3464

Faculty
Raul Aranovich, Ph.D., Associate Professor (Linguistics)
Carlee Arnett, Ph.D., Associate Professor (German)
Sanchez Barrameda, Ph.D., Assistant Professor (Linguistics)
Robert J. Bayley, Ph.D., Professor (Linguistics)
Robert Blake, Ph.D., Professor (Spanish)
Travis G. Bradley, Ph.D., Associate Professor (Spanish)
Chengzhi Chu, Ph.D., Associate Professor (East Asian Languages and Cultures)
M. Cecilia Colombi, Ph.D., Professor (Spanish)
David Corina, Ph.D., Professor (Linguistics)
Patrick Farrell, Ph.D., Professor (Linguistics)
Fernanda Ferreira, Ph.D., Professor (Psychology)
Dana Ferris, Ph.D., Professor (University Writing Program)
John A. Hawkins, Ph.D., Distinguished Professor (Linguistics)
Debra Long, Ph.D., Professor (Psychology)
Robert May, Ph.D., Distinguished Professor (Philosophy)
Julia Menard-Warwick, Ph.D. Professor (Linguistics)
Almerindo E. Ojeda, Ph.D., Professor (Linguistics)
Vaidhehi Ramanathan, Ph.D., Professor (Linguistics)
Eric Russell Webb, Ph.D., Assistant Professor (French)
Claudia Sánchez-Gutiérrez, Ph.D., Assistant Professor (Spanish)
Adam Sennet, Ph.D., Associate Professor (Philosophy)
Tomara Swaab, Ph.D., Associate Professor (Psychology)
Matthew Traxler, Ph.D., Professor (Psychology)
Yuuko Uchikoshi, Ed.D, Assistant Professor (Education)
Karen A. Watson-Geggei, Ph.D., Professor (Education)
Georgia Zellou, Ph.D., Assistant Professor (Linguistics)

Emeriti Faculty
Wilbur A. Benware, Ph.D., Professor Emeritus
Ellen Lange, M.A., Senior Lecturer Emerita
David L. Omsted, Ph.D., Professor Emeritus
Mary Schleppegrell, Ph.D., Professor Emerita
Gwendolyn Schwabe, M.A., Senior Lecturer Emerita
Lena Timm, Ph.D., Professor Emerita
Maximo Torreblanca, Ph.D., Professor Emeritus

Graduate Study. The Graduate Group in Linguistics offers a program of study leading to the M.A. and the Ph.D. degree. The M.A. program follows PLAN II. 36-38 units of coursework are required, at least 18 of which must be graduate level courses in the major field. A comprehensive final examination in the major subject is required of each candidate. No thesis is required.

The Ph.D. degree offers advanced training and research in linguistic theories and methods. Second language acquisition and development is a particu- lar emphasis of the program. Detailed information on both the M.A. and the Ph.D. degrees can be obtained from the graduate advisers, from the chair of the Graduate Group or the departmental chairs.

Graduate Advisers. Raul Aranovich (Linguistics), Julia Menard-Warwick (Linguistics)
Literature in Translation

The following courses are open to students throughout the campus. The readings can be in English. See departmental listing for the course description.

Chinese
10. Chinese American 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)
107. Traditional Chinese Fiction (in English)
108. Poetry of China and Japan (in English)
109A-I. Topics in Chinese Literature (in English)
110. Great Writers of China: Texts and Context (in English)

Classics
10. Greek, Roman, and Near Eastern Mythology
10Y. Greek, Roman, and Near Eastern Mythology
140. Homer and Ancient Epic
141. Greek and Roman Comedy
142. Greek and Roman Novel
143. Greek Tragedy

Comparative Literature
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
10A-N. Master Authors of World Literature
12. Introduction to Women Writers
13. Dramatic Literature
14. Introduction to Poetry
20. Humans and the Natural World
25. Ethnic Minority Writers in World Literature
53A. Literature of China and Japan
53B. Literature of India and Southeast Asia
53C. Literatures of the Islamic World
100. World Cinema
120. Writing Nature: 1750 to the Present
135. Women Writers
138. Gender and Interpretation
139. Shakespeare and the Classical World
140. Thematic and Structural Study of Literature
141. Introduction to Critical Theoretical Approaches to Literature and Culture
142. Critical Reading and Analysis
144. The Grotesque
145. Representations of the City
146. Myth in Literature
147. Modern Jewish Writers
151. Colonial and Postcolonial Experience in Literature
152. Literature of the Americas
153. The Forms of Asian Literature
154. African Literature
155. Classical Literature of the Islamic World

157. War and Peace in Literature
158. The Detective Story as Literature
159. Women in Literature
160A. The Modern Novel
160B. The Modern Drama
161A. Tragedy
161B. Comedy
163. Biography and Autobiography
164A. The Middle Ages
164B. The Renaissance
164C. Baroque and Neoclassicism
164D. The Enlightenment
165. Caribbean Literature
166. Literature of the Modern Middle East
166A. The Epic
166B. The Novel
167. Comparative Study of Major Authors
168A. Romanticism
168B. Realism and Naturalism
169. The Avant-Garde
170. The Contemporary Novel
180. Selected Topics in Comparative Literature
194H. Special Study for Honors Students
195. Seminar in Comparative Literature

Dramatic Art
20. Introduction to Dramatic Art
154. Asian Theatre and Drama: Contexts and Forms
156AN. Performance Analysis
156BN. Theatre in History and Place: Local, National and Global Conditions for Production
156CN. Modern Aesthetic Movements in Performance
159. Contemporary Experimental Theatre and Drama

French
50. French Film
51. Major Works of French
52. France and the French-Speaking World

German
48. Myth and Saga in the Germanic Cultures
49. Freshman Colloquium
111. Topics in German Literature
112. Goethe's Faust
115. German literature since 1945
118A. Fin-de-siécle Vienna (The Swan Song of the Habsburg Empire)
118B. World War Culture: Defeat, the Roaring Twenties, the Rise of Nazism
118C. Germany under the Third Reich
119. French and German Fiction to German Film
140. The Holocaust and its Literary Representation
142. New German Cinema: From Oberhausen to the Present

Italian
50. Studies in Italian Cinema
107. Survey of Italian Culture and Institutions
108. History of Italian Culture and Society
139. Board, Barter and the Renaissance
140. Italian Literature in English Translation: Dante, Divine Comedy
141. Comedy: Gender and the Italian Renaissance
142. Masterpieces of Modern Italian Narrative
150. Studies in Italian Cinema

Japanese
10. Masterworks of Japanese Literature (in English)
15. Introduction to Traditional Japanese Culture
50. Introduction to the Literature of China and Japan

101. Japanese Literature in Translation: The Early Period
102. Japanese Literature in Translation: The Middle Period
104. Modern Japanese Literature: War and Revolution
105. Modern Japanese Literature: Hero and Anti-Hero
106. Japanese Culture through Films
107. Modern Japanese Autobiographies (in English)
108. Poetry of China and Japan
109. Japanese Literature as a Context
152. Traditional Japanese Drama
156. Japanese Literature on Film

Native American Studies
181A. Native American Literature (the novel and fiction)
181B. Native American Literature (non-fiction works by Native authors)
181C. Native American Literature (traditional and contemporary poetry)
184. Contemporary Indigenous Literature of Mexico
188. Special Topics in Native American Literary Studies

Russian
45. Russian Fantasy
121. Nineteenth-Century Russian Prose
123. Twentieth-Century Russian Prose
126. The Russian Theaters
130. Contemporary Soviet Culture
140. Dostoevsky
141. Tolstoy

Spanish
149. Latin-American Literature in Translation

Luso-Brazilian Studies

(College of Letters and Science)
The Department of Spanish and Portuguese sponsors the minor in Luso-Brazilian Studies, which offers students the opportunity to engage with the Portuguese-speaking world as a global space, as well as gain in-depth knowledge of Brazilian literature, culture and society. The minor is structured to facilitate engagement with Latin American, peninsular, and transatlantic topics, while ensuring that students master the essential skills of linguistic competence, and literary and cultural knowledge.

Minor Program Requirements:

Luso-Brazilian Studies ................. 23-24
Portuguese 100, 161 ..................... 8

Select one course in each of the following categories:

Portuguese 111N, 115, or 116 ........... 3-4
Portuguese 162 or 163 .................. 4

Select one elective course in each of the following categories:

Portuguese 159, 162, or 163 .......... 4
History 159, 163A, or 163B ............ 4

Note: Consult a departmental adviser if any of these courses are to be taken abroad.

Minor Advisers. L. Bernucci, R. Newcomb

Education Abroad Program Options.

We highly recommend that students participate in study abroad in Salvador, Brazil, see http://studyabroad.ucdavis.edu. Courses taken abroad may count toward the Luso-Brazilian Studies minor.
Courses in Management (MGT/MBG/MGP)

Lower Division

11A. Elementary Accounting (4)
Lecture—3 hours; discussion—1 hour. Basic concepts of accounting; interpreting and using financial statements; understanding accounting principles. GE credit: SocSci | SS—S. (S)

11B. Elementary Accounting (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A. Theory of product costing; Analyzing the role and impact of accounting information on decision making; planning and performance evaluation. GE credit: SocSci | SS—S. (S)

12Y. Navigating Life's Financial Decisions (3)
Lecture—2 hours; web virtual lecture—1 hour. Survey of major life financial decisions (e.g., career choice, consumption v. saving, investments, mortgages, insurance) and how decision-making biases (e.g., overconfidence, present bias, limited attention) can lead to suboptimal choice. The course draws on research from economics, psychology, and sociol. Offered irregularly. GE credit: SS, QL—W (W)

98. Directed Group Study (1-5)
Seminar—3-15 hours. Prerequisite: consent of instructor. Open to all undergraduates, but is primarily intended for lower division students. (P/NP grading only).—F, W, S, F, W, S

Upper Division

100. Introduction to Financial Accounting (3)
Lecture—3 hours. Prerequisite: course 11A. Course is open to all upper division undergraduate and graduate students, except those in the Graduate School of Management. Introduction to the concepts, methods, and uses of accounting and financial reporting.—F (F)

120. Managing and Using Information Technology (4)
Lecture—3 hours; discussion—1 hour. Develop an analytical framework to manage and monitor business systems concerned with operational, human, and organizational interactions. Introduction to computer hardware, systems software, and telecommunications. Management of information technology and the impact of information systems on modern management. GE credit: SocSci | SS—Arm

140. Marketing for the Technology-Based Enterprise (4)
Lecture—3 hours; discussion—1 hour. Quantitative analysis of needs in a product (technology-based) economy, with emphasis on how scientists, engineers, and business people interact to develop and market products and services.—W (W) Fall

150. Technology Management (4)
Lecture—3 hours; discussion—1 hour. Management of firms in high technology industries such as software development and biotechnology research. Motivating and managing workers, organizing for innovation, and making decisions. GE credit: SocSci | SS—W, S, Su | W, S, Su | Olson

160. Financing New Business Ventures (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A; Mathematics 178, 21A, 21B; Statistics any 100 level course or 13 above.—F, W, S, S, S

Minor Program Requirements:

Choose five courses from:
- Management 120, 140, 150, 160, 170
- 20
- Technology Management
203. Forecasting and Managerial Research Methods (3) Lecture—3 hours. Prerequisite: course 203A. Practical analyses and applications for managerial decision making covers regression analysis, time series analysis and forecasting, design and analysis of experiments in managerial context, and contingency table analysis. Application of these methods to marketing, finance, accounting, production, operations, and public policy. —W. (W.) Tsai

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. —S. (S.) Naik

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 skills and principles for investments with long-lived and risky cash-flows, and extends these to derivative securities, asset portfolios, investment management, and hedging. —S. (S.) 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 analysis skills through a quantitative model-building approach. Emphasizes how structured modeling techniques, probability forecasting, simulation, and computer optimization models are used in the overall process of making decisions in an uncertain environment. —Su. (Su.) R. Chen

207. Management Information Systems (3) Lecture—3 hours. Prerequisite: graduate student or 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. —W. Su. (W. Su.)

216. Managing Professionals, Budgets, Controls and Ethics (3) Lecture—3 hours. Prerequisite: graduate standing. Performance measures, budgetary controls and ethical dilemmas at middle management levels in service-type operations. Addresses such organizations as engineering, medical groups, law offices, management consultants. —F. (F.) Suran

217. The Business of Politics (3) Lecture—3 hours. Class size limited to 30 students. Covers the role of business and business leaders as policy and political actors at the federal, state, and local level, including government relations programs, regulation by government, political campaigns, and policy as a business advantage. —W. Su. (W. Su.) J. Smith

220. Management of Social Networks (3) Lecture/discussion—3 hours. Prerequisite: course 201A. Open to MBA students only. Principles and applications of social network theory with an emphasis on coordinating divergent interests to create value for individuals and organizations. Emphasis on conceptual models, web tools, diagnostic tools, and practical applications. —F. (F.)

223. Power and Influence in Management (3) Seminar—3 hours. Prerequisite: consent of instructor. Investigation of the bases of power in organizations and the tactics that managers use to influence power. Topics include the control of resources (including information), social psychological processes (including leadership), the construction of meaning, and ethics. —F. (F.) Palmer

224. Managing Human Resources (3) Lecture/discussion—3 hours. Open to MBA students only. Restricted to MBA students only. Explore choices firms make in managing workers-decisions as to wages, benefits, working conditions, and other management policies and practices. Analyze employment systems that fit with firms’ environments and strategies, and the consequences of choices managers make to achieve these policies. Not open to students who have taken MGT 224 or MGP 224. —W. Su. (W. Su.) Hsu

234. Pricing (3) Lecture/discussion—3 hours. Prerequisite: completion of first-year core courses at the Graduate School of Management or equivalent, including courses 202A & 203B. Restricted to students in the MBA Program. Combines lectures, cases and homework to teach students how to price. Students must analyze pricing situations, make pricing decisions, and implement them, in a systematic manner. —S. (S.)

239. Digital Marketing (3) Lecture/discussion—3 hours. Prerequisite: course 204. Course equips students for a career in digital marketing and social media. Topics include online advertising, search engine optimization, interactive web, online privacy issues, e-commerce, social influence, social network theory, measurement of social influence, integrating social and traditional media. —S. (S.) Peters

240. Management Policy and Strategy (3) Lecture—3 hours. Prerequisite: first-year core courses of A.B.A. program. Examines the scope of missions, objectives strategies, policies, structures, measures, and incentives which bear on the management of an organization. Real client organizations, in the private sector, are assigned to student teams as the subjects of study. —F. (F.)

241. New Product Development (3) Lecture/discussion—3 hours. Prerequisite: course 249 or consent of instructor. Open to graduate students in the Graduate School of Management. State-of-the-art concepts and methods to enhance the effectiveness of new product development activities. Focuses on the understanding of managerial issues and activities to solve problems. —W. Su. (W. Su.) Aravindakshan

242. Marketing Communications (3) Lecture—3 hours. Issues in designing a marketing communications strategy. Topics include mass and direct communication aspects of advertising, consumer behavior, evaluating effectiveness, determining ad budget, creative strategy, and use and abuse of promotions. —S. (S.)

243. Customer Relationship Management (3) Lecture/discussion—3 hours. Prerequisite: completion of first-year core courses at the Graduate School of Management or the equivalent. Restricted to MBA students only. Explores the management of customer relationships. CRM is a management approach under which marketing activities are organized and measured around customers (rather than around brands). This approach is appealing because customers, not brands, are those who make buying decisions. —F. (F.) Aravindakshan

244. New and Small Business Ventures (3) Lecture—3 hours. Student teams develop complete business plans for their own startup ventures. Process includes: creating a business plan strategy, comprehensive bottom-up financial projections, capital requirements, product differentiation, competitive, alliance, and development, investor presentation, and comprehensive written business plan. —F. (F.) W. (W.) Lowe

245. Business Writing (3) Lecture/discussion—3 hours. Prerequisite: completion of first-year core courses at the Graduate School of Management or the equivalent. Restricted to MBA students only. Techniques for sharpening writing skills are introduced, along with grammatical structure, word choice, and proofreading. Learn styles that are pitch-perfect for given situations and to think strategically about each communication challenge in a management setting. —W. (W.)

246. Negotiation and Team Building (3) Lecture/discussion—3 hours. Prerequisite: courses 202 & 203. Basic theory of negotiation; applies theory to process of building teams to achieve business purposes. Covers integrative and distributive strategies of claiming value, how to recognize bargaining tactics, uncovering hidden agendas transforming to extend Pareto frontier. —W. (W.) Olson

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 services improvement. —F. (F.)

248. Marketing Strategies (3) Lecture—3 hours. Examine processes 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 public and private sector marketing. —F. (F.) Rubel

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, research design, information collection, measuring instruments, data analysis, and marketing research applications. —W. (W.) Bunch

250. Technology, Competition and Strategy (3) Lecture—3 hours. Prerequisite: completion of first-year core courses at the Graduate School of Management or the equivalent. Restricted to students in the MBA program. Why is software typically so expensive? Who provides the technology that is necessary to analyze pricing situations, make pricing decisions, and implement them, in a systematic manner? —F. (F.)


252. Managing for Operational Excellence (3) Lecture—3 hours. Open to students in the Graduate School of Management. Explores the management of operations as applied to manufacturing as well as services provided both inside and outside the organization. Develop an understanding of how uncertainty influences planning and decision making at fundamental models of operations. —S. (S.) Woodruff

253. Corporate Social Responsibility (3) Lecture—3 hours. Goal in this course will be to develop a thought process and approach to corporate social responsibility that students will be able to
255. Entrepreneurship and Venture Investment Clinic (3)
Lecture—3 hours. Prerequisite: course 205 Management or Management Working Professional 205; consent of instructor. Analyzes the role of financial markets and institutions in allocating capital. Focuses on debt securities, financial futures contracts. Pricing of derivative securities, primarily by arbitrage methods.
techniques of finance to business problems. Use of appropriate electronic database and research techniques. May be repeated for credit.—F, W, S, Su.

293. Topics in Marketing (3) Seminar—3 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.—F, W, S, Su.

294. Topics in Accounting (3) Seminar—3 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.—F, W, S, Su.

295. Topics in Information Technology (3) Seminar—3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Integration of material from other topics and emerging issues in strategic management and also acquire a set of techniques of finance to business problems. Use of appropriate electronic database and research techniques. May be repeated for credit.—F, W, S, Su.

296. Topics in Technology Management (3) Seminar—3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Cyclical nature of innovation and technological change, features of innovative firms and industries, national innovation systems, and impact of information technologies on innovation processes. May be repeated for credit.—F, W, S, Su.

297. Topics in International Management (3) Seminar—3 hours. Prerequisite: completion of all first-year graduate courses at the Graduate School of Management or the equivalent. Broader environment in which U.S. firms and their foreign competitors operate. Integration of material from other topics and emerging issues in strategic management and also acquire a set of techniques of finance to business problems. Use of appropriate electronic database and research techniques. May be repeated for credit.—F, W, S, Su.

299. Individual Study (1-12) Prerequisite: consent of instructor. (S/U grading only.)—F, W, S, Su.

Professional

401. Crisis Management (1) Laboratory/discussion—1 hour. Establishes and explores the defining characteristics of crises. Will learn to anchor crisis management firmly within overall strategic management and also acquire a set of useful tools and techniques for planning for and handling actual crises. (S/U grading only.)—F, W

402. Crisis Communications and Reputation Management (1) Laboratory/discussion—1 hour. Provides a working knowledge of the risks and opportunities arising from climate change and climate policy for businesses. (S. Su.) Mazzacurati

403. Business Statistics Practicum (1) Project—1 hour. Prerequisite: MGT, MGP, or MGB 203A; MGT, MGP, or MGB 203B concurrently or completed. Restricted to students in the MBA program. Applies techniques and concepts in business statistics to real case studies.—F, F

404. Organizational Change Management (1) Laboratory/discussion—1 hour. Challenges in getting significant changes made in organizations. Learn Organization Change Management (OCM) techniques and discuss case situations where OCM techniques play a role. (S/U grading only.)—F, F Mathur

405. Business Literature (1) Laboratory/discussion—1 hour. Will explore current business history — historical trends that might influence contemporary business. Some argue that the recent collapse of our financial system might have been averted if business leaders had a better sense of history. (S/U grading only.)—W, W

406. Ethical Issues in Management (1) Lecture/discussion—1 hour. Explores the philosophical foundation of ethical theory and its recent applications to business situations. Professional codes of ethics, such as those promulgated by educational, managerial, engineering, scientific, medical and legal professional associations, are presented. (S/U grading only.)—W, W

407. Storytelling for Leadership (1) Lecture/discussion—1 hour. Internalize the fundamental principles behind stories that educate, influence, motivate, and inspire. (S/U grading only.)—Su. Charnsupharindr

408. The Business of the Media (1) Lecture/discussion—1 hour. Focuses on the media industries and how emerging digital technologies are disrupting traditional business models, distribution and business models work. Will highlight the economics of several media, both news and entertainment. (S. Su.) Louis


410. Corporate Governance (1) Lecture/discussion—1 hour. Covers recent and not-so-recent business and accounting scandals, discuss how corporations can be held accountable in the interest of shareholders and the public, and learn from people who rely on corporate governance in making investment decisions. (S/U grading only.)—W, W

411. Turnaround Management (1) Lecture/discussion—1 hour. Evaluate the financial performance of a company, identify opportunities for improvement, propose real solutions to enhance performance, and most important inspire action in staff. (S/U grading only.)—S. (S.) Peters

412. International Marketing (1) Lecture/discussion—1 hour. Understanding basic concepts of international marketing. Understanding and managing heterogeneous, dynamic, and interdependent environments across countries. How to develop and implement an international marketing strategy: where and how to compete, how to adapt your marketing mix. (S/U grading only.)—W, W

413. Sustainable Business Ventures: Business and Energy (1) Lecture/discussion—1 hour. Introduction to sustainability goals, indicators, values, measurement techniques, and practices that apply to large and small enterprise.—W, W Jaffe

414. Multi-Channel Marketing (1) Lecture/discussion—1 hour. Multi-channel marketing strategies empower managers to create value for different customer segments. Covers the necessary concepts to evaluate and select go-to-market strategies in order to capitalize on the ubiquity of modern customers. (S/U grading only.)—W, W Kubel

415. Climate Risks and Opportunities (1) Lecture/discussion—1 hour. Provide a working knowledge of the risks and opportunities arising from climate change and climate policy for businesses. —Su. (S.) Mazzacurati

416. Topics in Private Equity (1) Lecture—1 hour. Prerequisite: course 205. Restricted to students in the MBA program. Focuses on the finance principles related to the private equity (PE) industry, valuation of PE target companies, the structuring of leveraged buyouts (LBOs), and the management of PE portfolio companies. (S/U grading only.)—F, W, Su. Schmitz

417. Incentives and Controls (1) Lecture/discussion—1 hour. Understand how organizations use financial and nonfinancial performance management and incentive systems to motivate people and manage resources. (S/U grading only.)—S. (S.)

418. Scientific Discovery and Business Innovation at Scale in the Food and Agriculture Sector (1) Lecture—3 hours. Restricted to students in the MBA program. Scientific discovery and business innovation within the food and agriculture sector profoundly influences the sustainability of society and enterprise competitiveness. This course will highlight how business innovation models co-exist antagonistically or synergistically with scientific discovery and its influence on enterprise competitiveness. (S/U grading only.)—F, W, Su. Mathur

419. Business Strategy Consulting Skills (1) Lecture—5 hours. Restricted to students enrolled in the MBA program. Students will learn practical business consulting skills which will help apply strategy theories in the workplace. Students will learn and practice tools to frame and analyze problems, conduct research, communicate findings and navigate client relationships. (S/U grading only.)—F, F Bethlahmy

420. Advanced Optimization in a Python-based Modeling Language (1) Web virtual lecture—1 hour. Prerequisite: course 252 or MGT 252 or MGP 252, and course 206 or MGT 206 or MGP 206. Restricted to students enrolled in the MBA program. Covers advanced optimization modeling techniques and practical application of modern, scalable modeling language. Techniques will be developed using examples from production planning in a supply chain, but students may explore other areas of application of optimization for their final project. (S/U grading only.)—W, W Woodruff

421. Behavioral Finance and Valuation (1) Lecture—1 hour. Prerequisite: MGT 260 or MGP 260 or course 260, and MGT 261 or MGP 261 or course 261. Restricted to students enrolled in the MBA program. Investor psychology and market frictions can cause asset prices to deviate from fundamental values, creating profit opportunities for sophisticated investors. The course will cover techniques of financial management and risk analysis, and strategies of learning how to value assets and identify mispricing. (S/U grading only.)—S. (S.) Scherbin

422. Leader as Coach: An Introduction to Coaching Skills for Leaders (1) Lecture—1 hour. Restricted to students enrolled in the MBA program. Course introduces the fundamental coaching skills and coaching models that leaders can apply in everyday interactions with their team and colleagues in order to build trust, overcome challenges and help others discover their own full potential. (S/U grading only.) Offered irregularly.—F, W, S, Su. (S.) Charnsupharindr

423. Practicum for Managing People in Modern Organizations (1) Project—1 hour. Prerequisite: course 224. Restricted to students in the MBA program. Provides solid grounding in the management of work and the employment relationship. Examines firms’ interrelated policies and practices for managing people.—W, W Hsu
Managerial Economics

425. Digital Marketing Techniques (1)
Lecture—1 hour. Restricted to students enrolled in the MBA program. Course provides students with an introduction to digital marketing. The course introduces MBA students to the fundamental aspects and tools of online marketing communication, i.e., how organizations develop and use technology to effectively communicate their value propositions to the target customer. (S/U grading only.) Offered irregularly.—S. (S.) Blanchard

426. The Business of Healthcare (1)
Lecture—1 hour. Restricted to students enrolled in the MBA program (Business Administration—Working Professional, Business Administration—Bay Area, Business Administration—Full-Time). Course is intended to provide students with an understanding of the unique business aspects of the healthcare industry. (S/U grading only.) Offered irregularly.—F, W, S, Su. (F, W, S, Su.) Bird, Murin

427. The Business of Healthcare (1)
Lecture—1 hour. Restricted to students enrolled in the MBA program (Business Administration—Working Professional, Business Administration—Bay Area, Business Administration—Full-Time). Course looks at the pitfalls of implementing international strategies, and suggests several accessible, yet powerful frameworks to help international managers implement strategies successfully and completely. (S/U grading only.) Offered irregularly.—F, W, S, Su. (F, W, S, Su.) Katzenstein

428. Renewable Energy Ventures: Planning, Funding and Regulatory Risk Assessment for Entrepreneurs and Investors (1)
Lecture—1 hour. Restricted to students enrolled in the MBA program. Advanced innovation lab will introduce students to issues addressed by entrepreneurs and renewable ventures. Lectures, simulations, case studies and practical experience of the presenters will be delivered. Offered irregularly.—Su. (Su.) Schefsky

429. Detection and Prevention of Asset Misappropriation Fraud in the Workplace (1)
Lecture—1 hour. Restricted to students enrolled in the MBA program. Course will discuss the fundamentals of fraud detection and prevention in the workplace. Students will learn the major schemes involving workplace fraud, how management can detect fraud and what policies and procedures can be implemented to prevent fraud. Offered irregularly.—F, Su. (F, Su.) Biscoe

430. Learning From Catastrophes: Lessons for Managers (1)
Lecture—1 hour. Restricted to students enrolled in the MBA program. Catastrophes unfold in surprisingly similar ways. This course will provide students with analytic tools to analyze catastrophes to understand these common patterns and investigate how they can be prevented and mitigated. Students will then apply these lessons to management to gain unconventional insights. Offered irregularly.—Su. (Su.) Pugnetti

434. Practicum for Pricing (1)
Project—1 hour. Prerequisite: course 234. Restricted to students in the MBA program. Enhance understanding of pricing concepts and learning in Pricing by (1) teaching the necessary statistical and mathematical skills, and (2) requiring a report for a real Pricing case. (S/U grading only, pending completion of sequence.)—F. (F.)

440B. Integrated Management Project (3)
Project—3 hours. Prerequisite: first-year core courses of MBA program. Restricted to full-time MBA students. Applies classroom learning to solve complex business challenges for real world clients. Student teams learn practical consulting skills while their clients benefit from the student’s experience, insights, and work product. (F, W grading only, pending completion of sequence.)—F. (F.)

440B. Integrated Management Project (3)
Project—3 hours. Prerequisite: first-year core courses of MBA program. Restricted to full-time MBA students. Applies classroom learning to solve complex business challenges for real world clients. Student teams learn practical consulting skills while their clients benefit from the student’s experience, insights, and work product. (F, W grading only, pending completion of sequence.)—F. (F.)

442. Practicum for Marketing Communication (1)
Project—1 hour. Prerequisite: course 242. Restricted to students in the MBA program. Provides experience applying concepts learned in Marketing Communications to a realistic advertising or communication problem faced by firms. —S. (S.)

443. Practicum for Customer Relationship Management (1)
Project—1 hour. Prerequisite: course 243. Restricted to students in the MBA program. Hands-on training in applying Customer Relationship Management concepts and secondary data. Enhances ability to interpret results and decide the right type of marketing actions by requiring an executive report at the end of the quarter.—F. (F.) Aravindakshan

448. Practicum for Marketing Strategies (1)
Project—1 hour. Prerequisite: course 248. Restricted to students in the MBA program. Provides opportunities to apply the concepts covered in the Marketing Strategies class through a group project involving the analysis of strategic marketing decisions based on business-related issues, simulation and modeling.—F. (F.) Rubel

449. Marketing Research Practicum (1)
Project—1 hour. Prerequisite: course 249. Restricted to students in the MBA program. In project, students will analyze market research data and report findings in a professional manner. Offered irregularly.—F. (F.) Zuo

450. Practicum for Technology Strategy and Competition (1)
Project—1 hour. Prerequisite: course 250. Restricted to students in the MBA program. In-depth practicum project course. Apply theories, concepts, and models, learned in course 250 to a real-world business problem, through data collection, data analysis, simulation, modeling and post-model interpretation.—W. (W.) Bhargava

450. Practicum for Corporate Finance and Real Estate (1)
Project—1 hour. Prerequisite: course 260. Restricted to students in the MBA program. Work in groups to select and value a financial entity. It could be a firm, a sports player, a building, a project, or a patent. Grade based on in-class presentation and a write-up.—S. (S.) Scherbina

461. Practicum for Investment Analysis (1)
Project—1 hour. Prerequisite: course 261. Restricted to students in the MBA program. Provides practical experience applying concepts learned in Investment Analysis to a realistic portfolio management setting via a hypothetical exercise. Produce a realistic executive summary and presentation of an investment proposal for a hypothetical client.—F. (F.) R. Chen

464. Practicum for Taxes and Business Strategy (1)
Project—1 hour. Prerequisite: course 264. Restricted to students in the MBA program. Practical application of project drawing on tax planning theory contained in course 264. Project consists of a business formation and operation, change in organization (incorporation), and movement into multi-national and multi-jurisdictional tax.—F. (F.) R. Yet

465. Practicum for Venture Capital (1)
Project—1 hour. Prerequisite: course 265. Restricted to students in the MBA program. Provides an opportunity to apply concepts learned in Venture Capital in a realistic setting. Complete project analyzing a potential investment in a hypothetical venture and prepare a memo/investment agreement.—S. (S.) Yasuda

467. Practicum for Teams and Technology (1)
Project—1 hour. Prerequisite: course 267. Restricted to students in the MBA program. Groups investigate the performance, creativity, conflict, information sharing, and leadership behaviors of a real world team. Provide consulting advice to the team, which normally gives only skills, but also builds presentation skills.—S. (S.) Olson

469. Practicum for Business Intelligence Technologies (1)
Project—1 hour. Prerequisite: course 269. Restricted to students in the MBA program. Projects applying concepts learned in Business Intelligence Technologies to real business problems.—W. (W.) Yang

482. Practicum for Supply Chain Management (1)
Project—1 hour. Prerequisite: MGT, MGF or MGB 282 is a prerequisite or corequisite. Restricted to students in the MBA program. Provides an opportunity for students to gain experience in applying business methodologies previously acquired in other GSM courses. May be repeated for credit. Offered irregularly.—Su. (Su.)

490. Directed Group Study Management Practicum (1-12)
Project. Prerequisite: consent of instructor, sponsor of a GSM Academic Senate faculty member; approval of graduate adviser. Provides the opportunity for students to gain experience in applying business methodologies previously acquired in other GSM courses. May be repeated up to 6 units for credit. Offered irregularly.—F, W, S, F, W, S, J. Bunch

499. Directed Individual Study Management Practicum (1-12)
Project. Prerequisite: consent of instructor, sponsor of a GSM Academic Senate faculty member, and approval of graduate adviser. 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.)—F, W, S, F, W, S, J. Bunch

Managerial Economics

[College of Agricultural and Environmental Sciences] http://manecon.ucdavis.edu

Faculty. See Agricultural and Resource Economics, on page 154.

Major Advisers. Contact Department office.

Undergraduate Advising Center for the major, minor, and course offerings (including peer advising) is located in 1176 Social Sciences and Humanities Building, 530754-9536, http://manecon.ucdavis.edu.

The Major Program

The Managerial Economics major at UC Davis is a disciplinary program combining strong preparation in microeconomic theory and quantitative methods.
It prepares students for the analysis of management and policy issues in business, finance, marketing, production, agriculture, food distribution, natural resources, the environment, resource allocation, and international trade and development. Students specialize in one or more emphases selected from the following: (1) Business Economics focuses on the economic aspects of managerial decision-making essential for solving problems in business, management, marketing, and finance. (2) International Business Economics explores the economic drivers and policy challenges in the major emerging markets and focuses on how these markets are impacting the world economy. (3) Environmental and Resource 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 careers in business and government.

Internships and Career Alternatives. Students in Managerial Economics have opportunities to gain additional career information and preparation through internships in a variety of business enterprises and governmental agencies. Graduates qualify for supervisory and management training positions in banking, accounting, commodity and stock brokerages in the private sector, farm and ranch production, food and agricultural processing, sales and service, and a variety of agency career positions in the state, and federal government. Graduates are well qualified to seek advanced degrees in agricultural and resource economics, economics, business administration, accounting, public policy, or law. For more information, see http://sicweb.ucdavis.edu.

Study Abroad. The Agricultural and Resource Economics department encourages students to complement their Managerial Economics degree or minors with a study abroad experience. Two upper-division courses, a maximum of 4 units per course, (excluding core courses) may be taken at international campuses. Students must select courses from the pre-approved list at UC Davis Study Abroad and seek pre-approval from a Managerial Economics staff adviser.

Graduate Study. Students who meet the admission requirements of Graduate Studies and the Department of Agricultural and Resource Economics may pursue studies leading to the M.S. and Ph.D. degrees. For information on admission to graduate study, degree requirements, consult the Graduate Program Coordinator in the Department of Agricultural and Resource Economics; also see http://agecon.ucdavis.edu.

B.S. Major Requirements:

UNITS

Major English Requirement ............... 8
Choose one course from: Communications
1 or 3 ............................................. 4
University Writing Program 104A .......... 4
(1) The upper-division composition exam will not satisfy this requirement.

Preparatory Subject Matter ............... 39-41
Agricultural and Resource Economics 18 ........................................... 4
Economics 1A-1B ..................................... 8
One course from: Philosophy 21
Engineering Computer Science 10, 15 or 30 .............................................. 3
Management 11A-11B ............................. 4
Mathematics 16A-16B-16C, 17A-17B, or 21A-21B ............................. 8
Statistics 13, 103 .................................. 8

Total Depth Subject Matter ............... 52-55
Core ............................................. 20
Agricultural and Resource Economics 100A, 100B, 106, 153 and Economics 101 ......... 3
Restricted Electives ............................. 32-35
Choose at least one of the emphases below:

Business Economics emphases
Choose at least 16 units from: Agricultural and Resource Economics 112, 118, 119, 136, 157, 171A, 171B.
Select the remaining 16 units from the above list or from Agricultural and Resource Economics 115A, 115B, 120, 121, 130, 132, 138, 139, 140, 143, 144, 145, 146, 150, 156, 175, 176, 194HA-194HB, Economics 115A, 115B, 121A, 121B, 151A, 151B, 160A, 160B.

International Business Economics
Select the remaining 12 units from the above list or from Agricultural and Resource Economics 120, 171A, 171B, 175, 176, Economics 121A, 121B, Political Science 130.

Environmental and Resource Economics
Agricultural and Resource Economics 175 and 176 ....................................... 8
Select the remaining 12 units from the above list or upper-division courses in Agricultural and Resource Economics, Environmental Science and Policy 160, 161, 163, 166, 167A, 167B, 172, 173 or Environmental Toxicology 138.

Agricultural Economics Emphases
Choose at least 16 units from Agricultural and Resource Economics 120, 121, 130, 132, 138, 140, 145, 150.
Select the remaining 16 units from the above list or upper-division courses in Agriculture and Resource Economics and/or Economics.
* Students must attain a major GPA of at least a C average (2.000) in courses taken for depth subject matter (core and restricted electives). These courses must be taken for a letter grade. All restricted elective courses taken will be calculated as part of the major GPA, including courses with F grades that have not been repeated.

Total Units for the Major .................. 99-104

Minor Program Requirements:

UNITS

Managerial Economics .......................... 24
Agricultural and Resource Economics 100A, 100B, and 21A-21B ............................. 12

NOTE: Preparation for the minor includes Economics 1A, 1B; Mathematics 16A-16B-16C or 17A-17B or 21A-21B; Statistics 13 and 103.

Prerequisites for courses taken for the minor are mandatory and should be taken through. Accordingly, upper-division class to satisfy the minor may be taken for passed/not passed grading. All minor courses must be taken in residence. Two upper-division courses, a maximum of 4 units per course, may be taken through UC Study Abroad. Students must seek pre-approval from a Managerial Economics staff adviser for any international courses.

B.S. Major Requirements:

1 denotes courses only offered at Bodega Marine Laboratory.

UNITS

Preparatory Subject Matter ............... 51-63
Biological Sciences 2A-2B-2C ............................ 15

Marine and Coastal Science

The major in Marine and Coastal Science focuses on the interdisciplinary nature of marine sciences, by exposing students to core, breadth, and focus area courses in the discipline, in addition to a strong foundation of science preparatory material. The major builds upon existing strengths at UC Davis in marine and coastal sciences as well as field-based courses offered at Bodega Marine Laboratory to provide students with a unique, interdisciplinary, “hands on” education. Advising is provided by the Department of Earth and Planetary Sciences for interested students.

The Program. The major begins with introductory courses in mathematics, chemistry, physics, biology, and earth sciences. These are followed by core courses in Marine and Coastal Science. The major requirements provide focus and breadth, so that each student gains mastery in one area and broad exposure to many facets of Marine and Coastal Science. Focus and Breadth areas include: Coastal Environmental Processes, Marine Ecology and Organismal Biology, Marine Environmental Chemistry, and Oceans and the Earth System.

In this major, students will be exposed to the foundational disciplines within marine science (biology, chemistry, geology, physics) as well as modern issues facing marine and coastal environments; e.g., climate change, pollution, carbon cycling, conservation. The major requires field experience, independent research or internship, and concludes with a capstone course featuring current research in marine science. These integrative experiences will require students to synthesize the disciplinary topics that they have encountered through this degree program. The mastery achieved provides a strong foundation for future careers in academic science, government, policy, and the private sector.

Internships and Career Alternatives. A B.S. in Marine and Coastal Science will provide students with knowledge and practical experience needed to pursue careers in marine science (government, private sector, research) and/or advanced degree programs. The major program includes both research and internship experiences to help prepare students for these career paths. Advising. Students majoring in Marine and Coastal Science are strongly encouraged to meet with their faculty adviser (assigned, based upon Focus Area choice) once per year to review their coursework plans. Staff advising is available through the Department of Earth and Planet Sciences, and student peer advisers are available. Faculty advisers include: Tessa Hill (College of Letters and Science), Anne Toddghm and John Lagier (College of Agricultural and Environmental Sciences), and Brian Gaylord (College of Biological Sciences). The student’s chosen Focus Area will determine the college into which the student is admitted, the college where the degree is awarded, and the associated department:

- Coastal Environmental Processes, College of Agricultural and Environmental Sciences; Environmental Science & Policy
- Marine Ecology & Organismal Biology, College of Biological Sciences; Evolution & Ecology
- Marine Environmental Chemistry, College of Agricultural and Environmental Sciences; Environmental Toxicology
- Oceans and the Earth System, College of Letters and Science; Earth and Planetary Sciences

B.S. Major Requirements:
Master of Education (M.Ed.) (A Graduate Group)

Chemistry 2A-2B-2C ................. 15
Mathematics 16A-16B-16C, 17A-17B-17C, or 21A-21B-21C ................. 9-12
Note: Students in Marine Ecology & Organismal Biology focus area must take 17A-17B-17C or 21A-21B.
Physics 7A-7B-7C or 94A-94B-9C ................. 12-15
Chemistry 8A-8B for students in Marine Ecology & Organismal Biology focus area ........................................ 6
Evolution & Ecology 12 and 16 are strongly recommended.

Depth Subject Matter ................. 46-75
Geology 116N (Environmental Science & Policy 116N) ...................... 3
Statistics 100 or 102 ....................... 4
Two courses from: Geology 150A (Environmental Science & Policy 150A), Geology 150B (Environmental Science & Policy 150B), Geology 150C (Environmental Science & Policy 150C), 7-8
Two courses from: Atmospheric Sciences 120, Environmental Science and Policy 100, 110, Environmental Toxicology 101, 102, Hydrology 100, 101, 112, 112L, Hydrology 103N .................................................. 8-9
Evolution & Ecology 111 (Environmental Science and Policy 111) ........ 1
Marine Ecology & Organismal Biology focus area: Biological Sciences 101, 102, 103 or 105, and 104 ........................................... 10-13
Courses cannot be utilized to fulfill multiple requirements, with the exception that any Bodega Marine Laboratory course simultaneously fulfills the field requirement below.

Focus Area Requirement ................. 12
Complete at least four courses from one category below, totaling at least 12 units.

Coastal Environmental Processes. Emphasis on processes and environments of the coastal zone, and the strong physical-geological connection that exists here. Courses highlight the critical terrestrial-marine interface and fundamental physical processes in the coastal zone.

Some courses may require additional prerequisites, such as: Atmospheric Sciences 120, Math 210, Chemistry 88, Environmental Science and Policy 100, Hydrology 103N, Hydrology 141, Hydrology 145, Engineering, Civil and Environmental 144.

Marine Ecology and Organismal Biology. Focus on physiological adaptations to the marine environment, and the biology of marine species from the molecular to population levels. Courses include emphasis on the ecological processes that determine the distribution and abundance of marine organisms, and the patterns and mechanisms of evolution in the ocean.


Marine Environmental Chemistry. Emphasis on major themes in marine chemistry, geochemistry, the carbon cycle, and contaminant fate and transport.

Some courses may require additional prerequisites, such as: Chemistry 88, Geology 50, 60, Hydrology 145, 145C, and Environmental Engineering 144.

Oceans and the Earth System. A study of our changing oceans in the context of earth system history, including climate change, paleoceanography, ecological shifts, conservation, and marine policy.

Some courses may require additional prerequisites, such as: Atmospheric Sciences 60, Geology 8A, Geology 1, Economics 1A, 145, Environmental Resources 100, International Relations 1

Breadth Requirement .................................. 6
Complete one course from each category below that is not the student's chosen Focus Area, totaling at least 8 units.


Marine Ecology and Organismal Biology. The breadth requirement can be fulfilled using the following courses: Environmental Science & Policy 124, *155, Evolution & Ecology *110, *114, 115, Environmental Toxicology *112, Neurobiology, Physiology, and Behavior 141*141P

Marine Environmental Chemistry. The breadth requirement can be fulfilled using the following courses: Environmental Toxicology 120, Chemistry 100, Geology 182, Hydrology 134, 141

Oceans and the Earth System. The breadth requirement can be fulfilled using the following courses: Atmospheric Sciences *116, Environmental Science & Policy 166N, Evolution & Ecology *120, Geology 107, 108, Wildlife, Fish and Conservation Biology 154

Some courses may require additional prerequisites; see above.

Field Requirement .................................. 0-14

The Field Requirement provides exposure to field techniques, experimental design, and the marine environment itself. It is highly recommended that students fulfill this requirement by residence at Bodega Marine Laboratory for one or more courses; see courses denoted with a T. Bodega Marine Laboratory courses may simultaneously fulfill an additional requirement in categories above ........................................... 0 OR
Alternatively, students may fulfill the Field Requirement by taking two of the following courses; these courses cannot fulfill multiple requirements: Geology 109L, Evolution and Ecology 112L, Biological Sciences 121, Environmental Science & Policy 123, 151L, Geology 182, Wildlife, Fish & Conservation Biology 100, 102L, 157 ................................................................. 4-14

Internship/Research .................................. 3

Biological Sciences 124, Geology 192, Environmental Science & Policy 192, Evolution and Ecology 192, 199 or equivalent.

Total Units for the Major (by chosen Focus Area)

Coastal Environmental Processes .... 97-119
Marine Ecology & Organismal Biology ............................................ 113-138
Marine Environmental Chemistry .... 97-119
Oceans and the Earth System .... 97-119

Master of Education (M.Ed.) (A Graduate Group)

The Master of Education (M.Ed.) program is no longer admitting students; admissions are suspended.

Master of Professional Accountability (A Graduate Group)

Robert Yetman, Ph.D., Chairperson of the Group

Group Office. Gallagher Hall 530-752-7658; Fax 530-754-9355; http://sgm.ucdavis.edu/master-professional-accountability

Faculty

Shannon W. Anderson, Ph.D., Professor (Graduate School of Management)
Brad Barber, Ph.D., Professor (Graduate School of Management)
Joseph Chen, Ph.D., Associate Professor (Graduate School of Management)
Roger Edelen, Ph.D., Associate Professor (Graduate School of Management)
Paul A. Griffin, Ph.D., Professor (Graduate School of Management)
Robert Marquez, Ph.D., Professor (Graduate School of Management)
Hallis A. Skille, Ph.D., Professor (Graduate School of Management)
Victor Stango, Ph.D., Associate Professor (Graduate School of Management)
Ayako Yasuda, Ph.D., Associate Professor (Graduate School of Management)
Michelle Yetman, Ph.D., Associate Professor (Graduate School of Management)
Robert Yetman, Ph.D., Professor (Graduate School of Management)
Paul Wong, Ph.D., Assistant Professor (Graduate School of Management)

Affiliated Faculty

Will Snyder, M.B.A., C.P.A., Executive Director (Graduate School of Management)

Graduate Adviser. Contact the Group office.

Courses in Master of Professional Accountability (ACC)

Graduate

201. Financial Reporting (4)
Lecture—4 hours. Restricted to Master of Professional Accountability graduate students. Coverage includes the fundamentals of accounting and reporting of operating events and transactions. Emphasizes the preparation of balance sheets, income statements, statements of cash flow, and statements of stockholders' equity. Not open for credit to students who have taken any Management 200A. —F (F. Yetman)

Lecture—4 hours. Prerequisite: course 201 or Management 200A. Restricted to students enrolled in the Master of Professional Accountability degree program. Focuses on the preparation of complex financial statements. Topics include accounting
Master of Preventive Veterinary Medicine (A Graduate Group)

Ashley Hill, D.V.M., M.P.V.M., Ph.D., Chairperson of the Group

Group Office. 5215 Vet Med 3A
330-752-2657; Fax 330-754-9161;

241. Auditing and the Accounting Profession (4)
Lecture—4 hours. Prerequisite: course 201; any Management 200A. Restricted to Graduate School of Management students. Introduction to the audit environment, professional standards, the accounting profession, and the professional responsibilities of accountants. Integrate audit topics across the areas of financial, cost, tax and systems accounting. (S/U grading only.)—F. (F.) Snyder

243. Auditing and Attestation Services (4)
Lecture—4 hours. Prerequisite: course 241. Restricted to graduate students in Graduate School of Management. Advanced treatment of the audit process and environment. Topics include audit planning and performance, internal controls, professional standards, and audit reports. Reviews, compilations and attestation services are examined. As with governmental agency audits. —S. (E.) Ekanayake

251. Managerial Accounting and Controls (4)
Lecture—4 hours. Prerequisite: course 201; any Management 200A. Restricted to graduate students in the Graduate School of Management. Analysis of management accounting systems including cost accounting, performance measurement, and compensation and reward systems. Focuses on the production of information useful for managerial decision-making, as well as the design of these systems. Not open for credit to students who have completed any Management 271. —W. (W.) Anderson

253. Accounting Information and Control Systems (4)
Lecture—4 hours. Prerequisite: course 201 or any Management 200A. Restricted to graduate students in Graduate School of Management. Analysis of information systems in accounting, including controls, keeping, and control. Topics include the regulatory requirements of accounting control systems as well as their implementation and auditing considerations. Not open for credit to students who have taken any Management 271. —W. (W.)

261. Communications for Professional Accountants (4)
Lecture—4 hours. Prerequisite: course 201 or any Management 200A. Restricted to graduate students in Graduate School of Management. Analysis of written and oral professional communications with an emphasis on structuring and documenting audits and reports, understanding audiences (investors, creditors, regulators, and other stakeholders), and consideration of ethical and regulatory responsibilities. Not open for credit to students who have taken any Management 200A. —W. (W.) Kennedy

271. Accounting Ethics (4)
Lecture—4 hours. Prerequisite: course 201; any Management 200A. Restricted to graduate students in Graduate School of Management. Analysis of accounting ethics, including the behavioral foundations of ethics in a business environment, how those elements affect accountants' integrity, objectivity, and independence. Professional standards related to accountants' conduct are also covered. —F. (F.) Yetman

Falling 2011 and on Revised General Education (GE) AE—Arts and Humanities; SC—Science and Engineering; SS—Social Sciences; OL—Oral Skills; Q—Quantitative; SL—Scientific; VE—Visual; WC—World Cultures; WE—Writing Experience

Pre-Fall 2011 General Education (GE): AH—Arts and Humanities; SC—Science and Engineering; SS—Social Sciences; Div—Diverse

Quarter Offered: F=Fall, W=Winter, S=Spring, Su=Summer.
Mark Thurmond, D.V.M., M.P.V.M., Ph.D., Professor Emeritus
(Medicine & Epidemiology)
Graduate Adviser. Contact the Group office.

Courses in Preventive Veterinary Medicine (PMV)
Graduate
200. Introduction to Information Management for Epidemiologists (1)
Laboratory—1 hour. Restricted to students in the Master of Preventive Veterinary Medicine program. Introduction to practical application of epidemiological methods to solve problems involving population health data. Emphasis on using spreadsheet/database software tools for organizing, analyzing, reporting, and interpreting data. Ten, three-hour sessions. —Su. (Su.) Lehnenbauer

201. Emerging Issues at the Interface of Animal, Human, and Ecosystem Health (2.5)
Lecture—1 hour; discussion—1.5 hours. Class size limited to 35 students. Introduce one health topics emphasizing relationships between environmental, animal and human health. Topics include ecosystem change and impacts on animals and humans, cross-species transmission and approaches for addressing critical data gaps to inform ecosystem health and disease prevention. —F. (F.) Johnson

202. Medical Statistics I (4)
Lecture—13 sessions; laboratory—10 sessions. Prerequisite: MPVM or MPH standing, or consent of the instructor. Restricted to 80 students. Basic statistics in clinical, laboratory and population medicine: descriptive statistics; probability; binomial, Poisson, normal, t-, F-, and Chi-square distributions; sampling distributions; parameter estimation; hypothesis testing; elementary nonparametric methods, simple linear regression and correlation; life table construction and analysis. —Su. (Su.) Johnson

203. Medical Statistics II (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: course 202 (or equivalent) or consent of instructor. Continuation of course 202. Analysis of variance in biomedical sciences; nonparametric methods; multiple regression; unconditional logistic regression; biomedical applications of statistical methods. Microcomputer applications in population medicine to reinforce principles that are taught in lecture. —W. (W.) Johnson

204. Medical Statistics III (4)
Lecture—3 hours; laboratory—2 hours. Continuation of course 203. selecting the best regression equation, conditional logistic regression, Poisson regression, survival analysis, analysis of time dependent variation and trends. Microcomputer applications in population medicine to reinforce principles that are taught in lecture. —W. (W.) Johnson

205. Principles of Epidemiology (4)
Lecture—4 hours. Prerequisite: course 202, an introductory statistics course, or consent of the instructor. Continuation of course 202. Basic epidemiologic concepts and approaches to epidemiologic research, with examples from veterinary and human medicine including: research, hypothesis testing, infectious disease epidemiology, properties of tests, and an introduction to epidemiologic study design and surveillance. (Same course as Epidemiology 205.) —F. (F.) Johnson

206. Epidemiologic Study Design (4)
Lecture—30 sessions, discussion—9 sessions; laboratory—2 sessions. Prerequisite: course 205 or consent of instructor. Builds on concepts presented in course 205. Covers epidemiologic study design—clinical trials, observational cohort studies, 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 Epidemiology 206.) —F., W., S. (F., W., S. J.) Atwill

207. Applied Epidemiologic Problem Solving (1)
Laboratory discussion—2 hours. Integration of epidemiologic and statistical methodology in a problem-solving approach to contemporary animal population health issues. Data validation and manipulation. —W. (W.) Martinez-Lopez

Professional
202. Medical Statistics I (3)
Lecture—37 sessions; laboratory—13 sessions. Prerequisite: MPVM standing in the School of Veterinary Medicine or consent of instructor. Statistics in clinical, laboratory and population medicine: graphical and tabular presentation of data; probability; binomial; Poisson, normal, t-, F-, and Chi-square distributions; elementary nonparametric methods; simple linear regression and correlation; life tables. Microcomputer applications of statistical procedures in population medicine. —F., W. (F., W.) Farver

203. Medical Statistics II (3)
Lecture—20 sessions; laboratory—10 sessions. Prerequisite: MPVM standing in the School of Veterinary Medicine and/or successful completion of course 402 (or equivalent) or consent of instructor. Analysis of variance in biomedical sciences; non-parametric methods; multiple regression; biomedical applications of statistical methods. Microcomputer applications to reinforce principles that are taught in lecture. Continuation of course 402. —F., W. (F., W.) Farver

204. 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 variance, survival analysis—simulating the best regression equation; biomedical applications. —S. (S.) Farver

401. Epidemiology Laboratory (1)
Lecture—1 session; lecture/discussion—1 session; laboratory—1 session. Prerequisite: MPVM standing in the School of Veterinary Medicine or consent of instructor. Practical application of epidemiological methods using the microcomputer as a tool to solve problems. Utilizes spreadsheets and databases as tools to organize and analyze data. Emphasize epidemiological methods introduced in course 405. Data sets provided. —F., W. (F., W.) Lehnenbauer

408A. Veterinary Research: Planning and Reporting (2)
Lecture—20 sessions. Prerequisite: MPVM standing in the School of Veterinary Medicine or consent of instructor. Planning, critical analysis, ethics, and written and oral communication of veterinary research. —Foley

408B. Veterinary Research: Planning and Reporting (1)
Lecture—10 sessions. Prerequisite: MPVM standing in the School of Veterinary Medicine or consent of instructor. Planning, critical analysis, ethics, and written and oral communication of veterinary research. —S. (S.) Farver

408C. Veterinary Research: Planning and Reporting (1)
Discussion—10 sessions. Prerequisite: Master of Preventive Veterinary Medicine standing in the School of Veterinary Medicine or consent of instructor; completion of course 408A and course 408B. Planning, critical analysis, ethics, and written and oral communication of veterinary research. —S. (S.) Chomel

410. Animal Health Policy and Risk Communication (1)
Discussion—10 sessions. Prerequisite: MPVM standing in the School of Veterinary Medicine or consent of instructor. International, national and state policy issues affecting veterinary medicine, how policy is made, organizational cultures, the role of science in policy-making, ten best practices in risk/crisis com-
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 fellowship pursuing interdepartmental research and teaching in this area of inquiry.

Courses in Mathematical and Physical Sciences (MPS)

**Lower Division**

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 the scientific method; the historical development of scientific thought; the scientific method; the history of scientific thought; and the relationship between science and society. Offered irregularly. GE credit: SciEng.—F, W, S.

2. **11A. Mathematical and Physical Sciences Seminar (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. Offered irregularly.—F, W, S (F, W, S)

3. **11B. Mathematical and Physical Sciences Seminar (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. Offered irregularly.—F, W, S (F, W, S)

### Mathematics

See Mathematics; and Applied Mathematics (A Graduate Group), on page 177.

**Mathematics**

[College of Letters and Science]  
Dan Romik, Ph.D., Chairperson  
Department Office, 1130 Mathematical Sciences Bldg.  
530-752-0827;  
studentservices@math.ucdavis.edu;  
http://www.math.ucdavis.edu

**Faculty**

Javier Arsuaga, Ph.D., Professor (Molecular and Cellular Biology)  
Erin Babson, Ph.D., Professor  
Zhaonan Bai, Ph.D., Professor (Computer Science)  
Craig Benham, Ph.D., Professor  
Joseph Biello, Ph.D., Professor  
James Bremer, Ph.D., Associate Professor  
Angela Y. Cheer, Ph.D., Professor  
Tudor Dimofte, Ph.D., Assistant Professor  
Jesus De Loera, Ph.D., Professor  
C. Albert Fannjiang, Ph.D., Professor  
Roland Freund, Ph.D., Professor  
Michael P. Friedlander, Ph.D., Professor  
Eugene Gorsky, Ph.D., Assistant Professor  
Janko Gravner, Ph.D., Professor

Niels Gronbech-Jensen, Ph.D., Professor (Mechanical Engineering)  
Robert Guralnik, Ph.D., Professor  
Joel Hass, Ph.D., Professor  
John K. Hunter, Ph.D., Professor  
Adam J. Jacob, Ph.D., Assistant Professor  
Michael Kapovich, Ph.D., Professor  
Matthias Koecke, Ph.D., Professor  
Gregory J. Kuperberg, Ph.D., Professor  
Timothy Lewis, Ph.D., Professor  
Fu Liu, Ph.D., Professor  
Kevin Luli, Ph.D., Assistant Professor  
Ben Morris, Ph.D., Professor  
Matoiha Mulase, Ph.D., Professor  
Academic Senate Distinguished Teaching Award  
Bruno I. Nachtergaele, Ph.D., Professor  
Brian Osserman, Ph.D., Professor  
E. Gerry Puckett, Ph.D., Professor  
Dan Romik, Ph.D., Associate Professor  
Naoki Saito, Ph.D., Professor  
Anne Schilling, Ph.D., Professor  
Jennifer Schultens, Ph.D., Professor  
Albert Schwarz, Ph.D., Professor  
Steve Shkolnik, Ph.D., Professor  
Alexander Soshnikov, Ph.D., Professor  
Thomas Strohmeier, Ph.D., Professor  
J. Blake Temple, Ph.D., Professor  
UC Davis Distinguished Professor 2012  
Becca Tomases, Ph.D., Associate Professor  
Abigail Thompson, Ph.D., Professor  
(Library and Information Science)  
Samuel Walcott, Ph.D., Associate Professor  
Andrew Waldron, Ph.D., Professor  
Qingxin Xio, Ph.D., Professor

**Emerti Faculty**

David Barnett, Ph.D., Professor Emeritus  
Donald C. Benson, Ph.D., Professor Emeritus  
Carlos R. Borges, Ph.D., Professor Emeritus  
Robert J. Buck, Professor Emeritus  
Guthman D. Chakerian, Ph.D., Professor Emeritus  
Academic Senate Distinguished Teaching Award  
Doyne O. Culler, Ph.D., Professor Emeritus  
James R. Diederich, Ph.D., Professor Emeritus  
Dmitry B. Fuchs, Ph.D., Professor Emeritus  
Robert D. Glaouz, Ph.D., Professor Emeritus  
Kurt Kreith, Ph.D., Professor Emeritus  
Arthur J. Krener, Ph.D., Professor  
Melwen R. Krom, Ph.D., Professor Emeritus  
Gary J. Kravowski, Ph.D., Professor Emeritus  
David G. Mead, Ph.D., Professor Emeritus  
Academic Senate Distinguished Teaching Award  
E. O. Milton, Ph.D., Professor Emeritus  
Academic Senate Distinguished Teaching Award  
Alexander I. Mogilner, Ph.D., Professor Emeritus  
Donald A. Norton, Ph.D., Professor Emeritus  
Washek F. Pfeffer, Ph.D., Professor Emeritus  
G. Thomas Sallee, Ph.D., Professor  
Academic Senate Distinguished Teaching Award  
Sherman K. Stein, Litt.D. (hon’), Ph.D., Professor Emeritus  
Academic Senate Distinguished Teaching Award  
Howard J. Weiner, Ph.D., Professor Emeritus  
Roger Wets, Ph.D., Professor Emeritus

**Affiliated Faculty**

Ali Dad-del, Ph.D., Lecturer  
Academic Federation Excellence in Teaching Award  
Duanmei Koubia, Ph.D., Lecturer

**The Major Programs**

Mathematics is the study of abstract structures, space, change, and their interrelations. It also is the language of the exact sciences. The Program. Students majoring in mathematics may follow a program leading to either the Bachelor of Arts or the Bachelor of Science degree. After completing basic introductory courses such as calculus and linear algebra, students plan an upper division program in consultation with a faculty adviser. The upper division course offering is grouped into entry level, core, and enrichment. Entry level courses are designed to serve as a bridge between the core mathematical of the lower division and the more abstract concepts taught in upper division courses. The core courses are intended to provide basic mathematical techniques, whereas the enrichment courses allow students to further mathematical knowledge and skills that feature their research or career interests. This individualized program can lead to graduate study in pure or applied mathematics, elementary or secondary level teaching, or to other professional goals. It can also reflect a special interest such as complex and applied mathematics, computer science, or statistics, or may be combined with a major in some other field.

**Career Alternatives.** A degree in mathematics provides entry to many careers in addition to teaching. For instance, operations research, systems analysis, computing, actuarial work, insurance, and financial services are only a few such careers. Mathematics is also a sound basis for graduate work in a variety of fields, such as law, engineering, and economics.

**A.B. Major Requirements:**

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Requirements</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preparatory Subject Matter</strong></td>
<td>Mathematics 12 (or high school equivalent)</td>
<td>0-3</td>
</tr>
<tr>
<td>Mathematics 21A, 21B, 21C, 21D, 22B, 22E</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>Mathematics 111, 112, 120, 121, 122, 130, 131</td>
<td></td>
<td>23</td>
</tr>
<tr>
<td>One of the following two options:</td>
<td></td>
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</tr>
<tr>
<td>(a) Mathematics 22A and 108 OR (b) Mathematics 67</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Computer Science 30 or Engineering 134</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Mathematics 22AL or equivalent MATLAB knowledge</td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td>Additional non-Mathematics courses chosen from</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>natural sciences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NOTE: Basic knowledge of MATLAB is required for</td>
<td></td>
<td></td>
</tr>
<tr>
<td>both Mathematics 67 and 22A. Students can learn</td>
<td></td>
<td></td>
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<tr>
<td>on their own, enroll in Engineering 6, Mechanical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering 6, or in the one unit course Mathematics 22AL can be taken concurrently.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Depth Subject Matter**

**A. Entry Level (Optional)**

**B. Core**

- Mathematics 125A ........................................ 4
- Mathematics 125B ........................................ 4
- Mathematics 135A ........................................ 4
- Mathematics 150A ........................................ 4
- One of the following two courses (to total 12)
  - **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.

**Plan 1: General Mathematics**

Additional upper division mathematics units selected in consultation with and subject to approval of an adviser.

**Plan 2: Secondary Teaching Mathematics**

Add 12 additional upper division mathematics units selected in consultation with and subject to approval of an adviser.

**NOTE:** Students who wish to satisfy the single subject matter waiver for the teaching credential should see an adviser as early as possible.

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Requirements</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics 180 or 192 (Internship in Applied</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>Mathematics 194 (Undergraduate Thesis) or 180</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Special Topics) or an approved substitute in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>consultation with the Undergraduate Vice Chair.</td>
<td></td>
<td>34</td>
</tr>
</tbody>
</table>

**Fall 2011 and on Revised General Education (GE)\[AHI-Arts and Humanities; SCI-Science and Engineering; SS-Social Sciences; AGCH-American Cultures; DD-Dominant Diversity; QL-Quantitative; SL-Scientific; V-L-Visual; WC-World Cultures; WE-Writing Experience Pre-Fall 2011 General Education (GE): AhH-Arts and Humanities; ScilEng-Science and Engineering; SocSci-Social Sciences; Div-Dominant Diversity; Wrt-Writing Experience Quarter Offered: F-Fall; W-Winter; S-Spring; Su-Summer; 2017-2018 offering in parentheses**
Applied Mathematics

B.S. Major Requirements:

Preparatory Subject Matter ............... 42-52
Mathematics 12 (or high school equivalent) ... 0-3
Mathematics 21A, 21B, 21C, 21D, 228, 25 ... 23

One of the following two options: (a)
Mathematics 22A and 108 OR (b) Mathematics 67 ... 4-7

Mathematics 69 (or equivalent basic knowledge of MATLAB) ... 0-1

Computer Science 30, 40 ... 8

One two-quarter sequence from: Physics 9A-9B; Biological Sciences 2A-2B; Chemistry 2A-2B; Economics 1A-1B; Statistics 32, 100; or other applied preparatory courses approved by your adviser ... 7-10

NOTE: Basic knowledge of MATLAB is required for both Mathematics 67 and 22A.

Students can learn it on their own, enroll in Engineering 6, Mechanical Engineering 5 or in the one unit course Mathematics 22AL (can be taken concurrently).

Depth Subject Matter ............... 51-56

A. Entry Level (Optional) ............... 0-4
Suggested choice; one course from:
Mathematics 108, 114, 115A, 141, 145

B. Core ........................................ 28

Mathematics 10A ............................ 4
Mathematics 125A ............................ 4
Mathematics 125B ............................ 4
Mathematics 125C ............................ 4
Mathematics 115A ............................ 4
Mathematics 185A ............................ 4

C. Enrichment ................................ 20
Choice of five courses from Mathematics, between Mathematics 111 and Mathematics 185B (or Mathematics 180) worth at least four units each. Up to four units can be approved upper division units outside the Department of Mathematics with extensive use of mathematics.

D. Capstone Course: Mathematics 189 or 192 (Internship in Applied Mathematics or 194 [Undergraduate Thesis] or 180 [Special Topics]) or an approved substitute in consultation with the Undergraduate Vice Chair ... 3-4

Plan: Mathematics for Secondary Teaching

A. Entry Level (Optional) ............... 0-4
Suggested choice; one course from:
Mathematics 108, 114, 115A, 141, 145

B. Core ........................................ 28

Mathematics 10A ............................ 4
Mathematics 125A ............................ 4
Mathematics 125B ............................ 4
Mathematics 125C ............................ 4
Mathematics 115A ............................ 4
Mathematics 185A ............................ 4

C. Enrichment ................................ 20
Choice of five courses from Mathematics, between Mathematics 111 and Mathematics 185B (excluding Mathematics 180) worth at least four units each. Up to four units can be approved upper division units outside the Department of Mathematics with extensive use of mathematics.

D. Capstone Course: Mathematics 189 or 192 (Internship in Applied Mathematics or 194 [Undergraduate Thesis] or 180 [Special Topics]) or an approved substitute in consultation with the Undergraduate Vice Chair ... 3-4

Total Units for the Major ............... 86-98

Mathematics

B.S. Major Requirements:

Preparatory Subject Matter ............... 43-50
Mathematics 12 (or high school equivalent) ... 0-3
Mathematics 21A, 21B, 21C, 21D, 228, 25 ... 23

One of the following two options: (a)
Mathematics 22A and 108 OR (b) Mathematics 67 ... 4-7

Mathematics 69 (or equivalent basic knowledge of MATLAB) ... 0-1

Computer Science 30 ... 8

Physics 9A [Plan 1] or one course from:
Physics 7A, 9A, Statistics 13, 32, 100 [Plan 2] ... 3-5

NOTE: Basic knowledge of MATLAB is required in both Mathematics 67 and 22A. Students can learn it on their own in Engineering 6, Mechanical Engineering 5 or in the one unit course Mathematics 22AL (can be taken concurrently).

Depth Subject Matter ............... 51-56

A. Entry Level (Optional) ............... 0-4
Choices: 1 course from Mathematics 108, 114, 115A, 141, 145

B. Core ........................................ 28

Mathematics 10A ............................ 4
Mathematics 125A ............................ 4
Mathematics 125B ............................ 4
Mathematics 125C ............................ 4
Mathematics 115A ............................ 4
Mathematics 185A ............................ 4

C. Enrichment ................................ 20
Choice of five courses from Mathematics, between Mathematics 111 and Mathematics 185B (excluding Mathematics 180) worth at least four units each. Up to four units can be approved upper division units outside the Department of Mathematics with extensive use of mathematics.

D. Capstone Course: Mathematics 189 or 192 (Internship in Applied Mathematics or 194 [Undergraduate Thesis] or 180 [Special Topics]) or an approved substitute in consultation with the Undergraduate Vice Chair ... 3-4

Total Units for the Major ............... 94-105

Mathematical Analytics and Operations Research

B.S. Major Requirements:

Preparatory Subject Matter ............... 35-42
Mathematics 12 (or high school equivalent) ... 0-3
Mathematics 21A, 21B, 21C or Mathematics 17A, 17B, 17C, 21D, 228, 25 ... 23

One of the following two options: (a)
Mathematics 22A and 108 OR (b) Mathematics 67 ... 4-7

Mathematics 69 (or equivalent basic knowledge of MATLAB) ... 0-1

Computer Science 30 ... 8

NOTE: Basic knowledge of MATLAB is required in both Mathematics 67 and 22A.

Students can learn it on their own, enroll in Engineering 6, Mechanical Engineering 5 or in the one unit course Mathematics 22AL (can be taken concurrently).

Depth Subject Matter ............... 51-56

A. Entry Level (Optional) ............... 0-4
Suggested choice; one course from:
Mathematics 108, 114, 115A, 141, 145

B. Core ........................................ 28

Mathematics 10A ............................ 4
Mathematics 125A ............................ 4
Mathematics 125B ............................ 4
Mathematics 125C ............................ 4
Mathematics 115A ............................ 4
Mathematics 185A ............................ 4

C. Enrichment ................................ 20
Choice of five courses from Mathematics, between Mathematics 111 and Mathematics 185B (excluding Mathematics 180) worth at least four units each. Up to four units can be approved upper division units outside the Department of Mathematics with extensive use of mathematics.

D. Capstone Course: Mathematics 189 or 192 (Internship in Applied Mathematics or 194 [Undergraduate Thesis] or 180 [Special Topics]) or an approved substitute in consultation with the Undergraduate Vice Chair ... 3-4

Total Units for the Major ............... 85-98

Mathematical and Scientific Computation

B.S. Major Requirements:

Preparatory Subject Matter ............... 35-42
Mathematics 12 (or high school equivalent) ... 0-3
Mathematics 21A, 21B, 21C or Mathematics 17A, 17B, 17C, 21D, 228, 25 ... 23

One of the following two options: (a)
Mathematics 22A and 108 OR (b) Mathematics 67 ... 4-7

Mathematics 69 (or equivalent basic knowledge of MATLAB) ... 0-1

Computer Science 30 ... 8

NOTE: Basic knowledge of MATLAB is required in both Mathematics 67 and 22A.

Students can learn it on their own, enroll in Engineering 6, Mechanical Engineering 5 or in the one unit course Mathematics 22AL (can be taken concurrently).

Depth Subject Matter ............... 51-56

A. Entry Level (Optional) ............... 0-4
Suggested choice; one course from:
Mathematics 108, 114, 115A, 141, 145

B. Core ........................................ 28

Mathematics 10A ............................ 4
Mathematics 125A ............................ 4
Mathematics 125B ............................ 4
Mathematics 125C ............................ 4
Mathematics 115A ............................ 4
Mathematics 185A ............................ 4

C. Enrichment ................................ 20
Choice of five courses from Mathematics, between Mathematics 111 and Mathematics 185B (excluding Mathematics 180) worth at least four units each. Up to four units can be approved upper division units outside the Department of Mathematics with extensive use of mathematics.

D. Capstone Course: Mathematics 189 or 192 (Internship in Applied Mathematics or 194 [Undergraduate Thesis] or 180 [Special Topics]) or an approved substitute in consultation with the Undergraduate Vice Chair ... 3-4

Total Units for the Major ............... 85-98

Recommended Language Preparation, Bachelor of Science degree candidates are advised, but not required, to satisfy the same language requirement as that for a Bachelor of Arts degree candidate, and to fulfill it in French, German, or Russian.
Major Advisers. For a current list of faculty and staff advisers, contact the Student Services office at studentservices@math.ucdavis.edu, or see https://www.math.ucdavis.edu/undergrad/advising/advisers/.

Depth Subject Matter Requirements. Certain mathematically oriented courses given by other departments in full satisfaction of the depth subject matter requirements with prior departmental approval. Up to three units of Mathematics 194 may be counted toward the depth subject matter requirements. Additionally, up to three units of Mathematics 198 or Mathematics 199 can be counted.

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. Programs to be used for this are available on our website or from the Department office. 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 website, as well as by consulting a faculty adviser. Information about the Department’s faculty advisers can be found on our website.

Mathematics Placement Requirement. Students who wish to enroll in Mathematics 12, 16A, 17A, 21A, 21AH, and 36 must satisfy the mathematics placement requirement by taking an online diagnostic examination. Failure to satisfy the requirement will be administratively dropped from these courses.

Note: Mathematics 16A, 16B, and 16C are intended for students who will take no more Mathematics courses. Mathematics 17A, 17B, and 17C have the same level of rigor as 16A, 16B, and 16C, yet are much more mathematically (containing algebra, differential equations and probability besides traditional calculus), and are intended for biology.

16A. Introduction to Calculus (3)
Lecture—3 hours. Prerequisite: two years of high school algebra, plane geometry, plane trigonometry, and required having obtained score on the Precalculus Diagnostic Examination. Topics selected for their use in calculus, including functions and their graphs, slope, zeroes of polynomials, exponential, logarithmic and trigonometric functions, sketching surfaces and solids. Not open for credit to students who have completed any courses of 16A, 16B, 16C, 17A, 17B, 17C, 21A, or 21B. GE credit: SciEng | QL, SL—F, W, F, W, S, F, W, S.

Note: Mathematics 16A, 16B, and 16C are intended for students who take no more Mathematics courses. Mathematics 17A, 17B, and 17C have the same level of rigor as 16A, 16B, and 16C, yet are much more mathematically (containing algebra, differential equations and probability besides traditional calculus), and are intended for biology.

16B. Short Calculus (3)
Lecture—3 hours. Prerequisite: course 16A, 17A, or 21A. Integration; calculus for trigonometric, exponential, and logarithmic functions; applications. Not open for credit to students who have completed courses 17B, 17C, 21B, 21A, or 21C. Only 2 units of credit to students who have completed course 17A. GE credit: SciEng | QL, SL—F, W, S, F, W, S.

Note: Mathematics 16A, 16B, and 16C are intended for students who take no more Mathematics courses. Mathematics 17A, 17B, and 17C have the same level of rigor as 16A, 16B, and 16C, yet are much more mathematically (containing algebra, differential equations and probability besides traditional calculus), and are intended for biology students.

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 to biology and medicine. Fundamental theorems 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, 21B, or 21C. Only 2 units of credit for students who have completed course 16B. GE credit: SciEng | QL, SL—F, W, S, F, W, S.

17C. Calculus for Biology and Medicine (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 17B with C- or above. 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 | QL, SL—F, W, S, F, W, S.

21A. Calculus (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. Functions, limits, continuity. Slope and derivative. Differentiation of algebraic and transcendental functions. Applications to motion, natural growth, graphing, extreme of functions and related concepts. Fundamental 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 | QL, SL—F, W, S, F, W, S.

21AH. Honors Calculus (4)
Lecture/discussion—4 hours. Prerequisite: a Precalculus Diagnostic Examination score significantly higher than the minimum for course 21A is required. More intensive treatment of material covered in course 21A. Offered irregularly. GE credit: SciEng | QL, SL.

21AL. Emerging Scholars Program Calculus Workshop (2)
Workshop—6 hours. 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. (P/NP grading only). Offered irregularly. GE credit: SE.

21AL. Emerging Scholars Program Calculus Workshop (2)
Workshop—6 hours. Prerequisite: course 21A or 21AH. Continuation of course 21A. Definition 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 | QL, SL—F, W, S, F, W, S.

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 | SE.

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). GE credit: SE.
Mathematics

21C. Calculus (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 16C, 17C, 21B, or 21BH. Continuation of course 21B. Students should pass the Calculus Diagnostic Examination and its trigonometry portion. Green’s theorem, Stokes’ theorem, divergence theorem. GE credit: SciEng|QL, SE.—F, W, S. (F, W, S.)

21CH. Honors Calculus (4)
Lecture/discussion—4 hours. Prerequisite: a grade of B or better in course 21B or 218H. More intensive treatment of material covered in course 21C. Offered infrequently. GE credit: SciEng|SE.

21CL. Emerging Scholars Program Calculus Workshop
Workshop—6 hours. Prerequisite: concurrent enrollment in 21C. Continuation of course 21B. Same course content as course 21C. Enrollment for students in the Emerging Scholars Program by instructor’s invitation only. [P/NP grading only] Offered irregularly. GE credit: SE.

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. GE credit: SciEng|QL, SE.—F, W, S. (F, W, S.)

21M. Calculus Workshop
Lecture/discussion—4 hours; discussion/laboratory—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 trigonometry 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|SE.

22A. Linear Algebra (3)
Lecture—3 hours. Prerequisite: nine units of college mathematics and Engineering 6 or knowledge of Matlab or course 22AL (to be taken concurrently). Matrices and linear transformations, determinants, eigenvalues, eigenvectors, diagonalization, factorization. Not open for credit to students who have completed course 67. GE credit: SciEng|QL, SE.—F, W, S. (F, W, S.)

22AL. Linear Algebra Computer Laboratory (1)
Laboratory—2.3 hours. Prerequisite: nine units of college mathematics. Introduction to Matlab and its use in linear algebra. [P/NP grading only] GE credit: QL, SE.—F, W, S. (F, W, S.)

22B. Differential Equations (3)
Lecture—3 hours. Prerequisite: course 22A or 67 with C- or above. Solutions of elementary differential equations. GE credit: SciEng|QL, SE.—F, W, S. (F, W, S.)

25. Advanced Calculus (4)
Lecture/discussion—4 hours. Prerequisite: course 21C or 21CH. Introduction to the rigorous treatment of abstract mathematical analysis. Proofs in mathematics, increasing and bounded sequences, limits, convergence of sequences and series. Not open for credit to students who have completed former course 127A. GE credit: SciEng|SE.—F, W, S. (F, W, S.)

36. Fundamentals of Mathematics (3)
Lecture—3 hours. Prerequisite: satisfaction of the Mathematics Placement Requirement. Introduction to fundamental mathematical ideas selected from the principal areas of modern mathematics. Properties of the primes, the fundamental theorems of arithmetic, properties of the rationals and irrationals, binary and other number systems. Not open for credit to students who have completed former course 108. Offered irregularly. GE credit: SciEng.

67. Modern Linear Algebra (4)

71A. Explorations in Elementary Mathematics (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: two years of high school mathematics. Weekly explorations of mathematical ideas related to the elementary school curriculum will be carried out by cooperative learning groups. Lectures will provide background and synthesize the results of group exploration. [Deferred grading only, pending completion of sequence.] Offered irregularly.

71B. Explorations in Elementary Mathematics (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: two years of high school mathematics. Weekly explorations of mathematical ideas related to the elementary school curriculum will be carried out by cooperative learning groups. Lectures will provide background and synthesize the results of group exploration. [Deferred grading only, pending completion of sequence.] Offered irregularly.

89. Elementary Problem Solving (1)

98. Directed Group Study (1-5)
Satisfies: College mathematics. GE credit: SciEng, Social Sciences, World Cultures, Writing Experience.

108. Introduction to Abstract Mathematics (4)
Lecture/discussion—4 hours. Prerequisite: course 21B. A rigorous treatment of mathematical concepts with emphasis on developing the ability to understand abstract mathematical concepts and write mathematical concepts, and to prove theorems. Designed to serve as preparation for the more rigorous upper division courses. GE credit: SciEng, Wrt|SE.—F, W, S. (F, W, S.)

111. History of Mathematics (4)

114. Convex Geometry (4)
Lecture/discussion—4 hours. Prerequisite: courses 21C; 22A or 67. Topics selected from the theory of convex bodies, convex functions, geometric inequalities, combinatorial geometry, and integral geometry. Designed to serve as preparation for the more rigorous upper division courses. Offered in alternate years. GE credit: SciEng|SE.—F, W, S. (F, W, S.)

115A. Number Theory (4)
Lecture/discussion—4 hours. Prerequisite: course 21B. Divisibility and related topics, diophantine equations, selected topics from the theory of prime numbers. Designed to serve as preparation for the more rigorous upper division courses. GE credit: QL, SE.—F (F).

115B. Number Theory (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 22A or 67, and 115A. Euler function, moebius function, congruences, quadratic reciprocity law. Offered in alternate years. GE credit: SciEng|QL, SE, SL.—W.

116. Differential Geometry (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 125A. Vector analysis, curves, and surfaces in three dimensions. Offered in alternate years. GE credit: SciEng|SE.—S (S).

118A. Partial Differential Equations: Elementary Methods (4)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 21D; 22B; 22A or 67. Derivation of partial differential equations; separation of variables; equilibrium solutions and Laplace’s equation; Fourier series; method of characteristics for the one dimensional wave equation. Solution of nonhomogeneous equations. GE credit: SciEng|QL, SE.—F (F).

118B. Partial Differential Equations: Eigenfunction Expansions (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 118A. Sturm-Liouville Theory; self-adjoint operators; mixed boundary conditions; partial differential equations in two and three dimensions. Eigenvalue problems for regular domains; nonhomogeneous problems and the method of eigenfunction expansions; Poisson’s equations. GE credit: SciEng|QL, SE.—W (W).

118C. Partial Differential Equations: Green’s Functions and Transforms (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 118B. Green’s functions for one-dimensional problems and Poisson’s equation; Fourier transforms; Green’s Function method; time dependent problems; Laplace transform and solution of partial differential equations. Offered irregularly. GE credit: SciEng|QL, SE.

119A. Ordinary Differential Equations (4)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 21D; 22B; 22A or 67. Scalar and planar autonomous systems; nonlinear systems and linearization; existence and uniqueness of solutions; multiple solutions of linear systems; phase plane analysis; stability analysis; bifurcation theory; Liapunov’s method; limit cycles; Poincare Bendixon theory. GE credit: SciEng|QL, SE.—W (W).

119B. Ordinary Differential Equations (4)
Lecture—3 hours; project. Prerequisite: courses 22A or 67. Methods of mathematical modeling of biological systems including difference equations, ordinary differential equations, stochastic and 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. GE credit: SciEng|QL, SE.—S (S).

124. Mathematical Biology (4)
Lecture—3 hours; project. Prerequisite: courses 22A or 67. Methods of mathematical modeling of biological systems including difference equations, ordinary differential equations, stochastic and 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. GE credit: SciEng|QL, SE.—S (S).

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, uniform series of functions, pointwise series. Not open for credit to students who have completed former course 127B. GE credit: SciEng|QL, SE.—F, W, S. (F, W, S.)

125B. Real Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: courses 22A or 67; 125A. Theory of the derivative, Taylor series, integration, partial derivatives, Implicit Function Theorem. Not open for credit to students who have completed former course 127C. GE credit: SciEng|SE.—W, S. (W, S.).
128A. Numerical Analysis (4)
Lecture—3 hours; project. Prerequisite: course 21C; Computer Science Engineering 30. Error analysis, approximation, interpolation, numerical differentiation and integration. Programming in language such as Pascal, Fortran, or BASIC required. GE credit: SciEng|QL, SE.—W. (W.)

128B. Numerical Analysis in Solution of Equations (4)
Lecture—3 hours; project. Prerequisite: course 21C; 22A or 22B; and Computer Science Engineering 30. Solution of nonlinear equations and nonlinear systems. Numerical solutions of several various problems. Simultaneous linear equations. Eigenvalue problems. Linear programming. Programming in language such as Pascal, Fortran, or BASIC required. GE credit: SciEng|QL, SE.—W. (W.)

128C. Numerical Analysis in Differential Equations (4)
Lecture—3 hours; project. Prerequisite: course 22A or 67; 22B; and Computer Science Engineering 30. Difference equations, operators, numerical solutions of ordinary and partial differential equations. Programming in languages such as Pascal, Fortran, or BASIC required. GE credit: SciEng|QL, SE.—S. (S.)

129. Fourier Analysis (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 21D; 22A or 67; 228, and 25. Fourier series and integrals, orthogonal sets of functions. Topics selected from trigonometric approximation, orthogonal polynomials, approximation to signals and image processing, numerical analysis, and differential equations. GE credit: SciEng|QL, SE.—F. (F.)

133. Mathematical Finance (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 67 or both 22A and 108; and 135A. Analysis and evaluation of deterministic and random cash flow streams, yield and pricing of basic financial instruments, interest rate theory, meanvariance portfolio theory, capital asset pricing models, utility functions and general principles. MATLAB programming required. Offered in alternate years. GE credit: SciEng|QL, SE, SL.—F. (F.)

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. GE credit: SciEng|QL, SE.—W, W, W.' (W.)

135B. Stochastic Processes (4)
Laboratory/discussion—4 hours. 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, queuing theory, martingales. Not open for credit to students who have completed former course 131A. GE credit: SciEng|QL, SE,—W, W, W.' (W.)

146. Algebraic Combinatorics (4)
Lecture/discussion—4 hours. Prerequisite: courses 25, 22A or 67, 145. Enumeration, Polya theory, generating functions, and applications of complex combinatorics. Not open for credit to students who have completed former course 149A. GE credit: SciEng|VL. (S.)

147. Topology (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 25. Basic notions of point-set and combinatorial topology. GE credit: SciEng|VL. —F. (F.)

148. Discrete Mathematics (4)
Lecture/discussion—4 hours. Prerequisite: course 25 or 22A and 108; and 108/114. Error correcting codes, finite fields and the algebraic concepts needed in their development. Not open for credit to students who have completed former course 149B. GE credit: SciEng|QL, SE.—W. (W.)

150A. Modern Algebra (4)
Lecture/discussion—4 hours. Prerequisite: course 67; or 22A and 108. 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. GE credit: SciEng|SE.—F. (F.)

150B. Modern Algebra (4)
Lecture/discussion—4 hours. Prerequisite: course 150A. Bilinear forms, rings, factorization, modules. GE credit: SciEng|SE.—W. (W.)

150C. Modern Algebra (4)
Lecture/discussion—4 hours. Prerequisite: course 150B. Group representations, fields, Galois theory. GE credit: SciEng|SE.—S. (S.)

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 dependences. Separability. Cost benefit analysis of physical database design and reorganization. Performance via analytical modeling, simulation, and queuing theory: block accesses; buffering; operating system contention; CPU intensive operations. Offered irregularly. GE credit: SciEng|QL, SE.—S. (S.)

165. Mathematics and Computers (4)
Lecture—3 hours; project. Prerequisite: course 22A or 67; one of the following courses: 25, 108, 114, 115A, or 145. Introduction to computational mathematics, symbolic computation, and computer generated/verified proofs in algebra, analysis and geometry. Investigation of new mathematics developed in conjunction with modern computational questions and the role that computers play in mathematical conjecture and experimentation. GE credit: SciEng|QL, SE.—F. (F.)

167. Applied Linear Algebra (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 22A or 67. Applications of linear algebra: LU and QR matrix factorizations, eigenvalues and singular value decompositions. GE credit: SciEng|QL, SE.—S. (S.)

168. Optimization (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 67 or both 22A and 108; and 21C. Linear programming techniques. Basic properties of unconstrained nonlinear problems, descent methods, conjugate direction method. Constrained minimization. Programming language required. GE credit: SciEng|VL. (S.)

180. Special Topics (3)
Lecture—3 hours. Prerequisite: course 67 or both 22A and 108; and 25. Special topics from various fields of modern, pure, and applied mathematics. Some recent topics: the Knot Theory, General Relativity, and Fuzzy Sets. May be repeated for credit when topic differs. Offered irregularly. GE credit: SciEng|VL. —F. (F.)

185A. Complex Analysis (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 67 or both 22A and 108, and 125A. Complex number system and the Cauchy-Riemann equations, elementary functions, complex integration, power and Laurent series expansions, residue theory. GE credit: SciEng|SE.—W. (W.)

185B. Complex Analysis (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 185A. Analytical functions, elementary functions and their mapping properties, applications of Cauchy’s integral theorem, conformal mapping, and applications to heat flow and fluid mechanics. Offered in alternate years. GE credit: SciEng|SE.—S. (S.)

189. Advanced Problem Solving (3)
Lecture—3 hours; prerequisite: course 67 or both 22A and 108; and 25. Solution and presentation of advanced problem solving techniques. Solve and present interesting and challenging problems of all areas of mathematics. GE credit: SciEng, Writ|QL, QL, QL, WE, WE.—S. (S.)

192. Internship in Applied Mathematics (1-3)
Internship. Prerequisite: consent of instructor. Supervised work experience in applied mathematics. Final report. May be repeated for credit for a total of 10 units. (P/NP grading only)—F. W. S. (F. W. S.)

194. Undergraduate Thesis (3)
Independent study. Prerequisite: consent of instructor. Independent research under supervision of a faculty member. Student will submit written report in thesis form. May be repeated with consent of Vice Chairperson. (P/NP grading only). GE credit: SE. —F. W. S. (F. W. S.)

197TC. Tutoring Mathematics in the Community (1-5)
Seminar—1/2 hours; laboratory—2.6 hours. Prerequisite: consent of instructor. Special projects in mathematical education development: mathematics instruction and tutoring on an individual or small group basis. May be repeated one time for credit. (P/NP grading only)—F. W. S. (F. W. S.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)—F. W. S. (F. W. S.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only) GE credit: SE. —F. W. S. (F. W. S.)

425A. Problem-Solving in Analysis (1)
Lecture—1 hour; extensive problem solving. Prerequisite: courses 201ABC. Problem-solving in graduate analysis: continuous functions, metric spaces, Banach and Hilbert spaces, bounded linear operators, the spectral theorem, distributions, Fourier series and transforms, Lp spaces, Sobolev spaces. May be repeated two times for credit. (Deferred grading only, pending completion of sequence.)—S. (S.)

425B. Problem-Solving in Analysis (1)
Lecture—1 hour; extensive problem solving. Prerequisite: courses 201ABC. Problem-solving in graduate analysis: continuous functions, metric spaces, Banach and Hilbert spaces, bounded linear operators, the spectral theorem, distributions, Fourier series and transforms, Lp spaces, Sobolev spaces. May be repeated two times for credit. (Deferred grading only, pending completion of sequence.)—F. (F.)

425A. Analysis (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: graduate standing in Mathematics or Applied Mathematics, or consent of instructor. Metric and normed spaces. Continuous functions. Topological properties of Hilbert, and Banach spaces. Spectrum of bounded and compact linear operators. Linear differential operators and Green’s functions. Distributions. Fourier transform. Measure theory. lp and Sobolev spaces. Differential calculus and variational methods.—F. (F.)
201B. Analysis (4)

201C. Analysis (4)

202. Functional Analysis (4)

205. Complex Analysis (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 185 or the equivalent, or consent of instructor. Conformal mappings, the Schwarz lemma, analytic automorphisms, the Riemann mapping theorem, entire functions, special functions, elliptic functions. —W. (W.)

205A. Complex Analysis (4)
Lecture—3 hours; term paper or discussion—1 hour. Cauchy’s theorem, Cauchy’s integral formulas, meromorphic functions, complex logarithm, entire functions, Weierstrass infinite product formula, the gamma and zeta functions, and prime number theorems. —W. (W.)

205B. Complex Analysis (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 205A or consent of instructor. Conformal mappings, the Schwarz lemma, analytic automorphisms, the Riemann mapping theorem, entire functions, special functions, elliptic functions. —S. (S.)

206. Measure Theory (4)
Lecture—3 hours; extensive problem solving. Prerequisite: courses 201A and 201B. Analytic continuation, Riemann surfaces, conformal mappings, Riemann mapping theorem, entire functions, special functions, elliptic functions. —F. (F.)

207A. Methods of Applied Mathematics (4)

207B. Methods of Applied Mathematics (4)

207C. Methods of Applied Mathematics (4)

207D. Methods of Applied Mathematics (4)

207E. Methods of Applied Mathematics (4)

207F. Methods of Applied Mathematics (4)

207G. Methods of Applied Mathematics (4)

215A. Topology (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: graduate standing or consent of instructor. Fundamental group and covering space theory. Homology and cohomology. Manifolds and duality. CW complexes. Fixed point theorems. Offered in alternate years. —F.

215B. Topology (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: graduate standing or consent of instructor. Fundamental group and covering space theory. Homology and cohomology. Manifolds and duality. CW complexes. Fixed point theorems. Offered in alternate years. —S.

215C. Topology (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 215A. Introduction to measure theory. Topological, three-dimensional, and geometric manifolds. Surfaces and their diffeomorphisms. Dehn twists. Heegaard surfaces. Theory of 3-dimensional manifolds. Knots and knot theory. Hyperbolic manifolds and geometric structures. May be repeated one time for credit. Offered in alternate years. —S. (S.)

216. Geometric Topology (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 201ABC or consent of instructor. A year-long sequence on PDEs which covers linear, quasilinear, and fully nonlinear elliptic/parabolic equations, nonlinear hyperbolic equations, and compensated compactness. Offered in alternate years. —F.

218B. Partial Differential Equations (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 218A or consent of instructor. A year-long sequence on PDEs which covers linear transport, Laplace, heat, and wave equations, maximum principles, method of characteristics, Sobolev and Hölder space theory, weak derivatives, semilinear, quasilinear, and fully nonlinear elliptic/parabolic equations, nonlinear hyperbolic equations, and compensated compactness. Offered in alternate years. —S.

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. Inertial flow. Low Reynolds number flows and the Stokes equations. High Reynolds number flows and boundary layers. Compressible flows. Shock waves. Offered in alternate years. —F.

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. Inertial flow. Low Reynolds number flows and the Stokes equations. High Reynolds number flows and boundary layers. Compressible flows. Shock waves. Offered irregularly. —W.

221C. 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. Inertial flow. Low Reynolds number flows and the Stokes equations. High Reynolds number flows and boundary layers. Compressible flows. Shock waves. Offered in alternate years. —F.

226A. Numerical Methods: Fundamentals (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 128AB or equivalent, or consent of instructor; familiarity with some programming language. Fundamental principles and methods in numerical analysis, including the stability of algorithms and conditioning of numerical problems, numerical methods for interpolation and integration, eigenvalue problems, singular value decomposition and its applications. Offered in alternate years. —S.

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 methods for large-scale matrix computations, including direct and iterative methods for the solution of linear systems, computation of eigenvalues and singular values, the solution of least-squares problems, matrix compression, methods for the solution of linear programs. Offered in alternate years. —W.

226C. Numerical Methods: Ordinary Differential Equations (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 226B 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 for large-scale dynamical systems. Offered in alternate years. —S.

227. Mathematical Biology (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 228A or consent of instructor. The solution of linear programs. Offered in alternate years. —W.

228A. Numerical Solution of Differential Equations (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 228C. 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. —F.

228B. Numerical Solution of Differential Equations (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 228C. 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. —S.

229A. Probability Theory (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: courses 125B and 135A or Statistics 131A or consent of instructor. Measure-theoretic foundations, abstract integration, independence,
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 graphs, polytopes, rings, and simplicial complexes to solve combinatorial problems. Offered in alternate years.—F. (F.)

248A. **Algebraic Geometry (4)**


248B. **Algebraic Geometry (4)**

Lecture—3 hours; extensive problem solving. Prerequisite: course 248A. Complex varieties and the analytic topology. Sheaves and schemes. Fiber products. Separatedness and properness. Applications of scheme theory. Offered in alternate years.—(W.)

249A. **Problem-Solving in Algebra (1)**

Lecture—1 hour; extensive problem solving. Prerequisite: courses 250A & B. Problem-solving in graduate algebra: groups, rings, modules, matrices, tensor products, representations, Galois theory, ring extensions, commutative algebra, and algebraic geometry. May be repeated for credit. (Deferred grading only, pending completion of sequence.)—S. (S)

250A. **Algebra (4)**

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 201C or course/Statistics 235B; course/Statistics 235A-235B-235C recommended. Stochastic processes, Brownian motion, Markov chains, ergodic theory. Offered in alternate years.—F. (F.)

250B. **Algebra (4)**


250C. **Algebra (4)**


258A. **Numerical Optimization (4)**

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 217. Theory of numerical methods for infinite dimensional optimization problems. Newton and Quasi-Newton methods, lineal and sequential quadratic programming, barrier methods; large-scale optimization theory of approximations; infinite and semi-infinite approximation, applications to optimal control, stochastic optimization and distributed systems. Offered in alternate years.—F.

258B. **Discrete and Mixed-Integer Optimization (4)**

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 25 and 167, or consent of the instructor. Combinatorial, integer, and mixed-integer linear optimization problems. Ideal and strong formulations, cutting planes, branch and cut, decomposition methods. Offered in alternate years.—W.

261A. **Lie Groups and Their Representations (4)**

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: courses 215A, 240A, 250A-250B or the equivalent or consent of instructor. Lie groups and Lie algebras. Classification of semi-simple Lie groups. Classical and compact Lie groups. Representations of Lie groups and Lie algebras. Root systems, weights, Weil character formula. Koszul complexes, Morse theory, and Virasoro algebras. Applications. Offered in alternate years.—W.

261B. **Lie Groups and Their Representations (4)**


265. **Mathematical Quantum Mechanics (4)**

Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 265 or consent of instructor. Mathematical foundations of quantum mechanics: the Hilbert space and Operator Algebra formalism; the Schrödinger equation; symmetries in quantum mechanics, basics of spectral theory and perturbation theory. Applications to atoms and molecules. The Dirac equation. Offered in alternate years.

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. May be repeated one time for credit. Offered in alternate years.—(W.)

271. **Applied and Computational Harmonic Analysis (4)**

Lecture—3 hours; extensive problem solving. Prerequisite: courses 125B or 201C, and 128B or 167, and 129 or equivalent, or consent of instructor. Introduction to mathematical basic building blocks (wavelets, local Fourier basis) 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.—(W.)

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 will be based on the mutual interests of students and faculty. May be repeated for credit when topic differs.—F. W. S. (F. W. S.)

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.)—F. W. S. (F. W. S.)

298. **Group Study (1-5)**

F. W. S. (F. W. S.)

299. **Individual Study (1-12)**

(S/U grading only.)—F. W. S. (F. W. S.)

299D. **Dissertation Research (1-12)**

(S/U grading only.)—F. W. S. (F. W. S.)
Preceptorships and home visits continue. The Doctoring 3 theme concludes with a comprehensive final examination. Preceptorships and home visits continue. The fourth year consists of integrated neuroanatomy-clinical neurosciences that latter emphasizes the pathophysiology of common neurological disorders. The system pathology curriculum continues with a focus on neuropahtology, and the pharmacology course covers neuroscience. A clinical psychiatry course is also presented during this period. The Doctoring 2 course begins, focusing on advanced clinical skills and clinical reasoning using a combination of standardized patient assessments, problem-based learning, subspecialty physical examination sessions, preceptorships, and didactics in clinical epidemiology, medical economics, and socio-behavioral medicine. The Pathophysiology Block is devoted to compressed pathophysiology courses with tight integration of the systemic pathology and pharmacology courses. The curriculum is organized according to organ system (cardiovascular, pulmonary, renal, musculoskeletal system, hematology, gastroenterology, oncology, and dermatology). The Doctoring 2 curriculum consists concurrently with its focus on advanced clinical skills, epidemiology, ethics, and problem-based assessment. History taking and physical diagnosis skills are correlated with the ongoing pathology and pharmacology 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 preparation for USMLE Step 1, remediation, electives, and vacation. The third-year program begins in April and includes six required clerkship rotations in the clinical specialties. Clerkships in surgery, internal medicine, obstetrics & gynecology, pediatrics, and psychiatry run for 8 weeks each. A four-week family medicine clerkship and a four-week selective are also required. In addition to the core clerkships, students will participate in a longitudinal primary care clinic throughout the year. In the second-year clerkship students of longitudinal small groups led by faculty members who remain with their group 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 must 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 the chance to gain early exposure to clinical specialties or to complete clerkships which may have been deferred. All students are required to select a minimum of 32 weeks of clinical electives in addition to the four-week elective specialty module or scholarly project. The Special Study modules are designed to integrate basic sciences with clinical sciences, provide opportunities for students to practice and to develop fundamental skills in critical appraisal and analysis of emerging scientific developments, and to allow students to focus in depth on a multidisciplinary topic of special 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 winter.

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 rigor. There are strict guidelines for the choices and time allowed away from the home institution. 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. In addition to the fourth-year elective program available, there is an opportunity for students to select from a variety of electives during the first two years. Examples include electives in history of ethics and medicine, medical Spanish and insights in clinical research. Many students also participate in one of several student-run, community clinics for elective credit during their first and second years.

Coordination with other Advanced Degree Programs

The curriculum for the M.D. degree provides flexibility and encourages coordination with other advanced degree programs (Ph.D., M.S., M.A., M.B.A., and M.P.H.). These programs offer a wide breadth of study areas and draw upon the considerable expertise of the entire campus faculty. The Department of Public Health Sciences offers an M.P.H. program in conjunction with the M.D. program. This program is designed for students interested in disease prevention and community health. Health professionals and State Health Department employees.

School of Medicine administrators enthusiastically support students interested in pursuing advanced degree programs. The dual-degree program for the M.D./Ph.D. is targeted to train physicians to meet, respond to and solve the broad diversity of problems and dilemmas facing current and future health care. Students are encouraged to seek degrees in any of the campus wide Ph.D. programs, including those in social sciences and humanities. The UC Davis School of Medicine awards collaborative fellowships each year to students enrolled in the M.D./Ph.D. program. 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 course descriptions.
402. Clinical & Cultural Spanish (2)
Lecture—1 hour; practice—1 hour; independent study—4 hours. Prerequisite: consent of instructor. Medical students, nursing lectures and physician assistants students who are fluent Spanish speakers will learn a comprehensive set of medical vocabulary and will participate in the treatment of Spanish speaking patients. [P/F grading only].—F, W. S., Su. (F, W, S, Su) (W).

403. Science & Practice of Mindfulness and Composition (1)
Lecture/discussion—10 hours; independent study—20 hours. Prerequisite: consent of instructor. Restricted to Medical school students. Course will examine current scientific evidence for the effects of different forms of meditation; mindfulness practices in both healthy and clinical samples. [P/F grading only].—F, W, S. (F, W, S, Su) (Goldsic, Sitteri).

406. Endocrinology, Nutrition, Reproduction and Genetics (9.5)
Lecture—3.8 hours; discussion/lab—2.8 hours. Prerequisite: Biological Chemistry 410A; Human Physiology 400. Restricted to Medical students only. Basic and pathophysiological processes involved in endocrine control systems, nutritional regulation, and foundational genetics across the lifespan. Integrate information across foundational biological sciences to clinical reasoning process to identify and understand relevant perturbations and diseases. May be repeated three times for credit. [P/F grading only; deferred grading only, pending completion of sequence].—W. (W) Hagiwara., H. (H) (Ojito, N.)

411A. Doctoring 1 (4)
Discussion—1 hour; clinical activity—1 hour; lecture/discussion—1 hour. Prerequisite: approval of committees. 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, bioethical, and basic science concepts to patient case scenarios, outpatient clinical experiences and didactic presentations. [P/F grading only; deferred grading only, pending completion of sequence].—F, S, (F, S) (Edison-Ton, Henderson, Onate).

411B. Doctoring 1 (5)
Discussion—1.5 hours; clinical activity—1.5 hours; lecture/discussion—1.8 hours. 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, bioethical, and basic science concepts to patient case scenarios, outpatient clinical experiences and didactic presentation. [P/F grading only; deferred grading only, pending completion of sequence].—F, S, (F, S) (Edison-Ton, Henderson, Onate).

411KA. ACE-PC Program Doctoring 1 (8)
Clinical Activity—5 hours; lecture/discussion—6 hours. Prerequisite: consent of instructor. Small case-based learning groups with training in patient communication and interviewing techniques; clinical identification and problem solving applications of social psychological cultural bioethical and basic science concepts to patient case scenarios outpatient clinical experiences and didactic presentation. [P/F grading only; deferred grading only, pending completion of sequence].—F, S, (F, S) (Edison-Ton, Henderson, Han, Henderson).

411KB. ACE-PC Program Doctoring 1 (5)
Clinical Activity—4 hours; lecture/discussion—1 hour. Prerequisite: consent of instructor. Application of multidisciplinary basic, social and clinical science to clinical cases in small groups. History, physical examination, diagnostic techniques, biopsychosocial aspects of medical care, outcomes, global patient factors, the role of technology in the practice of medicine. [P/F grading only; deferred grading only, pending completion of sequence].—F, S, (F, S) (Henderson, Lee, Sciolla).

412A. Doctoring 2 (6)
Discussion—1 hour; lecture/discussion—1 hour; internship—0.5 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 medicine. [Deferred grading only, pending completion of sequence. P/F grading only].—S. (S) (Venogupal).

412B. Doctoring 2 (6)
Discussion—1 hour; lecture/discussion—1 hour; internship—0.5 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 medicine. [Deferred grading only, pending completion of sequence. P/F grading only].—F, (F) (Lee, Molla, Sciolla).

412C. Doctoring 2 (6)
Discussion—1 hour; lecture/discussion—1 hour; internship—0.5 hours. Prerequisite: permission of 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. Discussion facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of medicine. [H/P/F grading only; deferred grading only, pending completion of sequence].—W. (W) (Lee, Molla, Sciolla).

412KA. ACE-PC Program Doctoring 2 (6)
Discussion—1 hour; lecture/discussion—1 hour; internship—0.5 hours. Prerequisite: admission to ACE-PC and successful completion of MDS 411KA & MDS 411KB. MDS 412KA-C are a year-long series of courses. Objectives and assessments have been accelerated to accommodate the students enrolled in the ACEPC Program. Students will participate in all aspects of Doctoring 1, but the course was done in 411KA/KB. [P/F grading only; deferred grading only, pending completion of sequence].—Su. (Su) (Henderson, Sciolla, Williams).

412KB. ACE-PC Program Doctoring 2 (6)
Discussion—1 hour; lecture/discussion—1 hour; internship—0.5 hours. Prerequisite: permission of 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. Discussion facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of medicine. [Deferred grading only, pending completion of sequence. P/F grading only].—F, (F) (Lee, Molla, Sciolla).

412KC. ACE-PC Program Doctoring 2 (6)
Discussion—1 hour; lecture/discussion—1 hour; internship—0.5 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. Discussion facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of medicine. [Deferred grading only, pending completion of sequence].—W. (W) (Henderson, Sciolla, Williams).

421A. ACE-PC Program Doctoring 2 (6)
Discussion—1 hour; lecture/discussion—1 hour; internship—0.5 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. Discussion facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of medicine. [Deferred grading only, pending completion of sequence. P/F grading only].—S. (S) (Frank, Rich).

421B. Doctoring 2 (6)
Discussion—1 hour; lecture/discussion—1 hour; internship—0.5 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. Discussion facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of medicine. [Deferred grading only, pending completion of sequence. P/F grading only].—Su. (Su) (Fairman, Rich).

421C. Doctoring 2 (6)
Discussion—1 hour; lecture/discussion—1 hour; internship—0.5 hours. Prerequisite: permission of 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. Discussion facilitated by medical school faculty. Evaluation of professional competencies, attitudes and skills needed in the practice of medicine. [Deferred grading only, pending completion of sequence].—S. (S) (Bing, Venogupal).

428. Foundations of Bioethics (1)
Discussion—3 sessions; lecture/discussion—3 sessions; independent study—16.5 sessions; web virtual—1 session. Prerequisite: consent of instructor. Course will expose students to core content in bioethics and the law and introduce a framework for ethical decision-making, while emphasizing relationships between bioethics and clinical practice. [P/F grading only].—Su. (Su) (Fairman, Rich).

429. Transition to Clerkships (1)
Laboratory/discussion—12 hours; workshop—13 hours; discussion—7 hours; independent study—2 hours. Becoming third-year medical students, students will participate in a variety of educational experiences designed to prepare them to begin their clerkship curriculum. Core content will be disseminated in large and small group settings. [P/F grading only].—S. (S) (Bing, Venogupal).

430. Introduction to Doctoring 3 (1)
Discussion—2 hours. Prerequisite: approval by SOM Committee on Student Progress. Restricted to Medical students only. Introductory course for the Doctoring 3 Program. All students enrolling in Medical Sciences 430 A-D should complete this course prior to beginning their work in Doctoring 3. [H/P/F grading only; deferred grading only, pending completion of sequence].—S. (S) (Wilkes).

430A. Doctoring 3 (1)
Discussion—3 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Restricted to 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. [H/P/F grading only; deferred grading only, pending completion of sequence].—W. (W) (Wilkes).

430B. Doctoring 3 (1)
Discussion—2 hours. Prerequisite: approval by SOM Committee on Student Progress. Restricted to 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. [H/P/F grading only; deferred grading only, pending completion of sequence].—F. (F) (Wilkes).

430C. Doctoring 3 (1)
Discussion—2 hours. Prerequisite: approval by SOM Committee on Student Progress. Restricted to 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. [H/P/F grading only; deferred grading only, pending completion of sequence].—W. (W) (Wilkes).

430D. Doctoring 3 (1)
Discussion—2 hours. Prerequisite: approval by SOM Committee on Student Progress. Restricted to 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. [H/P/F grading only; deferred grading only, pending completion of sequence].—S. (S) (Holt, Zachary).

435KA. ACE-PC Longitudinal Integrated Clerkship A (18)
Clinical activity—45 hours; independent study—6 hours; discussion—4 hours. Prerequisite: consent of instructor. Longitudinal Clerkship will combine the Internal Medicine, OB/GYN, Pediatrics, Psychiatry and Surgery Clerkships for the ACE-PC Program. [H/P/F grading only; deferred grading only, pending completion of sequence].—S. (S) (Holt, Zachary).
and Surgery Clerkships for the ACE-PC Program.

Clinical activity—45 hours; independent study—6 hours; discussion—4 hours. Prerequisite: consent of instructor. Longitudinal Clerkship will combine the Internal Medicine, OB/GYN, Pediatrics, Psychiatry and Surgery Clerkships for the ACE-PC Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—Su. (Su./Holt, Zachary

**435KC. ACE-PC Longitudinal Integrated Clerkship C (18)**

Clinical activity—45 hours; independent study—6 hours; discussion—4 hours. Prerequisite: consent of instructor. Longitudinal Clerkship will combine the Internal Medicine, OB/GYN, Pediatrics, Psychiatry and Surgery Clerkships for the ACE-PC Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—F. (F./Holt, Zachary

**440. Doctoring 4 Teaching Fellowship (3)**

Discussion—5 hours; seminar—0.25 hours. Prerequisite: course 430A, 430B, 430C, 430D; consent of instructor. Restricted to Medical student only. Instructing on teaching methodology and pedagogy. Mentoring teaching of pre-fellows in clinical seminars, lecture, and bedside. (H/P/F grading only)—F, W, S, Su. (F., W., S., Su.) Wilkes

**441. Combined Ophthalmology and Otolaryngology Clerkship (6)**

Clinical activity—4 weeks. Prerequisite: approval by Combined Otolaryngology and Otolaryngology Clerkship. 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)—F, W, S, Su. (F., W., S., Su.) 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)—Su.

**455. Student Run Clinics (1-3)**

Clinical Activity—3-9 hours. Open to medical students in good standing. Will learn counseling, diagnosis and treatment of patients with chronic and acute disease under supervision of physician. Meet all requirements and prerequisites of the particular clinic within which they work. May be repeated for credit. (P/F grading only)—F, W, S, Su. (F., W., S., Su.) Lattimore, Servis

**460. Introduction to Clinical Research (2)**

Lecture—2 hours; independent study—3 hours. Restricted to completion of M.D., D.D.S., M.D., O.D., N.D., Pharm.D., D.V.M., Ph.D., or D.N.S. in nursing; application and acceptance into the Clinical Research Graduate Program, K30 program. Multidisciplinary introduction to the CRGG program and overview of major clinical research topics. Overview of basic clinical skills needed to accomplish CRGG mentored research project. (P/F grading only)—Su. (Su./Frederick

**461CR. Strategies for Grant Writing (2)**

Lecture/discussion—2 hours. Restricted to completion of M.D., D.D.S., M.D., O.D., N.D., Pharm.D., D.V.M., Ph.D., or D.N.S. in nursing; application and acceptance into the Clinical Research Graduate Program, K30 program. Practical skills and strategies to create successful grant proposals in the NIH style and format. Grant writing ideas, identifying and accessing research resources, grant components, specific aims, background and significance, preliminary studies, budgets, and bios. Matriculation through UC system, and pre-submissions. (S/F grading only)—Su. (Su./Rutledge

**462CR. Introduction to Clinical Epidemiology and Study Design (3)**

Lecture—25 hours; discussion—10 hours. Restricted to completion of M.D., D.D.S., M.D., O.D., N.D., Pharm.D., D.V.M., Ph.D., or D.N.S. in nursing; application and acceptance into the Clinical Research Graduate Program, K30 program. Anatomy and physiology of conducting clinical epidemiologic research. Familiarity with three basic study designs (cross-sectional, cohort, and case control). Discussion of principles of measurements in clinical epidemiological studies, basic methods for analyzing data, and ethical issues involved in conducting research. (S/U grading only)—Su. (Su./McCurdy, Romano

**463CR. Methods in Clinical Research (5)**

Lecture—3 hours; discussion—2 hours. Restricted to completion of M.D., D.D.S., M.D., O.D., Pharm.D., D.V.M., Ph.D., or D.N.S in nursing; application and acceptance into the Clinical Research Graduate Program, 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 support infrastructure. Methodologies applicable to clinical research and its multi-disciplinary perspective. (S/U grading only)—Su. (Su./Berghlund, Lloyd, Kravitz

**464CR. Responsible Conduct of Research (3)**


**465CR. Introduction to Medical Statistics (4)**

Lecture—3 hours; laboratory—2 hours. Restricted to completion of M.D., D.D.S., M.D., O.D., N.D., Pharm.D., D.V.M., Ph.D., or D.N.S. in nursing; application and acceptance into the Clinical Research Graduate Program, K30 program. Biomedical applications of statistical methods in clinical, laboratory and population medicine. Graphical/tabular data presentation, probability, binomial, Poisson, normal, t-, F- and Chi-square distributions, elementary nonparametric methods, simple linear regression/correlation, life tables. Microcomputer applications of statistical procedures in population medicine. (S/U grading only)—Su. (Su./Becket, Wegelin

**468C. International Clinical Preceptorship (1-12)**

Clinical activity—30 hours. Prerequisite: medical students with consent of instructor. Multidisciplinary preceptorship in a foreign country. Clinical credit will be awarded using this course, once approval has been received from the appropriate governing committee. (H/P/F grading only)—F, W, S, Su. (F., W., S., Su.)

**468D. International Elective (1-12)**

Independent study—20 hours; clinical activity—10 hours. Prerequisite: medical students with consent of instructor. Multidisciplinary preceptorship in a foreign country. Course used to award non-clinical credit for international experiences which have been approved by the appropriate governing committee. (H/P/F grading only)—F, W, S, Su. (F., W., S., Su.)

**470. Introduction to Dentistry (3-18)**

Clinical activity—34 hours; lecture—6 hours. Prerequisite: pre-medical student in good standing; consent of instructor. Introduction to Dentistry and basic Oral and Maxillofacial Surgery. Course is offered by the Oral and Maxillofacial Surgery department at UC San Francisco. (P/F grading only)—F, W, S, Su. (F., W., S., Su.) Fregoli, Wallace

**480. Insights in Clinical Research (1)**

Lecture—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)—S. (S.)

**481. Insights into Clinical Specialties (1)**

Lecture/discussion—1 hour. Prerequisite: medical student in good standing. Exposure to various medical specialties, their research priorities and ways in which medical students can prepare for and improve their candidacy for such programs. (H/P/F grading only)—Su. (Su.)

**482. Lecture Series in Reproductive Health (1)**

Lecture—1 hour. Prerequisite: medical student in good standing. Restricted to Medical student only. The practical aspects of a medical career. May be repeated two times for credit. (P/F grading only)—S. (S.)

**485. Health Policy Lecture Series (1)**

Lecture—1 hour. Lecture series provides an overview of local, state, national and international health policy. The current challenges and new research to reform implementation is facing how medical students can successfully advocate for changes in health policy. May be repeated for credit. (P/F grading only)—F. (F.) Roman

**486. Topics in Health Care Improvement (0.5)**

Lecture/discussion—15 sessions. Lecture series will cover major topics in health care improvement, presented by guest speakers who are leaders in the field. May be repeated for credit. (P/F grading only)—S. (S.) Shilki

**487. History and Ethics of Medicine (1)**

Lecture—1.25 hours. Introduction to ethical problems and events in health care in both modern and historic contexts. Historical topics in medicine and medical ethics. (P/F grading only)—F. (W.) Fitzgerald

**489. Directed Studies (1-9)**

Prerequisite: consent of instructor; individual directed studies in extended preparation for modified curriculum, USMLE exams, and/or as required by Committee on Student Progress. Independent studies to accommodate modified curriculums, prepare for taking USMLE exams and for remediation course work directed by the Committee on Student Progress. May be repeated for credit. (P/F grading only)—F, W, S, Su. (F., W., S., Su.)

**489C. Clinical Reintroduction Experience (1-9)**

Clinical activity—20 hours. Prerequisite: consent of instructor. Learn and practice basic clinical skills in a supervised clinical setting. Skills include patient interview viewing, history, physical examination, diagnostic and clinical reasoning, case presentation, and medical records documentation. Direct observation and individual feedback on clinical skills development is provided. (P/F grading only)—F, W, S, Su. (F., W., S., Su.) Servis

**489QA. Improving Quality in Health Care (3)**

Lecture—8 hours; discussion/laboratory—10 hours, project—10 hours. Prerequisite: consent of instructor. Working in interdisciplinary teams, will explore the theory and practical methods being employed to make improvement in health care systems while providing an opportunity for interprofessional educational experience. (H/P/F grading only; deferred grading only, pending completion of sequence.)—F. (F.) Baker, Johnson, Shilki

**489QB. Improving Quality in Health Care (3)**

Lecture—8 hours; discussion/laboratory—10 hours, project—10 hours. Prerequisite: consent of instructor. Working in interdisciplinary teams, will explore the theory and practical methods being employed to
make improvement in health care systems while providing an opportunity for interdisciplinary professional educational experience. [Same course as Nursing 493A.]

493A. Applied Physiology and Exercise Science (6)
- Lecture: 2 hours; laboratory—6 hours; tutorial—10 hours. Prerequisite: consent of instructor. Restrict activity to UC Davis School of Medicine students only. Special Studies Module, a yearlong in progress course to teach lecture and discussion education technique and theory. [H/P/F grading only;—F, W, S, Su.; (F, W, S, Su.) Fancher, Shaikh]

493A. Directed Remedial Studies (1-9)
- Independent study—20 hours. Prerequisite: recommendation by Committee on Student Progress. Independent studies to accommodate remediation for full-time USMLE exams directed by the Committee on Student Progress. [P/F grading only;—F, W, S, Su.; (F, W, S, Su.) Servis]

490A. PRIME Seminar Series: Fall Quarter (1)
- Lecture—1 hour. Weekly seminar series covering topics: community engagement, Health care to rural and under served populations, health policy and advocacy, leadership, technology and health equity and disparity. May be repeated for credit. [P/F grading only;—F, W, S, Su.; (F, W, S, Su.) Fancher]

490B. PRIME Seminar Series: Winter Quarter (1)
- Lecture—1 hour. Weekly seminar series covering the following areas: community engagement, Health care to rural and under served populations, health policy and advocacy, leadership, technology and health equity and disparity. May be repeated for credit. [P/F grading only;—W. (W.) Fancher]

490C. PRIME Seminar Series: Spring Quarter (1)
- Lecture—1 hour. Weekly seminar series covering the following areas: community engagement, Health care to rural and under served populations, health policy and advocacy, leadership, technology and health equity and disparity. May be repeated for credit. [P/F grading only;—W, Su.; (W, S, F, Su.) Fancher]

490D. PRIME Seminar Series: Summer Quarter (1)
- Lecture—1 hour. Weekly seminar series covering the following areas: community engagement, Health care to rural and under served populations, health policy and advocacy, leadership, technology and health equity and disparity. May be repeated for credit. [P/F grading only;—W, Su.; (W, Su.) Fancher]

493. Independent Special Study Module (3-12)
- Prerequisite: consent of instructor. FYOC approval required. Students may explore an alternative to the SSM/SPO Requirement. Approval by FYOC is required. [H/P/F grading only;—F, W, S, Su.; (F, W, S, Su.) Fancher]

493A. International and Comparative Health Care—SSM (6)
- Discussion—20 hours; lecture—10 hours. Prerequisite: consent on instructor. Restricted to UC Davis School of Medicine students only. Through a series of lectures, seminars and clinical 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. SSM Component. [H/P/F grading only;—F, W, S, Su.; (F, W, S, Su.) Wilkes]

493B. International and Comparative Health Care—Clinical (3-9)
- Clinical activity—30 hours. Prerequisite: consent on instructor. Restricted to UC Davis School of Medicine students only. Through a series of lectures, seminars and clinical 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. Clinical Component. [H/P/F grading only;—F, W, S, Su.; (F, W, S, Su.) Wilkes]

493A. Teaching the Basic Sciences SSM (6)
- Lecture—6 hours; lecture/laboratory—8 hours; laboratories—6 hours; tutorial—10 hours. Prerequisite: course 440 concurrently, consent of instructor. Restricted to UC Davis School of Medicine students only. Special Studies Module, a yearlong in progress course to teach lecture and discussion education technique and theory. [H/P/F grading only;—F, W, S, Su.; (F, W, S, Su.) Fancher, Shaikh]

493A. Improving Quality in Health Care (6)
- Lecture—8 hours; discussion/laboratory—10 hours; project—10 hours. Prerequisite: consent on instructor. Working in interdisciplinary teams, will explore the theory and practical methods being employed to make improvement in health care systems while providing an opportunity for interdisciplinary professional educational experience. [Same course as Nursing 493A.]

493B. Improving Quality in Health Care (3)
- Lecture—8 hours; discussion/laboratory—10 hours; project—10 hours. Prerequisite: consent on instructor. Working in interdisciplinary teams, will explore the theory and practical methods being employed to make improvement in health care systems while providing an opportunity for interdisciplinary professional educational experience. [Same course as Nursing 493B.]

493C. Enhancing Patient Safety in Health Care (6)
- Seminar—6 hours; clinical activity—8 hours; discussion—6 hours. Prerequisite: fourth-year Medical student; consent of instructor. Inter-professional module is designed to explore the theory and practical methods being employed to improve patient safety in health care while providing an opportunity for inter-professional educational experience. [Same course as Nursing 493C.]

494. Non-Clinical Medical Student Externship (3-9)
- Independent study—20 hours; clinical activity—10 hours. Prerequisite: consent on instructor. Restricted to students with approval of credit by the Fourth Year Adviser. Student developed alternative to the SSM/GE (Science and Engineering; VL=Visual; WC=World Cultures; WE=Writing Experience). Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci-Social Sciences; Div=Diverse; Wrt=Writing Experience Quarter Offered: F=fall, W=Winter, S=Spring, Su=Summer; 2017/2018 offering in parentheses

499. Research in Medical Education and Curriculum Development (4-9)
- Independent study—10-36 hours. Prerequisite: medical student in good standing; competency with computers. Research and development of an independent project related to expanding computer-assisted resources in support of the educational curriculum at UC Davis. [H/P/F grading only;—F, W, S, Su.; (F, W, S, Su.) Fancher, Shaikh]

Departmental Courses:
Anesthesiology and Pain Medicine (ANE)

Upper Division

192. Internship in Anesthesiology (1-6)
- Internship—3-18 hours. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in anesthesia and related fields. [P/NP grading only;—F, W, S, Su.; (F, W, S, Su.) Fancher, Shaikh]

199. Special Study for Advanced Undergraduates (1-5)
- Prerequisite: consent of instructor. [P/NP grading only;—F, W, S, Su.; (F, W, S, Su.) Fancher, Shaikh]

Professional

460. Anesthesiology Clinical Clerkship (3-18)
- Prerequisite: medical student. In-depth exposure to anesthesia through informal lectures and mentored by anesthesiologists. Emphasis on understanding and applying anesthetic principles in managing administration of general, regional, and specialized areas. [P/NP grading only;—F, W, S, Su.; (F, W, S, Su.) Fancher, Shaikh]

465. Away Acting Internship in Anesthesiology (3-18)
- Clinical activity—40 hours. Prerequisite: satisfactory completion of Anesthesiology Clerkship; consent of instructor. Supervised work experience at the level of a subs intern in inpatient and/or outpatient settings. Expectation is to provide direct patient management. May be repeated for credit. [H/P/F grading only;—F, W, S, Su.; (F, W, S, Su.) Fancher, Shaikh]

466. Away Acting Internship in Anesthesiology (3-18)
- Clinical activity—40 hours. Prerequisite: satisfactory completion of Anesthesiology Clerkship; consent of instructor. Supervised work experience at the level of a subs intern in inpatient and/or outpatient settings. Expectation is to provide direct patient management. May be repeated for credit. [H/P/F grading only;—F, W, S, Su.; (F, W, S, Su.) Fancher, Shaikh]

480. Brief Introduction to Clinical Anesthesiology and Chronic Pain Management (3)
- Clinical activity—25-30 hours. Prerequisite: second-year medical student. Daily experience in clinical anesthesiology at the preparative 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;—W, Su.; (W, S, F, Su.) Fancher, Shaikh]

493A. Applied Physiology and Exercise Science (6)
- Lecture—5 hours; lecture/laboratory—10 hours; laboratory—10 hours; tutorial—10 hours. Prerequisite: consent of instructor. UC Davis School of Medicine students only. Research and demonstrate the application of basic physiology and exercise physiology to patient care. There will be an in-depth analysis of...
the physiology and pathology of the cardiovascular, pulmonary, nervous, renal and endocrine systems. (H/P/F grading only) — W. (W) Fleming.

493B. Interdisciplinary Medicine in Pain Care (6)
Lecture—5 hours; laboratory—10 hours; laboratory—16 hours; clinical activity—4 hours. Prerequisite: admission to UC Davis School of Medicine students only. 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 or trauma. (H/P/F grading only) — S. (S) Fishman

498. Individual or Group Study (1-5)
Discussion—1.5 hours; laboratory—21.0 hours. Prerequisite: interested in students with consent of instructor. Directed reading and discussion and/or laboratory investigation on selected topics. (H/P/F or grading only) — F, W, S, Su. (F, W, S, Su)

499. Anesthesiology Research (4-18)
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. Inability to be repeated for credit. (H/P/F grading only for medical students.) — F, W, S, Su. (F, W, S, Su.)

Biological Chemistry (BCM)

Lower Division

49. 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

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

209. Prostaglandins/Leukotrienes and Related Lipids (2)

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. Offered in alternate years. (Same course as Plant Pathology 217.) — W. Holland, 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 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. — W. Hershey

230. Practical NMR Spectroscopy and Imaging (1)
Lecture—1 hour. Prerequisite: Chemistry 107A-107B, Physics 5A-5B-5C or 9A-9B-9C, or consent of instructor. Basic theory, experimental methods, and instrumentation of NMR. Enables students to understand NMR spectroscopy and imaging experiments. (S/U grading only) — F (F)

231. Biological Nuclear Magnetic Resonance (3)
Lecture—3 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 biological basis for magnetic resonance applications in areas of tissue characterization, imaging, metabolic regulation, and cellular bioenergetics. (Same course as Biophysics 231.) — S. (S)

291. Seminar in Genetic Approaches to Pathogenesis of Human Disease (1)
Seminar—1 hour. Prerequisite: student in Genetics Graduate Group or consent of instructor. Current genetic approaches to understanding the pathogenesis of disease and mammalian development 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 491.) (S/U grading only) — F, W, S, Su.

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.

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only)

Professional

410A. Molecular Medicine (4)
Lecture—3 hours; discussion—3 hours; web virtual lecture—1 hour. Prerequisite: consent of instructor. Restricted to Medical Students only. Biochemistry of proteins and nucleic acids. Includes an introduction to cancer biology and a full discussion of carbohydrate metabolism. Molecular aspects of human disease are highlighted throughout the course. (P/F grading only; deferred grading only, pending completion of requirements.)

491. Seminar in Genetic Approaches to Pathogenesis of Human Disease (1)
Seminar—1 hour. Prerequisite: student in Genetics Graduate Group or consent of instructor. Current genetic approaches to understanding the pathogenesis of disease and mammalian development 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 291.) (F/P/F grading only) — F, W, S, Su.

493. Medical Genomics (6)
Clinical activity—4 hours; lecture—4 hours; laboratory—12 hours. Prerequisite: consent of instructor. Four-week module will focus on the clinical methods and applications of medical genomics. Topics will include an introduction to the human genome and human genomics, genetic and epigenetic variation and the ethics of medical genomics. (H/P/F grading only) — F, W, S, Su (F, W, S, Su).

497T. Tutoring in Biological Chemistry (1-5)
Tutoring—3-15 hours. Prerequisite: advanced standing or consent of instructor Assist instruct by tutor ing 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. (H/P/F grading only)

499. Research (1-12)
Prerequisite: medical students with consent of instructor. (H/P/F grading only)

Courses in Cell Biology and Human Anatomy (CHA)

Upper Division

101. Human Gross Anatomy (4)
Lecture—4 hours. Prerequisite: Biological Sciences 2A; concurrent enrollment in Exercise Biology 106L or course 101L strongly recommended. Upper division students only; Pass One open to upper division Exercise Biology or Anthropology majors only; Pass Two open to Seniors in any major; open enrollment at the start of the quarter for upper division students in any major. Detailed study of the gross anatomical structure of the human body, with emphasis on function and clinical relevance to students entering health care professions. (Same course as Exercise Biology 106L.) GE credit: SciEng | SE — W (W) Gross

101L. Human Gross Anatomy Laboratory (3)
Laboratory—9 hours. Prerequisite: Biological Sciences 2A; must take Exercise Biology 106 or course 101 concurrently (or have already completed). Upper division students only; Pass One open to upper division Exercise Biology or Anthropology majors only; Pass Two open to Seniors in any major; open enrollment at the start of the quarter for upper division students in any major; mandatory attendance on first day of lab. Detailed study of dissected human cadavers in small group format with extensive hands-on experience. (Same course as Exercise Biology 106L.) GE credit: SciEng | SE — W (W) 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)

197. Tutoring in Cell Biology and Human Anatomy (1-5)
Discussion—1 hour; laboratory—6.9 hours. Prerequisite: completion of course 101 with a grade of B or better and consent of instructor. Provides laboratory instruction for the Gross human anatom y, with small groups of undergraduates under the supervision of the instructor. (S/U grading only)

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)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

Graduate

200. Graduate Human Gross Anatomy (6)
Lecture—4 hours; laboratory—6.9 hours. Prerequisite: consent of instructor. Lectures on human gross anatomy and cadaver dissection laboratory. Topics arranged by region; emphasis on osteology, neuromuscular anatomy, cardiovascular anatomy, gastrointestinal anatomy and anatomy of reproductive systems. Only two units of credit for students who
202. Human Microscopic Anatomy (5)
Lecture—3 hours; laboratory—5 hours. Examine the normal microscopic structure of the basic cells, tissues, and organs of the body. Examine different sections of the body by microscopy. An integrated presentation of development, gross and microanatomy. Embryology and radiology correlated with the dissection of the entire body. Embryology from implantation to birth. (Deferred grading only.)—W. (W.) Beck

208. Medical Neuroanatomy (5)
Lecture—5 hours; laboratory—5 hours. Corequisite: consent of instructor. Application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM/CTSC training programs; consent of instructor. Introduction to the CRGG program and overview of major clinical research topics. Overview of basic clinical skills needed to accomplish CRGG research projects. (Formerly Medical Sciences 460CR.)—Su. (S.) Meyers

210. Strategies for Grant Writing (2)
Lecture—2 hours; discussion—2 hours; web electronic discussion. Prerequisite: completed one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing. Application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM/CTSC training programs; consent of instructor. Introduction to the CRGG program and overview of major clinical research topics. Overview of basic clinical skills needed to accomplish CRGG research projects. (Formerly Medical Sciences 460CR.)—Su. (S.) Meyers

211. Critical Assessment of the Biomedical Literature (1)
Lecture—1 hour. Prerequisite: consent of instructor. Exposes students to topical issues and controversies in the design of interdisciplinary translational research, with an emphasis on critical assessment of the biomedical literature and values; Gain an appreciation of the role of trust in scientific research. Related to coursework in CH204. Must enroll in Fall to continue through Spring. (S/U grading only.)—F. W. S. (F, W, S.) Yarbrough

203. Neurobiology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: upper division or graduate degree in Neurobiology, consent of instructor. Application and acceptance into the Clinical Research Graduate Group, K12, T32 or other SOM/CTSC training programs; consent of instructor. (Formerly Medical Sciences 462CR.)—F, W, S. (F, W, S.) Beck, Gross, Fitzgerald, Tucker

290. Research Group Conference (1)
Seminar—1 hour. Prerequisite: consent of instructor. (S/U grading only.)—F, S. (F, S.)

291. Advanced Group Study (1-12)
Prerequisite: consent of instructor. Application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM/CTSC training programs; consent of instructor. Biomolecular applications of statistical methods in clinical, laboratory, population medicine. Graphical/tabular data presentation, probability, binomial, Poisson, normal, t, F, and Chi-square distributions, elementary nonparametric methods, simple linear regression/correlation, life tables. Microcomputer applications of statistical procedures in population medicine. (Formerly Medical Sciences 463CR.)—S/U grading only.)—S. (S.) Yang

292. Team Science (1)
Lecture/discussion—1 hour. Prerequisite: participation in CTSC Research Education and Training Programs, or consent of instructor. Overview of major clinical research topics. Overview of basic clinical skills needed to accomplish CRGG research projects. (Formerly Medical Sciences 461CR.)—S/U grading only.)—F. (F.) Chedin, Guo, Ozonoff

293. Methods in Clinical Research (3)
Lecture—2 hours; discussion—3 hours; seminar—1 hour. Prerequisite: completed one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM/CTSC training programs; consent of instructor. Introduction to the CRGG program and overview of major clinical research topics. Overview of basic clinical skills needed to accomplish CRGG research projects. (Formerly Medical Sciences 462CR.)—S/U grading only.)—Su. (S.) Fancher, Kravitz, Leigh, Melnikow, Romano, Tancredi

294. Comparative Effectiveness Research (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: completed one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM/CTSC training programs; consent of instructor. Biomolecular applications of statistical methods in clinical, laboratory, population medicine. Graphical/tabular data presentation, probability, binomial, Poisson, normal, t, F, and Chi-square distributions, elementary nonparametric methods, simple linear regression/correlation, life tables. Microcomputer applications of statistical procedures in population medicine. (Formerly Medical Sciences 463CR.)—S/U grading only.)—S. (S.) Yang

493. Anatomy Medical Education Special Module (6)
Seminar—3 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 the first three quarters (courses 400 and 402) during the four-week section (approximately seven anatomy labs and three to four histology labs); tutor first-year students during the laboratory sessions; prepare and present a clinical correlation discussion. (P/F grading only)—W. S. (F, W, S.) Beck, Gross, Fitzgerald, Tucker

497. Tutoring in Human Anatomy (1-5)
Tutoring—3 hours. Prerequisites: advanced standing on consent of instructor. Consent of instructor. Tutoring medical students in preparation for one of the didemprmental courses that is a component of the required curriculum for the School of Medicine. (P/F grading only.)—W. (W.) Beck

498. Advanced Group Study (1-12)
Prerequisite: consent of instructor. Application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM/CTSC training programs; consent of instructor. Introduction to the CRGG program and overview of major clinical research topics. Overview of basic clinical skills needed to accomplish CRGG research projects. (Formerly Medical Sciences 460CR.)—S/U grading only.)—Su. (S.) Meyers

499. Research (1-12)
Prerequisite: consent of instructor. (P/F grading only.)—F, S. (F, S.)

Clinical Research (CLH) Graduate
200. Introduction to Clinical Research (3)
Lecture—2 hours; independent study—3 hours. Prerequisite: one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM/CTSC training programs; consent of instructor. Introduction to the CRGG program and overview of major clinical research topics. Overview of basic clinical skills needed to accomplish CRGG research projects. (Formerly Medical Sciences 460CR.)—S/U grading only.)—Su. (S.) Meyers

201. Strategies for Grant Writing (2)
Lecture—2 hours; discussion—2 hours; seminar—1 hour. Prerequisite: completed one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM/CTSC training programs; consent of instructor. Introduction to the CRGG program and overview of major clinical research topics. Overview of basic clinical skills needed to accomplish CRGG research projects. (Formerly Medical Sciences 460CR.)—S/U grading only.)—Su. (S.) Ruelle

202. Introduction to Clinical Epidemiology and Study Design (3)
Lecture—25 hours; discussion—10 hours. Prerequisite: completed one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM/CTSC training programs. Epidemiology and physiology of conducting clinical epidemiologic research. Familiarity with three basic study designs (cross-sectional, case-control, and cohort), Discussion of principles relevant to conducting clinical epidemiologic studies, basic methods for analyzing data, and ethical issues involved in conducting research. (Formerly Medical Sciences 462CR.)—S/U grading only.)—S. (S.) Blankenship, Ghatri

203. Methods in Clinical Research (3)
Lecture—4 hours; discussion—1 hour; independent study—10 hours. Prerequisite: completed one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM/CTSC training programs; consent of instructor. Overview of major approaches to clinical research, including health services research techniques, informatics, CCRG, and preclinical methodologies to enhance clinical research. Overview of UCD clinical research support infrastructure. Methodologies applicable to clinical research and its multi-disciplinary perspective. (S/U grading only.)—S. (S.) Blankenship, Ghatri

204. The Ethics of Research (1)
Lecture—3 hours. Prerequisite: consent of instructor. Priority given to those with acceptance into the Clinical Research Graduate Group, K12, T32 or other SOM/CTSC training programs; consent of instructor. Information about ethical responsibilities; Explore major questions in ethics; Apply ethical principles, concepts and values; Gain an appreciation of the role of trust in scientific research. Related to coursework in CH204. Must enroll in Fall to continue through Spring. (S/U grading only.)—F. W. S. (F, W, S.) Yarbrough

205. Introduction to Medical Statistics (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: completed one of the following degrees: MD, DDS, DMD, OD, ND, DO, PharmD, DVM, PhD or DNS in nursing; application and acceptance into the Clinical Research Graduate Group, K30 program or other SOM/CTSC training programs; consent of instructor. (S/U grading only.)—F. W. S. (F, W, S.) Beck, Gross, Fitzgerald, Tucker

206. Introduction to Grant Writing, I (2)
Lecture/discussion—2 hours; extensive writing. First in a two-quarter series. Scholars are encouraged to enroll in both classes. The two-course sequence provides training in practical aspects of competitive grant writing. The focus is NIH, but information will apply to other funding agencies. (S/U grading only.)—F. (F.) Chedin, Guo, Ozonoff

207. Introduction to Grant Writing, II (1)
Lecture/discussion—1 hour. Prerequisite: completed course 206; consent of instructor. Restricted to students who have completed course 206. Second in a two-quarter series. Two-course sequence provides training in practical aspects of competitive grant writing. (S/U grading only.)—W. (W.) Chedin, Guo, Ozonoff

210Y. Principles and Methods of Comparative Effectiveness Research (4)
Web virtual lecture—4 hours; discussion—2 hours; project—6 hours; web electronic discussion. Prerequisite: familiarity with research methodology, and a course in introductory statistics; consent of instructor. Provides an introduction to Comparative Effectiveness Research (CER) and methods for conducting CER. (S/U grading only.)—S. (S.) Fancher, Kravitz, Leight, Melnikow, Romano, Tancredi

211. Critical Assessment of the Biomedical Literature (1)
Lecture/discussion—1 hour. Prerequisite: consent of instructor. Exposes students to topical issues and controversies in the design of interdisciplinary translational research, with an emphasis on critical assessment of the biomedical literature and values; Gain an appreciation of the role of trust in scientific research. Related to coursework in CH204. Must enroll in Fall to continue through Spring. May be repeated three times for credit. (S/U grading only.)—F. W. S. (F, W, S.) Boldt, Franks, Lane, Romano
212. Introduction to Stem Cell Biology (3)
Lecture/discussion—1 hour. Prerequisite: consent of instructor. Introduction to Stem Cell Biology. Each week will focus on different aspects of stem cells, including general concepts, stem cells in lower organisms, embryonic stem cells and cellular reprogramming. Open to graduate students with a fundamental knowledge of cell biology. —F (F) Fierz

220. Basics of Stem and Progenitor Cells (1)
Lecture—1 hour. Prerequisite: Molecular, Cellular, and Integrative Physiology 200, 200L; 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 cells of interest to the stem cell research community. (S/U grading only.) —S (S) Tarantal

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.) —W (W) Ikemoto, Rich

230. Congestive Heart Failure, Mechanism of Disease (3)
Lecture/discussion—2 hours; project. Prerequisite: consent of instructor; graduate standing. Underlying mechanisms of cardiomyopathy and heart failure. Presentation of fundamental knowledge of and recent basic research in heart failure. Student projects: investigation and presentation of a research topic and bench research project to advance research in the same area. —W (W) Knowlton

231. Current Techniques in Clinical Research (2)
Lecture—1 hour; clinical activity—3 hours. Prerequisite: consent of instructor and graduate standing; completion of course 220. Current techniques used in clinical research such as electrophysiology, cardiac catheterization and echocardiography, team science, and patient management. Lectures are presented by experts on each technique, with an emphasis on use in translational research. (S/U grading only.) —F, W, S, Su. —F, W, S, Su.

233. Molecular Mechanisms of Disease: Cancer (3)
Lecture/discussion—2 hours; project—3 hours. Prerequisite: consent of instructor; restricted to students pursuing the designated emphasis in Translational Research; graduate standing. Cutting edge of research on underlying mechanisms of cancer development, progression and prevention—clinical trials/ drug development, signaling pathways and molecular mechanistic aspects of cancer development, recent basic research on cancer stem cells, genetics and epigenetic events and animal models used. —W (W) Goldfarb

240. Predoctoral Clinical Research Training Program Research Integration (1)
Seminar—0.5 hours; discussion—0.5 hours. Prerequisite: consent of instructor and enrollment in the Predoctoral 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.) —F, W, S. —F, W, S, S. Kenyon

245. Biostatistics for Biomedical Science (4)
Lecture—4 hours. Prerequisite: course 244 or Public Health Sciences 244 or the equivalent; consent of instructor. Analysis of data and design of experiment for laboratory data. (Same course as Public Health Sciences 247.) —W (W) Kim

246. Biostatistics for Clinical Research (4)
Lecture—4 hours. Prerequisite: course 245 or Public Health Sciences 245. Emphasizes critical biostatistics for clinical research and targets biomedical audience. Students will develop understanding for basic planning and analysis of clinical studies and learn to develop collaborations with biostatisticians. (Same course as Public Health Sciences 246.) May be repeated for credit. Offered in alternate years. —W, QL

273. Statistical Analysis for Laboratory Data (4)
Lecture—4 hours. Prerequisite: course 245 or Public Health Sciences 245. Statistical methods for experimental design and analysis of laboratory data including gene expression arrays, RNA-Seq, and mass spec. (Same course as Public Health Sciences 247.) —S (S) Rocke

250. Integrating Medicine Into Basic Science (6)
Lecture—3.75 hours; discussion—6 hours; semi- nar—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 and medical aspects of relevant medical principles, physiology and pathophysiology into basic research; introduce high-impact clinical studies related to medicine and health. (S/U grading only.) —Su. —Su. Knowlton, Stevensen

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.) —F, W, S. —F, W, S, Su.

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.) —F, W, S. —F, W, S, Su.

290C. Literature in Translational Research (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Critical presentation and analysis of recent journal articles in translational research by students. May be repeated for credit. (S/U grading only.) —F, W, S, Su. —F, W, S, Su.

290D. Literature in Translational Research (1)
Discussion—1 hour. Prerequisite: consent of instructor; graduate standing. Critical presentation and analysis of recent journal articles in translational research by students. May be repeated for credit. (S/U grading only.) —F, W, S, Su. —F, W, S, Su.

298. Group Study in Clinical Research (1-5)
Seminar—1 hour. Prerequisite: consent of instructor. Independent research and special topics in clinical research appropriate for group study at the graduate level. May be repeated for credit. (S/U grading only.) Isseroff, Liu, Murphy, Takada

299. Research in Cutaneous Biology (1-12)
Seminar—1 hour. Prerequisite: consent of instructor. Independent research in cellular and biochemical mechanisms of cutaneous biology and pathology. (S/U grading only.) Isseroff, Liu

Graduate

299. Research in Cutaneous Biology (1-12)
Laboratory—3.36 hours. Prerequisite: consent of instructor. Independent research in cellular and biochemical mechanisms of cutaneous biology and pathology. (S/U grading only.) Isseroff, Liu

Professional

420. Integratory System (2)
Lecture/discussion—3 hours; clinical activity—0.25 hours. Prerequisite: approval of School of Medicine Committee on Student Promotions. Restricted to Medical students only; student must have passed all SOM Year 1 courses. Cell biology unit will cover the microscopic diagnosis of the skin. Recognition of normal variations, and common or important dermatomes. Patient demonstrations of select conditions. [P/F grading only.] —F, F Eisen, Isseroff

460. Dermatology Clinical Clerkship (6)
Clinical activity (inpatient/outpatient service) —40 hours for four weeks. Prerequisite: completion of three years of medical school; or consent of instructor. Limited enrollment. Observation and participation in dermatology clinics/practice and participation in Ward Rounds and Dermatology Clinics at UC Davis Medical Center, Kaiser, and private practitioner offices. —F, W, S, Su. —F, W, S, Su.

465. Specialty Extensm in Dermatology (3-16)
Clinical Activity—30 hours; lecture—6 hours. Prerequisite: consent of instructor. Extensm provides in-depth exposure to one of a variety of specialities in Dermatology. May be repeated for credit. (H/P/F grading only.) —F, W, S, Su. —F, W, S, Su.

466. Away Acting Internship in Dermatology (3-18)
Clinical Activity—40 hours; lecture—6 hours. Prerequisite: consent of instructor. Work at the level of a sub intern in Inpatient and/or Outpatient settings. Expectation is to provide direct patient management. May be repeated for credit. (H/P/F grading only.) —F, W, S, Su. —F, W, S, Su.

470. Introduction to Dermatopathology (6)
Clinical—20 hours; independent study—20 hours; lecture/discussion—6 hours. Prerequisite: previous rotation in a Dermatology Clerkship; consent of instructor. Restricted to fourth year medical student. Integrated, multi-specialty approach to the microscopic diagnosis of inflammatory and neoplastic skin disorders. (H/P/F grading only.) —F, W, S, Su. —F, W, S, Su. Bart, Fung, Konia

475. Telehealth in Dermatology (6)
Clinical activity—4 hours; project—36 hours. Restricted to Medical students. Introduction to the application of telehealth in dermatology to provide diagnoses, consultation, treatment, and education. Participate in teledermatology clinics with remote sites throughout California, conduct telehealth project(s), and review the latest literature in telehealth application in improving healthcare access. May be repeated up to six units for credit for additional time needed to complete telehealth project or work on new telehealth projects. (H/P/F grading only.) —F, W, S, Su. —F, W, S, Su.

480. Insights in Dermatology (1-3)
Clinical activity—3-9 hours; restricted to second-year medical students. Second year academic standing; consent of instructor. Critical presentation and analysis of recent journal articles in dermatologic care and attendance at some conferences. (H/P/F grading only.) —F, W, S, Su. —F, W, S, Su.

495. Wound Healing: From Bench to Bedside (6)
Clinical activity—12 hours; laboratory—8 hours; autotutorial—15 hours; term paper. Prerequisite: consent of instructor. Research to medical students only. An integrated, multi-specialty approach to clin- cal soft tissue wound healing. —F, W, S, Su. —F, W, S, Su. Isseroff
498. Special Topics in Clinical Dermatology (1-6)
Independent study—3-18 hours. Prerequisite: medical students with consent of instructor. Individually arranged study of special topics in clinical dermatology determined by student and instructor. Assigned readings and/or clinical examination of selected patients. (H/P/F grading only.)—F, W, S, Su. [F, W, S, Su.] Armstrong

499. Research in Cutaneous Biology (1-12)
Laboratory—3-36 hours. Prerequisite: consent of instructor. Research, either laboratory or clinical, on ongoing projects in the department under supervision of faculty. (H/P/F grading only.)—Armstrong

Emergency Medicine (EMR)

Lower Division

92. Emergency Medicine Clinical Research Internship (1-4)
Prerequisite: undergraduate student in good academic standing at UC Davis; consent of instructor. Intended to give the undergraduate student an opportunity to conduct "hands-on" 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.—F, W, S, Su. [F, W, S, Su.] Nishijima

Upper Division

192. Emergency Medicine Clinical Research Internship (1-4)
Internship—6-12 hours. Prerequisite: undergraduate student in good academic standing at UC Davis; consent of instructor. Intended to give the upper division undergraduate student an opportunity to conduct "hands-on" research in the Emergency Department. Through the lecture/discussion, students learn the basics of conducting and developing clinical research studies. May be repeated twice for credit.—P/NP grading only. —F, W, S, Su. [F, W, S, Su.] Nishijima

199A. Special Study for Advanced Undergraduates (4-12)
Prerequisite: experienced RA’s who have successfully participated in the EMRAP core module or a minimum of 3 quarters; consent of instructor; must have database skills. For students interested in working on specific EM projects in a more extensive way. Must commit to at least four hours of study each week for two quarters. Will be awarded credit upon completion of course requirements. (Deferred grading only, pending completion of sequence.)—F, W, S, Su. [F, W, S, Su.] Nishijima

Professional

401. Preceptorship in Emergency Medicine (1-6)
Clinical activity—10 hours. Prerequisite: consent of instructor. Exposure to the specialty of Emergency Medicine and observation of a wide array of patients in the Emergency Department. May be repeated for credit.—P/NP grading only.—F, W, S, Su. [F, W, S, Su.] Bing

430. Introduction to Medical Toxicology (3-6)
Prerequisite: fourth-year medical student in good standing, consent of instructor. In-depth review of clinical management of toxic emergencies. Rotation includes contact with toxicology trained emergency faculty, didactic lectures, journal club, simulation training and exposure to a very busy poison control center. (H/P/F grading only.)—F, W, S, Su. [F, W, S, Su.] Ford

435. Wilderness Medicine (3-6)
Lecture/discussion—20 hours; clinical activity—12 hours; independent study—8 hours. Prerequisite: consent of instructor. Elective is designed as an introductory course for students who want to explore how physicians can interact with the environment in austere conditions through lectures, hands-on/field experience, and case-based learning. (H/P/F grading only.)—F

440. Emergency Medicine Clerkship (6)
Clinical activity—46 hours; lecture/discussion—4 hours. Prerequisite: satisfactory completion of Medicine, Surgery, and Pediatric Clerkships. Students complete clinical shifts in the Emergency Department, functioning as Acting Intern. Treat a wide variety of patients and problems under the supervision of the EM Attending. Students are expected to take focused histories and present in clear, concise fashion. (H/P/F grading only.)—F, W, S, Su. [F, W, S, Su.] Jones

445. Emergency Medicine Ultrasound for Fourth-Year Medical Student (3-6)
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. Limited enrollment. Intended for students interested in learning both the technical and clinical aspects of bedside ultrasound. Emphasis will be on the use of ultrasound in emergency medicine as a diagnostic tool and in procedural guidance. (H/P/F grading only.)—F, W, S, Su. [F, W, S, Su.] Jones

450. Ambulatory Externship in Emergency Medicine (3-18)
Restricted to MS4 students in good standing; externships/away rotations only. Credit will be given for approved non-AIUEC courses at other institutions to which there is not an equal learning experience at UC Davis. (H/P/F grading only.)—F, W, S, Su. [F, W, S, Su.] Jones

465. Externship in Emergency Medicine (3-9)
Clinical activity—36 hours; lecture/discussion—4 hours. Prerequisite: satisfactory completion of Medicine, Surgery and Pediatrics. Students complete clinical shifts in the Emergency Department, functioning as Acting Intern. Treat a wide variety of patients and problems under the supervision of the EM Attending. Students are expected to take focused histories and present in clear, concise fashion. (H/P/F grading only.)—F, W, S, Su. [F, W, S, Su.] Jones

470. Pediatric Emergency Medicine Clerkship (6)
Clinical activity—36 hours; lecture/discussion—4 hours. Prerequisite: satisfactory completion of Medicine, Surgery, Pediatrics. Restricted to fourth-year medical student in good standing only. See patients in the Pediatric area of the Emergency Department under the supervision of the Pediatric Attending. Emphasis on recognition and management of the acutely ill pediatric patient and treatment of common pediatric complaints. (H/P/F grading only.)—F, W, S, Su. [F, W, S, Su.] Vance

480. Understanding Health Policy: A Focus on Analysis and Translation (1-6)
Lecture—4 hours; discussion—16 hours; independent study—10 hours. Prerequisite: consent of instructor. The delivery of health care in the US is changing rapidly. To prepare the next generation of physician leaders, this course will provide students with the skills, tools, and knowledge needed to impact decisions at the policy level. (H/P/F grading only.)—F, W, S, Su. [F, W, S, Su.] Moulin

490. Emergency Procedures Elective (3)
Lecture/discussion—24 hours; web virtual lecture—8 hours; tutorial—4 hours; independent study—4 hours. Prerequisite: current basic life support (BLS) certification. Restricted to fourth-year medical student in good standing only. Simulation-based skills training for emergency procedures. Topics include airway management, thoracic tube placement, and general critical care resuscitation skills. (P/NP grading only.)—F, W, S, Su. [F, W, S, Su.] Barton

493A. Cardiac Arrest, Resuscitation and Repurfusion (3)
Lecture—5 hours; lecture/laboratory—10 hours; laboratory—16 hours; clinical activity—4 hours. Prerequisite: consent on instructor. Restricted to UC Davis School of Medicine students only. Special Studies Module, a four week course specific to the topics of Cardiac Arrest, Resuscitation and Repurfusion. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—F, S. [F, S.] Barnes, Laurin

493B. Cardiac Arrest, Resuscitation and Repurfusion SS (3)
Lecture—5 hours; lecture/laboratory—10 hours; laboratory—16 hours; clinical activity—4 hours. Prerequisite: consent on instructor. Restricted to UC Davis School of Medicine students only. Special Studies Module, a four week course specific to the topics of Cardiac Arrest, Resuscitation and Repurfusion. (Deferred grading only, pending completion of sequence. H/P/F grading only.)—F, S. [F, S.] Barnes, Laurin

499. Research (2-18)
Laboratory—full time [1 to 12 weeks]. Prerequisite: consent of instructor. Elective where topics may be selected in either basic or clinical research areas of Emergency Medicine or Critical Care. The goals will be tailored to each individual student. Enrollment requires prior discussion and consent of instructor. (H/P/F grading only.)

Family and Community Medicine (FAP)

Lower Division

92C. Primary Care Clinics (2)
Clinical activity—68 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 Tepati or Imani Clinic. Field experience exposes lower division students to health care delivery, patient histories and physical examinations, health promotion and disease prevention, diagnosis, treatment of episodic, acute, chronic illness; appropriate referral and follow-up. May be repeated for credit. (P/NP grading only.)—F, W, S, Su. [F, W, S, Su.] Edison-Ton, Hitzeman, Smith

Upper Division

92C. Primary Care Clinics (1-2)
Clinical activity—68 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 Tepati or Imani Clinic. Field experience introduces students to health care delivery, patient histories and physical examinations, health promotion and disease prevention, diagnosis, 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.)—F, W, S, Su. [F, W, S, Su.] Edison-Ton, Hitzeman, Smith

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/intercultural relationships in making health care decisions; and clinician’s perspectives in treating people of cultures which are unfamiliar and/or uncomfortable with Western medicine. May be repeated for credit. (P/NP grading only.)—F, S. [F, S.] Edison-Ton, Nesbitt, Srinivasan

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.)—S, Su. [S, Su.] Edison-Ton
405. The Healer’s Art (1)
Lecture—0.6 hours; workshop—3 hours. Prerequisite: consent of instructor. Limited to first-year medical students. Learning how to strengthen your humanity and remain open-hearted can make the difference between professional burnout and a fulfilling life. Opportunities to try hands-on tools for self-care, healing, finding meaning, strengthening commitments, and becoming a true physician. (H/P/F grading only.)—W. (W.) Eidson-Ton

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 one time for credit. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.) Baldaugh

430. Family Medicine Clerkship (6-12)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Family medicine clerkship for third year medical students. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.) Eidson-Ton, Srinivasan

430A. SJVP Longitudinal Primary Care Clerkship at UCSF Track 1 (4)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—W. (W.) Eidson-Ton, Srinivasan

430B. SJVP Longitudinal Primary Care Clerkship at UCSF Track 1 (4)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Eidson-Ton, Srinivasan

430C. ACE-PC Family Medicine Clerkship (6)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Family medicine clerkship for ACEPC Program. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Eidson-Ton, Srinivasan

430K. ACE-PC Family Medicine Clerkship A (1.5)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—Su. (Su.) Eidson-Ton, Srinivasan

430KB. ACE-PC Family Medicine Clerkship B (1.5)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—Su. (Su.) Eidson-Ton, Srinivasan

430K. ACE-PC Family Medicine Clerkship C (1.5)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—F. (F.) Eidson-Ton, Srinivasan

430K. ACE-PC Family Medicine Clerkship D (1.5)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—F. (F.) Eidson-Ton, Srinivasan

430R. Rural PRIME Family Medicine Clerkship (1)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Eight week primary care clerkship for rural prime third year medical students. Eight weeks of family medicine training at a rural site. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.) Eidson-Ton

430TA. TeachMS Longitudinal Primary Care Clerkship (A) (4)
Clinical activity—2 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Internal Medicine and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—W. (W.) Eidson-Ton, Srinivasan

430T. TeachMS Longitudinal Primary Care Clerkship (B) (6)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Internal Medicine and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—W. (W.) Eidson-Ton, Srinivasan

431. Primary Care Continuity Clinic (1)
Clinical activity—4 sessions; project—1 session. Pre-requisite: completion of the Pre-Clinical Curriculum; consent of instructor. Longitudinal component of the third-year primary care curriculum. Student attends their clinic roughly 18 half-days over the course of the year, working one-on-one with a primary care preceptor. (H/P/F grading only.)—S. (S.) Eidson-Ton, Schwartz, Srinivasan

431A. Primary Care Continuity Clinic (1)
Clinical activity—4 sessions; project—1 session. Pre-requisite: completion of the Pre-Clinical Curriculum; consent of instructor. Longitudinal component of the third-year primary care curriculum. Student attends their clinic roughly 18 half-days over the course of the year, working one-on-one with a primary care preceptor. (H/P/F grading only; deferred grading only, pending completion of sequence.)—Su. (Su.) Eidson-Ton, Schwartz, Srinivasan

431B. Primary Care Continuity Clinic (1)
Clinical activity—4 sessions; project—1 session. Pre-requisite: completion of the Pre-Clinical Curriculum; consent of instructor. Longitudinal component of the third-year primary care curriculum. Student attends their clinic roughly 18 half-days over the course of the year, working one-on-one with a primary care preceptor. (H/P/F grading only; deferred grading only, pending completion of sequence.)—F. (F.) Eidson-Ton, Schwartz, Srinivasan

431C. Primary Care Continuity Clinic (1)
Clinical activity—4 sessions; project—1 session. Pre-requisite: completion of the Pre-Clinical Curriculum; consent of instructor. Longitudinal component of the third-year primary care curriculum. Student attends their clinic roughly 18 half-days over the course of the year, working one-on-one with a primary care preceptor. (H/P/F grading only; deferred grading only, pending completion of sequence.)—F. (F.) Eidson-Ton, Schwartz, Srinivasan

431D. Primary Care Continuity Clinic (1)
Clinical activity—4 sessions; project—1 session. Pre-requisite: completion of the Pre-Clinical Curriculum; consent of instructor. Longitudinal component of the third-year primary care curriculum. Student attends their clinic roughly 18 half-days over the course of the year, working one-on-one with a primary care preceptor. (H/P/F grading only; deferred grading only, pending completion of sequence.)—W. (W.) Eidson-Ton, Schwartz, Srinivasan

34. Primary Care Clinics—Clinica Tepati (3-12)
Clinical activity—32.36 hours; seminar—0.2 hours; lecture—1.2 hours. 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
435. Primary Care Clinics-Imani Clinic (3-12)
Clinical activity—32-36 hours; seminar—0.2 hours; lecture—1-2 hours. Open to medical students in all four years of medical school. Lecture: diagnosis, treatment and prevention of various systemic diseases. May be repeated for credit. (P/F grading only.)—F, W, S, Su. (F, W, S, Su./Su.)—Smith

436. Continuity Clinic in Primary Care—Shifa Clinic (3-12)
Clinical activity—32-36 hours; seminar—0.2 hours; lecture—1-2 hours. Open to medical students in all four years of medical school. Lecture: diagnosis, treatment and prevention of various systemic diseases. May be repeated for credit. (P/F grading only.)—F, W, S, Su. (F, W, S, Su./Su.)—Yasmeen

437. Primary Care Clinics-Knights Landing (3)
Clinical activity—2-3 hours; lecture—1 hour. Must complete an application and interview prior to registering. Lecture: diagnosis, treatment and prevention of various systemic diseases. May be repeated for credit. (P/F grading only.)—F, W, S, Su. (F, W, S, Su./Su.)—Eidson-Ton

438. Directed Clinical Studies-Imani Clinic (1-12)
Clinical activity—32-36 hours; seminar—0-2 hours; lecture—1-2 hours. Open to medical students in all four years of medical school. Lecture: diagnosis, treatment and prevention of various systemic diseases. May be repeated for credit. (P/F grading only.)—F, W, S, Su. (F, W, S, Su./Su.)—Hitzeman

439. Directed Clinical Studies in Family Medicine (1-12)
Clinical activity—40 hours. Prerequisite: consent of instructor. Individual directed studies in extended preparation for modified curriculum or to complete a clinical rotation following a leave of absence. May be repeated for credit. (P/F grading only.)—F, W, S, Su. (F, W, S, Su./Su.)—Eidson-Ton

440. Geriatrics in Community Health (4)
Fieldwork—24 hours; clinical activity—12 hours; lecture—4 hours. Prerequisite: course 430. Visits to community agencies including men's homes, adult day health centers, a diagnostic and research center, and case management specialists. Observation and participation in the MDSSE, patient-family conferences, interdisciplinary team meetings, neuropsychiatric testing and home visit evaluations. (H/P/F grading only.)—F, W, S, Su.

468. International Preceptorship (3-12)
Clinical activity—40 hours. Prerequisite: medical student with consent of instructor. May be repeated for credit. (P/F grading only.)—F, W, S, Su. (F, W, S, Su./Su.)—Eidson-Ton

469. Inpatient Clinical Elective in Family Medicine (4)
Clinical activity—40 hours. Prerequisite: completion of third-year of medical school or consent of instructor. Open to medical students only. Comprehensive primary medical care of patients on a family medicine hospital service. Includes inpatient and outpatient experience. May be repeated up to 12 units of credit. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su./Su.)—Eidson-Ton

470. International Inpatient/Outpatient Clinical Elective in Family Medicine (3-12)
Clinical activity—40 hours. Prerequisite: completion of third-year of medical school or consent of instructor. Open to medical students only. Comprehensive primary medical care of patients on a family medicine hospital service. Includes inpatient and outpatient experience. May be repeated up to 12 units of credit. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su./Su.)—Eidson-Ton

471. Selected Studies in Family Practice (1-9)
Prerequisite: medical students with consent of instructor. Assigned readings in family practice to increase understanding on selected topics related to family medicine and primary health care delivery system. Visits to and written analysis of selected health care programs; and clinicians' perspectives in treating people of cultures which are unfamiliar and/or uncomfortable with Western medicine. May be repeated for credits only. (H/P/F grading only.)—F, W; (F, W) Eidson-Ton, Nesbit, Srinivasan

493. Aging and Health (6)
Seminar—12 hours. Prerequisite: consent of instructor. Is disease and infirmity the inevitable consequence of aging? We will spend four weeks exploring this question by reviewing the biology of aging, physiologic changes seen in aged individuals and disease processes commonly found in elderly persons. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su./Su.)—Lin

495. LGBTIQQA Healthcare Lecture Series (1)
Lecture—6 sessions. Increase the awareness of medical issues surrounding the LGBTIQQA community, and arm students with knowledge of the health disparities the community faces. Provide better quality care to the LGBTIQQA patients cared for as physicians. May be repeated for credit. (P/F grading only.)—W (Callahan

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.)—F, W, S, Su. (F, W, S, Su./Su.)—Eidson-Ton

499. Research (1-12)
Prerequisite: medical students with consent of instructor. For research in various aspects of the health care delivery system. (H/P/F grading only.)

Human Physiology (HPI)

Lower Division
99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Upper Division
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 human and animal physiology. (P/NP grading only.)

198. Directed Group Study (1-5)
To be arranged. Prerequisite: consent of instructor. Directed reading, discussion and/or laboratory experience in selected topic. (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
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.)—F (F) Payne

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.

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional
400. Human Physiology (6)
Lecture—3 hours; laboratory—2 hours. Medical student only. General and cellular physiology of neuromuscular, epithelial cells and systems; physiology of cardiovascular, respiratory, gastrointestinal, and renal systems. (Deferred grading only, pending completion of sequence.) (P/F grading only.)—F, S, Su. F, S, Su./Ferris, Pare

403. 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 neu roanatomy of motor, sensory, and cognitive systems.
Incorporates application of neuroanatomy to clinical problem solving. (Same course as Cell Biology and Human Anatomy 403B; F/P/F grading only.)—Su. (Su.) Blankenship, Gross

493. Physiological Principles in ICU SSM
(6)
Lecture—5 hours; lecture/laboratory—10 hours; laboratory—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 493C.)—[H/P/F/F grading only]—F, W, S, Su. (F, W, S, Su.) Sala, 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 in preparation for one of the departments courses that comprises the required curriculum of the School of Medicine. (H/P/F grading only.)—Ferns, Payne

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 (IMD)

Lower Division

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

164. Practicum in Community Health Clinic: Bayanihan Clinic (1-2)
Clinical activity—3-36 hours. Prerequisite: upper division standing. Supervised work experience in internal medicine and related fields. (P/NP grading only.)

192. Internship in Internal Medicine (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing. Supervised work experience in internal medicine and related fields. (P/NP grading only.)

194. Practicum in Community Health Clinics (1-3)
Clinical activity—5-15 hours on Saturday mornings and during the week as necessary, excluding holidays. Prerequisite: consent of instructor. The undergraduate student, through active participation in the medical aspects of community health clinics, will gain knowledge of the organization, administration, and problem-solving capabilities. May be repeated for credit. (P/NP grading only.)—F, W, S, Su. (F, W, S, Su.) Guerrero

192. Internship in Internal Medicine (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing. Supervised work experience in internal medicine and related fields. (P/NP grading only.)

194. Practicum in Community Health Clinics (1-3)
Clinical activity—5-15 hours on Saturday mornings and during the week as necessary, excluding holidays. Prerequisite: consent of instructor. The undergraduate student, through active participation in the medical aspects of community health clinics, will gain knowledge of the organization, administration, and problem-solving capabilities. May be repeated for credit. (P/NP grading only.)—F, W, S, Su. (F, W, S, Su.) Kumagai

198. Directed Group Study (1-2)
Seminar—1-2 hours. Prerequisite: consent of instructor. Directed group study in medicine and related fields. (P/NP grading only.)—Last

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: upper division standing; consent of instructor. (P/NP grading only.)

Graduate

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 medical practice may be revisited once a semester. Prerequisite: consent of instructor. (H/P/F grading only.)

220D. Cardiovascular System (2.5)
Lecture/discussion—2 hours; project—2 hours. Legal and ethical aspects regarding cardiovascular disease in medicine. Prerequisite: consent of instructor. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.) Laslett

250. Medicine and the Law (3)
Seminar—3 hours. Clinical Research Study design and data analysis related to controversial research areas. Presentations assigned to and given by faculty. Prerequisite: may be repeated for credit. (S/U grading only.)—S. (S.) Lane, Meyers

Professional

414. One Health: A Course on Global Health (1)
Conference—8 hours. Global health problems are complex and require culturally-sensitive, socially-acceptable, and action-oriented approaches to create practical and cost-effective solutions. Will examine major health problems created by the convergence of human, animal, and environmental influences. May be repeated for credit. (P/F grading only.)—F, W, S, Su. (F, W, S, Su.) Wilkes

416. Summer Institute on Race and Health (1)
Seminar—1 hour. The complex moral, legal, and ethical dilemmas that patients, families, and health care providers face in today’s medical practice may be revisited once a semester. Prerequisite: consent of instructor. (H/P/F grading only.)

290C. Controversies in Clinical Research (1)
Seminar—3 hours. Clinical Research Study design and data analysis related to controversial research areas. Presentations assigned to and given by faculty. Prerequisite: may be repeated for credit. (S/U grading only.)—S. (S.) Lane, Meyers

420A. Hematology (2)
Lecture/discussion—1 hour; discussion—1 hour. Prerequisite: approval of Committee on Student Progress. Restricted to Medical students only. Prerequisite: consent of instructor. Restricted to Medical students only. May be repeated for credit. (P/F grading only.)—F, W, S, Su. (F, W, S, Su.) Yeung

420B. Gastrointestinal System (2.5)
Laboratory/discussion—5.5 hours. Prerequisite: approval of SOM’s Committee on Student Promotions. Restricted to Medical students only; student must pass all SOM Year 1 courses. Clinical aspects of respiratory anatomy, physiology, and pathology. Diagnostic procedures and a description of the major pulmonary diseases & disorders, and critical care medicine. (P/F grading only.)—F, W, S, Su. (F, W, S, Su.) Blankenship, Gross

420D. Cardiovascular System (2.5)
Lecture/discussion—5.5 hours. Prerequisite: approval of School of Medicine Committee on Student Promotions. Restricted to Medical students only; student must pass all SOM Year 1 courses. 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.)—F, W, S, Su. (F, W, S, Su.) Blankenship, Gross

420E. Nephology (2)
Lecture—2 hours; discussion—2 hours. Prerequisite; approval of SOM’s Committee on Student Promotions. Restricted to Medical students only; student must pass all SOM Year 1 courses. 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.)—F, W, S, Su. (F, W, S, Su.) Blankenship, Gross

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 each at UCSDMC and at Kaiser Hospitals. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be deferred for credit. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Aronowitz, Jahl

430A. SJVP Longitudinal Medicine Clerkship at UCSF Track 1 (4)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be deferred for credit. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Aronowitz, Jahl

430B. SJVP Longitudinal Medicine Clerkship at UCSF Track 1 (4)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be deferred for credit. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Aronowitz, Jahl

430C. SJVP Longitudinal Medicine Clerkship at UCSF Track 1 (4)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be deferred for credit. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Aronowitz, Jahl

430D. SJVP Longitudinal Medicine Clerkship at UCSF Track 2 (4)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be deferred for credit. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Aronowitz, Jahl

430E. SJVP Longitudinal Medicine Clerkship at UCSF Track 2 (4)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty.
440 Medicine, School of

Ongoing patient write-ups, rounds, conferences are required. May be repeated for credit. (H/P/F grading only; deferred grading only, pending completion of sequence.)—W. (W) Aronowitz, Johl

430FF. SJVP Longitudinal Medicine Clerkship at UCSF Track 2 (4)

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. Ongoing patient write-ups, rounds, conferences are required. May be repeated for credit. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Aronowitz, Johl

430TA. TeachMS Longitudinal Medicine Clerkship (A) (4)

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. Ongoing patient write-ups, rounds, conferences are required. May be repeated for credit. (H/P/F grading only; deferred grading only, pending completion of sequence.)—F. (F.) Aronowitz, Johl

430TB. TeachMS Longitudinal Medicine Clerkship (B) (4)

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. Ongoing patient write-ups, rounds, conferences are required. May be repeated for credit. (H/P/F grading only; deferred grading only, pending completion of sequence.)—W. (W) Aronowitz, Johl

430TC. TeachMS Longitudinal Medicine Clerkship (G) (2)

Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. Ongoing patient write-ups, rounds, conferences are required. May be repeated for credit. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Aronowitz, Johl

439D. Directed Clinical Studies in Internal Medicine (1-12)

Clinical activity—40 hours. Prerequisite: consent of instructor. Directed studies in internal medicine in extended preparation for modified curriculum or to complete a clinical rotation following a leave of absence. May be repeated for credit. (H/P/F grading only;—F. W. S., Su. (F. W. S., Su.)

439R. Directed Studies in Internal Medicine (1-12)

Clinical activity—30 hours; independent study—10 hours. Prerequisite: consent of instructor. Individual directed study in extended preparation for remediation of all or part of clinical rotation. Clinical studies to accommodate and satisfy remedial work as directed by the Committee on Student Progress and approved by the School. May be repeated for credit. (P/F grading only;—F. W. S., Su. (F. W. S., Su.)

450A. Medicine and the Law (1.5)

Seminar—2 hours; discussion—2 hours. Prerequisite: consent of instructor. Restricted to Medical students only. Legal and ethical principles and concepts in medicine. Topics include standard of care, informed consent, reproductive medicine, and end-of-life issues. Deferred grading only, pending completion of sequence. H/P/F grading only.)—F. (F.) Rich

450B. Medicine and the Law (1.5)

Seminar—2 hours; discussion—2 hours. Prerequisite: consent of instructor. Restricted to Medical students only. Legal and ethical principles and concepts in medicine. Topics include standard of care, informed consent, reproductive medicine, and end-of-life issues. Deferred grading only, pending completion of sequence. H/P/F grading only.)—S. (S.) Rich

459. 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 practices of cancer and state-of-the-art research approaches and prevention of cancer. Emphasis on epidemiology, molecular biology, and pharmacology. (H/P/F grading only;—F. (F.) DeGreggio

460. Correctional Health Care Clerkship (1-4)

Clinical activity—full time. Prerequisite: fourth-year medical student in good academic standing; consent of instructor. 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;—F. W. S., Su. (F. W. S., Su.) Silvia

461. Mather VA Internal Medicine (6)

Clinical Activity—50 hours; lecture/discussion—5 hours; independent study—5 hours. Prerequisite: consent of instructor. Limited enrollment. Active Internship in Internal Medicine for qualified 4th year Medical Students from the UC Davis School of Medicine at the Sacramento VA Hospital. Experiences will somewhat mirror those of Al at UCDMC. May be repeated for credit. (H/P/F grading only;—F. W. S., Su. (F. W. S., Su.) Jagadeesan, Tran

462. Medicine Wars Al (6)

Clinical activity—40 hours. Prerequisite: Medical Sciences 431; consent of instructor; demonstrated ability to accept responsibility. Limited enrollment. Assume role of acting intern in ward of physician on ward under direction of medical resident and staff. Teams I-V take call every fifth night. Emphasis on evidence-based inpatient care. May be repeated for credit. (H/P/F grading only;—F. W. S., Su. (F. W. S., Su.) Jahl

463. Acting Internship in Medicine Intensive Care Unit (MICU (3-6)

Clinical activity—40 hours. Prerequisite: completion of third year in medical school; consent of Director of MICU. Limited enrollment. At UCDMC, student functions as acting intern. MICU service under direction of medical resident and staff. Responsibility for patients admitted to MICU. On call in hospital every fourth night. May be repeated for credit. (H/P/F grading only;—F. W. S., Su. (F. W. S., Su.) Jahl

464. Bayanihan Primary Care Clinic (3)

Clinical activity—6 hours. Prerequisite: consent of instructor. Restricted to medical students in all four years of medical school. Under the guidance and supervision of the director, medical students will learn patient history taking, medical documentation, counseling, diagnosis and treatment of patients with chronic and acute disease. Provides exposure to the special needs of aboriginal and socioeconomic groups. May be repeated for credit. (P/F grading only;—F. W. S., Su. (F. W. S., Su.) Sandrock

465. Medicos-Global Health Sciences (9)

Lecture—5 hours; clinical activity—25 hours; fieldwork—5 hours; guest lectures—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. Students will experience with clinic patients. Cultural exchange and awareness of global health care. (P/F grading only;—Su. (Su.) Wilkes

468. Ambulatory Internal Medicine Externship (3-18)

Clinical activity—40 hours. Prerequisite: course 430; consent of instructor; demonstrated ability to accept responsibility. Limited enrollment. Hands-on primary care clinical experience in the ambulatory setting supervised by a general internist. Emphasis on evidence-based outpatient care. (H/P/F grading only;—F. W. S., Su. (F. W. S., Su.) Henderson

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 epidemiological/research perspective. Principals of evidence-based medicine. (H/P/F grading only;—S. Kravitz, 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 different subspecialties. (P/F grading only.)—F. 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 conceptualize with practical aspects of primary health care. May be repeated for credit. (H/P/F grading only;—F. W. S., Su. (F. W. S., Su.) 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 problems physicians face in practice today. Demonstration that evil emerges incrementally until taken for granted. (P/F grading only.) Offered irregularly.—F. W. S.

499. 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 UCDMC or off campus by specific arrangement. (H/P/F grading only;—F. W. S. Su. (F. W. S., Su.)

General Medicine Research (1-18)

Independently—20 hours. (H/P/F grading only.)—F. W. S., Su. (F. W. S., Su.) Meyers

Internal Medicine—Cardiology (CAR)

Upper Division

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. (H/P/F grading only.)—F. W. S., Su. (F. W. S., Su.)

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/F grading only.)

Graduate

220. Basic Science in Cardiology (1)

Lecture—1 hour. Prerequisite: graduate or medical student status. Fundamentals underlying cardiovascular medicine. Including hemodynamics, neural control of the circulation, biochemistry and some experimental data and statistics. Experts in each of these fields will give current information in their areas. Offered in alternate years. (S/U grading only.)—S. Kaufman
401. Clinical Cardiology Clerkship: Kaiser (3-18)
Clinical activity—1-5 hours. Prerequisite: third- and fourth-year medical students with advance approval by Division of Cardiology. Limited enrollment. Emphasis placed on history taking and physical examination of pediatric and adult patients with congenital and acquired cardiovascular disease. Hospital rounds in CUC and elsewhere. Roles of ECG, PCG, and cardiac fluoroscopy, etc., in office cardiology will be evaluated. May be repeated for credit. (H/P/F grading only) — F, W, S, Su. (F, W, S, Su.)

460. Cardiology Clinical Clerkship (3-18)
Clinical activity—2-12 hours. Prerequisite: Internal Medicine 430, third- and fourth-year medical students in good academic standing with consent of instructor. Limited enrollment. 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. (H/P/F grading only) — F, W, S, Su. (F, W, S, Su.)

461. Management of Coronary Artery Disease: Coronary Care Unit (3-18)
Clinical activity. Prerequisite: completion of second year of medical school and advance approval by Division of Cardiology. Limited enrollment. 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, cardiac catheterization, pathologic correlation, and modern approach to therapy, both medical and surgical, based on pathophysiologic mechanisms. May be repeated for credit. (H/P/F grading only) — F, W, S, Su. (F, W, S, Su.)

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, Cardiac Care Unit, Cardiac Catheterization, and Cardiac Surgery services. (P/P/F grading only) — W, S, Su. (W, S, Su.) 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 attend one or more cardiovascular medicine clinics: general, hypertension, arrhythmia. Introduction to the diagnosis/treatment of common cardiovascular problems. (H/P/F grading only) — F, W, S, Su. (F, W, S, Su.)

493. Gender Specific Medicine SSM (6)
Lecture—5 hours; lecture/taboratory—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 on the topic: Basic Science Principles Relating to Gender Specific Medicine. (Same course as Obstetrics & Gynecology 493 J.) (H/P/F grading only) — F, W, S, Su. (F, W, S, Su.)

498. Special Group Study: EKG Unit (1-12)
Prerequisite: medical student with advance approval by monthly attending faculty. Limited enrollment. 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. (H/P/F grading only) — F, W, S, Su. (F, W, S, Su.)

499. Research (1-12)
Prerequisite: approval by Division of Cardiology. (H/P/F grading only)

Internal Medicine—Endocrinology, Diabetes and Metabolism (ENM)

Upper Division
492. Internship in Endocrinology (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experience in endocrinology may be repeated for credit up to 12 units. (P/NP grading only)

Graduate
299. Research (1-12)
Prerequisite: consent of instructor. Endocrinology research. (S/U grading only)

Professional
460. Endocrinology Clinical Clerkship (3-18)
Clinical activity (inpatient/outpatient service)—full time (5 days per unit). Prerequisite: Internal Medicine 430 and/or consent of instructor. Limited enrollment. Participation with members of subspecialty service in the initial evaluation, work-up, management, and follow-up of patients with endocrinologic disorders. (H/P/F grading only) — F, W, S, Su. (F, W, S, Su.)

465. Clinical Nutrition Clerkship (3-18)
Clinical activity—30 hours. Prerequisite: completion of Internal Medicine 430; consent of IOR. In-depth experience in assessment and monitoring of nutritional support of patients whose illnesses are complicated by malnutrition and of patients with problems in under-nutrition due to various illnesses. May be repeated for credit. (H/P/F grading only) — F, W, S, Su. (F, W, S, Su.)

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 physiology oral presentation to the endocrine group. (H/P/F grading only) — F, W, S, Su. (F, W, S, Su.)

499. Research (1-12)
Prerequisite: consent of instructor. (H/P/F grading only)

Internal Medicine—Gastroenterology (GAS)

Upper Division
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 general medicine. May be repeated for credit up to 12 units. (P/NP grading only)

Graduate
299. Research (1-12)
Prerequisite: consent of instructor. General Medicine research. (S/U grading only)

Professional
460. General Medicine Consults (1-18)
Clinical activity (inpatient/outpatient service)—40 hours. Prerequisite: fourth-year medical students with consent of instructor; a general medicine clerkship. Limited enrollment. Supervised opportunity to see entire spectrum of medical problems encountered by a general internist. Student spends time in General Medicine Clinic and on the Internal Medicine Consult Service. Consultation Service is particularly concerned with medical evaluation of surgical patients. (H/P/F grading only) — F, W, S, Su. (F, W, S, Su.)

470. Health Care Ethics (3-9)
Lecture/discussion—2 hours; laboratory/discussion—1 hour. Prerequisite: consent of instructor. Guided independent study of issues in biomedical ethics, with discussion of readings that are based on student interests and needs. Participation in ethics rounds. (Same course as Nursing 470.) (S/U grading only) — W, S, Su. (S, Su.)

485. Introduction to Health Care Ethics (1)
Lecture—10 weeks. Prerequisite: medical student in good standing. Introduction to concepts and methods of healthcare ethics. Emphasis on problems and methods. (H/P/F grading only) — F (F)

499. General Medicine Research (1-18)
Discussion—3 hours; clinical research—8-40 hours. Prerequisite: consent of instructor. Student 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
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) — F, W, S, Su. (F, W, S, Su.)
Graduate

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 system, 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

420. Oncology (4)
Lecture/discussion—2 hours. Prerequisite: approval by the SOM Committee on Student Promotions. Restricted to Medical student only; students must pass all Year 1 SOM courses. Covers the principles of oncology and the pathophysiology of specific, common cancers correlated with organ systems pathology and systemic pathology courses. (P/F grading only.)—F (F, W, S, Su.)

460. Hematology–Oncology Acting Internship (6-18)
Clinical activity. Prerequisite: fourth-year medical student in good academic standing. Limited enrollment. Acting intern on inpatient hematology/oncology ward service. May be repeated for credit. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.)

461. Hematology–Oncology Consult Clerkship (6-12)
Clinical activity. Prerequisite: fourth-year medical student in good academic standing. Limited enrollment. Student is an integral 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. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.)

462. Hematology–Oncology Ambulatory Clerkship (3-18)
Clinical activity—30 hours. Prerequisite: fourth-year medical student in good academic standing; consent of instructor. Limited enrollment. Outpatient rotations in related clinics. Participation with members of the subspecialty service in the initial clinical evaluation, work-up, management and follow-up of the patient with hematologic or oncologic disorders. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.)

493. Cancer as a Process (1-6)
Seminar—10 hours; clinical activity—14 hours; autotutorial—6 hours; independent study—10 hours. Prerequisite: consent on instructor. Restricted to UC Davis School of Medicine students only. Covers cancer as a process, beginning with risks and prevention, preneoplasia, microinvasion, treatment options, metastases and systemic therapy, pain medicine and palliative care, and cancer communication. Format includes traditional lectures, student-led case discussions, and problem-based learning. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.) Meyer, van Friedericks Fitzwater

499. Research (1-12)
Prerequisite: consent of instructor. (H/P/F grading only.)

Internal Medicine—Infectious Diseases (ID1)

Upper Division

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 infectious agent, organism, and vector; diagnostic testing and treatment strategies, and the role of infectious diseases in contemporary society and throughout human history. (P/NP grading only.)—F (F) Danevak

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 clinical settings. 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, physical and biochemistry preferred), biologic and pathophysiology of specific, common cancers correlated with organ systems pathology and systemic pathology courses. (P/F grading only.)

Graduate

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 equal emphasis on human and veterinary diseases. Major categories of infectious diseases by mode of transmission.—S. DeFlemers, Sandrock

299. Research in Infectious Diseases (1-12)
Prerequisite: consent of instructor. Laboratory investigation contributing to the dissertation for a graduate degree. (S/U grading only.)

Professional

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 be in good academic standing and have consent from the instructor. Familiarizes students with the diagnosis and treatment of individuals infected with the human immunodeficiency virus. Students will interview patients, observe patient care and participate in ongoing clinic research as well as examine alternative lifestyles. May be repeated for credit. (H/P/F grading only.)—F, W, S, Su.

450. Social and Care of the Injection Drug User (1-4)
Lecture—1 hour; clinical activity—3 hours. Prerequisite: first and second year medical students in good academic standing. Requires participation and guided clinical practice in a supervised clinical setting, focusing on the social and medical aspects of health care for injection drug users. May be repeated for credit up to 24 units. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.)

460. Infectious Diseases Clinical Clerkship (3-6)
Clinical activity. Prerequisite: successful completion of two years of study in an accredited medical school. Limited enrollment with priority to fourth-year medical students. Patients ill with infectious diseases, including AIDS, will be evaluated and presented at rounds and case conferences. Students will be seen in the Infectious Diseases Clinic. Instruction in clinical microbiology and the proper use of the laboratory will be provided. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.)

499. Research Topics in Infectious Disease (2-12)
Prerequisite: successful completion of the first year of study in School of Medicine, graduate students (approved for graduate credit), and/or 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 without a formal seminar presentation. (H/P/F grading only.)

Internal Medicine—Nephrology (NEP)

Upper Division

192. Internship in Nephrology (1-12)
Internship—3-36 hours; final report. Prerequisite: upper division standing; approval of project by preceptor prior to internship. Supervised work experience in nephrology. May be repeated for credit up to 12 units. (P/NP grading only.)—F, W, S, Su. (F, W, S, Su.)

Graduate

299. Nephrology Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional

444. Curriculum Design for Doctoring (1)
Project—2 hours; seminar—1 hour. Prerequisite: consent of instructor; second year standing in School of Medicine. Design of Doctoring curriculum for medical students in focused topic areas to be announced annually. Students will design sessions, consider resource needs, and work with IORs to initiate the curriculum. (P/F grading only.)—Su. (Su.)

460. Nephrology and Fluid Balance (3-6)
Clinical activity—4 hours; Lecture/discussion—10 hours. Prerequisite: completion of 3rd year medical school; completion of Medicine Care Clerkship; consent of the instructor. Limited enrollment. Active participation in all inpatient/outpatient clinical activities, attendance at specific lectures and conferences at UCD Medical Center covering the field of nephrology and fluid-electrolyte disorders. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.) Yeun

499. Research in Nephrology (3-18)
Prerequisite: individual arrangement and consent of instructor. Independent laboratory research on a specific problem related to biochemical or immunologic causes of renal disease and/or uremic disorders in humans or animals. (H/P/F grading only.)

Internal Medicine—Pulmonary Medicine (PUL)

Upper Division

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

299. Pulmonary Disease Research (1-12)
Laboratory. Prerequisite: by arrangement only. Pulmonary disease research activity with focus in inhalation toxicity, oxidants or lung biochemistry, and cell and molecular biology. (S/U grading only.)—Cross

Professional

460. Comprehensive Pulmonary Medicine Clerkship (3-6)
Clinical activity—40 hours. Prerequisite: completion of second year of medical school and/or consent of instructor; completion of Internal Medicine Clerkship. Rotation intended to provide a comprehensive student education in Pulmonary Medicine. Students will participate in hands on clinic rotations, as well as completing an assigned curriculum. Intended for students pursuing Internal Medicine & Primary Care careers. May be repeated for credit. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.) Stollenwerk

461. Critical Care Clinical Clerkship (3-6)
Clinical activity—40 hours. Prerequisite: completion of second year of medical school and/or consent of instructor; completion of Internal Medicine and Surgical Clerkships. Rotation intended to provide student education in the Critical Care Management of...
sub-specially patients. May be repeated for credit.

462. Pulmonary Clinical Clerkship (3-6)
Clinical activity—35 hours. Prerequisite: completion of second-year medical school and consent of instructor; completion of Internal Medicine Clerkship. Simultaneous with 460. Rotation designed for students interested in learning pulmonary medicine, but who desire more variety in their clerkships, and do not desire the comprehensive experience offered by a four-week pulmonary rotation. May be repeated for credit. (H/P/F grading only)—F, W, S, Su (F, W, S, Su) Stollenwerk

470. Practicum in Care of the Terminally Ill (3-6)
Clinical activity—35 hours; seminar—5 hours. Prerequisite: consent of instructor. Restricted to fourth-year medical students in good standing. Work with hospice interdisciplinary team. Direct experience in care of patients. Internship when possible. Emphasis on symptom relief, end of life issues, physician assisted suicide. (H/P/F grading only)—F, W, S, Su (F, W, S, Su) McMillan

475. Encounters in Ethics in the ICU (3-6)
Clinical Activity—12 hours; lecture/discussion—6 hours; independent study—6 hours. Prerequisite: all fourth-year Medical Student. Care for critically ill adults with complex medical disease carries with it unique ethical roles and responsibilities for the physician. (H/P/F grading only)—F, W, S, Su (F, W, S, Su) Black

480. Pulmonary-Critical Care Medicine Insights (1-3)
Clinical activity—3-9 hours. Prerequisite: student in good academic standing; consent of instructor. Attend respiratory outpatient clinics and in-patient pulmonary consultation rounds and medical intensive care rounds. Introduction to diagnosis and treatment of common pulmonary problems. Offered irregularly. (F, W, S, Su) Stollenwerk

499. Research (1-12)
Prerequisite: consent of instructor. (H/P/F grading only.)

Internal Medicine—Rheumatology—Allergy (RAL)

Lower Division
99. 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)—F, W, S, Su (F, W, S, Su)

Upper Division
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
209. Current Topics in Immunology: From Preclinical Actions to Grants (3)
Lecture—1 hour, term paper or discussion—1 hour; project—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. —W (W) Van de Water

298. Topics in Rheumatology and Clinical Immunology (1-5)
Lecture: Prerequisite: consent of instructor. Library and/or laboratory work as required. (S/U grading only) —Gershwin

299. Research in Autoimmune Disease (1-12)
Laboratory. Prerequisite: consent of instructor. Independent research will be encouraged in both animal models of human disease (including congenitally athymic [nude], asplenic, and New Zealand mice) and the cellular immune system of patients with systemic lupus erythematosus, Sjogren's syndrome, polymyositis and drug hypersensitivity. (S/U grading only.)

Professional
460. Rheumatology Clinical Clerkship (1-18)
Clinical activity—2-40 hours. Prerequisite: Medical School III or IV year status; approval of project by preceptor prior to internship. Participation of members of the subspecialty service in the diagnosis and therapeutic management of patients with rheumatologic diseases. May be repeated for credit. (H/P/F grading only) —F, W, S, Su (F, W, S, Su) Black

461. Allergy Clinical Clerkship (3-18)
Clinical activity (inpatient-outpatient service)—full time (2 to 12 weeks). Prerequisite: completion of second-year medical school and consent of instructor. Student 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)—F, W, S, Su (F, W, S, Su)

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) —F, W, S, Su (F, W, S, Su) Leek

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. May be repeated for credit. (H/P/F grading only) —F, W, S, Su (F, W, S, Su) Black

Master of Public Health (MPH)
The Department of Public Health Sciences offers the Master of Public Health (MPH) degree. The MPH degree is accredited by the Council on Education for Public Health. Students apply for admission through the Office of Graduate Studies. The following listing is all required core course work for the degree. Course descriptions are given under the individual course offerings. For Public Health Sciences courses, see the Public Health Sciences (SPH), on page 451. UNITS

Required Units for Master of Public Health
Core courses ....................................... 40
Added-competence selective ........................ 6-11
Elective units ....................................... 5-10
Total units required for the degree .......... 56

Core coursework
Biostatistics
Introduction to Health Science Statistics .......... 4
Biostatistics for the Health Sciences ............... 4
Public Health Informatics ............................ 2

Epidemiology
Principles of Epidemiology ........................ 4

Environmental Health Science
Principles of Environmental Health Science ........ 3

Health Services Administration
Health Services Administration ..................... 3

Social and Behavioral Influences on Health
Social & Behavioral Aspects of Public Health ... 3

General Public Health
Introduction to Public Health ....................... 3

Topics in Public Health Seminar
1 unit/quarter ......................................... 4

Public Health Practice
For more information about the Master of Public Health, see http://mph.ucdavis.edu/

Medical Microbiology (MMI)

Upper Division
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 430.) —W. Pappagianis

188. Human Immunology (3)
Lecture—3 hours. Prerequisite: undergraduate level introductory biology course. Understanding the immune system and mechanisms of immunity. Basic components 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. —S (S) Torres

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) —F, W, S, Su (F, W, S, Su)

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 and medically important viruses. Development of 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) —F, W, S, Su (F, W, S, Su)

199. Research in Medical Microbiology (1-5)
Prerequisite: upper division standing and consent of instructor. Individual research. (P/NP grading only.)

Graduate
200D. Mechanisms for Microbial Interactions with Hosts (3)
Lecture/discussion—3 hours. Prerequisite: Microbiology 200A or 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. —W (W)

210A. Critical Analysis of Contemporary Research on Animal Models of Human (1)
Lecture/discussion—1 hour. Prerequisite: (1) students funded by the Animal Models of Infectious Diseases Training Grant; consent of instructor. Limited enrollment. Topics will include diverse vertebrate and invertebrate models of human infectious diseases. May be repeated for credit. Offered in alternate years. (S/U grading only). —W. Bevin, Solnick
2108. Comparative Analysis of Animal Models of Human Infectious Diseases (1)
Lecture/discussion—1 hour. Prerequisite: students funded by the Animal Models of Infectious Diseases Training Grants, other consent by instructor. Limited enrollment. Compares the major vertebrate and invertebrate animal models that are used most commonly to study human infectious disease, including mouse, nonhuman primate, Caenorhabditis elegans, and drosophila. May be repeated for credit. Offered in alternate years. (S/U grading only)—W. Bevins, Solnick

215. Medical Parasitology (3)
Lecture—1.5 hours; discussion—1.5 hours. Prerequisite: graduate student with consent of instructor. Epidemiology, pathogenesis, clinical manifestations, current literature discussion of protozoa, helminths, and arthropods of medical importance. Offered in alternate years. —S. Luckhart

280. The Endogenous Microbiota in Health and Disease (3)
Lecture—3 hours. Prerequisite: graduate standing. Recent insights into the microbial communities inhabiting mucosal surfaces, and will discuss how the composition of these communities contributes to normal development, metabolism, education of the immune system, and disease susceptibility. —S. (S.) Baumler, Dandekar, Tsolis

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. (S/U grading only)—F, W, S, W. S. Sankaranar, 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

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 frontiers in biomedical literature. May be repeated for credit. (H/P/F grading only)—F. (F.) Bevins

430. 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, diagnosis and therapy. Offered in alternate years. (Same course as 130). (H/P/F grading only)—F. (F.) Bevins

480A. Medical Immunology (2.5)
Lecture—2 hours; laboratory/discussion—0.5 hours. Restricted to Medical students only. Helping to understand the immune system, the nomenclature and functional significance of the tissues, cells, proteins and genes of the immune system and pathology. Presentation of current regulatory mechanisms and pathologic outcomes related to the immune response. (P/F grading only; deferred grading only, Hartigan-O'Connor, Shackelford)

480B. Microbiology (1-5)
Lecture—2.75 hours; laboratory/discussion—1 hour. Restricted to Medical students only. Discussion of the diseases caused by infectious agents including their pathogenesis, clinical manifestations, diagnosis, treatment epidemiology and prevention. Covers the general properties of and diagnostic techniques for bacteria, fungi and viruses. (P/F grading only; deferred grading only, pending completion of sequence)—S. (S.) Luckhart, Mudry, Tsolis

497T. Tutoring in Medical Microbiology (1-5)
Tutoring—3-15 hours. Prerequisite: appropriate preparation in subject matter and consent of instructor. Assistant in medical microbiology. Supervising 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)
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)

Medical Pharmacology and Toxicology (PHA)

Lower Division

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

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

205. Problem Solving in Pharmacology (1)
Lecture/discussion—1 hour. Restricted to Graduate Students in Pharmacology and Toxicology. Chemisty and Clinical Research Graduate Groups; other students may be accepted with consent of instructor. Students will be introduced to a current biomedical problem that would benefit from a developing drug and will develop an experimental strategy for addressing the issue. Students will develop model systems for testing various classic and recent pharmacological approaches. May be repeated 12 times for credit. Course changes subjects every quarter; each course is unique and can be taken as often as desirable; certain students (Trainees of the Training Program in Pharmacological Sciences) must take course at least three times. (F, W, S, W. S. J. Hell

207. Drug Discovery and Development (3)
Lecture/discussion—2 hours; extensive writing—1 hour. Prerequisite: course 201, an equivalent course in general pharmacology, or knowledge of basic pharmacology. Intended for graduate students in Pharmacology and Toxicology, Chemistry and Clinical Research Graduate Groups; other students including undergraduates, may be accepted with consent of instructors. Survey of the process by which a drug is discovered, developed and made available to the public. Topics include drug identification and optimization, safety testing, clinical evaluation, regulatory issues, intellectual property formulation, and the global pharmaceutical industry. May be repeated for credit.—W. (W.) Horuk, Rogawski, Wulff

208. Advanced Cardiac Physiology and Pharmacology (3)
Lecture—2 hours; lecture/discussion—1 hour. Prerequisite: Pharmacology and Toxicology 201, Pharmacology and Toxicology 202, an equivalent course in general pharmacology or physiology (example, Biomedical Engineering 204), or knowledge of basic pharmacology/physiology. Open to graduate students from the Pharmacology and Toxicology, Molecular, Cellular and Integrated Physiology, Biomedical Engineering and Clinical Research Graduate Groups; other students (including undergraduates) may be accepted upon consultation with the instructors. Detailed characterization of the mechanisms involved in cardiac excitation–contraction coupling, alterations that occur in heart disease and pharmacological interventions. Topics include cardiac contractile apparatus, action potential, Ca cycling, excitation–transcription coupling, cardiac inotropy, heart failure and arrhythmias. —S. (S.) Bossuyt, Despa, Ripplinger

225. Gene Therapy (3)
Lecture/discussion—3 hours. Prerequisite: Genetics 201C, Molecular and Cellular Biology 214, or equivalent. Gene therapy from basic concepts to clinical applications. Topics include the human genome and genetic variation, genetic diseases, methods to manipulate gene expression, viral and nonviral delivery vectors, history and progress of gene therapy, case studies, and ethical issues. (Same course as Genetics 225.)—S. (S.) Anderson

250. Functional Genomics: From Bench to Bedside (3)
Lecture/discussion—3 hours. Prerequisite: Genetics 201C, Molecular and Cellular Biology 214, or equivalent. Functional genomics (how genetic variation and epigenomics affect gene expression), with an emphasis on clinical relevance and applications. Topics include genetic variation and human disease, cancer therapeutics, and biomarker discovery. (Same course as Genetics 250.)—S. (S.) Diaz, LaSalle, Segal

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. Topic differs. (S/U grading only)—F, W, S, W. F, W. S. Wulff

298. Group Study (1-5)
Prerequisite: consent of instructor.

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only)

Professional

400A. Pharmacology (2)
Lecture—1 hour; discussion/laboratory—0.3 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Restricted to Medical student 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)—F, S, W. S, W. S. Gelli, W. Wulff

400B. Pharmacology (1.5)
Lecture—1 hour; discussion—0.25 hours. Prerequisite: approval by the School of Medicine Committee on Student Progress; medical student only. Principles in pharmacology, including autonomic pharmacology, general anesthetics, neuropharmacology and sedative/hypnotics. (P/F grading only)—Su. (S.) Diaz

400C. Pharmacology (3.5)
Lecture—2 hours; discussion—0.5 hours. Prerequisite: Approval by School of Medicine Committee on Student Progress; medical student only; successful completion of courses 400A and 400B. Treatment of
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., acupuncture, osteopathy, naturopathy, homeopathy, herbalism, guided imagery/meditation, massage therapy), and mind/body connection are presented as introduction to integrating alternative treatments into traditional medical practice. (H/P/F grading only.)—W, W., S., S., Su.

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.)—F, W, S., Su. (F, W, S., Su.) Clancy, Gelli

497T. Tutoring in Pharmacology (1-5)
Tutoring—3-15 hours. Prerequisite: advanced standing or consent of instructor. Assist instructor by tutoring 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. Special Study for Medical Students (1-15)
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

199. Individual Special Study and Research (1-4)
Prerequisite: consent of instructor. Individual special study in neurophysiology and biomedical engineering is offered to qualified students. Studies on psychophysics, single-unit electrophysiology and instrumentation are offered in Davis. (P/NP grading only.)

Graduate

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 Neurophysiology and Biomedical engineering is offered at both Davis and Sacramento Medical Center. (S/U grading only.)

Professional

420. Clinical Neurosciences (2)
Lecture/discussion—1 hour; lecture—1.5 hours. Restricted to 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.)—Su., S., W., S., W. Brass, Wheaton, Shahlaie

450. Clinical Neurology Clerkship (3-6)
Clinical activity—24 hours; conference—12 hours; seminar—4 hours; independent study—10 hours. Prerequisite: Medical students and third year medical students with consent of instructor. Restricted to six students per rotation. Critical elements of clinical and laboratory skills (history & exam) and basic and clinical neurological concepts expected for general residency preparation. Active, didactic, experiential and independent learning to encourage motivation and development of professional competencies. (H/P/F grading only.)—F, W., S., Su. (F, W., S., Su.) Malhada-Chang

452. Advanced Clinical Neurology (6)
Clinical activity—full time (4 weeks). Prerequisite: completion of four-week Neurology clerkship and consent of instructor. Extension of basic Neurology clerkship. Designed for students with special interest in medical disorders of nervous system. By arrangement with department, students may serve as an acting intern. Principles of neurological differential diagnosis and therapeutics emphasized. (H/P/F grading only.)—F, W., S., Su. (F, W., S., Su.)

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 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.)—F, W., S., Su. (F, W., S., Su.) Chang

498NE. Group Study in Neurology (1-6)
Prerequisite: medical students with consent of instructor. Student exposed to children with disorders of the nervous system, both in 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.)—F, W., S., Su. (F, W., S., Su.)

499. Research (1-12)
Laboratory—2-24 hours. Prerequisite: consent of instructor. Approved for graduate degree credit. Laboratory investigations. (H/P/F grading only.)—F, W., S., Su. (F, W., S., Su.)

499NE. Group Study in Neurosurgery (1-6)
Prerequisite: medical students with consent of instructor. Student exposed to children with disorders of the nervous system, both in 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.)—F, W., S., Su. (F, W., S., Su.)

499NE. Group Study in Neurosurgery (1-6)
Prerequisite: medical students with consent of instructor. Student exposed to children with disorders of the nervous system, both in 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.)—F, W., S., Su. (F, W., S., Su.)

Neurosurgery (NSU)

Upper Division

199. Special Study in Neurosurgery for Advanced Undergraduates (1-5)
Prerequisite: advanced undergraduate standing with consent of instructor. Students may participate in ongoing neurosurgical projects or may pursue and design independent projects. (P/NP grading only.)

Graduate

299. Neurosurgery Research (3-12)
Prerequisite: graduate student with consent of instructor. Student may participate in ongoing neurosurgical projects or may pursue and design independent projects. (S/U grading only.)

Professional

451. Neurosurgical Critical Care Clerkship (3)
Clinical activity—full time (2 weeks). Prerequisite: third or fourth-year medical student having completed a neurosurgical 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 through the Emergency Room. (H/P/F grading only.)—F, W., S. (F, W., S.)

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 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.)—F, W., S., Su. (F, W., S., Su.)

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 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.)—F, W., S., Su. (F, W., S., Su.)

459NE. Group Study in Neurosurgery (1-6)
Prerequisite: medical students with consent of instructor. Students may participate in ongoing neurosurgical projects or may pursue and design independent projects. (P/NP grading only.)

459NE. Group Study in Neurosurgery (1-6)
Prerequisite: medical students with consent of instructor. Students may participate in ongoing neurosurgical projects or may pursue and design independent projects. (P/NP grading only.)

460. Clinical Neurosurgery (6-18)
Clinical activity—full time (3 days per week; 4 weeks minimum). Prerequisite: third and 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 emphasized. Students participate in meaningful aspects of surgical procedures and attend listed conferences, rounds, and seminars. (H/P/F grading only.)—F, W., S., Su. (F, W., S., Su.)

464. Extremity (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 is to be arranged at another institution with accredited residency program in neurosurgery under proper supervision. (H/P/F grading only.)—F, W., S., Su. (F, W., S., Su.)

470. Advanced Clinical Neurosurgery (6-18)
Clinical activity—full time (4-12 weeks). Prerequisite: fourth-year medical student in good academic standing. Student will function as acting intern on neurosurgery service. Admission and management of patients. Neurological history, examination, diagnostic procedures, and surgical management are emphasized. Students participate in meaningful aspects of surgical procedures and attend required conferences and rounds. (H/P/F grading only.)—F, W., S., Su. (F, W., S., Su.)

480. Insights in Neurosurgery (1-3)
Clinical activity—3- to 9 hours. Prerequisite: first and second-year medical students in good academic standing; consent of instructor. Observation of neurosurgical care in emergency room, operating room and hospital floors, including manner of treatment of a variety of chronic and acute neurological diseases. (H/P/F grading only.)—F, W., S., Su. (F, W., S., Su.)

499. Neurosurgery Research (1-18)
Prerequisite: medical student with consent of instructor. Student may participate in ongoing neurosurgical projects or may pursue and design independent projects. (P/NP grading only.)

Obstetrics and Gynecology (OBG)

Upper Division

192. Shifa Clinic/Student Volunteer (1)
Conference—2 hours; clinical activity—68 hours; discussion—1-2 hours. Conference is offered to volunteer students only. Supervised work experience in obstetrics and gynecology. May be repeated up to three times for credit. (P/NP grading only.)—F, W., S., Su. (F, W., S., Su.) Yasmeen

194. Shifa Clinic Student Volunteer (1)
Conference—1 hour; clinical activity—6 hours. Prerequisite: consent of instructor; the applications will be available for students. Selection of students will be made by selection committee of medical student coordinators and the IOR. Attend clinic every third Sunday and participate with medical students in receptionist, intake, translation, monitor. Students attend a meeting immediately after the clinic. There is a mandatory Monday meeting with Clinic co-directors. Students are expected to participate on various committees. May be required by faculty. (P/NP grading only.)—F, W., S., Su. (F, W., S., Su.) Yasmeen

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

220. Genetics of Reproduction (3)
471. Ambulatory Gynecology and Obstetrics Elective (3-18)
Clinical activity—35 hours. Prerequisite: third- or fourth-year Medical Student having successfully completed course 430; consent of instructor of record. Conduct examinations, present patients and discuss treatment regimen of all or part of the following ambulatory clinics: General Obstetrics & Gynecology, New and Return Obstetrics (including Post-Partum), High-Risk Obstetrics, Pre-Operative Clinic, and other subspecialty clinics as assigned. (H/P/F grading only.)—F, W, S, Su. [F, W, S, Su.] Hou

472. Family Planning and Reproductive Health (1-6)
Clinical activity—30 hours; seminar—5 hours. Prerequisite: course 430; consent of instructor. Elective that will focus on the Gynecologic Subspecialty of Family Planning. Counseling and provision of contraceptive methods, experience with pelvic ultrasounds, management of spontaneous, inevitable and induced abortion and postabortion care by both surgical and medical techniques are included. May be repeated for credit. (H/P/F grading only.)—F, W, S, Su. [F, W, S, Su.] Hou

475. Labor & Delivery Acting Internship (3-18)
Clinical activity—40 hours. Prerequisite: satisfactory completion of course 430 and the third-year core clerkships; consent of instructor. Four week elective primarily involves direct inpatient management of women on the UCDMC L&D unit. Students will be acting at the level of a sub-intern and will work under the supervision of house staff, fellows, and attendings. May be repeated for credit. (H/P/F grading only.)—F, W, S, Su. [F, W, S, Su.] Hou

480. The Birthing Process (1)
Lecture/discussion—1 hour. Open only to UC Davis medical students. Teaching in the birthing process as a Doula. Topics not covered in the summer course. [S/U grading only.]—F.

493. Gender Specific Medicine SSME (6)
Lecture—5 hours; lecture/laboratory—10 hours; laboratory—16 hours; clinical activity—16 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 Cardiology 493.] (H/P/F grading only.)—F, W, S, Su. [F, W, S, Su.] Finza

494. Shifa Clinic (6)
Clinical activity—8 hours. Prerequisite: medical student in good standing. Restricted to medical student only. Interaction with patients from multiple ethnic and cultural backgrounds under the direct supervision of a physician/preceptor. Women’s health issues and primary care issues in a diversely mixed population. May be repeated up to three times for credit. (P/F grading only.)—F, W, S, Su. [F, W, S, Su.] Yassen

494A. Shifa Clinic (1)
Clinical activity—8 hours. Prerequisite: medical student in good standing; consent of instructor. Interaction with patients from multiple ethnic and cultural backgrounds under the direct supervision of a physician/preceptor. Women’s health issues and primary care issues in a diversely mixed population. (H/P/F grading only; deferred grading only, pending completion of sequence.)—Su. [Su.] Yassen

494C. Shifa Clinic (5)
Clinical activity—8 hours. Prerequisite: medical student in good standing; consent of instructor. Interaction with patients from multiple ethnic and cultural backgrounds under the direct supervision of a physician/preceptor. Women’s health issues and primary care issues in a diversely mixed population. (H/P/F grading only; deferred grading only, pending completion of sequence.)—F, W. [W.] Yassen

496. Away Acting Internship in OB/GYN (3-18)
Clinical activity—40 hours. Prerequisite: satisfactory completion of course 430 and the third-year core clerkships; consent of instructor. Work at the level of a sub-intern in Inpatient and/or Outpatient settings. Students are expected to provide direct patient management. (H/P/F grading only.)—F, W, S, Su. [F, W, S, Su.] Hou

497. Gynecologic Oncology Acting Internship (3-18)
Clinical activity—40 hours. Prerequisite: satisfactory completion of course 430 and other third-year core clerkships; consent of instructor. Four week elective primarily involves direct inpatient management of women on the UCDMC Gyn/Onc service. Students will be acting at the level of a sub-intern and will work under the supervision of house staff, fellows, and attendings. May be repeated up to 99 units for credit. (H/P/F grading only.)—F, W, S, Su. [F, W, S, Su.] L eiersonowitz

499. Research in Obstetrics and Gynecology (2-12)
Clinical activity. Prerequisite: consent of instructor; fourth-year medical student. Research in Obstetrics and Gynecology arranged with instructor. May be repeated eight times for credit. (H/P/F grading only.)—F, W, S, Su. [F, W, S, Su.]

Ophthalmology (OPT)

192. Research Internship (1-12)
Internship—3-36 hours. Prerequisite: upper division standing; approval of project prior to period of internship by preceptor. Supervised work experience in ophthalmology research. Research staff in Ophthalmology have programs in cell biology, electron microscopy, biochemistry, immunology and visual psychophysics. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate

299. Basic Research in Visual Science (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional

442. Introduction to Ophthalmology (3)
Clinical activity—40 hours. Prerequisite: third- or fourth-year Medical Student with consent of instructor; consent of adviser; completion of third-year clerkships in Medicine and Surgery; consult Course Coordinator. Ocular disease diagnosis and management relevant to the clinical care of primary care physicians and others. (H/P/F grading only.)—F, W, S, Su. [F, W, S, Su.] Baik

465. Advanced Subspecialty Ophthalmology (3-6)
Clinical activity—40 hours. 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. (H/P/F grading only.)—F, W, S, Su. [F, W, S, Su.] Baik

498. Group Study (1-3)
Prerequisite: medical students with consent of instructor. Directed reading and discussion. (H/P/F grading only.)

499. Research in Ophthalmology (1-12)
To be arranged—3-36 hours. Prerequisite: medical students with consent of instructor. Individual research on selected topics in optometric and ophthalmic visual physiology, cornea and external disease. (H/P/F grading only.)

Orthopaedic Surgery (OSU)

Lower Division

99. Special Studies for Undergraduates (1-4)
Prerequisite: lower division standing and consent of instructor. (P/NP grading only.)

Upper Division

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: upper division standing; consent of instructor. (P/NP grading only.)

Professional

421. The Musculoskeletal System (2.5)
Lecture/discussion—4 hours; discussion—2 hours. Prerequisite: consent of committee on student progress. Restricted to Medical students only. Basic and clinical science of orthopaedic surgery and rheumatology. (P/NP grading only.)—F. [F.] Marder, Van DenBogaerde
428. Ambulatory and Emergency Room Orthopaedics (3-6)
Clinical activity. Prerequisite: fourth-year medical student in good academic standing; 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. (H/P/F grading only) – F, W, S, Su. (F, W, S, Su.) Eastman

462. Community Preceptorship (3-6)
Clinical activity. Prerequisite: fourth-year medical student in good academic standing; consent of instructor. Rotation designed to increase basic knowledge of musculoskeletal abnormalities at clinical level. Attention focused on selective case material. For those students who demonstrate proficiency, responsibility will be similar to that of intern. May be repeated for credit. (H/P/F grading only) – F, W, S, Su. (F, W, S, Su.) Eastman

465. Externship in Advanced Orthopaedics (3-6)
Clinical activity – 40 hours. Prerequisite: fourth-year medical student in good academic standing and consent of instructor. Advanced Orthopaedic rotation done at an approved institution. Topics may include Trauma, Sports, Spine, Pediatrics, Joint and/or Foot/Ankle. Students are expected to perform at the level of an intern. (H/P/F grading only) – F, W, S, Su. (F, W, S, Su.) Eastman

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) – F, W, S, Su. (F, W, S, Su.) Szabo

481. 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) – F (F)

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 with consent of instructor. Overview of current research in orthopaedics throughout the world to introduce medical students to landmark accomplishments and key figures in the development of modern medicine.

Otolaryngology (OTO)
Upper Division

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)

199. Special Study in Otolaryngology for Advanced Undergraduates (1-5)
Prerequisite: advanced undergraduate with consent of instructor. (P/NP grading only) – F, W, S, Su.

Graduate

290C. Research Conference in Otolaryngology (1)
Lecture/discussion – 1 hour. Prerequisite: graduate students; medical students; advanced undergraduate with consent of instructor. Presentation and discussion of faculty and student research in otolaryngology. (S/U grading only) – F, W, F, W

291. Principles of Speech, Hearing and Equilibrium (1)
Lecture/discussion – 3 hours. Prerequisite: graduate students; medical students; advanced undergraduate 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. – F, W, S, Su.

Professional

403. Basic Principles of Reconstructive Surgery (1)
Clinical activity – 30 hours. Prerequisite: consent by Committee on Student Evaluation and Promotion. Provide fundamental knowledge of otorhinolaryngologic 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 otorhinolaryngologic care. (H/P/F grading only) – F, W, S, Su. (F, W, S, Su.) Diaz

440. Otolaryngology Required Clerkship (3-9)
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. Parathesis laboratory study of sensory and operating room. Evaluation and management of common otolaryngologic diseases. (H/P/F grading only) – F, W, S, Su. (F, W, S, Su.) 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 degree credit. Total involvement in clinical activities of the department. (H/P/F grading only) – F, W, S, Su. (F, W, S, Su.) 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. (H/P/F grading only) – F, W, S, Su. (F, W, S, Su.) Olson

499. Individual Study in Otolaryngology for Advanced Graduate Students (1-12)
Prerequisite: advanced graduate student with consent of instructor. (S/U grading only)

Pathology (PMD)
Upper Division

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 undergraduate and consent of instructor. (P/NP grading only)

Graduate

290C. Research Group Conferences (1)
Seminar – 1 hour. Prerequisite: graduate level standing. Seminar. Topics on animal models of human disease and infectious diseases. May be repeated for credit. (S/U grading only) – F, W, S, Su. (F, W, S, Su.)

298. Advanced Group Study (1-5)
Prerequisite: consent of instructor.

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only)

Professional

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 correlated with basic pathologic principles. (H/P/F grading only) – F, W, S, Su. (F, W, S, Su.) Ellis

407. Advanced Neuropathology (3-18)
Lecture/discussion – 40 hours. Prerequisite: third- or fourth-year medical student; consent of instructor. Restricted to Medical students only. Presents an integrated introduction to mechanisms of the central and peripheral nervous system injury. Gain an understanding of pathologic mechanisms underlying disease, the anatomy and molecular manifestations of pathologic processes of the CNS and PNS. (H/P/F grading only) – F, W, S, Su. (F, W, S, Su.) Lechpammer

410A. General and Endocrine Pathology (2.5)
Lecture – 4 hours; laboratory – 4.5 hours. Restricted to Medical students only. Pathologic mechanisms of human disease. Concepts of general pathologic processes, i.e., cell death, inflammation and neoplasia. Endocrine pathology in the context of clinical human disease. Emphasis on integration of clinical practice with gross and histologic images emphasizing team-based learning. (P/F grading only) – W, S, Su. (W, S, Su.) Olson

410B. Systemic Pathology I (1)
Lecture – 1 hour; laboratory/discussion – 0.5 hours. Prerequisite: Approval by SOM Committee on Student Progress. Restricted to Medical students only. Anatomic and clinical pathology of organ system human disease with an emphasis on integration with clinical medicine. Topics include hematopathology and neuropathology. (P/F grading only) – F, W, S, Su. (F, W, S, Su.) Olson

410C. Systemic Pathology II (2.5)
Lecture – 1 hour; discussion – 2 hours. Prerequisite: approval by SOM Committee on Student Progress. Restricted to Medical students only. Anatomic and clinical pathology of organ system human disease with an emphasis on integration with clinical medicine. Topics include hematopathology, cardio-vascular pathology, hematopathology, oncologic pathology, and nephropathology. (Deferred grading only, pending completion of sequence. P/F grading only) – W, S, Su. (W, S, Su.) Olson

410D. Systemic Pathology (2.5)
Lecture – 1 hour; discussion – 2 hours. Prerequisite: approval by SOM Committee on Student Progress. Restricted to Medical students only. Anatomic and clinical pathology of organ system human disease with an emphasis on integration with clinical medicine.
435. Clinical Patient Care in Pathology (3-9)
Clinical activity—24 hours; independent study—7 hours; lecture/discussion—4 hours. Prerequisite: completed one of the following 3rd year clerkships: Family Medicine, Obstetrics and Gynecology, Surgery, OB/GYN or Pediatrics; consent of instructor. Four-week course is designed to give the third-year medical student an exposure to the diverse roles that pathologists have in clinical patient care. May be repeated for credit. [H/P/F grading only]—F, W, S, Su; (F, W, S, Su) Dolyre

440. Surgery-Pathology-Radiology (SPR) Research Laboratory (2)
Lecture/laboratory/discussion—2 hours. Future clinicians and scientists with basic clinical and bioengineering laboratory skills to prepare for careers in translational research. [P/F grading only]—F, W, S, Su; (F, W, S, Su) Tran, Wang

464. Anatomic Pathology (3-6)
Clinical activity—40 hours. Prerequisite: fourth-year Medical Students; consent of instructor. Restricted to Medical Students; consent of instructor. Anatomic pathology with an emphasis on autopsy and surgical pathology with application to clinical practice. Specimen grossing, frozen sections, microscopic sign-out and conferences. May be repeated for credit. [H/P/F grading only]—F, W, S, Su; (F, W, S, Su) Bishop

465. Applied Clinical Laboratory Medicine (3-6)
Prerequisite: consent of instructor. Emphasis upon laboratory techniques, procedures, and interpretation of laboratory results. Students will be expected to participate fully and in all laboratory operations including, but not limited to, laboratory management, quality assurance and quality control. May be repeated for credit. [H/P/F grading only]—F, W, S, Su; (F, W, S, Su) Jensen

470. Sub-Specialty in Didactic Pathology (3-16)
Lecture/laboratory—25 hours. Prerequisite: consent of instructor. Extremity provides in-depth exposure to one of a variety of subspecialties in Pathology. May be repeated for credit. [H/P/F grading only]—F, W, S, Su; (F, W, S, Su) Gaudard-Edwards

474. Anatomic Pathology Acting Internship (6)
Clinical activity—4080 hours. Prerequisite: fourth-year medical student or consent of instructor. Restricted to Medical Students only. Anatomic Pathology AI will permit students to gain skills needed for first year Pathology Residency. Students will perform autopsies and take full responsibility for a variety of surgical pathology cases. A mix of outpatient and inpatient cases is expected. [H/P/F grading only]—F, W, S, Su; (F, W, S, Su) Bishop

475. Anatomic Pathology Acting Internship (3-9)
Clinical activity—40-80 hours. Prerequisite: completion of course 410 series or equivalent; successful completion of third-year clinical rotations; consent of instructor. Restricted to Medical Students only. Year four level course is designed to provide a concentrated experience in Surgical Pathology and Cytology-Pathology. Rotate on the surgical and cytopathology subspeciality teams and assume responsibility for patient cases. May be repeated for credit. [H/P/F grading only]—F, W, S, Su; (F, W, S, Su) Huang

493. Interdisciplinary Study of Gastrointestinal Cancer (6)
Lecture—5 hours; clinical activity—12 hours; laboratory—3 hours; discussion/laboratory—20 hours. Prerequisite: consent of instructor. In-depth study of gastrointestinal, hepatic and pancreatic cancer. Emphasis on understanding of normal and clinical practices includes departments include pathology, surgical oncology, medical oncology, gynecological oncology, and radiation oncology. [Same course as Surgery 493D] (H/P/F grading only)—F, S, S; (F, S, S) Khatri, Olson

497. 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]—F, S, S; (F, S, S) Jensen

498. Advanced Group Study (1-5)
Prerequisite: medical student and consent of instructor. Group study in varied topics in general, special, experimental, or comparative pathology with an emphasis on autopsy. [H/P/F grading only]—F, W, S, Su; (F, W, S, Su)

499. Research (1-18)
Prerequisite: medical student; consent of instructor. Limited enrollment. Research in experimental, molecular, comparative, and applied pathology. [H/P/F grading only]—F, W, S, Su; (F, W, S, Su)

Pediatrics (PED)

199. Special Study in Pediatric Research (1-5)
Prerequisite: undergraduate student with consent of instructor based upon adequate preparation or determined by instructor. [P/NF grading only]

Graduate

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

401. Preceptorship in Pediatrics (2)
Preceptorship—half time. Prerequisite: second-year medical student or first-year medical student with consent of instructor and preceptor based upon adequate preparation and participation in primary care medical practice in a pediatrician’s office. Opportunity to participate in history-taking and physical examination and in the discretion of preceptor and dependent on student’s experience. Evaluation by student. [H/P/F grading only]—F, W, S, Su; (F, W, S, Su)

402. Clinical Experience in Private Practice (1-18)
Clinical activity—full time [2 to 12 weeks]. Prerequisite: third/fourth-year medical student; course 430; consent of preceptor and Chairperson. Opportunity to participate in private practice in such tasks as history-taking, physical examination, and patient management. [H/P/F grading only]—F, W, S, Su; (F, W, S, Su)

405. Pediatrics Lecture Series (0.5)
Lecture—15 sessions. Prerequisite: consent of instructor. Lectures provide overview of various pediatric diseases with case presentations and panels from pediatric subspecialists. Topics include, but are not limited to: cardiology, pulmonology, nephrology, gastroenterology, critical care, and primary care pediatrics. May be repeated for credit. [F] Gross

415. Fetal and Neonatal Physiology (1)
Lecture/discussion—4 hours; independent study—4 hours. Prerequisite: consent of instructor. Elective is designed to cover the basic and advanced aspects of the physiology, anatomy and biochemistry of the fetus and newborn with relevant clinical examples of disorders in each of the 10 topics that will be discussed. [P/F grading only]—S; (S) Philips, Subramaniam

430. Pediatric Clerkship (12)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Restricted to Medical students only. 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 UCSF. Rounds, conference, and out-patient education. [H/P/F grading only]—F, W, S, Su; (F, W, S, Su) Plant

430F. SJVP Pediatric Clerkship at UCSF (12)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Restricted to Medical students only. 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 UCSF Froudo. Rounds, conferences, and student presentations will be arranged. [H/P/F grading only]—F, W, S, Su; (F, W, S, Su) Butani, Plant

439D. Directed Clinical Studies in Pediatrics (1-12)
Clinical activity—40 hours. Prerequisite: consent of instructor. Individual directed studies in extended preparation for modified curriculum or to complete a clinical rotation following a leave of absence. May be repeated for credit. [P/F grading only]—F, W, S, Su; (F, W, S, Su)

439R. Directed Studies in Pediatrics (1-12)
Clinical activity—30 hours; independent study—10 hours. Prerequisite: consent of instructor. Individual directed studies in extended preparation for modified curriculum or to complete a clinical rotation following a leave of absence. May be repeated for credit. [P/F grading only]—F, W, S, Su; (F, W, S, Su)

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. Limited enrollment. The Ward Acting Intern functions in a manner similar to that of a pediatric intern. The Acting Intern takes 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. [H/P/F grading only]—F, W, S, Su; (F, W, S, Su) Kim

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. Limited enrollment. Supervised experience in pediatric care on outpatient service at UCSDMC. Student functions as “Acting Intern” with appropriate supervision by residents and attending faculty. [H/P/F grading only]—F, W, S, Su; (F, W, S, Su) Palmer

461. Pediatric Inpatient AI in Hematology/ Oncology (6)
Clinical activity—37.5 hours; lecture—7.5 hours. Prerequisite: satisfactory completion of course 430; consent of instructor. Limited enrollment. Inpatient and outpatient experience in diagnosis and management of neoplastic disorders in children. Clinical experience and participation in clinical investigation may be arranged. [H/P/F grading only]—F, W, S, Su; (F, W, S, Su) Pawar

462. Elective in Pediatric Endocrinology (3-3)
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. Consent of instructor. Limited enrollment. Inpatient and outpatient experience in diagnosis and management of endocrine disorders in children. Clinical experience and participation in clinical investigation may be arranged. [H/P/F grading only]—F, W, S, Su; (F, W, S, Su) Syme

463. Medical and Mental Health Evaluation of Children at Risk for Maltreatment (3-9)
Clinical activity—30 hours; discussion—4 hours. Elective for fourth-year medical students covers basic areas of knowledge needed for child abuse prevention and consultation. Rotation includes legal cases, abuse exams, child and parent interactive therapy
and visits to community organizations. May be repeated for credit. (H/P/F grading only.)—F, W, S, Su.—Kawazu

464. Active 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. Limited enrollment. Diagnostic and therapeutic aspects of the medical and surgical high-risk neonate. Student expected to take night call. (H/P/F grading only.)—F, W, S, Su.—Chan, Philipps, Urrizga

465. Pediatric Specialty Clinic Elective (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430; consent of instructor. Limited enrollment. Supervised experience in a variety of pediatric subspecialty clinics. (H/P/F grading only.)—F, W, S, Su.—Kawazu

466. Elective in Pediatric Cardiology (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 cardiologic disorders in children. Laboratory experience and participation in clinical investigation may be arranged. (H/P/F grading only.)—F, W, S, Su.—Berger

467. Elective in Pulmonary Medicine (3-18)
Clinical activity—full time (2 to 12 weeks); daily rounds, two weekly half-day clinics. Prerequisite: pediatric experience. Inpatient and outpatient management of pediatric patients with pulmonary disease. These will include but will not be limited to cystic fibrosis, asthma, and other forms of chronic pulmonary disease as well as congenital abnormalities. (H/P/F grading only.)—F, W, S, Su.—Jhawar

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. (H/P/F grading only.)—F, W, S, Su.—Butani

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. Limited enrollment. Inpatient and outpatient experience in diagnosis and treatment of infectious diseases in children. Laboratory and clinical investigation may be arranged. (H/P/F grading only.)—F, W, S, Su.—Butani

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. Limited enrollment. Inpatient and outpatient experience in diagnosis and management of neurological disorders in children. Students will also participate in other pediatric subspecialty clinics which serve children with neurological disorders. This course does not satisfy the fourth year neurology requirement. (H/P/F grading only.)—F, W, S, Su.—Blumberg

471. Elective in Pediatric Gastroenterology (3-18)
Clinical activity—full time (2 to 12 weeks). Prerequisite: satisfactory completion of course 430; consent of instructor. Limited enrollment. Inpatient and outpatient experience in diagnosis and management of gastrointestinal disorders in children. Laboratory experience and participation in clinical investigation may be arranged. (H/P/F grading only.)—F, W, S, Su.—Kawazu

472. Clinical Rotation in Adolescent Medicine (3-9)
Clinical activity—39 hours; lecture—1 hour. Prerequisite: fourth year Medical Student; consent of instructor. Under supervision, students will see patients in the UCDC clinic and at a number of community-based sites. Emphasis on the socially-mediating problems that face adolescents, including substance abuse, STD’s, pregnancy, depression and suicide. One hour of lecture each week. (H/P/F grading only.)—F, W, S, Su.—Wilkes

473. Away Acting Internship in Pediatrics (6-18)
Clinical activity—40 hours; lecture—6 hours. Prerequisite: satisfactory completion of Pediatrics Clerkship; consent of instructor. Work at the level of a sub intern in Inpatient and/or Outpatient settings. Expectation is to provide direct patient management. (H/P/F grading only.)—F, W, S, Su.—Butani

476. Active 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 of record; letter of recommendation from Pediatrics faculty member. Limited enrollment. Evaluation and support of critically ill infants and children. In general, student expected to take night shift approximately 1 hour/week. (H/P/F grading only.)—F, W, S, Su.—Plant

493. Ethical, Legal and Social Issues in Clinical Genetics (6)
Seminar—12 hours; clinical activity—18 hours; autotutorial—9 hours; independent study—2 hours. Prerequisite: consent of instructor. Limited to UC Davis School of Medicine students only. Develop advanced knowledge, communication skills and attitudes necessary to participate in the care and counseling of patients with genetic disorders. (H/P/F grading only.)—F, W, S, Su.—Plant

493B. Living with Intellectual & Developmental Disability in the Community (1-6)
Clinical activity—4 hours; lecture—10 hours; fieldwork—4 hours; seminar—4 hours. Prerequisite: consent of instructor. In-depth experience with Intellectual & Developmental Disability across the lifespan. (H/P/F grading only.)—F, W, S, Su.—Hansen

493C. Fetal and Neonatal Physiology 55M (6)
Lecture/discussion—24 hours; clinical activity—8 hours. Prerequisite: consent of instructor. Elective is available for students interested in exploring the fascinating world of the fetus and neonate. The elective is designed to combine the basic sciences with relevant clinical examples of disorders. (H/P/F grading only.)—F, W, S, Su.—J Chan, Philippis, Tache

498. Directed Group Study (1-5)
Variable—3-15 hours. Explore in-depth various topics in Pediatrics. Extensive contact with and oversight by instructor. May be repeated for credit. (H/P/F grading only.)—F, W, S, Su.—Hansens

499. Research Topics in Pediatrics (1-18)
Prerequisite: student in Medical School with consent of instructor. Individual research project in pediatric subspecialty areas (cardiology, endocrinology, hematology, metabolism, newborn physiology and others) may be arranged with faculty member. Independent research project by student will be emphasized and long-term projects are possible. (H/P/F grading only.)
462. Rehabilitation Medicine Clinical Elective (5-18)
Clinical activity—5 hours; full-time. Prerequisite: Internal Medicine 430, Surgery 430; completion of third year in Medical School. Emphasis on evaluation of patients with neurological or orthopaedic problems requiring rehabilitative techniques for their management. Introduction to management of such patients. Physical Medicine and Rehabilitation at off-campus facility must be approved by Chairperson. (H/P/F grading only.)—F, W, Su. (F, W, Su.)

460. Klingenstein Summer Elective (2.5)
Clinical activity—20 hours. Prerequisite: consent of instructor. During this "mini- clerkship," fellows will attend clinics, in-patient settings, and clinicians' offices. They will be expected to present cases and review current literature, and will complete a summary narrative at the end of their experience. (H/P/F grading only.)—S. (S.)

410L. Klingenstein Longitudinal Elective (2)
Clinical activity—5 hours; laboratory/discussion—10 sessions; discussion—2 sessions. Prerequisite: consent of instructor. Year-long mentoring program provides clinical exposure to child and adolescent psychiatric healthcare during a medical student's pre-clinical years. (H/P/F grading only; deferred grading only, pending completion of sequence.)—W, Su. (W, Su.)

410. Klingenstein Longitudinal Elective (2)
Clinical activity—5 hours; laboratory/discussion—10 sessions; discussion—2 sessions. Prerequisite: consent of instructor. Year-long mentoring program provides clinical exposure to child and adolescent psychiatric healthcare during a medical student's pre-clinical years. (H/P/F grading only; deferred grading only, pending completion of sequence.)—W, Su. (W, Su.)

412. Psychiatry Grand Rounds (1)
Lecture—1 hour, 2-2 hours. Prerequisite: students or staff or other qualified health professional consent with consent of instructor. Weekly conference at UCSDM for presentation of selected clinical cases, presentation of lecture and research reports. (H/P/F grading only.)—W, Su. (W, Su.)

413. Outpatient Psychiatry Clerkship (6)
Clinical activity—36 hours; conference—2 hours; lecture—2 hours. Prerequisite: course 430 and/or consent of coordinator. Observation of clinical management/treatment of adult outpatients with psychiatric and substance abuse disorders; crisis management/intervention; evaluation/development of diagnosis and treatment plan. Emphasis on outpatients' psychiatric pharmacology/brief psychotherapy; observation of group therapy. Individual supervision by faculty/residents. (H/P/F grading only.)—F, W, Su. (F, W, Su.)

414. Psychosomatic Medicine Clerkship (3-12)
Clinical activity—32 hours; discussion—8 hours. Prerequisite: Psychiatry Clerkship or consent of instructor; medical students only. A large university hospital service in which the student functions as a member of the team in evaluation, management and psychotropic liaison with other medical specialties. Intensive supervision from senior staff and psychiatrist residents. May be repeated twice for credit. (H/P/F grading only.)—F, W, Su. (F, W, Su.)

415. Telemedicine Clinical Elective (3-9)
Clinical activity—20 hours. Prerequisite: MS 4 with consent of Instructor. Fourth-year medical student elective in Telemedicine focusing on psychiatric issues. Align with University, School and Center for Health and Technical Outreach and public health, particularly in primary care. (H/P/F grading only.)—F, W, Su. (F, W, Su.)

416. Child Psychiatry Clerkship (6)
Clinical activity—36 hours; lecture/discussion—2 hours; conference—2 hours. Prerequisite: course 430 and/or consent of instructor. Didactic and clinical inpatient, outpatient, and consultation-liaison experiences with children, adolescents and families. Clinical observations, discussion, assessment, and treatment will be undertaken with close supervision. Literature review and case conferences presented on a regular basis. (H/P/F grading only.)—F, W, Su. (F, W, Su.)

417. Jail Psychiatry Clerkship (6)
Clinical activity—28 hours; conference—8 hours; lecture—4 hours. Prerequisite: course 430 and/or consent of course coordinator. Students gain experience, under close supervision and supervision, assessing acute and chronic mentally ill inmates in both inpatient and clinic settings. (H/P/F grading only.)—F, W, Su. (F, W, Su.)

418. Off-Campus Clinical Experience (3-9)
Clinical activity—20-40 hours. Prerequisite: fourth-year medical students; consent of instructor. Clinical or research elective in off-campus medical school or mental approval of instructor and individual in charge of off-campus setting. May be repeated for credit. (H/P/F grading only.)—F, W, Su. (F, W, Su.)

420. Acting Internship in Psychiatry (62)
Clinical activity—40 hours. Prerequisite: course 430 and/or consent of course coordinator. Acting intern position with close faculty supervision with emphasis on biological psychiatry, psychopharmacology and psychodynamic aspects appropriate to diagnostic and interventional management. (H/P/F grading only.)—F, W, Su. (F, W, Su.)

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 of indigent and uninsured patients as well as primary care for psychiatry patients. May be repeated for credit two times. (H/P/F grading only.)—F, W, Su. (F, W, Su.)

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.)—F, W, Su. (F, W, Su.)

423. Willow Clinic (1-12)
Open to medical students in all four years of medical school. Student run clinic for medical students interested to learn about and meeting the unique health care needs for the homeless population. (H/P/F grading only.)—F, W, Su. (F, W, Su.)

424. Functional Genomics (2)
Readings—1 hour; discussion—1 hour. Prerequisite: graduate standing or consent of the instructor. The theory, methods and principles of functional neurogenomics with emphasis on the relationship to molecular mechanisms involved in development and disease of the nervous system. (H/P/F grading only.)—F, W, Su. (F, W, Su.)

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 experiences. Emphasis on diagnostic, therapeutic and interpersonal skills. Areas of focus include patient management, interviewing skills, mental status exam, differential diagnosis, basic psychopharmacology, crisis intervention and case referrals. (H/P/F grading only.)—F, W, Su. (F, W, Su.)

430A. SVP Longitudinal Psychiatry Clerkship at UCSF Fresno (1)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. (H/P/F grading only; deferred grading only; pending completion of sequence.)—S. (S.)

430FB. SVP Longitudinal Psychiatry Clerkship at UCSF Track 1 (4)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are...
required. May be repeated for credit. [H/P/F grading only; deferred grading only, pending completion of sequence.]—S. (S.)

430FC. SJVP Longitudinal Psychiatry Clerkship at UCSF Track 1 (4)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. [H/P/F grading only; deferred grading only, pending completion of sequence.].—F. (F.)

430FD. SJVP Longitudinal Psychiatry Clerkship at UCSF Track 2 (4)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Medicine for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. [H/P/F grading only; deferred grading only, pending completion of sequence.].—F. (F.)

430FE. SJVP Longitudinal Psychiatry Clerkship at UCSF Track 2 (4)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Psychiatry for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. [H/P/F grading only; deferred grading only, pending completion of sequence.].—W. (W.)

430FF. SJVP Longitudinal Psychiatry Clerkship at UCSF Track 2 (4)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Medicine for 24 weeks at UCSF Fresno. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. [H/P/F grading only; deferred grading only, pending completion of sequence.].—S. (S.)

430TA. TeachMS Longitudinal Psychiatry Clerkship (A) (4)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Promotions; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Medicine for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. [H/P/F grading only; deferred grading only, pending completion of sequence.].—F. (F.)

430TB. TeachMS Longitudinal Psychiatry Clerkship (B) (6)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Promotions; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Medicine for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. [H/P/F grading only; deferred grading only, pending completion of sequence.].—W. (W.)

430TC. TeachMS Longitudinal Psychiatry Clerkship (C) (2)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Promotions; consent of instructor. Longitudinal Clerkship runs concurrently with Primary Care and Medicine for 24 weeks. Time is spent in direct patient care situations under the guidance of faculty. On-going patient write-ups, rounds, conferences are required. May be repeated for credit. [H/P/F grading only; deferred grading only, pending completion of sequence.].—F. (F.)

439D. Directied Clinical Studies in Psychiatry (1-12)
Clinical activity—40 hours. Prerequisite: consent of instructor. Individual directed studies in extended preparation for modified internship program or to complete a clinical rotation following a leave of absence. May be repeated for credit. [P/F grading only.].—F, W, S, Su. (F, W, S, Su.)

439R. Directed Studies in Psychiatry (1-12)
Clinical activity—30 hours; independent study—10 hours. Prerequisite: consent of instructor. Individual directed studies in extended preparation for remediation of all or part of clinical rotation. Clinical studies to accommodate and satisfy remedial work as directed by the Committee on Student Progress and approved by the course IOR. May be repeated for credit. [P/F grading only.].—F, W, S, Su. (F, W, S, Su.)

480. Insights in Psychiatry (1-3)
Clinical activity—3–9 hours. Prerequisite: first-or second-year medical student in good academic standing; consent of instructor. On individual basis, student provided with an opportunity for gaining insight into various clinical activities in the practice of psychiatry. [H/P/F grading only.].—F, W, S, Su. (F, W, S, Su.)

488. Acting Internship in Inpatient Psychiatry, Away Rotation (6)
Clinical activity—40 hours. Prerequisites: Psychiatry Clerkship and/or consent of course coordinator. Inpatient acting internship at an approved non-UCDSI affiliated training program that provides experience and preparation for ambulatory medical care. Students perform as an intern, with a smaller number of patients, greater supervision, and responsibility for the ongoing care of assigned patients. [H/P/F grading only.].—F, W, S, Su. (F, W, S, Su.)

499. Research (1-12)
Prerequisite: consent of instructor. Approved for graduate degree credit. Medical students desiring to explore particular topics in depth. [H/P/F grading only for graduate or medical students.]

501. Directed Group Study (1-5)
Prerequisite: consent of instructor. Approved for graduate degree credit. Medical students desiring to explore particular topics in depth. [H/P/F grading only for graduate or medical students.]

92. Internship in Community Health (1-12)
Internship—3.36 hours. Prerequisite: lower division standing; consent of instructor. Students apply theory and concepts learned in the classroom through field work in a community health agency. [P/NP grading only.]

Public Health Sciences (SPH)

Lower Division
92. Internship in Community Health (1-12)
Internship—3.36 hours. Prerequisite: lower division standing; consent of instructor. Students apply theory and concepts learned in the classroom through field work in a community health agency. [P/NP grading only.]

Upper Division
101. Introduction to Public Health (3)
Lecture—3 hours. Prerequisite: undergraduate standing. Provide basic concepts and controversies in public health, basic scientific understanding of the relationship between health, social, and behavioral factors in health and disease, environmental and occupational health issues, the relationship of public health to the medical care system and health care reform. GE credit: SciEng or SocSci | SE or SS. —W. S. (W. J.)

102. Introduction to Human Epidemiology (3)
Lecture—1.5 hours; discussion—1.5 hours. Learn and understand the principles of epidemiology as it relates to human populations. The content is fundamental to the Public Health minor and a required core course. GE credit: SE—S. (S.)

104. Globalization and Health: Evidence and Policies (3)
Lecture—3 hours. Provides an overview of the evidence on the multiple effects of globalization policies on health. GE credit: SS, WC. —W. (W.)

105. Health Disparities in the U.S. (2)
Lecture—2 hours. Introduction to the principles and practice of health disparities research. GE credit: DD, SS. —W. (W.)

132. Health Issues Confronting Asian Americans and Pacific Islanders (4)

140. General Health Education and Prevention (5)
Lecture—4 hours; discussion—1 hour. Open to students in the internship program for the Health Education Program only; class size limited to 50 students. Topics include addiction, substance abuse/prevention, nutrition, stress management, physical fitness, body image, reproductive anatomy and physiology, contraceptive options, safer sex, sexual health, relationship issues, and other general wellness/health promotion topics. Practice in peer counseling and outreach presentations. [P/NP grading only.]

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); consent of instructor. Preparation for internship in campus and community substance abuse prevention and educational intervention. Addition and other physiological responses to alcohol and other drugs. 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); consent of instructor. 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.]

175W. Health Policy and Health Politics (4)
Seminar—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 160 or 175. GE credit: SocSci | SS. —W. (W.)

175W. Health Policy and Health Politics (4)
Seminar—3 hours; extensive writing or discussion—1 hour. Restricted to students attending UC Washington Center program. Following the model of a Congressional subcommittee, develop salient health policy issues for study, research, and development of model policies to address them. [Same course as UC Davis Washington Center 175W. GE credit: SocSci, W, ACGH, OL, SS, WE. —S. (S.)

Wintemute

Fall 2011 and on Revised General Education (GE) AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; AGCM—American Cultures; DD—Diversity; OL—Oral Skills; QL—Quantitative; SL—Scientific; VL—Visual; WC—World Cultures; WE—Writing Experience

Quarter Offered: F=Fall; W=Winter; S=Spring; Su=Summer; 2017/2018 offering in parentheses
190C. Research Conference in Community and International Health (1)
Discussion—2 hours. 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.)—F, W, S. (F, W, S.)

192. Internship in Community Health Practice (1-12)
Internship—3-36 hours. Prerequisite: upper division and graduate students; consent of instructor. The student, through community health agency, learns to apply theory and concepts learned in the classroom. (P/NP grading only.)

198. Study in Community and International Health (1-5)
Prerequisite: graduate standing and consent of instructor. Study and experience for undergraduate students in any number of areas in community and international health. (P/NP grading only.)

199. Research in Community and International Health (1-5)
Prerequisite: undergraduate standing and consent of instructor. Study and experience for undergraduate students in any number of areas in community and international health. (P/NP grading only.)

Graduate

201. Introduction to Public Health (3)
Lecture—3 hours; laboratory/discussion—2 hours. Prerequisite: upper division or graduate standing; consent of instructor. Provides an overview of public health. Covers the history of public health in the U.S.; defines its major functions and constituencies; and, introduces fundamental principles of epidemiology, biostatistics, behavioral sciences, environmental health, infectious diseases, and reducing health disparities. May be repeated one time for credit.—Su. [S.] Garcia

203. Learning and Teaching in Public Health Contexts (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing or consent of instructor. Designed for students who have had formal coursework in public health or health-related fields. Topics include public health education theories and practice in diverse settings. No formal assessment of learning will be read/discussed. Topics may include: infectious disease, accidents/adverse events, nutritional deficiencies, community vaccination trials, occupational exposures, cancer, birth defects, cardiovascular disease, and smoking. (Same course as Epidemiology 200.—S.)—Schenker

210. Public Health Informatics (2)
Lecture—2 hours; laboratory—2 hours. Restricted to upper division or graduate standing. Collection, verification, and utilization of data related to populations, infrastructures, and tools used to generate public health knowledge supporting public health practices and policy development/dissemination. (S/U grading only.)—Su. [S.] Hogarth

211. Infectious Disease Epidemiology (3)
Lecture—2 hours; laboratory—1 hour. Prerequisite: introductory epidemiology course [e.g., Epidemiology 205]. Infectious disease epidemiology and prevention, with emphasis on human and veterinary diseases of global health importance. Major global health epidemics and challenges of infectious diseases, by mode of transmission. (Same course as Epidemiology 231.)—W. [W.] DeKiermeier

212. Migration and Health (3)
Lecture/discussion—3 hours. Prerequisite: graduate standing. Principles of migration and health. Topics will include demographics, public health investment programs, health care delivery, occupational health, and effects of international migration on health in communities of origin, transit, and destination. Guest presentations by outside experts. Offered in alternate years.—S. [S.] Schenker

222. Social & Behavioral Aspects of Public Health (3)
Lecture/discussion—3 hours. Prerequisite: consent of instructor required; graduate standing, Statistics 102 and 106. Theories and strategies of health behavior change at the individual, community, and environmental levels. Examples include: trans-theoretical model, social networks, and social marketing. Theories are applied to solve common public health problems (cancer, obesity, smoking, and HIV/AIDS).—W. [W.] De Vogli

223. Obesity Prevention in Community Settings (3)
Lecture/discussion—3 hours. Prerequisite: consent of instructor. (Lecture: Population-based interventions and on-the-ground observations of obesity prevention programs across the U.S.; W. De Vogli)

232. Health Communication (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Health communication theories from various traditions. Topics include consumer health information seeking; physician-patient interaction; information, social marketing, “edutainment,” and media advocacy campaigns; social marketing; and how media influences on health and new communication technologies in health promotion and healthcare delivery. (Same course as Communication 232.) Offered in alternate years.

244. Introduction to Medical Statistics (4)
Lecture/discussion—4 hours; laboratory/discussion—3 hours. Prerequisite: course 206. In-depth integration of advanced epidemiologic concepts. Theory, methods, and applications for observational studies including random and systematic error control, meta-analyses, causal inference, effect modification, internal and external validity, estimability, and interpretation of effect measures, and advanced study designs. (Same course as Epidemiology 245.—S.)—Kass

245. Biostatistics for Biomedical Science (4)
Lecture—4 hours. Prerequisite: consent of instructor. Development of biostatistical expertise for an effective and efficient research career in the health sciences. Topics include: descriptive statistics, probability, binomial, Poisson, normal, t, F, and Chi-square distributions, elementary nonparametric methods, simple linear regression and correlation, life tables. Only upper-division students who have completed Statistics 100 or Preventive Veterinary Medicine 402. Su. [S.] Yang

246. Biostatistics for Biomedical Science (4)
Lecture—4 hours. Prerequisite: Clinical Research 244 or consent of instructor. Analysis of data and design of experiments for laboratory data. (Same course as Clinical Research 245.)—W. [W.] Kim

246. Biostatistics for Clinical Research (4)
Lecture—4 hours. Prerequisite: consent of instructor. Development of biostatistical expertise for an effective and efficient research career in the health sciences. Topics include: descriptive statistics, probability, binomial, Poisson, normal, t, F, and Chi-square distributions, elementary nonparametric methods, simple linear regression and correlation, life tables. Only upper-division students who have completed Statistics 100 or Preventive Veterinary Medicine 402. Su. [S.] Yang

247. Statistical Analysis for Laboratory Data (4)
Lecture—4 hours. Prerequisite: Clinical Research 245 or course 245. Statistical methods for experimental design and analysis of laboratory data including gene expression arrays, RNA-Seq, and mass spec. (Same course as Clinical Research 246.) May be repeated for credit. Offered in alternate years.—W. [W.] Qi

252. Social Epidemiology (2)
Lecture/discussion—2 hours. Prerequisite: Epidemiology 205A; consent of instructor. Social determinants of health; psychosocial and physiological pathways, health and social inequality; gender and racial/ethnic disparities in health; social support, social cohesion and health; social gradient in behavioral and physiological factors; sociological approaches to health intervention; interventions addressing social determinants. (Same course as Epidemiology 252.)—S. [S.]

255. Human Reproductive Epidemiology (3)
Lecture—3 hours. Prerequisite: Preventative 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, epidemiologic study designs and analyses. Offered in alternate years.—F. [F.] Hertz-Picciotto

262. Principles of Environmental Health Sciences (3)
Lecture—3 hours. Prerequisite: consent of instructor required. 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.—F. [F.] Bennett

264. Public Health Econometrics (2)
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 and Poisson regression, case-control studies and case-control case studies, Poisson regression, survival-time methods. (Same course as Population Health and Reproduction 266.)—S. [S.] Kass, Kim

273. Health Services Administration (3)
Lecture—2 hours; laboratory—2 hours. Prerequisite: consent of instructor. (Lecture: Population-based interventions and on-the-ground observations of obesity prevention programs across the U.S.; W. De Vogli)

274. Critical Assessment in Health Policy and Economics (2)
Lecture/discussion—2 hours. Course aims to develop critical reading skills of the health policy and health economics literature, mainly following the microeconomic paradigm and analytical techniques. Topics include: health care, insurance, the role of markets in health care, payment methods, social security, arms race, new communication technologies, and cost-effectiveness analysis. Some basic concepts of micro economic theory will be explained in the class.—F. [F.] W. [W.] Yoo

290. Topics in Public Health (1)
Seminar. Prerequisite: consent of instructor. Open to students in Master of Public Health program, or permission of instructor. Seminar on key issues and current topics in public health. Course begins in August
SS11. Students must enroll in August, then Fall and Winter. The course is a series but grades and units are given at the end of each quarter. May be repeated four times for credit. (S/U grading only)—F, W, S, Su; (F, W, S, Su) Kass, McCurdy

295. International Health (2)
Lecture/discussion—2 hours. Prerequisite: graduate standing or consent of instructor. 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 professional in international settings. (S/U grading only)—S. (J.) Koga

297. Public Health Practicum (1-16)
Prerequisite: consent of instructor. Open 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 for credit. (S/U grading only)—F, W, S, Su; (F, W, S, Su) McCurdy

298. Study in Community and International Health (1-5)
Prerequisite: graduate student in good academic standing; consent of instructor. Study and experience for graduate students in any number of areas in community and international health. (S/U grading only)—F, W, S, Su; (F, W, S, Su) McCurdy

299. Research in Community and International Health (1-12)
Prerequisite: graduate standing; consent of instructor. Student will work with a 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. (S/U grading only)—F, W, S, Su; (F, W, S, Su) McCurdy

301. Professional
402. Introductory Medical Spanish (2)
Lecture—2 hours. Prerequisite: medical student or consent of instructor. The vocabulary needed to conduct a physical examination and history taking in Spanish. (S/U grading only)—S. (J.) Koga

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 public health care for the aged. (S/U grading only)—F, W, S, Su; (F, W, S, Su) McCurdy

465. Community Health Preceptorship (3-18)
Clinical activity—5-40 hours. Prerequisite: fourth-year medical student; consent of instructor. Participate at state or county health department or other public health organization in on-going 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)—F, W, S, Su; (F, W, S, Su) McCurdy

466. Occupational and Environmental Medicine Elective (6-12)
Clinical activity, laboratory. Prerequisite: fourth-year medical student in good academic standing; consent of instructor. Participate in activities of Occupational and Environmental Health Unit. Major activity is involvement in an epidemiologic research project of the University. Participate in Occupational and Environmental Medicine Clinic at UC Davis Medical Center and other sites, as arranged. (H/P/F grading only)—F, W, S, Su; (F, W, S, Su) McCurdy

470. Clinical Selective in Occupational and Environmental Medicine (3-9)
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 other sites, as arranged. Gain experience in evaluating occ/env medical conditions, use of medical literature, worker’s compensation system, and toxicological principles. Students may take up to four weeks for six units. (H/P/F grading only)—F, W, S, Su; (F, W, S, Su) McCurdy

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. 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. Develop and present small individual research projects. (F/P/F grading only)—F, W, S, Su; (F, W, S, Su) McCurdy

495. International Health (2)
Lecture/discussion—2 hours. Prerequisite: medical student in good academic standing; consent of instructor. Study and experience in current public health practices in national and international health. (S/U grading only)—S. (J.) Koga, Schenker

496. Current Issues in Public Health (1)
Lecture/discussion—1 hour. Topical issues in public health. Speakers from the local public health community address issues in disease control programs, access to care. May be repeated up to three times for credit. (F/P/F grading only)—S. (J.) McCurdy

498. Study in Public Health Sciences (1-6)
Prerequisite: medical student in good academic standing and consent of instructor. Study and experience for medical students in areas in community and international health. (H/P/F grading only)—F, W, S, Su; (F, W, S, Su) McCurdy

499. Research in Public Health Sciences (1-9)
Prerequisite: medical students with consent of instructor. Work with faculty member in areas of research interest, including but not limited to public health, 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)—F, W, S, Su; (F, W, S, Su) McCurdy

Radiation Oncology (RON) Upper Division
199. Special Study for Advanced Undergraduates; Research in Radiation Biology (1-5)
Prerequisite: undergraduate standing; consent of instructor. Radiation Oncology is a unique discipline combining elements of clinical practice linked to complex physical dosimetry and treatment planning. Included within this clinical environment is a strong basis in biology that underpins the clinical effectiveness of radiation treatment. (F/P/F grading only)—F, W, S, Su; (F, W, S, Su) McCurdy, Schenker

211. Introduction to Radiation Oncology Physics (3-6)
Prerequisite: consent of instructor; restricted to physics and engineering graduate students and senior undergraduate physics majors. Class size limited to three students. Introduction to radiation oncology physics. Overview of treatment methodologies. Medical physics equipment. Treatment machine dosimetry, including calibration. Machine quality assurance and quality assurance. Treatment planning. Simulation and treatment. Treatment quality assurance, including calculation checks and chart checks. Biotherapy. (S/U grading only)—F, W, S, Su; (F, W, S, Su) Stern

Graduate
212. Clinical Radiation Oncology (3-6)
Prerequisite: consent of instructor; restricted to physics and engineering graduate students and senior undergraduate physics majors. Class size limited to three students. Introduction to radiation oncology physics. Overview of treatment methodologies. Medical physics equipment. Treatment machine dosimetry, including calibration. Machine quality assurance and quality assurance. Treatment planning. Simulation and treatment. Treatment quality assurance, including calculation checks and chart checks. Biotherapy. (S/U grading only)—F, W, S, Su; (F, W, S, Su) Stern

299. Independent Study and Research (1-12)
Laboratory—3-40 hours. Prerequisite: enrollment with a Graduate Group for Ph.D. candidacy and consent of Group Adviser and Sponsor. Research under supervision of Radiation Oncology faculty. Work must be appropriate to current requirements for the Ph.D. degree. (S/U grading only)—F, W, S, Su; (F, W, S, Su) Coleman, Li, Vaughan

Professional
420. Radiobiology Lecture Course (1)
Lecture—1 hour. Prerequisite: Biological Sciences 1A, Mathematics 12, Physics 1A. Radiobiology lectures are designed to engage the physician residents, physics residents, and medical students in learning Radiobiology principles and concepts during the year the Radiation Physics course is taught. May be repeated two times for credit. (H/P/F grading only)—F, W, S, Su; (F, W, S, Su) Coleman, Li, Vaughan

463. Radiation Oncology Clerkship (3-9)
Clinical activity—30 hours. Prerequisite: consent of instructor. Externship provides in-depth exposure to the field of Radiation Oncology for students who rotation through an affiliated institution. May be repeated for credit. (H/P/F grading only)—F, W, S, Su; (F, W, S, Su) Fragoso, Li, Mayadev, Manjareb, Vaughan

Radiology—Diagnostic (RDI) Professional
413. Radiological Diagnosis II (Physics of Diagnostic Radiology) (5)
Lecture—44 hours; laboratory—6 hours total. Prerequisite: consent of instructor. Physics of diagnostic imaging; x-ray projection and interaction; image formation; modulation transfer function; fluoroscopy; cine fluoroscopy; radiography; fluoroscopy and fluoroscopy; computerized and geometrical tomography; magnetic resonance and ultrasound. Principles of radiation protection in imaging will be covered. (H/P/F grading only)—F, W, S, Su; (F, W, S, Su) Coleman, Fragoso, Li, Mayadev, Manjareb, Vaughan

414. Medical Radiation Biology (3)
Lecture—27 hours total. Prerequisite: consent of instructor. Medical radiation biology; molecular cellular and organ system response to acute and chronic irradiation; radiation carcinogenesis and genetic effects; radiation risk assessment; diagnostic ultrasound and magnetic resonance imaging health effects. Medical/legal considerations of radiation exposure. Offered in alternate years. (H/P/F grading only)—S. Bushberg

461. Advanced Clinical Clerkship in Diagnostic Radiology (3-6)
Clinical activity—35 hours; conference—4 hours; diagnostic/laboratory—1 hour. Prerequisite: satisfactory completion of second year medical school curriculum and of third-year clerkships in Internal Medicine and General Surgery; consent of instructor. Restricted to eight students and open to visiting medical students from accredited programs. Work with clinical Radiologists in image interpretation: fluoroscopy angiography image-guided intervention: cardiac stress testing radionuclide therapy.
462. Imaging of Acquired and Congenital Heart Disease (2)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: clinical activity—35 hours; conference—4 hours; independent study—1 hour. Restricted to two students per 2/4 week rotation. Work with Neuroradiologists in interpretation of CT, MR, and fluoroscopy. Opportunity to participate in assessment of Neurointerventional patients, and to observe Neurointerventional procedures. In-depth discussion of percutaneous or surgical interventions. Offered as a 2-week rotation for third-year medical students and a 2/4 week rotation for fourth-year medical students. Credit limited to 3 units for 2 weeks, 6 units for 4 weeks. May be repeated for credit. (H/P/F grading only)—F, W, S, Su.; (F, W, S, Su.) Babinbiski

473. Advanced Clinical Clerkship in Neuroradiology (3-6)
Clinical activity—35 hours; conference—4 hours; independent study—1 hour. Prerequisite: fourth-year medical student with interest in Diagnostic Radiology, Neuroradiology, Nuclear Medicine, Psychology, Psychiatry, or related field; satisfactory completion of course 461, or the equivalent, is strongly encouraged. Restricted to one student per 2/4 week rotation. Work with Neuroradiologists in interpretation of CT, MR, and fluoroscopy. Opportunity to participate in assessment of Neurointerventional patients, and to observe Neurointerventional procedures. In-depth discussion of percutaneous or surgical interventions. Offered as a 2-week rotation for third-year medical students and a 2/4 week rotation for fourth-year medical students. Credit limited to 3 units for 2 weeks, 6 units for 4 weeks. May be repeated for credit. (H/P/F grading only)—F, W, S, Su.; (F, W, S, Su.) McGahan

474. Advanced Clinical Clerkship in Pediatric Radiology (3-6)
Clinical activity—30 hours; conference—5 hours; film viewing—3 hours; independent study—2 hours. Prerequisite: fourth-year medical students with interest in Radiology and/or Pediatrics; interested third-year medical students who have successfully completed prerequisite electives may enroll, given availability and consent of the instructor of record; prior completion of course 461, or the equivalent, is strongly encouraged. Restricted to two students per two-week rotation. Course work in the radiological care of Pediatric patients; evaluate the patient receiving the radiographic study, including pertinent historical/physical findings. Student expected to write up imaging cases encountered during their rotation. Credit limited to 3 units for 2 weeks, 6 units for 4 weeks. May be repeated for credit. (H/P/F grading only)—F, W, S, Su.; (F, W, S, Su.) Georges

475. Advanced Clinical Clerkship in Musculoskeletal Radiology (MSK) (3-6)
Clinical activity—35 hours; conference—4 hours; discussion/lab—1 hour. Prerequisite: fourth-year medical student with interest in Musculoskeletal Radiology, Orthopedic Surgery, Sports Medicine, PMNR, or related field; satisfactory completion of course 461, or the equivalent, is strongly encouraged. Restricted to one student per 2/4 week rotation. Work with Musculoskeletal Radiologists in interpretation of CT, MR, radiography, and fluoroscopy. Opportunity to assess patients for, and to interpret findings of, CT, MRI, radiography, and fluoroscopy. Restricted to one student for 2/4 week rotation. Credit limited to 3 units for 2 weeks, 6 units for 4 weeks. May be repeated for credit. (H/P/F grading only)—F, W, S, Su.; (F, W, S, Su.) Batineki

476. Advanced Clinical Clerkship Vascular/Interventional Radiology (IR) (3-6)
Clinical activity—35 hours; conference—4 hours; discussion/lab—1 hour. Prerequisite: fourth-year medical student with interest in Diagnostic Radiology, Vascular/Interventional Radiology, Cardiovascular Imaging, Cardiology, Cardiovascular Surgery, General Surgery, or related field; satisfactory completion of course 461, or the equivalent, is strongly encouraged. Restricted to one student per 2/4 week rotation. Medical student will work with Vascular/Interventional Radiologists in the evaluation of patients for interventional procedures. There will be opportunities to participate in Daily conferences in Nuclear Medicine, Neuroradiology, Radiology, Health Physics, and Radiology Safety. Assigned readings. Credit limited to 3 units for 2 weeks, 6 units for 4 weeks. May be repeated for credit. (H/P/F grading only)—F, W, S, Su.; (F, W, S, Su.) Batineki

477. Advanced Clinical Clerkship in Ultrasound Radiology (3-6)
Clinical activity—30 hours; conference—5 hours; film viewing—3 hours. Prerequisite: fourth-year medical student with interest in OB/GYN, or in other medical or surgical subspecialties employing ultrasound in their clinical practice; prior completion of course 461, or the equivalent, is encouraged. Restricted to two students per 2/4 week rotation. Participation as an active team member on a busy clinical ultrasound service. Credit limited to 3 units for 2 weeks, 6 units for 4 weeks. May be repeated for credit. (H/P/F grading only)—F, W, S, Su.; (F, W, S, Su.) McGahan

478. Advanced Clinical Clerkship Abdominal Imaging (3-6)
Clinical activity—35 hours; conference—4 hours; discussion/lab—1 hour. Restricted to two students per 2/4 week rotation. Work with clinical Radiologists on abdominal and pelvic CT, MR, ultrasound, digital radiography, gastrointestinal and genitourinary procedures, imaging-guided intervention. Offered as a 2-week rotation for third-year medical students and a 2/4 week rotation for fourth-year medical students. Credit limited to 3 units for 2 weeks, 6 units for 4 weeks. May be repeated for credit. (H/P/F grading only)—F, W, S, Su.; (F, W, S, Su.) Lamba

479. Specialty Externship in Radiology (3-16)
Clinical activity—25 hours; discussion—10 hours. Prerequisite: consent of instructor. Externship provides in-depth exposure to one of a variety of subspecialties in Radiology. May be repeated for credit. (H/P/F grading only)—F, W, S, Su.; (F, W, S, Su.) Hagge

498. Group Study in Diagnostic Radiology (1-12)
Prerequisite: consent of instructor. (H/P/F grading only)

499. Independent Study and Research in Therapeutic Radiology (1-18)
Prerequisite: consent of instructor. Advanced-level research seminar in clinical and/or translational research oncology. Course instructor to generate a testable hypothesis. May be repeated for credit. (H/P/F grading only)—F, W, S, Su.; (F, W, S, Su.) cuff (Y)

Radiology—Nuclear Medicine (RNU)
Upper Division
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
299. Research (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only)

Professional
430. Surgery Clerkship (12)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Eight week general surgery clerkship includes GI, Burn, Oncology, Plastics, Vascular Cardiothoracic, consult, transplant and trauma. Clerkship assignments are at UCSF. Eight week general surgery clerkship includes GI, Burn, Oncology, Plastics, Vascular Cardiothoracic, consult, transplant and trauma. Clerkship assignments are at UCDMC. Daily core material presentations and reading assignments. Student involvement includes workshops and presentations, critical thinking sessions. (P/NP grading only)—F, W, S, Su.; (F, W, S, Su.) Wisner

430F. SJVP Surgery Clerkship at UCSF (12)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Eight week general surgery clerkship includes GI, Burn, Oncology, Plastics, Vascular Cardiothoracic, consult, transplant and trauma. Clerkship assignments are at UCSF. Eight week general surgery clerkship includes GI, Burn, Oncology, Plastics, Vascular Cardiothoracic, consult, transplant and trauma. Clerkship assignments are at UCDMC. Daily core material presentations and reading assignments. Student involvement includes workshops and presentations, critical thinking sessions. (P/NP grading only)—F, W, S, Su.; (F, W, S, Su.) Wisner

454. Medicine, School of

454 Medicine, School of

Daily conferences in Radiology Diagnosis and Ther-
481. Interactive Clinical Case Presentation

Clinical activity—1 hour. Prerequisite: fourth-year medical students; however, course is open for third and fourth year student observers. Course taught as one session (4 hours) per month for three quarters (July to March); students are granted up to three credits and the minimum requirements will be to attend at least six sessions; students can do all nine sessions and work toward an honor; for the written part, students will work in groups of two on the nine case presentations and write a detailed paper with a literature review on “The Current management” of that disease; each can be a manuscript submitted for publication with a faculty member as an adviser; maximum of 10-15 students in good standing. Case presentation of common clinical scenarios (i.e., chestpain/MI; fever/pneumonia; abdominal pain/chrasis stites etc.) from various discipline held in an auditorium with real patients exposure. Interactive session to review history, physical findings and case management. Students will be asked to perform H&P (H/P/F grading only).—F, W, Su. (F, W, Su.) Khatri

493. Clinically-Oriented Anatomy Special Study Module

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: Applicaton of Basic Cardiopulmonary Physiology to Problems Encountered in Critically Ill Surgical Patients. (H/P/F grading only).—F, W, Su. (F, W, Su.) Holcroft

493C. Physiological Principles in SICU SSM

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: Application of Basic Cardiopulmonary Physiology to Problems Encountered in Critically Ill Surgical Patients. (H/P/F grading only).—F, W, Su. (F, W, Su.) Holcroft

493D. Interdisciplinary Study of Gastrointestinal Cancer

Clinical activity—3 hours; discussion/laboratory—20 hours. Prerequisite: consent of instructor. In-depth study of gastrointestinal, hepatic and pancreatic cancer. Emphasis on an integration of basic science and clinical training. Required of all students. Special study modules include pathology, surgical oncology, medical oncology, gastroenterology, radiology and radiotherapy. (Same course as Pathology 493C.) (H/P/F grading only).—F, W, Su. (F, W, Su.) (F, W, Su.) Cala, Holcroft

494H. Fourth-Year Surgical Honors Program

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).—F, W, Su. (F, W, Su.) Holcroft
Clinical activity—full time (approximately 40 hours per week). Prerequisite: third- or fourth-year medical students; Surgery 430; consent of instructor. Total involvement in patient care involving surgical prepa-
ration, treatment, operative care, and follow-up. Developing understanding reconstruction and a-
esthetic plastic surgery. Microvascular surgery included. Student rotation. (H/P/F grading only.)—F, W, S, Su; f [W, W, S, Su]

Surgery—Plastic Surgery (PSU)

Professional

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 involvement in patient care involving surgical prepa-
ration, treatment, operative care, and follow-up. Developing understanding reconstruction and a-
esthetic plastic surgery. Microvascular surgery included. Student rotation. (H/P/F grading only.)—F, W, S, Su; f [W, W, S, Su]

Urology (URO)

Upper Division

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

Professional

400. Office Urology (1)
Clinical activity—4 hours in afternoons (6 weeks). Prerequisite: fourth-year medical students with con-
sent of instructor. Introduction to ambulatory care of urologic patients including basic therapeutic and
diagnostic procedures from case material referred to private clinic. Preparation of uninary tract infection will be emphasized. (H/P/F grading only.)—F, W, S, Su; f [W, W, S, Su]

460. Urology Clinical Clerkship (5-18)
Clinical activity—full time. Prerequisite: second-year medical student; physical diagnosis or equivalent; consent of instructor. Limited enrollment. Clinical experience in diagnosis and treatment of urologic disease. Student will work closely with house staff, participate in conferences, and surgery, and perform initial patient evaluation on new patients. May be repeated for credit. (H/P/F grading only.)—F, W, S, Su; f [W, W, S, Su]

461. Electives in Urology (3-18)
Clinical activity—60 hours. Prerequisite: fourth-year medical student; consent of instructor. Under supervi-
sion, student acting as intern will assume full inpa-
tient responsibility including admission history, physical examination, management of hospitalization, and participate in surgical procedures, outpa-
tient clinic and learning diagnostic and therapeutic procedures. May be repeated for credit. (H/P/F grading only.)—F, W, S, Su; f [W, W, S, Su]

499. Research in Urology (1-12)
Research—3-36 hours. Prerequisite: medical or vet-
erinary medical students with consent of instructor. Research in oncology, male infertility, urodynamics, neurogenic bladder. Unique opportunity to apply recent technologies (nuclear medicine resonance, flow cytometry, recombinant DNA) in investigation, diagnosis and treatment of GU cancer, infectious dis-
ease, male infertility and development of genitouri-

Medical and Epidemiology

See Medicine and Epidemiology (VME), on page 583.

Medieval and Early Modern Studies

[College of Letters and Science]

Claire Waters, Ph.D. (English), Program Director
Program Office. 176 Voorhees Hall 530-752-2257; http://mems.ucdavis.edu

Committee in Charge
Carlson Arnett, Ph.D. (German/Russian)
Catherine Chin, Ph.D (Religious Studies)
Sally McKee, Ph.D. (Philosophy)
Matthew Vernon, Ph.D. (English)
Heghnar Watenpaugh, Ph.D. (Art History)

The Major Program
The major in Medieval and Early Modern Studies examines the intellectual, political, and cultural forces that shaped modern European civilization during the period from the end of Ancient Rome (fifth century) to the beginning of the Enlightenment (mid-eighteenth century). An interdisciplinary and interde-
partamental program, the major includes studies in history, art history, philosophy, literature, drama, music, national languages, religion, rhetoric, and political theory.

The Program. The major requires interdisciplinary work, while allowing the student to focus on the early-
ly Middle Ages, the High Middle Ages, the Renaissance, or the Baroque. The series of medieval and early modern courses in the program provides the foundation for the major and prepares students for advanced work within the individual disciplines. On the upper-division level, students may choose coursework in specific areas of History, Compara-
tive Literature, English, French, German, Italian, Spanish, and Latin, philosophy and religion, arts and language, and political thought. In addition, each student may elect to complete a senior thesis on a selected aspect of medieval and/or early modern culture.

Career Alternatives. The major in Medieval and Early Modern Studies is a liberal arts degree provid-
ing excellent preparation for the rigorous of profes-
sional schools as well as careers in law, museology, journalism, and teaching.

Medieval and Early Modern Studies

A.B. Major Requirements: 22

Preparatory Subject Matter: ........... 12

Medieval Studies 20A, 20B, 100 Three additional courses chosen from: Art History 18, 1C, 1E; Comparative Literature 2, 10A, 10B, 10C, 10D, 10E; English 10A; German 48; History 14A, 14B, Humanities 1*, 9; Philosophy 21, 22 12 Language proficiencies is a desideratum. Courses in Latin and other European languages are strongly recommended, particularly for students planning to pursue graduate studies in the medieval or early modern field.

Depth Subject Matter: ........... 44

In consultation with the undergraduate adviser, students select a total of eleven courses from the following disciplines with at least three courses each from the medieval and early modern periods:

Art History 155, 156, 178A, 178B, 178C, 179B, 190B, 190C
Classics 110 Comparative Literature 139, 164A, 164B, 164C, 164D, 180A
English 111A, 113B, 113E, 117, 122, 130A, 135*, 165*, 185*, 188*, 189*
French 115, 176, 117A, 118B, 141*
German 101A, 112*, 120, 121, 122, 124*, 131*, 134*, 169*
Italian 105, 115, 121, 123, 115A, 115B, 115C, 115D, 118, 139B, 140, 141
Medical Studies 130A, 130B, 131, 189, 190
Music 121*, 124A, 124B
Philosophy 105, 145, 168, 170, 172
Political Science 115, 116, 118A
Religious Studies 102, 115, 155
Spanish 130, 133N, 134A, 134B, 142*

Total Units for the Major: .......... 66
* Prior approval by Undergraduate Adviser necessary.

Major Adviser. See Program office.

Minor Program Requirements:

Medieval and Early Modern Studies 24

The minor in Medieval and Early Modern Studies is a coherent program of interdisciplinary study. Medi-

Early Modern Studies units may be taken in one or more of the traditional fields of concentration, including art, his-
tory, literature, music, national languages, philoso-
phy, political theory, and religious studies. Courses must be upper-division with at least two courses each from the medieval and early modern periods. Students may also select a minor with a thematic emphasis.

Although there is no foreign language requirement for the minor, knowledge of Latin or a modern Euro-

The minor must be designed in consultation with the Undergraduate Adviser.

Minor Adviser. See Program office.

Courses in Medieval Studies (MST)

Lower Division

20A. Early Medieval Culture (5)
Lecture—3 hours; discussion—1 hour; extensive writ-
ing. Readings (in translation) in medieval culture, such as Codex of Justinius, Confessions of Saint Augustine, Beowulf, the Nibelungenlied, The Song of Roland, the Summa Theologica of Thomas Aquin-
as, the Chronicles of Froissart, Chaucer’s Canter-
bury Tales, and Dante’s Divine Comedy. GE credit: ArtHum, Wrt|AH, WC, WE. —F. (F).

20B. The Culture of the High Middle Ages (5)
Lecture—3 hours; discussion—1 hour; extensive writ-
ing. Great transformations that created the modern world: Constitutional Government, the Hundred Years War, the Black Death, and the Peasants’ Ar-
revolt, the Renaissance, Reformations and Counter-
Reformation, and the Baroque. GE credit: ArtHum, Wrt|AH, WC, WE, —W. (W)

98. Directed Group Study (1-5)
P/NP grading only.

99. Special Study for Undergraduates (1-5)
Upper Division

130A. Special Themes in Medieval Cultures (4)
Lecture—3 hours; discussion—1 hour. Each offering constitutes an interdisciplinary course in early modern culture in the Middle East and Europe: the idea of the hero, mysticism, urban development. Extensive readings focused on medieval source material. May be repeated for credit. GE credit: ArtHist, Writ 1A-H, WC, WE.

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 pathology, daily life, baroque culture. Immersion in source material from 1300-1650. May be repeated for credit. GE credit: ArtHist, Writ 1A-H, WC, WE.

131. Cross-Cultural Relations in the Medieval and/or Early Modern World (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 20A or 20B or consent of instructor. Medieval and/or Renaissance aspects of cultural exchange. Relations between Christians, Jews, and Muslims: Europeans, Africans, and Asians; Old World and New World. Offered irregularly. GE credit: WC, WE.

189. Seminar in Medieval and Early Modern Culture (4)
Seminar—3 hours; term paper. Prerequisite: course 20A or 20B or consent of instructor. Focus on a particular problem or issue in the Medieval or Early Modern period. Seminar topics might include (but not limited to) monasticism, origins of the university, chivalry, exploration, the role of women in the Medieval and Early Modern world. Offered in alternate years. GE credit: WE.

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. F, W, S. (F, W, S.)

197T. Tutoring in Medieval Studies (1-4)
Seminar—2 hours. Prerequisite: courses 20A and 20B; upper division standing; consent of instructor and chairperson of curriculum committee. Tutoring in Medieval Studies 20A and 20B, including leadership in small discussion groups affiliated with the course. May be repeated for credit for a total of 6 units. (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.)

Microbiology (A Graduate Group), on page 459; and Pathology, Microbiology, and Immunology (PMI), on page 584.

Microbiology and Molecular Genetics

Formerly Microbiology
(College of Biological Sciences)

Wulf-Dietrich Heyer, Ph.D., Chairperson of the Department

Department Office, 357 Briggs Hall
530-752-2626; http://microbiology.ucdavis.edu

Faculty

Primary Department Directors

Jacqueline Ballou, Ph.D., Assistant Professor
Sean Collins, Ph.D., Assistant Professor
Scott C. Dawson, Ph.D., Associate Professor
Wulf-Dietrich Heyer, Ph.D., Professor
Neil Hunter, Ph.D., Professor
Michele M. Igo, Ph.D., Professor
Stephen C. Kowalczykowski, Ph.D., Distinguished Professor

Su-Ju Lin, Ph.D., Professor
Miriam Martin, Ph.D., Lecturer
John C. Meeks, Ph.D., Research Professor
Douglas C. Nielsen, Ph.D., Research Professor
Rebecca Parales, Ph.D., Professor
Martin L. Privalsky, Ph.D., Distinguished Professor
Katherine Rasohl, Ph.D., Assistant Professor
John R. Roth, Ph.D., Distinguished Professor
Michael A. Savageau, Ph.D., Distinguished Professor

Kazuhiro Shizaki, Ph.D., Visiting Professor
Mitchell H. Singer, Ph.D., Professor
Valley J. Stewart, Ph.D., Professor
Lileng Xu, Ph.D., Assistant Professor

Secondary Department Members

Sean Burgess, Ph.D., Professor
Jodi Nunnari, Ph.D., Professor
Ted Powers, Ph.D., Professor

Emeriti Faculty

Stanley W. Arzt, Ph.D., Professor Emeritus
Paul Baumann, Ph.D., Professor Emeritus
John L. Ingraham, Ph.D., Professor Emeritus
JaKue S. Manning, Ph.D., Professor Emeritus
David Pratt, Ph.D., Professor Emeritus
Chester W. Price, Ph.D., Professor Emeritus
Merna R. Villarejo, Ph.D., Professor Emerita
Mark L. Wheelis, Ph.D., Senior Lecturer Emeritus

Affiliated Faculty

Eric D. Mann, Ph.D., Lecturer

The Major Program

Microbiology is the branch of biology that deals with bacteria, yeasts and other fungi, algae, protists, 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. The ease and power of simultaneous genetic and biochemical analysis of microbes led to the emergence of the new disciplines of molecular biology and molecular genetics, and spawned the new industry of biotechnology.

The Program. The Microbiology Undergraduate Program offers Bachelor of Science and Bachelor of Arts degrees in the College of Biological Sciences. Both degrees are designed to provide students with quantitative skills and knowledge across the breadth of Biological Sciences, while maintaining a focus on the biology of microorganisms. The B.S. degree offers more training in mathematics, biochemistry and laboratory methodology; the A.B. degree incorporates more exposure to the liberal arts. 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 serves as the foundation for advanced study in microbiology, entry into the professional schools of all health sciences, or immediate employment in biotechnology, healthcare and food science industries.

A.B. Major Requirements:

Preparatory Subject Matter ............. 45-57
Biological Sciences 2A-2B-2C .................. 15
Chemistry 8A-8B or 118A-118B-118C ............ 18
Mathematics 17A-17B or 21A-21B ............ 8
Physics 1A-1B or 7A-7B-7C .................. 6-12

Depth Subject Matter .................... 36
Biological Sciences 101, 105 (or 102+103) ........ 7-10
Microbiology 102, 104L, 105, 105L, 111 ............. 15
Select at least one course from each of the areas of study below.

Areas of Study:

1. Microbial Genetics: Microbiology
   115, 150, 170, 188 ............. 3-12
2. Virology or Immunology: Microbiology
   162, Medical Microbiology and Immunology
   188, Pathology, Microbiology, and Immunology
   126, 128, 130, 132, 138 .......... 3-12

Additional course work, chosen from the list below, to achieve a total of 36 or more units. Upper division Microbiology courses not used in satisfaction of any other requirement; or Biological Sciences 104, 181, Food Science and Technology 104; Molecular and Cellular Biology 121, 182; Plant Pathology 130; Soil Science 111; or upper division courses in related fields, relevant to the student’s interest and chosen in consultation with the adviser. No more than three units of variable-unit courses (numbered 192, 198 or 199) may be used for credit in this category. Note: Although a course might be listed in more than one category, that course may satisfy only one requirement in the entire major.

Total Units for the Major ........... 81-93

B.S. Major Requirements:

Preparatory Subject Matter ............. 57-67
Biological Sciences 2A-2B-2C .................. 15
Chemistry 2A-2B-2C .................. 15
Chemistry 8A-8B or 118A-118B-118C ............ 18
Mathematics 17A-17B or 21A-21B ............ 8
Physics 7A-7B-7C .................. 12
Microbiology 191 or 191L .................. 12

Depth Subject Matter .................... 45
Biological Sciences 101, 105 (or 102+103), 104 ............ 10-13
Statistics 100 or 102 ............. 4
Microbiology 102, 104L, 105, 105L, 111 ............. 15
Select at least one course from each of the areas of study below.

Meteorology

See Atmospheric Science, on page 185.

Mexican-American (Chicano) Studies

See Chicana/Chicano Studies, on page 204.

Microbiology

See Microbiology and Molecular Genetics, on page 457; Medical Microbiology (MMI), on page 443;
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

101. Introductory Microbiology (5)
Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Prerequisites: Biological Sciences 1A, or 2A; Chemistry 2B (may be taken concurrently). Survey of microorganisms emphasizing their interactions with humans and disease. Topics include microcosm surveys of various microbes, the immune system, food microbiology, microbial pathogens, and mechanisms of disease transmission. Designed for students requiring microbiology for professional schools. Not open for credit to students who have completed courses 102, 102L, 104L, or 104L. GE credit: SciEng | SE, SL.

102. Introductory Microbiology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A or 2A; Chemistry 2B (may be taken concurrently). Essentials of microbial biology, emphasizing phylogeny, physiology, genetics, ecology, and pathogenesis. Prior microbiology and immunology. GE credit: SciEng | SE, SL.

103L. Introductory Microbiology Laboratory (2)
Lecture—1 hour; laboratory—3 hours. Prerequisites: course 102 C- or better; Chemistry 2B. Introduction to principles and techniques employed in working with microorganisms. Designed for students requiring microbiology for professional school admission. Not open to students who have completed course 101 before Spring 2016, or who have completed courses 102L or 104L—F, W, S, F, W, S, J—Man.

104L. General Microbiology Laboratory (3)
Lecture—1 hour; laboratory—6 hours. Prerequisites: course 102 C- or better; Chemistry 88 or 118B or 129A, consent of instructor. Students must complete a petition for consideration of enrollment; petition available on department of Microbiology and Molecular Genetics website. Principles and laboratory methods employed in working with microorganisms. Designed for students continuing in microbiology, genetics, or biochemistry. Only two units of credit may be counted toward course 101 before Spring 2016, or who have completed course 103L. Not open to students who have completed course 102L. GE credit: SciEng | SE, WE—F, J—Martin.

105. Microbial Diversity (3)
Lecture—3 hours. Prerequisites: course 102 or 104, Biological Sciences 101; 103 or 105 strongly recommended. Survey of microbial diversity in the three domains of life: Bacteria, Archaea, and microbial eukaryotes. Emphasizes microbial evolution and phylogeny, physiology and metabolism, global biogeochemical cycles, environmental adaptations, and genomic methods for analyzing culturable and unculturable microorganisms. CE credit: SciEng | SE—W, W, W—Dawson, Parales.

105L. Microbial Diversity Laboratory (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: course 102 or 104, or course 103 or 105 (if taken concurrently). Students must complete a petition for consideration of enrollment; petition available on department of Microbiology website. Classical enrichment for the isolation of metabolically diverse microbes; modern molecular methods for the identification of isolates; cultivation independent analysis of microbial communities from local environmental sources. GE credit: SciEng | SE, WE—W, W—Dawson, Parales, Ralston

111. Human Microbiology (3)
Prerequisite: course 102; Biological Sciences 101. Biology of microorganisms that form commensal, mutualistic, and pathogenic relation-
ships with human beings, emphasizing their phylogeny, physiology, genetics, and ecology. Effects on human nutrition, development and physiology. Mechanisms of pathogenesis, immune response eva-
sion, antibiotic action, and antibiotic resistance. GE credit. SciEng | SE—F, F—Shiozaki

115. Recombinant DNA Cloning and Analysis (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101 or equivalent. Cloning and analysis of recombi-
nant DNA, with emphasis on Escherichia coli host systems. DNA-modifying enzymes include restriction and their use; manipulation and expression of insert DNA; polymerase chain reaction; and sequence annotation. Graduate students see course 215. GE credit: SciEng | SE—F, F—Shiozaki

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 character-
istics of various groups and their adaptation to and modification of specific habitats. Offered irregularly. GE credit. SciEng | SE—Nelson

140. Bacterial Physiology (3)
Lecture—3 hours. Prerequisites: Biological Sciences 101, 102, 103 (103 may be taken concurrently), or Biological Sciences 101, 105 Microbiology 102 recommended. Fundamentals of bacterial growth and bacterial responses to environmental stresses. Topics will include carbon and nitrogen regulation, growth rate control, post-exponential growth, and motility and chemotaxis. Not open for credit to stu-
dents who have completed course 130A. Offered irregularly. GE credit: SciEng | SE.

150L. Bacterial Physiology Lab (4)
Lecture/discussion—1 hour; laboratory—8 hours. Prerequisite: course 102; Biological Sciences 101, 102 or 105 recommended. Integrated presentation of the nature of animal, plant, and bacterial viruses, including their structure, replication and genetics. Only three units to students who have com-
pleted Pathology, Microbiology, and Immunology 121, 122, 123; and any three units of Organic Chemistry. CE credit: SciEng | SE—S, S—Stewart

155L. Viral Microbiology (4)
Lecture—4 hours. Prerequisite: Biological Sciences 101, 102 or 105 recommended. Integrated presen-
tation of the nature of animal, plant, and bacterial viruses, including their structure, replication and genetics. Only three units to students who have com-
pleted Pathology, Microbiology, and Immunology 121, 122, 123; and any three units of Organic Chemistry. CE credit: SciEng | SE—S, S—Shiozaki

170. Yeast Molecular Genetics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101; 102 or 105 strongly recommended. Survey of the genetics, cell biology and technologies in yeasts and related lower eukaryotic organisms. Topics include genet-
ery of yeasts, cell structure; metabolism; cell cycle; genetic approaches and genomics; gene expres-
sion; yeasts as models to study higher eukaryotes; and contemporary techniques. GE credit: SciEng | SE—S, S—Privalsky

190C. Undergraduate Research Conference (1)
Discussion—1 hour. Prerequisite: upper division standing and consent of instructor, course 199 con-
currently. Presentation and critical discussion of staff...
research activities: designed for advanced under-
graduate students. May be repeated for credit. (P/NP grading only.)—F, W, S. (F, W, S.)
191. Introduction to Research for Advanced Undergraduates (1)
Seminar—1 hour. Prerequisite: Biological Sciences 2A or equivalent. Restricted to upper division stand-
ing. Discussion of faculty research focusing on the bio-
chemistry, genetics, and cell biology of microor-
ganisms, along with ways undergraduates can par-
ticipate in research projects of faculty members. May be repeated three times for credit. (P/NP grading only.) GE credit: SE — S. (S.) Hunter
192. Internship (1-12)
Internship—3-36 hours. Technical and/or professi-
onal 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 stand-
ing, 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.)—F, W, S. (F, W, S.)
197T. Tutoring in Microbiology (1-12)
Prerequisite: upper division standing and consent of instructor. Assisting the instructor in one of the sec-
tion's regular courses by tutoring individual or small groups. Includes tutoring in laboratory, voluntary dis-
cussion groups, or other voluntary course activities. May be repeated for credit. (P/NP grading only.)—F, W, S. (F, W, S.)
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.)—F, W, S. (F, W, S.)
Graduate
200B. Advanced Bacteriology (3)
Lecture—3 hours. Prerequisite: course 200A. Intended for first year graduate students in microbiol-
ogy and closely related fields. Advanced topics in phylageny, physiology, and diversity of bacteria. Offered irregularly.—Dawson, Parales
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 bio-
chemistry, biochemistry, and genetics, emphasizing molecular cloning strategies, choice of vectors, preparation of insert DNA, and selection proce-
dures.—F. (F) Privalsky
262. Advanced General and Molecular Virology (3)
Lecture—3 hours. Prerequisite: graduate standing. Advanced integrated presentation of animal, bacte-
rial, and plant viruses, including their structure, modes of regulation, expression and replication, and effects on host cells and organisms. Offered in alternate years. —W. Luciw
263. Principles of Protein--Nucleic Acid Interactions (3)
Lecture—3 hours. Prerequisite: advanced graduate standing and completion of one year of basic gradu-
ate course work in biochemistry, biophysics, chemis-
try, genetics, microbiology, or molecular biology. Physical basis of protein--nucleic acid interaction. Topics include nucleic acid recognition by proteins, thermodynamics of protein--nucleic acid stability, and kinetics of binding process for both non-specific and sequence-specific nucleic acid binding proteins. Emphasis on topics that represent paradigms in protein--nucleic acid interactions. Offered irregularly.—Kowalczykowski
274. Seminar in Genetic Recombination (1)
Seminar—1 hour. Prerequisite: graduate standing; consent of instructor. Biochemical and genetic as-
pects of genetic recombination in prokaryotes and eukaryotes. Mechanisms of recombination and bio-
chemical and genetic characteristics of recombin-
a tion proteins. Proteins include DNA strand exchange, DNA helicases, and Holliday junction resolving proteins. May be repeated for credit. (S/U grading only.) Offered irregularly.—Kowalczykowski
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 pre-
sentations by individual students and invited speak-
ers. May be repeated for credit. (S/U grading only.)—W. S. (F, S.) Heyer
276. Advanced Concepts in DNA Metabolism (1)
Lecture—3 hours. Prerequisite: Molecular and Cellu-
lar Biology 221C or Genetics 201C or equivalent course recommended. DNA damage checkpoints, homologous recombination, and meiotic recombina-
tion. An advanced treatment of the clinic and cur-
rent literature to discuss emerging principles and current models in these research areas. Offered in alternate years. —K. Hunter
290C. Advanced Research Conference (1)
Discussion/conference—1 hour. Prerequisite: gradu-
ate standing and/or consent of instructor. Presenta-
tion and critical discussion of staff research activities. Designed for advanced graduate students. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)
291. Selected Topics in Microbiology (1)
Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Current progress in micro-
biology and cellular and molecular biology. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)
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.)—F, W, S. (F, W, S.)
299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)—F, W, S. (F, W, S.)
Professional
366. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)
Michael A. Savageau, Ph.D., Professor (Biomedical Engineering)
Lark Schneider, Ph.D., Assistant Professor (Pathology; Microbiology & Immunology)
Barbara L. Shacklett, Ph.D., Professor (Medical Microbiology and Immunology)
Mitchell H. Sing, Ph.D. (Microbiology & Molecular Genetics)
Clorinda Slupsy, Ph.D., Professor (Microbiology; Veterinary Medicine & Epidemiology)
Joy V. Solnick, M.D., Ph.D., Professor (Internal Medicine)
Esteban Sato-Martínez, Ph.D., Assistant Professor (Veterinary Medicine & Epidemiology)
Jeffrey L. Stott, Ph.D., Professor (Pathology; Microbiology, and Immunology)
Dawn Sumner, Ph.D., Professor (Earth and Planetary Sciences)
Iljas Tagakoulos, Ph.D., Assistant Professor (Computer Science)
George Thompson, M.D., Assistant Professor (Medical Microbiology & Immunology)
Jose V. Torres, Ph.D., Professor (Medical Microbiology and Immunology)
Renée M. Tsolis, Ph.D., Professor (Medical Microbiology and Immunology)
Bart Weimer, Ph.D., Professor (Population Health & Reproduction)
Sofia Wurzel, Ph.D., Professor (Civil and Environmental Engineering)
Lifeng Xu, Ph.D., Assistant Professor (Microbiology & Molecular Genetics)
Tilahun D. Yilma, Ph.D., Professor (Pathology; Microbiology, and Immunology)
Glenn M. Young, Ph.D., Professor (Food Science and Technology)
Huajun Zhou, Ph.D., Associate Professor (Animal Sciences)

Affiliated Faculty
Kathryn DeKemer, Ph.D., MPH, Adjunct Associate Professor (Medical Microbiology & Immunology)
Patrick S. C. Leung, Ph.D., Adjunct Professor (Internal Medicine)
Ellen E. Sparger, D.V.M., Ph.D., Associate Adjunct Professor (Veterinary Medicine and Epidemiology)

Graduate Study. The Graduate Group in Microbiology offers study and research leading to the M.S. and Ph.D. degrees. Strong preference is given to doctoral applicants. The group offers study in modern molecular approaches to microbiological problems. Areas of research span fundamental, applied, and pathogenic microbiology, including bacterial and viral virology, aquatic microbiology, microbial genomics and genetics, microbial physiology and development, microbial ecology and environmental microbiology, cancer biology, and bioengineering and biotechnology. Information on the graduate study and undergraduate preparation for the program contact a graduate adviser or the Chairperson of the Group.

Graduate Advisers. S.C. Dawson (Microbiology & Molecular Genetics), J.F. Bisson (Viticulture and Enology), E.R. Parales (Microbiology & Molecular Genetics), E.E. Sparger (Vet Med; Medicine), R. Tsolis (Medicine; Microbiology & Immunology), B. Weimer (Wine Science; Extension)

Courses in Microbiology (MBI)

Graduate

200A. Microbial Biology (3) Lecture—3 hours. Prerequisite: course Microbiology 102 or equivalent, prior coursework in Microbiology. Designed to provide an overview of various aspects of microbiology and microbial processes. Topics will include microbial genetics and genomics, microbial metabolism, signaling, and adaptations. — F. [F] Weimer

2011. Advanced Microbiology Laboratory Rotations (5) Laboratory—15 hours. Two five-week assignments in microbial research laboratories. Individual research problems with emphasis on methodological/ procedural experience and experimental design. May be repeated twice for credit. — F, W. S. [F] W. S.

210. Microbial Interactions (2) Lecture—2 hours. Prerequisite: course 200A or consent of instructor. Analysis of the molecular level of the interactions of microbes with the environment, microbes with other microbes, and microbes in symbiotic and/or pathogenic associations with eukaryotic hosts. Topics discussed will vary. May be repeated for credit. — F, W. S. [F] W. S.

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]— F, W. S. [F] W. S.

299. Research (1-12) Research under the guidance of dissertation committee. [S/U grading only]

Middle East/South Asia Studies

[College of Letters and Science]
Smriti Srivinas, Ph.D., Program Director

Committee in Charge
Ali Anooshahr, Ph.D. (History)
Flagg Miller, Ph.D. (Religious Studies)
Jocelyn Shariel, Ph.D. (Comparative Literature)
Nahum Radwanski, Ph.D. (Comparative Literature)
Smriti Srivinas, Ph.D. (Anthropology)
Suad Joseph, Ph.D. (Anthropology; Women and Gender Studies)
Sudipta Sen, Ph.D. (History)
Susan Miller, Ph.D. (History)

The Major Program
A study of the Middle East and South Asia as a whole allows students to explore a unique set of issues of both historical and contemporary import. In order to guide students in comparative analysis, faculty members present their inquiries through coursework on antique, medieval, and early modern empires and political systems. Given the dynamism of modern cultural contexts, majors are invited to consider a wide range of variables including the evolution of states along with new understandings of citizenship, the rise and development of nationalist movements, political conflicts informed by religious majorities, the nuclearization of India and Pakistan, the growth of information societies and computer industries, the production of oil and its social and cultural legacies, labor migrations, urbanization, and the emergence of sizeable middle classes, transnational literary movements using sophisticated media technologies, the expansion and intrusion of global security regimes into everyday life, and peace offers that shape struggles for justice across the world. Our program’s focus on both the Middle East and South Asia is a pioneering achievement in the United States rivaled by only four other colleges or universities. By the end of their studies, majors will have acquired an in-depth understanding of the common historical experience shared by many peoples in these regions, and of the legacies of culture, social exchange, power and empowerment across diverse settings. Students are also required to complete at least two years of training in a language appropriate to their area of expertise.

The major in Middle East/South Asia Studies at UC Davis offers a unique opportunity for students to explore issues of the Middle East and South Asia through a variety of courses, including exchange students, complementarities, and correspondences in such fields as history, political economy, culture, literature and film, religion, family structures, gender relations, media, anthropology, law, international relations, development, diasporas, and urbanism. Students who complete our major will be well suited to embark on careers in non-governmental organizations, journalism and media industries, education and research, governmental service and diplomacy, and business.

Programs, Internships, and Career Alternatives. Many internship opportunities are available for the Middle East/South Asia Studies major and minor, consult with your adviser.

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, 16...8

Two years or the equivalent of Arabic, Hebrew, or Hindi/Urdu (other Middle East/South Asia Studies regional languages accepted with petition). Arabic 1, 2, 3, 21, 22; Hebrew 1, 2, 3, 21, 22; Hindi/Urdu 1, 2, 3, 21, 22, 23

Depth Subject Matter........................................40-42

Middle East/South Asia Studies 100 ........ 4

Middle East/South Asia Studies 400 ........ 4

Two courses from: Anthropology 142; Comparative Literature 166; History 113, 190A, 190B, 190C, 193A, 193B; Political Science 135, 136; Religious Studies 160, 162; Women’s Studies 178A, 184 ......... 8

Two courses from: Anthropology 145; History 102Q, 196A, 196B; Religious Studies 170; Women’s Studies 178B, 178C 

Additional Electives from Core Course list [below] ....................... 16-18

Total Units for Major.........................................48-80

Core Course List:

Anthropology 142, 145; Arabic 1, 2, 5, 21, 22, 23; Art History 1E, 155; Asian American Studies 150F, 189; Classics 1; Comparative Literature 53B, 53C, 166; Hebrew 1, 2, 3, 21, 22, 23; Hindi/Urdu 1, 2, 3, 21, 22, 23; History 102Q, 102R, 114, 190A, 190B, 190C, 193A, 193B, 193E, 196A; Middle East/South Asia Studies 92, 98, 99, 180, 192, 198, 199; Music 129B, 148; Political Science 135, 136; Religious Studies 21, 23, 60, 65C, 68, 160, 161, 162, 170; Women’s Studies 178A, 178B, 184.

Note: With prior consultation with an adviser, students can petition in 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. However, students must have completed at least 40 units of upper division course work in satisfaction of the major requirements.

Major adviser. Consult the Middle East/South Asia Studies Program in 155 Kerr Hall 530-754-4926 or the Middle East/South Asia Studies website at http://mesa.ucdavis.edu/
Arab Studies Minor Program Requirements:
The minor in Arab Studies covers an area of utmost historical, cultural, economic, and geopolitical significance. Several key contemporary issues make the region as a whole a focus of interest for scholarly inquiry. The Arab Studies minor is an interdisciplinary minor open to undergraduates in all four colleges.

Arab Studies ............................. 20-24
Middle East/South Asia 100 ................. 4
Middle East/South Asia 180 ................... 4
Additional Electives from Core Course list (below) ............................................... 4-8
Core Course List:
- Middle East/South Asia 111A, 121A/188
- Middle East/South Asia 180
- Anthropology 142, 145
- Middle East/South Asia 190
- Middle East/South Asia 100
- Comparative Literature 538, 145
- History 192A, 192B
- Middle East/South Asia 181B or 182B

With prior consultation with an adviser, students can petition the Program Committee to accept other elective courses toward the minor program if the content is 50% or more on the Arabian World. Under no circumstances may more than one lower division course be offered in satisfaction of requirements for the minor.

With prior consultation with an adviser, students can petition the Program Committee to accept other elective courses toward the minor program if the content is 50% or more on the Arabian World. Under no circumstances may more than one lower division course be offered in satisfaction of requirements for the minor.

Iran & PersianStudies Minor Program Requirements:
The Iran & Persian Studies minor offers students courses on history and culture in the Iran & Persian World during the early modern and modern periods. It is an interdisciplinary minor open to undergraduates in all four colleges.

Iran & Persian Studies .................... 20-24
Middle East/South Asia 100 ................. 4
Middle East/South Asia 180 ................... 4
Additional Electives from Core Course list (below) ............................................... 4-8
Core Course List:
- Middle East/South Asia 131A/Cinema & Technocultural Studies 146A, Middle East/South Asia 131B/Cinema
- Comparative Literature 155, History 190D, 190E

With prior consultation with an adviser, students can petition the Program Committee to accept other elective courses toward the minor program. With prior consultation with an adviser, students can petition the Program Committee to accept other elective courses toward the minor program if the content is 50% or more on the Iranian and Persian World. Under no circumstances may more than one lower division course be offered in satisfaction of requirements for the minor.

With prior consultation with an adviser, students can petition the Program Committee to accept other elective courses toward the minor program. With prior consultation with an adviser, students can petition the Program Committee to accept other elective courses toward the minor program if the content is 50% or more on the Iranian and Persian World. Under no circumstances may more than one lower division course be offered in satisfaction of requirements for the minor.

India & South Asia Studies Minor Program Requirements:
The minor in India & South Asia Studies covers an area of immense historical, cultural, demographic, and geopolitical significance. The minor is designed to emphasize the interconnected and comparative aspect of history, culture, society, economy, religion, gender relations, media, law, political and economic relations, urbanism, migration and diaspora, language and literatures across regional and national boundaries. It is an interdisciplinary minor open to undergraduates in all four colleges.

India & South Asia Studies................. 20-24
Middle East/South Asia 100 ................. 4
Middle East/South Asia 180 ................... 4
Choose one from: History 196A or History 196B ......................................................... 4
Choose one from: Middle East/South Asia 181B or 182B .................................................. 4
Additional Electives from Core Course list (below) ......................................................... 4-8
Core Course List:
- Middle East/South Asia 111B, 181B, 182B
- Anthropology 145
- Middle East/South Asia 190
- Middle East/South Asia 100
- Comparative Literature 538, 145
- History 80, 102Q, 196A
- Middle East/South Asia 180
- Religious Studies 30, 68, 69, 156, 157

With prior consultation with an adviser, students can petition the Program Committee to accept other elective courses toward the minor program if the content is 50% or more on the Indian & South Asian World. Under no circumstances may more than one lower division course be offered in satisfaction of requirements for the minor.

With prior consultation with an adviser, students can petition the Program Committee to accept other elective courses toward the minor program if the content is 50% or more on the Indian & South Asian World. Under no circumstances may more than one lower division course be offered in satisfaction of requirements for the minor.

Upper Division

92. Middle East and South Asia Studies (3-15)
Internship. Prerequisite: consent of instructor. Work experience on and off campus in all subject areas offered as part of the ME/SA Studies program. Internship supervised by a member of the ME/SA faculty. May be repeated for credit up to 15 units. (P/NP grading only) — F, W, S, Su. (F, W, S, Su.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor (P/NP grading only) — F, W, S, S, Su. (F, W, S, Su.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor (P/NP grading only) — F, W, S, S, Su. (F, W, S, Su.)

Courses in Middle East/South Asia Studies (MSA)

Lower Division

92. Internship in Middle East/South Asia Studies (3-15)
Internship. Prerequisite: consent of instructor. Work experience on and off campus in all subject areas offered as part of the ME/SA Studies program. Internship supervised by a member of the ME/SA faculty. May be repeated for credit up to 15 units. (P/NP grading only) — F, W, S, Su. (F, W, S, Su.)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor (P/NP grading only) — F, W, S, S, Su. (F, W, S, Su.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor (P/NP grading only) — F, W, S, S, Su. (F, W, S, Su.)

Upper Division

111A. Great Cities of Arab Middle East and South Asia (4)
Lecture—2 hours; weekly discussion. Prerequisite: Knowledge of Arabic or Persian required. Study of major cities in the Arab Middle East and South Asia as historical and cultural artifacts. Topics include: the Islamic city, processes of modernization, and representations that reinforce imagination, memory and personal identity. Offered irregularly. GE credit: ArtHum or SocSci, Div, Wtr | AH or SS, WC, WE — F, W, S, F, W, S

111B. History of South Asian Islam (4)

121A. Shahnameh: The Persian Book of Kings (4)
Lecture/discussion—3 hours; term paper. In-depth analysis of the Persian Book of Kings (Shahnameh) by Abu al-Qasim Ferdowsi (d. 1020 CE) in its historical context with a comparative perspective on the role of this work in Persian and world literature. (Some course as Comparative Literature 121). Offered in alternate years. GE credit: ArtHum, Div, Wtr | AH, WC, WE — Jocelyn, Sharlet

121C. A Story for a Life: The Arabian Nights (4)
Lecture/discussion—3 hours; term paper. In-depth exploration of The Arabian Nights, the best-known work of pre-modern Arabic literature and a major work of world literature. Analysis of the work in its historical context and in translation. Thematically connected reading supplemented by non-fictional writings when appropriate. May be repeated twice for credit if the texts/theme of required course readings sufficiently change. Offered in alternate years. GE credit: ArtHum | AH, SS, WC, WE — F, S, Su. (F, S, Su.)

122A. Themes in the Arabic Novel (4)
Lecture/discussion—3 hours; independent study; extensive writing. Class size limited to 30 students. Select modern Arabic fiction (novels and short stories) in translation. Thematically connected reading supplemented by non-fictional writings when appropriate. May be repeated two times for credit if the texts/theme of required course readings sufficiently change. Offered in alternate years. GE credit: ArtHum | AH, SS, WC, WE — F, S, Su. (F, S, Su.)
113A. Modern Iranian Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: upper-division standing, or consent of instructor. Iran’s cinema of the 20th century in the context of profound cultural and social changes in Iran especially since the Iranian Revolution. Productions by representative directors such as Kiarostami, Makhmalbaf, Bahram Beyzadi are included. Knowledge of Persian not required. (Same course as Cinema & Technocultural Studies 146A.) Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, OL, VL, WC, WE. —S. (S.)

113C. Religion and Media in Arab World (4)
Lecture—4 hours. Exploration of the role and experience of media technologies in the Arab world. Study of digital and electronic media as well as alternative media practices. Investigation of new trends in political activism and identity formation. (Same course as Religious Studies 166.) Offered in alternate years. GE credit: SocSci | OL, SS, VL, WC, WE. —Miller, Flagg

150. Women and Islamic Discourses (4)
Lecture/discussion—4 hours. Prerequisite: Women’s Studies 50 or comparable course. Introduction to the debates/discourses about women and Islam. Transformations in debates/discourses in colonial and postcolonial periods in Middle East & South Asia. Comparative study of debates/discourses on family, work, law, sexuality, religion, comportment, human rights, feminist and religious movements. (Same course as Women’s Studies 185.) Offered irregularly. GE credit: ArtHum or SocSci | AH or SS, WC, WE.

151A. Iranian Society & Culture (4)
Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: some knowledge of Islamic/Middle Eastern history is very useful, consent of instructor. In-depth investigation of modern Iranian society and culture. Exploration of structures of Iranian society: family, gender, religion, minorities, economy, politics, and state. Iran’s role in the globalizing world, and the role of Iranian diasporas. Offered in alternate years. GE credit: ArtHum | AH, OL, VL, WC, WE. —S. (S.)

180. Topics in Middle East and South Asian Studies (4)
Lecture—3 hours; extensive writing. Comparative perspective on the Middle East and South Asia. Topics may include modernity, religious traditions, colonialism, subalternity and social movements, gender and sexuality, history and memory, science and development, ritual and performance, public culture, diaspora. May be repeated one time for credit. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE. —F, W, S, Su. (F, W, S.)

181A. Topics in Regional ME/SA Studies (4)
Lecture—3 hours; term paper. Iran & Persian topics for students specializing in region-specific Middle East and South Asia Studies. May be repeated three times for credit. GE credit: ArtHum or SocSci | AH or SS, WC, WE. —S. (S.)

181B. Topics in Regional ME/SA Studies (4)
Lecture—3 hours; term paper. Indian/South Asia topics for students specializing in region-specific Middle East and South Asia Studies. May be repeated three times for credit. GE credit: ArtHum or SocSci | AH or SS, WC, WE. —S. (S.)

181C. Topics in Regional ME/SA Studies: Arab Studies (4)
Lecture—3 hours; term paper. Arab Studies topics. May be repeated three times for credit when different topics and themes are studied. GE credit: ArtHum or SocSci, Div, Wrt | AH or SS, WC, WE. —S. (S.)

182A. Undergraduate Proseminar in Middle East/South Asia (4)
Seminar—3 hours; term paper. Prerequisite: course 100 recommended. Class size limited to 15 students. Seminar in India/South Asia topics specializing in region-specific Middle East and South Asia studies. May be repeated three times for credit when different topics and themes are studied. —W. (W.)

182B. Undergraduate Proseminar in Middle East/South Asia (4)
Seminar—3 hours; term paper. Prerequisite: course 100 recommended. Class size limited to 15 students. Seminar in India/South Asia topics specializing in region-specific Middle East and South Asia studies. May be repeated three times for credit. —W. (W.)
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. Courses emphasize adventure activities including offense, defense and patrolling techniques, weapons familiarization, rappelling, rope bridging, obstacle courses, leadership reaction course, and land navigation. All cadets are required to attend leadership laboratories for practical leadership experience and to prepare for attendance at LDAC, held at Fort Lewis, Washington.

**Academic Credit**

College of Agricultural and Environmental Sciences. The Bachelor of Science degree in agriculture requires the completion of 180 units. Military Science courses are counted in the unit allowance for electives.

College of Biological Sciences. The Bachelor of Science degree requires the completion of 180 units. Military Science courses are counted in the 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 unrestricted 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 allowance for electives.

School of Veterinary Medicine. The number of Military Science units acceptable toward the Bachelor 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.

**Aerospace Studies (Air Force)**

The Air Force Reserve Officer’s Training Corps (AFROTC) is an educational program providing training in leadership, management, communications and military proficiency on college and university campuses. It also provides 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. Undergraduate scholarships are available, but are not necessary for participation. Until you accept a scholarship or enter your junior year of the program, you have no obligation to join the Air Force. 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 campuses.

**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 31 at time of graduation (may be waived).

**Scholarships**

Opportunities for four-year and three-year under-graduate scholarships are available. 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 $3000 per month stipend 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. A successful AFROTC 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 enrolled in college or university that offers AFROTC on campus or through cross-registration. The program is available at more than 1,000 universities and colleges nationwide.

If you are already in college, contact your 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 nontechnical majors are slightly higher. Applicants are primarily evaluated on their leadership ability and academic performance.

**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 in one of 32 primary career fields. Opportunities to fly are better than ever. Whether you are piloting the F-22 fighter, supervising 150 aircraft maintainers on the flightline, or caring for sick personnel in the emergency room, you will be rewarded knowing that you are making a difference.

Air Force ROTC is offered through the Aerospace Studies department at the California State University Sacramento and U.C. Berkeley. Scholarships (including tuition, book allowance, and stipend) are available for qualified students. Students may enroll and attend one course per semester at the U.C. Berkeley or CSU Sacramento campus at no cost. Topics covered in AFROTC courses include Basic Military knowledge (1-credit), Military History (1-credit), Leadership Training (3-credits), and U.S. National Security Affairs and Preparation for Active Duty (3-credits). Additional components of the AFROTC program include 2 hours per week of fitness activities, 2 hours per week of leadership lab, and a 4-week Summer Field Training between the Sophomore and Junior years. Upon completion of the program and granting of 4-year degree, students will commission as Second Lieutenants in the United States Air Force.

To be eligible for AFROTC, applicants should be a full-time student and meet additional fitness, GPA, and other requirements. Interested students, please contact the choosing office. For SF Sacramento: http://www.csus.edu/afrotc 916-278-7315; det088@maxwell.mil For U.C. Berkeley: http://airforceotc.berkeley.edu (510) 642-3572; airforce@berkeley.edu

**Naval ROTC**

Department of Naval Science
152 Hearst Gymnasium, UC Berkeley

Berkeley, CA 94270-3640
(510) 642-3571; http://navyrotc.berkeley.edu UC Davis students may participate in the Navy and Marine Corps ROTC program at UC Berkeley. The program is 4 years long and includes courses and weekly professional development laboratories (drill) at UC Berkeley. Students normally compete for national scholarships as high school seniors, although interested students may enroll as freshmen or sophomores and compete for scholarships based on successful participation in the program. A student who satisfactorily completes an ROTC program and is awarded a degree from UC Davis receives an active duty commission as a Second Lieutenant in the U.S. Marine Corps or an Ensign in the U.S. Navy.

Navy option students take the following courses:

Freshman year:

NS 1 Introduction to Naval Science
NS 2 Sea Power and Maritime Affairs

Sophomore year:

NS 11 Leadership and Management
NS 10 Naval Ship Systems I
Junior year:

NS 12A Navigation and Naval Operations I
NS 12B Navigation and Naval Operations II
Senior year:

NS 401 Naval Ship Systems II
NS 412 Leadership and Ethics

In lieu of NS401, NS10, NS12A and NS12B, Marine Corps students participate in Marine Seminars and complete MA154, History of Littoral Warfare and MA20, Evolution of Warfare or a designated equivalent.

**Scholarship**

Students are required to complete a number of other courses at Davis, including one each of calculus, physics, and English, and one quarter each of computer science, and military history or national security policy.

Interested students should contact the Department of Naval Science at UC Berkeley at the address above to obtain information and apply.

**Courses in Military Science (MSC)**

**Lower Division**

11. U.S. Army Leadership and Personal Development (1)

Lecture—1 hour. Prerequisite: lower division standing, United States Army, its organization, customs, courtesies, and rank structure. Course surveys some development skills to prepare leaders for effective leadership such as critical thinking, time management, and health and fitness. Familiarization with the Army ROTC program. —F (J)

12. Introduction to Tactical Military Leadership (1)

Lecture—1 hour. Prerequisite: lower division standing.

Military leadership fundamentals to include setting direction, problem-solving, presenting briefs, and using effective writing skills. Basic military tactics, orienteering and land navigation. Dimensions of leadership values, attributes, skills, and actions. —W (K)

13. Introduction to Basic Military Operations (1)

Lecture—1 hour. Prerequisite: lower division standing.

Basic military tactical theories and their application at the individual and squad level. Military tactical operations and basic military first aid. —S (J)

14A. Introduction to Military Leadership Skills (0.5)

Laboratory—2 hours. Prerequisite: lower division standing and consent of instructor. Personal and organizational leadership skills introduced in leader laboratory. Extensive supervised leadership experiences conducted in a military environment. Basic military skills necessary to function in a leadership role. (P/NP grading only.) —F (J)
14B. Introduction to Military Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: lower division standing; consent of instructor. Development of leadership and military skills required for promotion to junior noncommissioned officer level. Consent of instructor. Development of leadership skills in extensive supervised leadership labs. Performance of basic military skills, improve on troop leading procedures and lead subordinates in tactical situations. Begin with drill and ceremony, land navigation and individual movement techniques. (P/NP grading only)—W. (W.)

22A. Innovative Team Leadership (2)
Laboratory—2 hours. Prerequisite: lower division standing or consent of instructor. Leadership values, attributes and theories. Use of basic military skills such as land navigation and squad operations to enhance understanding of the Army. Types of military briefings. Practice in interpersonal skills. Presentation of briefing. —F. (S.)

22B. Innovative Tactical Leadership (2)
Laboratory—2 hours. Prerequisite: course 22A or consent of instructor. Leadership of tactical teams in complex operating environment. Self-assessment of leadership style. Basic military skills: terrain analysis, patrolling and operations orders. Dynamics of adaptive leadership in the context of military operations. —W. (W.)

24A. Individual Military Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: courses 14A, B and C, enrolled in course 22A or consent of instructor. Develop and practice personal military leadership skills in extensive supervised leadership labs. Cadets perform basic military skills, improve on troop leading procedures and lead subordinates in tactical situations. Begin with drill and ceremony, land navigation and individual movement techniques. (P/NP grading only)—F. (F.)

24B. Individual Military Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: courses 14A, B and C, enrolled in course 22B or consent of instructor. Development and practice of personal military leadership skills in extensive supervised leadership labs. Performance of basic military skills, improvement on troop-leading procedures, leadership of subordinates in tactical situations. (P/NP grading only)—W. (W.)

24C. Individual Military Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: courses 14A, B and C, enrolled in course 21 or consent of instructor. Develop and practice personal military leadership skills in extensive supervised leadership labs. Begin with drill and ceremony, land navigation and individual movement techniques. Cadets perform basic military skills, improve on troop leading procedures and lead subordinates in tactical situations. (P/NP grading only)—S. (S.)

Upper Division
131. Military Leadership and Management (2)
Laboratory—2 hours. Prerequisite: upper division standing and consent of instructor. Leadership and management in organizational context. Team dynamics, leadership styles, professional ethics, development of a leadership framework. Management skills for planning, decision making, and organizing developed through definition of problems, development of courses of action, implementation of solutions. —F. (F.)

132A. Advanced Military Operations (2)
Laboratory—2 hours. Prerequisite: upper division standing, course 131 or consent of instructor. Military small unit tactical operations as the basis for leadership development. Principles of war, contemporary operating environment, Geneva Law of Land Warfare, military offensive and defensive operations. Emphasis on development of critical thinking, problem solving, and communication skills. —W. (W.)

132B. Applied Leadership (2)
Laboratory—2 hours. Prerequisite: upper division standing, course 132A or consent of instructor. Military small unit tactical operations serve as the basis for leadership development. Application of leadership styles and skills to complete problem-solving exercises and the development of an adaptable framework applicable to a variety of shifting environments and situations. —S. (S.)

134A. Adaptive Tactical Leadership (0.5)
Laboratory—2 hours. Prerequisite: upper division standing, course 131 or consent of instructor. Small unit tactical operations serve as the basis for enhancement of leadership performance through tactical application. Assessment of leadership attributes, skills, and actions through participation in a variety of leadership roles in problem-solving exercises. (P/NP grading only)—F. (F.)

134B. Adaptive Tactical Leadership (0.5)
Laboratory—2 hours. Prerequisite: upper division standing, course 132A or consent of instructor. Small unit tactical operations serve as the basis for enhancement of leadership performance through tactical application. Assessment of leadership attributes, skills, and actions through participation in a variety of leadership roles in problem-solving exercises. (P/NP grading only)—W. (W.)

134C. Adaptive Tactical Leadership (0.5)
Laboratory—2 hours. Prerequisite: upper division standing, course 132B or consent of instructor. Small unit tactical operations serve as the basis for students exploration, development. Serve in variety of leadership roles in which leadership attributes, skills, actions are closely assessed and developed while they are faced with series of problem solving exercises. (P/NP grading only)—S. (S.)

141. Ethical Leadership (2)
Laboratory—2 hours. Prerequisite: upper division standing; consent of instructor. Direct influence of leaders on individual motivations and group processes. The complexities of balancing moral, legal, and ethical obligations while applying fundamental business principles in determining the best possible outcome from competing interests. —F. (F.)

142. Military Law (2)
Laboratory—2 hours. Prerequisite: division standing and course 141, or consent of instructor. The United States Constitution and the Military Justice System. Basic law of war, with an emphasis on issues that might arise on the battlefield or during a national emergency. —W. (W.)

143. U.S. Army Management Systems (2)
Laboratory—2 hours. Prerequisite: upper division standing and course 142 or consent of instructor. Leadership and management, focusing on four management systems: planning, organizing, leading and controlling. Practical methodologies for assessing management decisions while balancing competing ethical, economic, technical and future growth trade-offs. —S. (S.)

144A. Military Training Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: upper division standing, course 141 or consent of instructor. Enhancement of student leadership performance through practical application. Small unit military tactical operations serve as the basis for student exploration and development. (P/NP grading only)—W. (W.)

144B. Military Training Leadership Skills (0.5)
Laboratory—2 hours. Prerequisite: upper division standing, course 142 or consent of instructor. Enhancement of student leadership performance through practical application. Small unit military tactical operations serve as the basis for student exploration and development. (P/NP grading only)—S. (S.)

191. 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. Possible areas of study include leadership dimensions, principles of war, air/land battle imperatives, military strategy, the operational art and professional ethics. May be repeated two times for credit when topic differs. (P/NP grading only.) Offered irregularly.
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 are open to biochemists in biomedical, biotechnological, pharmaceutical, agricultural research and chemical industries. Also, university-affiliated research laboratories, hospital laboratories, and government-sponsored research facilities provide employment options. The major provides excellent preparation for advanced study in graduate or professional schools.

**B.S. Major Requirements:**

### Preparatory Subject Matter: 50-57

- **Biological Sciences 2A-2B-2C**
- **Mathematics 128A-128B, 128C, or 128A-128B-128C**
- **Chemistry 107A-107B or 110A-110B-110C**
- Additional units in biology or chemistry relevant to the student's interest chosen in consultation with the adviser. Students are encouraged to obtain additional laboratory experience; however, no more than 3 units of 192, 193 or 199 research may be counted toward restricted elective units.

### Total Units for the Major: 100-115

- **Master Adviser,** C.S. Gasser
- **Advising,** Biology Academic Success Center (BASC), 1023 Sciences Laboratory Building, 530-752-0410, http://basc.ucdavis.edu/

**The Biochemistry and Molecular Biology Major Program**

The Biochemistry and Molecular Biology major provides a broad background in the biological, mathematical, and physical sciences basic to the study of heredity, gene expression and evolution. 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 such as biotechnology, medicine, and agriculture.

**The Program.** The genetics and genomics major provides a broad background in the biological, mathematical, and physical sciences basic to the study of heredity, gene expression and evolution. 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 such as biotechnology, medicine, and agriculture.

**The Program.** The genetics and genomics major provides a broad background in the biological, mathematical, and physical sciences basic to the study of heredity, gene expression and evolution. 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 such as biotechnology, medicine, and agriculture.

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**The Program.** The genetics and genomics major provides a broad background in the biological, mathematical, and physical sciences basic to the study of heredity, gene expression and evolution. 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 such as biotechnology, medicine, and agriculture.
Molecular and Cellular Biology (MCB)

Lower Division

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: SciEn|QL, SE, SL—W, S. (F, W, S.) Engebretich, Ranaida

99. Special Study (1–5)
Independent study 1–5 hours. Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE—F, W, S. (F, W, S.)

Upper Division

110Y. iBioseminars in Cell and Molecular Biology (3)
Web Virtual Lecture—1.5 hours; web electronic discussion—1.5 hours; lecture discussion—1 hour. Prerequisite: Biological Sciences 101, 102 and 103 or 105 and 104. Hybrid course in Cell and Molecular Biology for senior level (1) Biochemistry/Molecular Biology; (2) Genetics; or (3) Cell Biology majors. Face-to-face instruction combined with online lectures available at iBioseminars website delivered by leading researchers in Cell and Molecular Biology. Students must have previously taken MCB 110Y cannot receive credit for MCB 110Y. GE credit: SciEn|Ql, SE, SL—W, S. (F, W, S.) Scholery

120L. Molecular Biology and Biochemistry Laboratory (6)
Laboratory—4 hours; lecture—2 hours; laboratory/discussion—1 hour. Prerequisite: Biological Sciences 102 or consent of instructor. Restricted enrollment. Introduction to laboratory methods and procedures employed in studying molecular biology and biochemical processes. Designed for students who need experience in the use of molecular biology and biochemical techniques as research and analytical tools. GE credit: SciEn|Ql, SE, SL—W, S. (F, W, S.) Dixit-Kumar, Hilt, Lagarias, Liu, Mostov, Wilson

121. Advanced Molecular Biology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101 and one course from among Biological Sciences 102, 105, or Animal Biology 102 (Biological Sciences 102 or Animal Biology 102 may be taken concurrently although prior completion is recommended); Structure, expression, and regulation of eukaryotic genes. Chromosome structure and replication; gene expression; protein and RNA processing; protein synthesis and translation control; development, immune system, and oncogenes. Not open for credit to students who have completed course 162. GE credit: SciEn|Ql, SE, SL—F, W, S. (F, W, S.) Burgess, Gasser, Harmer, Natzle, Powers

123. Behavior and Analysis of Enzyme and Receptor Systems (3)
Lecture—3 hours. Prerequisite: Biological Sciences 103. Introduction to the structure and mechanism of enzyme and receptor-agonist interactions with emphasis on metabolic regulation and data analysis. Topics include simulation at equilibrium, chemical and steady-state kinetics, allosteric enzymes, multireceptor systems, enzyme assays, membrane transport and computer-assisted simulations and analyses. GE credit: SciEn|Ql, SE, SL—F, W, S. (F, W, S.) Fraser, Wilson

124. Macromolecular Structure and Function (4)
Lecture—4 hours. Prerequisite: Biological Sciences 103. Introduction to the physical structure of nucleic acids and proteins, and to the physical forces that shape these molecules. GE credit: SciEn|Ql, SE—F, W, S. (F, W, S.) Baldwin

126. Plant Biochemistry (3)
Lecture—3 hours. Prerequisite: Biological Sciences 103 or 105. The biochemistry of important plant processes and metabolic pathways. Discussion of methods used to understand plant processes, including use of transgenic plants. (Same course as Plant Biology 126.) GE credit: SciEn|Ql, SE—F, W, S. (F, W, S.) Callis, Tien

138. Undergraduate Seminar in Biochemistry (1)
Seminar—1 hour. Prerequisite: Biological Sciences 103. Discussion of the historical developments of modern biochemistry and major research problems. May be repeated for credit when topic differs. (P/NP grading only.) GE credit: OL, SE—F, W, S. (F, W, S.) Callis, Carrasco, Gasser, Nunnari

139. Undergraduate Seminar in Biochemistry (2)
Seminar—2 hours. Prerequisite: Biological Sciences 103. Discussion of the historical developments of modern biochemistry and major research problems. May be repeated for credit when topic differs. (P/NP grading only.) GE credit: SciEn|Ql, SE, SL—F, W, S. (F, W, S.) Callis, Gasser, Nunnari

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 principles of cell biology. Emphasis on light microscopy. GE credit: SciEn|Ql, Ql, Ql, SE, SL—W, S. (F, W) Kaplan, Morand, Nunnari

142. Advanced Cell Biology: Contractile and Motile Systems (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: Biological Sciences 102, 104 (may be taken concurrently); Mathematics 16B. Advanced cell biology with emphasis on molecular, biophysical and cellular properties of contractile and motile systems. Offered irregularly. GE credit: SciEn|Ql, SE—F, W, S. (F, W, S.)

143. Cell and Molecular Biophysics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101, 102, 103. Physical chemical principles by which molecules function in regulating and controlling cells. Physical nature of cytoplasm; molecular structure/banding in macromolecules, macromolecular assemblies and proteins. Physical techniques and modeling of cytokinetic polymer-motor dynamics and function during intracellular transport, mitosis and motility. GE credit: SciEn|Ql, SE—F, W, S. (F, W, S.) Al-Bassam

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. GE credit: SciEn|Ql, SE—F, W, S. (F, W, S.) McNally

145. Assembly and Function of Cell Signaling Machinery (3)
Lecture—5 hours. Prerequisite: Biological Sciences 101, 102, 104. Molecular basis of cell signaling, including positioning of cellular machinery, components of various signaling pathways, and downstream effects of signaling on cell adhesion, cell differentiation, and programmed cell death. GE credit: SciEn|Ql—S, (F, W, S.) Albeck, Erickson

148. Undergraduate Seminar in Cell Biology (2)
Seminar—2 hours. Prerequisite: upper division standing in the biological sciences or a related discipline. Student reports on current topics in cell biology with emphasis on integration of concepts, synthesis, and state-of-the-art research approaches. Reviews of literature and results of undergraduate research may be included. May be repeated for credit (P/NP grading only). Offered irregularly. GE credit: OL, SL—W, S. (F, W, S.)

150. Developmental Biology (4)
Lecture—4 hours. Prerequisite: Biological Sciences 101. Analysis of the mechanistic basis for animal development with a focus on experimental evidence and the relevant fundamental experimental strategies. Fertilization and early development, morphogenesis and patterning, cell differentiation, regulation of cell proliferation and tissue growth. GE credit: SciEn|Ql, SE, SL—W, S. (F, W, S.) Draper, Natzle

158. Undergraduate Seminar in Developmental Biology (2)
Seminar—2 hours. Prerequisite: upper division standing in the biological sciences or a related discipline. Student reports on current topics in cell biology with emphasis on integration of concepts, synthesis, and state-of-the-art research approaches. Reviews of literature and results of undergraduate research may be included. May be repeated for credit (P/NP grading only). GE credit: OL, SE—F, W, S. (F, W, S.)

160L. Principles of Genetics Laboratory (5)
Laboratory—6 hours; lecture—2 hours; discussion/lab—1 hour. Prerequisite: Biological Sciences 101. Laboratory work in basic and molecular genetics including gene mapping, isolation and characterization of mutants in eukaryotic model systems, reverse genetics, gel electrophoresis, recombinant DNA techniques, and PCR. Not open for credit to students who have completed Genetics 100L. GE credit: SciEn|Ql, SE, SL—W, S. (F, W, S.) Ellefson-Crowder, Engebretich, Harmer, Natzle, Rose, Strobel

162. Human Genetics and Genomics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101. The human genome and genetic variation in human populations, molecular and genomic approaches to the practice of human genetics, epi-genetic gene regulation, personal genetics and genomic medicine. GE credit: SciEn|Ql, SL—F, (F.) Chedin
163. Developmental Genetics (3)
Lecture—3 hours. Prerequisite: course 121. Current aspects of developmental genetics. Historical background and current genetics theories. Introduction to the study of development of higher animals. GE credit: SciEng SE. — W. (W.) Natzel, Rose

164. Advanced Eukaryotic Genetics (3)
Lecture—3 hours. Prerequisite: course 121. Five basic techniques of genetic analysis: mutation, segregation, recombination, complementation, and regulation. Emphasis on the theory and practice of analyzing and synthesizing data. Undergraduate methodology may be demonstrated by genetics, Arabidopsis, and epigenetic inheritance. GE credit: SciEng SE, SL. — S. (S.) Burgess, Engrebecht

178. Undergraduate Seminar in Molecular Genetics (1)
Seminar—1 hour. Prerequisite: upper division standing, completion of Biological Sciences 101, and completion or concurrent enrollment in course 121. Discussion of current topics in molecular genetics to show advanced applications of basic principles and to highlight professional career opportunities. May be repeated one time for credit when topic differs. (P/NP grading only.) GE credit: SciEng OL, SE. — F, W, S. (F, W, S.) Chinni, Natzel, Rodriguez

182. Principles of Genomics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101. Fundamentals of genomics, including structural genomics, functional genomics, proteomics, and bioinformatics, focusing on the impact of these disciplines on research in the biological sciences. Social impacts of genomic research. GE credit: SciEng SE. — W. (W.) Burtis, Kofl

190C. Undergraduate Research Conference (1)
Discussion—1 hour. Prerequisite: upper division standing and consent of instructor; concurrent enrollment in course 193 or 199. Presentation and discussion of current research by faculty and students. May be repeated for credit. (P/NP grading only.) GE credit: SE. — F, W, S. (F, W, S.)

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 undergraduates can participate in research projects of faculty members. May be repeated for credit. (P/NP grading only.) GE credit: SE. — F, W, S. (F, W, S.)

192. Internship (1-12)
Internship—3-6 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 Section of Molecular and Cellular Biology faculty. (P/NP grading only.) GE credit: SE. — F, W, S. (F, W, S.)

193. Advanced Research (3)
Laboratory—6 hours; discussion—1 hour. Prerequisite: 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 sponsor. Discussion and analysis of results and proposed experiments on a weekly basis with faculty sponsor. May include participation of a seminar to a research group. May be repeated for credit. (P/NP grading only.) GE credit: SE. — F, W, S. (F, W, S.)

194. Thesis Research (3)
Independent study—3-15 hours. Prerequisite: 6 units of course 193 and/or 199 with faculty director; senior standing. Honors project. Continuation of an intensive, individual laboratory research project in biochemistry, genetics, or cell biology culminating with the preparation of the work in a written thesis and in a seminar. (P/NP grading only.) GE credit: OL, SE, WE. — F, W, S. (F, W, S.)

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 receiving 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.) Offered irregularly. GE credit: SE. — F, W, S. (F, W, S.)

198. Directed Group Study (1-5)
Variable—1-5 hours. Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE. — F, W, S. (F, W, S.)

199. Special Study for Advanced Undergraduates (1-5)
Independent study—3-15 hours. Prerequisite: consent of instructor. (P/NP grading only.) GE credit: SE. — F, W, S. (F, W, S.)

Graduate

248. Seminar in Cell Biology (2)
Seminar—2 hours. Prerequisite: consent of instructor. Discussion of current literature on the physical and chemical aspects of organization and function of living systems, topics of current interest in ultrastructure and function of cells. Organizational and functional properties of the molecular and cellular levels of biological systems. May be repeated for credit.

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 of 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. (F.)

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. — W. (W.)

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.) — F, S. (F, W, S.) Draper

263. Biotechnology Fundamentals and Application (2)
Lecture—2 hours. Prerequisite: Biological Sciences 101, 102 and Microbiology 102 or consent of instructor. Must be a graduate student in good standing. Fundamentals of molecular biology and chemical engineering involved in recombinant DNA technology. Topics: principles of rate processes of biotechnological systems, optimization of bio reactors, and issues related to overexpression and production of recombinant molecules. Participation in student-directed team projects. — W. (W.) McDonald, Privalsky, Rodriguez, Gheynst

282. Biotechnology Internship (7-12)
Internship—21-36 hours. Prerequisite: graduate standing and consent of instructor. Open only to students participating in the Designated Emphasis in Biotechnology Research. Research in a biotechnology company or interdisciplinary cross-college lab for a minimum of 3 months as part of the Designated Emphasis in Biotechnology Program. (S/U grading only.) — F, W, S. (F, W, S.)

290C. Research Conference (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Presentations 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.) — F, W, S. (F, W, S.)

291. Current Progress in Molecular and Cellular Biology (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.) — F, W, S. (F, W, S.)

294. Current Progress in Biotechnology (1)
Seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Seminars presented by guest lecturers on topics of their own research activities. May be repeated for credit. (Same course as Chemical Engineering 294.) (S/U grading only.) — F, W, S. (F, W, S.) Kessel, McDonald, Rodriguez

295. Literature in Molecular and Cellular Biology (1)
Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Critical reading and evaluation of current literature in molecular and cellular biology disciplines. Papers will be presented and discussed in detail. May be repeated for credit. (S/U grading only.) — F, W, S. (F, W, S.) Baldwin, Fisher, Privalsky, Wilson

298. Group Study (1-5)
Variable—1-5 hours. Prerequisite: consent of instructor. (S/U grading only.) — F, W, S. (F, W, S.)

299. Research (1-12)
Independent study—3-36 hours. (S/U grading only.) — F, W, S. (F, W, S.)

Professional

390. 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.) — F, W, S. (F, W, S.)

Molecular, Cellular, and Integrative Physiology (A Graduate Group)

Catherine VandeVoort, Ph.D., Chairperson of the Group
Group Office. 227 Life Sciences Building 530-752-9092; http://mcp.ucsd.edu

Faculty
Paul Allen, Ph.D., Professor (Molecular Biociences)
Keith Baar, Ph.D., Associate Professor (Neurobiology, Physiology, and Behavior)
Linda Barter, Ph.D., Associate Professor (WM: Surgical and Radiological Sciences)
Donald M. Bers, Ph.D., Professor (Medical Pharmacology)
Sue Bodine, Ph.D., Professor (Neurobiology, Physiology, and Behavior)
Laura Borodinsky, Ph.D., Assistant Professor (Physiology & Membrane Biology)
Julie Boyl, Ph.D., Associate Professor (Medical Pharmacology)
Robert Brasnan, Ph.D., Professor (WM: Surgical & Radiological Sciences)
C. Titus Brown, Ph.D., Associate Professor (Genome Center)
Molecular, Cellular, and Integrative Physiology (A Graduate Group)

Rebecca Calisi Rodriguez, Ph.D., Assistant Professor
(Neurobiology, Physiology, and Behavior)
Christopher C. Collvert, Ph.D., Professor
(Animal Science)
Earl E. Carstens, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)
Luis Corral-Calvo, Ph.D., Assistant Professor
(Biochemistry and Molecular Medicine)
Gretchen Casazza, Ph.D., Research Director
(JCDC Sports Medicine)
Chao-Yin Chen, Ph.D., Professor
(Internal Medicine, Human Physiology)
FitzRoy E. Curry, Ph.D., Professor
(Physiology and Membrane Biology)
Wesburn Deng, Ph.D., Professor
(Biochemistry and Molecular Medicine)
Michael J. Ferris, Ph.D., Professor
(Anesthesiology and Pain Medicine)
Alla E. Faminova, Ph.D., Assistant Professor
(Physiology and Membrane Biology)
Charles A. Fuller, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)
J. David Furlow, Ph.D., Professor
(Physiology, Neurobiology, and Behavior)
Melanie Gareau, Ph.D., Assistant Adj. Professor
(VM: Anatomy, Physiology and Cell Biology)
Diane Gentry, Ph.D., Assistant Professor
(Physiology and Membrane Biology)
Aldrin Gomes, Ph.D., Associate Professor
(Physiology, Neurobiology, and Behavior)
Eleonora Grandi, Ph.D., Assistant Professor
(Medical Pharmacology)
Leigh Griffiths, Ph.D., Assistant Professor
(VM: Medicine and Epidemiology)
Fawaz H. Hat, Ph.D., Professor
(Nutrition)
Peter J. Havel, D.V.M., Ph.D., Professor
(Molecular Biosciences)
Barbara A. Horwitz, Ph.D., Professor
(Physiology, Neurobiology, and Behavior)
Mark Huing, Ph.D., Assistant Professor
(Physiology, Neurobiology, and Behavior)
Andrew T. Ishida, Ph.D., Professor
(Physiology, Neurobiology, and Behavior)
Lee-Way Jin, Ph.D., Associate Professor
(MIND Institute)
James H. Jones, D.V.M., Ph.D., Professor
(Surgical and Radiological Sciences)
Paul Knoepfler, Ph.D., Associate Professor
(Genome Center)
Anne A. Knowlton, M.D., Professor
(Internal Medicine)
Dietmar Kueltz, Ph.D., Professor
(Internal Medicine)
Gino Cortopassi, Ph.D., Professor
(Physiology and Membrane Biology)
Karen Ryan, Ph.D., Assistant Professor
(Physiology, Neurobiology, and Behavior)
John M. Horowitz, Ph.D., Professor Emeritus
(Endocrinology and Reproductive Physiology)
Karen Zito, Ph.D., Associate Professor
(Neurobiology, Physiology, and Behavior)
Emeriti Faculty
John M. Horowitz, Ph.D., Professor Emeritus
Graduate Study. The Graduate Group in Molecular, Cellular, and Integrative Physiology offers programs of study and research leading to the M.S. and Ph.D. degrees and participates in joint Ph.D./D.V.M. programs. The programs emphasize broad training in the fundamental principles of cellular, molecular, and integrative physiology.

Graduate Adviser. Chao-Yin Chen

Master Advisers. Gretchen Casazza, Nipavan Chiamvimonvat, Eleonora Grandi

Courses in Molecular, Cellular, and Integrative Physiology (MCP)

Formerly courses in Physiology and the actions of drugs and toxicants on cells, including normal and disease states; the role of pharmacology in the development of new drugs; and the relationship between cellular physiology and pharmacology.

Graduate

200L. Animal Cell Culture Laboratory (4)

Discussion—2 hours; laboratory—6 hours. Prerequisite: coursework in undergraduate physiology, biochemistry, cell biology, or general physiology, or consent of instructor. Techniques of cell culture, with emphasis on cell culture and physiology of the actions and drugs to toxicants on cultured somatic cells. Design, performance, and interpretation of experiments with animal cells in vitro. —W (S.) Ross, Pablo

210A. Advanced Physiology (3)

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 Human Physiology 210A.) — F (F.) Zheng

210B. Advanced Physiology (6)

Lecture—5 hours; discussion—1 hour. Prerequisite: Physiology 210A, Physiology Ph.D. program, or consent of instructor. Advanced course in general principles of physiology, surveying homeostasis, cellular and selected topics, and neurophysiology. — W. (W.) Ross, Pablo

210C. Advanced Physiology (5)

Lecture—5 hours. Prerequisite: doctoral student in the Molecular, Integrative and Comparative Physiology Graduate Group, or consent of instructor. Graduation level instruction in the general principles of physiology and the neural and hormonal control of the cardiovascular, renal, respiratory, gastrointestinal, sensory, muscular-skeletal, and reproductive systems. — S. (S.) Navedo, Xiang

210L. Physiology Laboratory Rotations (5)

Laboratory—15 hours. Restricted to Molecular, Cellular and Integrative Physiology (MCP) graduate students. One mandatory rotation and up-to two voluntary rotations. Students learn techniques and perform experiments related to particular research problems. At the end of the rotations students give a short talk and hand in a research paper. May be repeated two times for credit. (S/U grading only.) — F, W. (F, W) Sack, Yao-Varon, Yih

215. Electrophysiology Techniques and Applications (3)

Lecture—1.5 hours; discussion—1.5 hours. Broad scope of topics in electrophysiology techniques and applications. (Same course as Pharmacology and Toxicology 215) (S/U grading only.) — S. (S.) Chen

216. Neurophysiology Laboratory (3)

Lecture—1 hour; discussion—2 hours. Lectures covering experimental and theoretical methods in studying cell membrane ion channels and the resultant characterization of the physiological functions and structure/function relationships of some of the most important channel types. Discussion of classical and current original papers. — F, W.

219. Muscle Growth and Development (3)

Lecture—2 hours; seminar—1 hour. Prerequisite: Biological Sciences 103, Biological Sciences 104 or Molecular and Cellular Biology 150, or consent of instructor. Integration of growth and development of skeletal muscle; morphology, biochemistry, neural control mechanisms, circulatory and nutritional factors. Prenatal and neonatal differentiation of fiber types. Experimental and hereditary myopathies. Offered in alternate years. — S. Bodine, Carlsen

220. General and Comparative Physiology of Reproduction (3)

Lecture—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 110, 110; Biological Sciences 101, 103. Basic phenomena of sexual and asexual reproduction and comparisons of processes in a wide variety of animals; gamete formation, structure, and metabolism; fertilization; neuroendocrine mechanisms in maturation and reproductive cycles; behavioral aspects. — S. (S.) Adams, Berger, Conley

222. Mammalian Gametogenesis and Fertilization (3)

Lecture/discussion—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 121 or the equivalent. Course will emphasize our current understanding of events in mammalian gametogenesis and the fertilization process. Publication of conclusions drawn from these results, and their contribution to our understanding will be discussed. — S. (S.) Berger

230. Advanced Endocrinology (2)

Lecture—2 hours. Prerequisite: Neurobiology, Physiology, and Behavior 130 or the equivalent, and graduate standing. Focus on timely topics of endocrine research. Critical review of current literature and discussion of future research strategies in the area. May be repeated for credit when topic differs. — F, W.

231. Neuroendocrinology (3)

Lecture—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 110 or the equivalent course in systemic physiology; Neurobiology, Physiology, and Behavior 130 or the equivalent course in endocrinol-
ogy. Neural-endoctrine interactions; neural regulation of the endocrine system, especially in relation to reproduction; and the role of hormones and growth factors in sexual differentiation of the brain.

234. Current Topics in Neurotoxicology (3) Lecture—3 hours. Prerequisite: core courses in one of the following graduate programs: Pharmacology and Toxicology, Agricultural and Environmental Chemistry, Biochemistry and Molecular Biology, Cell and Developmental Biology, Immunology, Molecular Cellular and Integrative Physiology or Neuroscience. Restricted to upper level undergraduate students must obtain permission from the course coordinator. General principles of neurotoxicology, the cell and molecular mechanisms and health impacts of specific neurotoxics and the contribution of neurotoxic compounds to complex neurodevelopmental disorders and neurodegenerative diseases. (Same course as Environmental Toxicology 234 and Molecular Biosciences 234.) Offered in alternate years. —W. Lein

242. Biological Rhythms (3) Lecture—2 hours; lecture/discussion—1 hour. Prerequisite: Neurobiology, Physiology, and Behavior 110 or the equivalent. General aspects and basic mechanisms of biological rhythms; the importance of rhythm desynchronization in areas of pharmacology and space medicine; telemetry; mathematical methods, chronometry; daily, reproductive, and annual periods; shift-work, jet lag and sleep disorders. Offered in alternate years. —(F.) Fuller

255. Physiology of the Stress Response (2) Lecture/discussion—2 hours. Prerequisite: graduate student standing in 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 Animal Biology 255.) —S. (K) Kuehl

261A. Topics in Vision: Eyes and Retinal Mechanisms (2) Lecture/discussion—2 hours. Prerequisite: graduate standing, Neurobiology, Physiology, and Behavior 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 Neuroscience 261A and Neurobiology, Physiology, and Behavior 261A.) (S/U grading only.)—F. (F) Ishida

261B. Topics in Vision: Systems, Psychophysics, Computational Models (2) Lecture/discussion—2 hours. Prerequisite: consent of instructor; course 261A recommended. Functions of the visual pathways and their underlying mechanisms. Recent research on aspects of anatomy, biochemistry, electrophysiology, psychophysics, development, and genetics of the visual system. (Same course as Neuroscience 261B and Neurobiology, Physiology, and Behavior 261B.) (S/U grading only.) Offered in alternate years. —W. Britten

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 related to disease. (Same course as Neuroscience 261C and Neurobiology, Physiology, and Behavior 261C.) (S/U grading only) Offered irregularly. —S. Werner

275. Neurohumoral Regulatory Mechanisms of Thermogenesis (3) Lecture—2 hours; discussion—1 hour. Prerequisite: Biological Sciences 104 or the equivalent; Biological Sciences 105 or the equivalent; consent of instructor. Designed for graduate and advanced undergraduate students, this course will examine thermogenic processes in homeotherms (primarily mammals) with respect to regulation (hormonal and central nervous control) and effector mechanisms (basis of heat production at the target cell).

290. Seminar (1) Seminar—1 hour. Discussion and critical evaluation of advanced topics and current trends in research. (S/U grading only.)—F., W., S. (F., W., S.)

290C. Research Conference in Physiology (1) Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Presentation and discussion of faculty and graduate student research in physiology. May be repeated for credit. (S/U grading only.)—F., W., S. (F., W., S.)

291B. Seminar in Cellular Mechanisms of Adaptation (1) Discussion—0.5 hour; seminar—0.5 hour. Prerequisite: Neuroscience, 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 topics differ. (S/U grading only.)

291D. Research Approaches in Physiology (1) 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.)—F. (F.) Chen, Grandi

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

300A. Pedagogical Aspects of Physiology in Higher Education (3)
Lecture; discussion; laboratory. Prerequisite: meet qualifications for teaching assistant in physiology. Participation as a teaching assistant for one quarter in a designated physiology course. Instruction in methods of leading discussion groups, leading laboratory sections, 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.)—F., W., S. (F., W., S.)

300B. Pedagogical Aspects of Physiology in Higher Education (3)
Lecture; discussion; laboratory. Prerequisite: meet qualifications for teaching assistant in physiology. Participation as a teaching assistant for one quarter in a designated physiology course. Instruction in methods of leading discussion groups, leading laboratory sections, 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.)—F., W., S. (F., W., S.)

309. 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.)—F., W., S. (F., W., S.)
| Track | Music History, Theory, and Ethnomusicology | 43 |
| Track 1: Composition | Music 123, 124A, 124B | 9 |
| Track 1: Composition | Music 121 or 122 | 4 |
| Track 1: Composition | Music 131 (three quarters) | 6 |
| Track 1: Composition | At least 6 units selected from: Music 140-151 | 6 |
| Track 1: Communication | Music 101A, 101B | 8 |
| Track 2: Music History, Theory, and Ethnomusicology | Music 103 | 3 |
| Track 2: Music History, Theory, and Ethnomusicology | Music 131 (three quarters) | 6 |
| Track 2: Music History, Theory, and Ethnomusicology | Music 195 | 2 |
| Track 3: Music Performance | At least 6 units selected from: Music 140-151 | 6 |
| Track 3: Music Performance | Total Units for the Major | 64-85 |

### Note
- A maximum of 19 units in performance courses (Music 110A, 110B, 110C) apply toward the degree; see Unit Credit Guidelines, College of Letters and Science degree requirement sections. Faculty of the College of Letters and Science bylaws make it possible to award more than 19 units of performance classes without those additional units counting toward the 225-unit cap on units.
- Composition Honors Tracks: 46-50
- Music 101A, 101B | 8 |
- Music 123, 124A, 124B | 9 |
- Music 103 | 3 |
- Music 121 or 122 | 4 |
- Music 131 (one year) | 6 |
- At least six units selected from: Music 140-151 | 6 |
- Two quarters of Music 194H for a total of at least six units resulting in a Senior thesis | 6 |

### Music History, Theory and Ethnomusicology Honors Tracks
- Music 123, 124A, 124B | 9 |
- Music 121 and/or 122 | 8 |
- Music 131 (three quarters) | 6 |
- At least six units selected from: Music 140-151 | 6 |
- Two quarters of Music 194H for a total of at least six units resulting in a Senior thesis | 6 |

A student becomes eligible for graduation with honors by meeting the minimum GPA and course requirements established by the College of Letters and Science. To qualify for high or highest honors, students must also complete the Music Department honors program with a GPA of 3.50 or above and write a thesis or submit a portfolio that meets the criteria for high or highest 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, examples of previous writing, and the recommendation of a faculty member who is willing to sponsor the student's project. Students who anticipate seeking admission to the honors program are urged to complete at least one offering of Music 121 or 122 before the latter part of their junior year. Interested students are urged to consult with faculty in their field early in their junior year.

### Major Advisers
- C. Reynolds (A-F)
- A. Triest (G-J)
- L. San Martin (K-Z)

### Minor Program Requirements

<table>
<thead>
<tr>
<th>Minor Program Requirements</th>
<th>UNITS</th>
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</thead>
<tbody>
<tr>
<td>Music</td>
<td>22</td>
</tr>
<tr>
<td>A minimum of 16 units of upper division music courses</td>
<td>16</td>
</tr>
</tbody>
</table>

A minimum of six units in upper division music performance courses | 6 |
Courses chosen from: Music 140-151 | 6 |

### Foreign Language
- Students contemplating graduate study in music are advised to consider pursuing foreign language study in the elementary level.

### Diagnostic Exams
- 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 16A-16B-16C and 17A-17B-17C 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
- Beginners are required to take Music 2A-2B-2C (Keyboard Competence) unless they can pass out of one or more of the classes by demonstrating proficiency through a diagnostic exam given at the beginning of each quarter.
- Students learn (1) four major scales and all major and minor keys; (2) moderate fluency with figured bass at the keyboard; (3) major and minor scales with proper fingering; ability to sight read simple piano music and Bach chorales.

### Student Performing Activities
- The Department of Music presents more than 100 concerts each year, offering performance opportunities for both majors and non-majors in the UC Davis Symphony Orchestra, University Chamber Band and Wind Ensemble, Early Music Ensemble, Baroque Chamber Orchestra, Jazz Band, world music ensembles (Gamelan, Samba School, Hindustani Vocal Ensemble, Korean Drumming 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 housed.

### 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 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 informally.

### The Empyrean Ensemble, a professional new music ensemble, is in residence at UC Davis, where it annually premiers the work of student composers. 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 Sun-donesian gamelan. The arts and sciences building, the Computer and Electronic Music Studio, practice and rehearsal rooms, and an music library with over 12,000 CDs, several hundred videos and a collection of music reference materials. The newly opened Ann E. Pitzer Center, next door to the Music Building, features a 399-seat state-of-the-art concert hall, six practice rooms, and four large teaching/rehearsal studios. Scores and music monographs are housed in the Peter J. Shields Library, adjacent to the Music Building.

### A partnership of campus libraries affords online access to more than 100,000 tracks of classical and world music by streaming audio.

### Graduate Study
- The Department of Music offers programs 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
- K. Rohde, C. Hess

### Courses in Music (MUS)

<table>
<thead>
<tr>
<th>Lower Division</th>
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</thead>
<tbody>
<tr>
<td>2A. Keyboard Competence, Part 1 (2)</td>
</tr>
<tr>
<td>Performance—2 hours. Prerequisite: course 6A and 16A required concurrently. Training to meet the minimum piano requirements for the major in music.</td>
</tr>
</tbody>
</table>
Scales and simple harmonic progressions in twelve keys, both major and minor. (P/NP grading only.) GE credit: AH—F. (F.) Triest

2B. Keyboard Competence, Part 2 (2) 
Performance—2 hours. Prerequisite: course 6B and course 16B required concurrently; completion of course 2A or demonstration of required keyboard proficiency level on diagnostic exam; consent of instructor. Training to meet the minimum piano requirements for the major in music. Harmonic progressions, modulations and score reading at the piano. (P/NP grading only.) GE credit: AH—W. (W.) Triest

2C. Keyboard Competence, Part 3 (2) 
Performance—2 hours. Prerequisite: course 6C and course 16C required concurrently; completion of course 2B or demonstration of required keyboard proficiency level on diagnostic exam; consent of instructor. Training to meet the minimum piano requirements for the major in music. Harmonic progressions, figuration, band realization, voice leading and keyboard repertoire. (P/NP grading only.) GE credit: AH—S. (S.) Triest

3A. Introduction to Music Theory, Part I (4) 
Lecture—1 hour; recitation—3 hours. Fundamentals of music, harmony, counterpoint, and analysis directed toward the development of listening and writing techniques. Intended for the general student. GE credit: ArtHum | AH—F. W, F. (F.) Triest

3B. Introduction to Music Theory, Part II (4) 
Lecture—1 hour; recitation—3 hours. Prerequisite: completion of course 3A or consent of instructor. Continuation of course 3A. Development of melodic and harmonic writing skills. Basic analysis training. Intended for the general student. GE credit: ArtHum | AH—W. S. (W, S.) Craig, Triest

6A. Elementary Theory, Part 1 (3) 
Lecture—3 hours. Prerequisite: course 2A and course 16A required concurrently. Development of music writing and listening skills through the study of music fundamentals, species counterpoint, harmony, analysis of repertory. Intended primarily for music majors. GE credit: ArtHum | AH—F. (F.) Nichols

6B. Elementary Theory, Part 2 (3) 
Lecture—3 hours. Prerequisite: course 2B and course 16B required concurrently; completion of course 6A or demonstration of required proficiency level on diagnostic exam. Continuation of course 6A. GE credit: ArtHum | AH—W. (W.) Nichols

6C. Elementary Theory, Part 3 (3) 
Lecture—3 hours. Prerequisite: course 2C and course 16C required concurrently; completion of course 6B or demonstration of required proficiency level on diagnostic exam. Continuation of courses 6A,B. GE credit: ArtHum | AH—S. (S.) Nichols

7A. Intermediate Theory, Part 1 (3) 
Lecture—3 hours. Prerequisite: course 6C; course 17A concurrently. Homophonic music of the Classical era with an analysis of music by Haydn, Mozart, and Beethoven. Composition of pieces in the homophonic forms such as minuet and trio, theme and variation, rondo and sonata. Intended for music majors. GE credit: ArtHum | AH—F. (F.) Bauer, Pelo, Rohde, San Martin

7B. Intermediate Theory, Part 2 (2) 

7C. Intermediate Theory, Part 3 (2) 
Lecture—3 hours. Prerequisite: course 7B; course 17C concurrently. The music 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. GE credit: ArtHum | AH—S. (S.) Bauer, Pelo, Rohde, San Martin

10. Introduction to Musical Literature (4) 
Lecture—3 hours; listening—1 hour. Introduction to composers and major styles of Western music. Lectures, listening sections, and selected readings. For non-majors. GE credit: ArtHum, Wrl | AH, VL, WC, WE—F, W, S. (F, W, S.) Hess, Holoman, Levy, Pelo

11. Musics of the World (4) 
Lecture—3 hours; listening section—1 hour. Survey of selected art, folk, and popular music cultures from different parts of the world. Emphasis on understanding relationship of musical style, aesthetic principles, and performance practice to wider cultural contexts. GE credit: ArtHum, Div | AH, VL, WC—W, S. (W, S.) Lee, Spiller

16A. Elementary Musicianship, Part 1 (2) 
Lecture/laboratory—2 hours. Prerequisite: course 2A and course 6A required concurrently. The melodic, harmonic, and materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis. GE credit: ArtHum | AH—F. (F.) Triest

16B. Elementary Musicianship, Part 2 (2) 
Lecture/laboratory—2 hours. Prerequisite: course 2B and course 6B required concurrently; completion of 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. GE credit: ArtHum | AH—F. (F.) Triest

16C. Elementary Musicianship, Part 3 (2) 
Lecture/laboratory—2 hours. Prerequisite: course 2C and course 6C required concurrently; completion of 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. GE credit: ArtHum | AH—F. (F.) Craig

17A. Intermediate Musicianship, Part 1 (2) 
Lecture/laboratory—2 hours. Prerequisite: course 7A concurrently; completion of course 16C or demonstrate required proficiency level on diagnostic exam. Melodic, rhythmic, and harmonic materials of Western music. Includes sight singing, explanations, drills, melodic/rhythmic/harmonic dictations, and listening analysis. GE credit: ArtHum | AH—F. (F.) Craig

17B. Intermediate Musicianship, Part 2 (2) 
Lecture/laboratory—2 hours. Prerequisite: course 7B or 100B required concurrently; completion of course 17A 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. GE credit: ArtHum | AH—F. (F.) Bauer

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. GE credit: ArtHum | AH—S. (S.) Craig

24A. Introduction to the History of Music I (3) 
Lecture—3 hours. Prerequisite: can be concurrent with course 6A or consent of instructor. History of music from the Baroque to Beethoven. Intended primarily for majors in music. GE credit: ArtHum, Wrl | AH, VL, WE—F. (F.) Berger

24B. Introduction to the History of Music II (3) 
Lecture—3 hours. Prerequisite: completion of course 24A or consent of instructor. The history of music from the Romantic Period to the nineteenth century. Intended primarily for majors in music. GE credit: ArtHum, Wrl | AH, VL, WE—W. (W.) Berger

24C. Introduction to the History of Music III (3) 
Lecture—3 hours. Prerequisite: completion of course 24B or consent of instructor. The history of music of the 20th century. Intended primarily for majors in music. GE credit: ArtHum, Wrl | AH, VL, WE—S. (S.) Levy

25. 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 art music. Emphasis on historical and sociocultural contexts, as well as African roots. GE credit: ArtHum, Div | Wrl | ACGH, AH, DD, VL, WE—S. (S.)

98. Directed Group Study (1-5) 
Prerequisite: consent of instructor. (P/NP grading only) GE credit: AH—F. W. (F, W.)

99. Special Study for Graduates (1-5) 
Prerequisite: consent of instructor. (P/NP grading only) GE credit: AH—F. W. (F, W.)

Upper Division

101A. Advanced Theory, Part 1 (4) 
Lecture—3 hours; lecture/laboratory—1 hour. Prerequisite: completion of course 101A. Twentieth-century music from 1930 through 1950 and the various analytical tools pertaining to it. Works of Bartók, Carter, Dallapiccola, Ligeti, Varèse, Sessions, Schoenberg, Bartók, and Stravinsky. Composition of small pieces for piano and voice. GE credit: ArtHum | AH—F. (F.) Bauer, Pelo, Rohde, San 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 Ives, Carter, DeLaittre, Sessions, Schoenberg, Bartók, and Stravinsky. Composition of small pieces for ensemble. GE credit: ArtHum | AH—W. (W.) Bauer, Pelo, Rohde, 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 Klavier by J. S. Bach. Composition of exercises and short pieces using contrapuntal techniques. Intended for music majors. GE credit: ArtHum | AH—F. (F.) Bauer

103. Workshop in Composition (3) 
Workshop—3 hours. Prerequisite: completion of course 6C or consent of instructor. Workshop in musical composition for undergraduates who are interested in pursuing serious compositional studies and intending to follow the composition track of the major. Course will explore the techniques and materials of musical composition. May be repeated for credit. GE credit: ArtHum | AH—F. W. (F, W.) Bauer, Nichols, Ortiz, Pelo, Rohde, San Martin

105. History and Analysis of Jazz (4) 
Lecture—3 hours; discussion—1 hour. Prerequisite: completion of course 10 or 38 or 28 or consent of instructor. Jazz and the evolution of jazz styles in historical and cultural context. For non-majors. GE credit: ArtHum, Div | Wrl | ACGH, AH, DD, WE—F. (F.) Bauer

106. History of Rock Music (4) 
Lecture—3 hours; discussion—1 hour. Prerequisite: completion of course 10 or 38 or consent of instructor. Rock music and the evolution of rock styles in historical and cultural context. For non-majors. GE credit: ArtHum, Wrl | ACGH, AH, VL, WE—W. (W.) Frah, Reynolds
107A. Computer and Electronic Music (3)
Lecture—3 hours; laboratory—1 hour. Prerequisite: consent of instructor. Limited enrollment. Study in electronic and computer composition. The principles and procedures of composition in various electronic media are explored through compositional exercises. GE credit: ArtHum | AH. — S. (S.) Nichols

107B. Computer and Electronic Music (3)
Lecture—3 hours; laboratory—1 hour. Prerequisite: completion of course 107A or consent of instructor. Limited enrollment. Continuation of course 107A. Offered in alternate years. GE credit: ArtHum | AH. — W. (W.) Nichols

108A. Orchestration (2)
Lecture—2 hours. Prerequisite: completion of course 6C or consent of instructor. Techniques of orchestration from study of basic instrumental techniques to analysis of orchestral scores and scoring for various instrumental combinations. GE credit: ArtHum | AH. — VL, W. (W.) Ortiz

108B. Orchestration (2)
Lecture—2 hours. Prerequisite: completion of course 108A or consent of instructor. Techniques of orchestration from study of basic instrumental techniques to analysis of orchestral scores and scoring for various instrumental combinations. GE credit: ArtHum | AH. — VL. — S. (S.) Nichols

110A. The Music of a Major Composer: Beethoven (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: completion of course 10 or 3A or consent of instructor. The work of Beethoven will be studied in the context of his life and his contemporaries. Lectures, discussions, guided listening sessions, and selected readings. Offered in alternate years. GE credit: ArtHum | AH. — VL, W. (W.) Ortiz

110C. The Music of a Major Composer: Bach (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: completion of course 10 or course 3A or consent of instructor. The work of Bach will be studied in the context of his life and his contemporaries. Lectures, discussions, guided listening sessions, and selected readings. Offered in alternate years. GE credit: ArtHum | AH. — VL, W. (W.) Ortiz

110D. The Music of a Major Composer: Mozart (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: completion of course 10 or course 3A or consent of instructor. The work of Mozart will be studied in the context of his life and his contemporaries. Lectures, discussions, guided listening sessions, and selected readings. Offered in alternate years. GE credit: ArtHum, Wirt | AH, VL, W. (W.) Ortiz

110E. The Music of a Major Composer: Haydn (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: completion of course 10 or course 3A or consent of instructor. The work of Haydn in the context of his time and his contemporaries. Lectures, discussions, guided listening sessions, and selected readings. Offered for non-majors. Offered in alternate years. GE credit: ArtHum, Wirt | AH, VL, W. (W.) Ortiz

110F. American Masters (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: completion of course 10 or course 3A or consent of instructor. An introduction to American concert music by master composers from Charles Ives to the present. Lectures, discussion/guided listening sessions, and selected readings. Offered for non-majors. Offered in alternate years. GE credit: ArtHum, Wirt | ACCH; AH, DD, VL. — S. (S.) Levy

110G. Music of a Major Composer—Handel (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: completion of course 10 or course 3A or consent of instructor. Work of Handel in the context of his life and his contemporaries. Lectures, discussion/guided listening sections, and readings. For non-majors. Offered in alternate years. GE credit: ArtHum, Wirt | AH, VL, WC. — Thomas

113. Introduction to Conducting (2)
Lecture—1 hour; performance—1 hour. Prerequisite: completion of course 6C or consent of instructor. Principles and techniques of conducting. Intermediate conducting with a continued focus on principles and techniques as they apply to both choral and instrumental ensembles. GE credit: ArtHum | AH. — F. W. (F, W.) Baldini, Thomas

115. History of Film Music (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: completion of course 10 or course 3A or consent of instructor. Film music from silent films to movies of the past decade. How music supports and enhances the film. GE credit: ArtHum | AH. — W. (W.) Baldini, Thomas

116. Introduction to the Music of The Beatles (4)
Lecture—3 hours; listening—1 hour. Prerequisite: completion of course 10 or course 3A or consent of instructor. Survey of the songs of Lennon and McCartney. GE credit: ArtHum, Wirt | AH, VL, W. (W.) Ortiz

121. Topics in Music Scholarship (4)
Seminar—4 hours. Prerequisite: course 6C and course 24C, or consent of instructor. Sources and problems of historical style selected by the instructor and announced in advance. May be repeated for credit. GE credit: ArtHum | AH, OL. — F. W. (F, W.) Reynolds

122. Topics in Analysis and Theory (4)
Seminar—4 hours. Prerequisite: course 6C and course 24C, or consent of instructor. Analysis of works of a composer or musical style selected by the instructor and announced in advance. GE credit: ArtHum | AH, OL. — F. W. (F, W.) Reynolds

123. Music as Culture (3)
Lecture/discussion—3 hours. May be repeated for credit. GE credit: ArtHum | AH, OL. — F. W. (F, W.) Reynolds

124A. History of Western Music: Middle Ages to 1600 (3)
Lecture—3 hours. Prerequisite: course 24C or consent of instructor. Survey of compositional and musical styles from the Middle Ages to the beginning of the 17th century. GE credit: ArtHum, Wirt | AH, VL, WE. — W. (W.) Berger, Owens

124B. History of Western Music: 1600-1750 (3)
Lecture—3 hours. Prerequisite: course 124A or consent of instructor. Historical survey of composers and musical styles from the late 1500s to the mid-18th century. GE credit: ArtHum, Wirt | AH, VL, WE. — S. (S.) Berger, Owens

126. American Music (4)
Lecture—3 hours; listening—1 hour. Prerequisite: completion of course 10 or course 3A 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: ArtHum, Div, Wrt | ACCH, AH, DD, WE. — S. (S.) Levy

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 molena, musica andina) as well as its implications in other musical genres. Taught in Spanish. Not open to students who have taken Spanish 171 and 171S. (Same course as Spanish 171) May be repeated one time for credit when topic differs. Offered in alternate years. GE credit: ArtHum | AH. — F. (F.) Hess, Irwin, Ortiz

129A. Musics of the Americas (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or course 11 or course 3A or consent of instructor. 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. Offered in alternate years. GE credit: ArtHum, Div, Wirt | AH, DD, VL, WC, WE.

129B. Musics of Africa, Middle East, Indian Subcontinent (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or course 11 or course 3A or consent of instructor. 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. Offered irregularly. GE credit: ArtHum, Div, Wirt | AH, VL, WC, WE.

129C. Musics of East and Southeast Asia (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or course 11 or course 3A or consent of instructor. 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. Offered irregularly. GE credit: ArtHum, Div, Wirt | AH, VL, WC, WE. — W. (W.) Lee, Spiller

129D. Folk Musics of Europe (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 or course 11 or course 3A or consent of instructor. Survey of folk music, 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. Offered irregularly. GE credit: ArtHum, Div, Wirt | AH, VL, WC, WE. — W. (W.) Lee, Spiller

130A. Applied Study of Music: Advanced; Voice (1)
Performance instruction—1 hour. Prerequisite: consent of instructor; admission by audition. Class instruction, arranged by section; Voice. Offered as demand indicates. May be repeated for credit. — F. W. (F, W.) S.

308. Applied Study of Music: Advanced; Piano (1)
Performance instruction—1 hour. Prerequisite: consent of instructor; admission by audition. Class instruction, arranged by section; Piano. Offered as demand indicates. May be repeated for credit. — F. W. (F, W.) S.

309. Applied Study of Music: Advanced; Harpsichord (1)
Performance instruction—1 hour. Prerequisite: consent of instructor; admission by audition. Class instruction, arranged by section; Harpsichord. Offered as demand indicates. May be repeated for credit. — F. W. (F, W.) S.
130D. Applied Study of Music: Advanced; Organ (1)
Performance instruction—1 hour. Prerequisite: consent of instructor; admission by audition. Class instruction, arranged by section; Organ. Offered as demand indicates. May be repeated for credit. — F, W, S. (F, W, S.)

130E. Applied Study of Music: Advanced; Violin (1)
Performance instruction—1 hour. Prerequisite: consent of instructor; admission by audition. Class instruction, arranged by section; Violin. Offered as demand indicates. May be repeated for credit. — F, W, S. (F, W, S.)

130F. Applied Study of Music: Advanced; Viola (1)
Performance instruction—1 hour. Prerequisite: consent of instructor; admission by audition. Class instruction, arranged by section; Viola. Offered as demand indicates. May be repeated for credit. — F, W, S. (F, W, S.)

130G. Applied Study of Music: Advanced; Cello (1)
Performance instruction—1 hour. Prerequisite: consent of instructor; admission by audition. Class instruction, arranged by section; Cello. Offered as demand indicates. May be repeated for credit. — F, W, S. (F, W, S.)

130H. Applied Study of Music: Advanced; Double Bass (1)
Performance instruction—1 hour. Prerequisite: consent of instructor; admission by audition. Class instruction, arranged by section; Double Bass. Offered as demand indicates. May be repeated for credit. — F, W, S. (F, W, S.)

130J. Applied Study of Music: Advanced; Oboe (1)
Performance instruction—1 hour. Prerequisite: consent of instructor; admission by audition. Class instruction, arranged by section; Oboe. Offered as demand indicates. May be repeated for credit. — F, W, S. (F, W, S.)

130K. Applied Study of Music: Advanced; Clarinet (1)
Performance instruction—1 hour. Prerequisite: consent of instructor; admission by audition. Class instruction, arranged by section; Clarinet. Offered as demand indicates. May be repeated for credit. — F, W, S. (F, W, S.)

130L. Applied Study of Music: Advanced; Bassoon (1)
Performance instruction—1 hour. Prerequisite: consent of instructor; admission by audition. Class instruction, arranged by section; Bassoon. Offered as demand indicates. May be repeated for credit. — F, W, S. (F, W, S.)

130M. Applied Study of Music: Advanced; French Horn (1)
Performance instruction—1 hour. Prerequisite: consent of instructor; admission by audition. Class instruction, arranged by section; French Horn. Offered as demand indicates. May be repeated for credit. — F, W, S. (F, W, S.)

130N. Applied Study of Music: Advanced; Trumpet (1)
Performance instruction—1 hour. Prerequisite: consent of instructor; admission by audition. Class instruction, arranged by section; Trumpet. Offered as demand indicates. May be repeated for credit. — F, W, S. (F, W, S.)

130O. Applied Study of Music: Advanced; Trombone (1)
Performance instruction—1 hour. Prerequisite: consent of instructor; admission by audition. Class instruction, arranged by section; Trombone. Offered as demand indicates. May be repeated for credit. — F, W, S. (F, W, S.)

130P. Applied Study of Music: Advanced; Tuba (1)
Performance instruction—1 hour. Prerequisite: consent of instructor; admission by audition. Class instruction, arranged by section; Tuba. Offered as demand indicates. May be repeated for credit. — F, W, S. (F, W, S.)

130Q. Applied Study of Music: Advanced; Percussion (1)
Performance instruction—1 hour. Prerequisite: consent of instructor; admission by audition. Class instruction, arranged by section; Percussion. Offered as demand indicates. May be repeated for credit. — F, W, S. (F, W, S.)

130R. Applied Study of Music: Advanced; Classical (1)
Performance instruction—1 hour. Prerequisite: consent of instructor; admission by audition. Class instruction, arranged by section; Classical. Offered as demand indicates. May be repeated for credit. — F, W, S. (F, W, S.)

130U. Applied Study of Music: Advanced; Recorder (1)
Performance instruction—1 hour. Prerequisite: open to Music Majors with ability to perform scales and short compositions from standard repertoire; audition by audition and consent of instructor. Class instruction, arranged by section; Recorder. May be repeated for credit. — F, W, S. (F, W, S.)

131A. Applied Study of Music: Advanced (Individual); Voice (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: course 1 or the equivalent; open to Music Majors only; admission by audition and consent of instructor. Individual instruction in Voice. May be repeated for credit. — F, W, S. (F, W, S.)

131B. Applied Study of Music: Advanced (Individual); Piano (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Piano. May be repeated for credit. — F, W, S. (F, W, S.)

131C. Applied Study of Music: Advanced (Individual); Harpsichord (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Harpsichord. May be repeated for credit. — F, W, S. (F, W, S.)

131D. Applied Study of Music: Advanced (Individual); Organ (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Organ. May be repeated for credit. — F, W, S. (F, W, S.)

131E. Applied Study of Music: Advanced (Individual); Violin (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Violin. May be repeated for credit. — F, W, S. (F, W, S.)

131F. Applied Study of Music: Advanced (Individual); Viola (2)
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 Viola. May be repeated for credit. — F, W, S. (F, W, S.)

131G. Applied Study of Music: Advanced (Individual); Cello (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Cello. May be repeated for credit. — F, W, S. (F, W, S.)

131H. Applied Study of Music: Advanced (Individual); Double Bass (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Double Bass. May be repeated for credit. — F, W, S. (F, W, S.)

131I. Applied Study of Music: Advanced (Individual); Flute (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Flute. May be repeated for credit. — F, W, S. (F, W, S.)

131J. Applied Study of Music: Advanced (Individual); Oboe (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Oboe. May be repeated for credit. — F, W, S. (F, W, S.)

131K. Applied Study of Music: Advanced (Individual); Clarinet (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Clarinet. May be repeated for credit. — F, W, S. (F, W, S.)

131L. Applied Study of Music: Advanced (Individual); Bassoon (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Bassoon. May be repeated for credit. — F, W, S. (F, W, S.)

131M. Applied Study of Music: Advanced (Individual); French Horn (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in French Horn. May be repeated for credit. — F, W, S. (F, W, S.)

131N. Applied Study of Music: Advanced (Individual); Trumpet (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Trumpet. May be repeated for credit. — F, W, S. (F, W, S.)

131O. Applied Study of Music: Advanced (Individual); Trombone (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Trombone. May be repeated for credit. — F, W, S. (F, W, S.)

131P. Applied Study of Music: Advanced (Individual); Tuba (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Tuba. May be repeated for credit. — F, W, S. (F, W, S.)

131Q. Applied Study of Music: Advanced (Individual); Percussion (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Percussion. May be repeated for credit. — F, W, S. (F, W, S.)

131R. Applied Study of Music: Advanced (Individual); Classical Guitar (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Classical Guitar. May be repeated for credit. — F, W, S. (F, W, S.)
131A. Applied Study of Music: Advanced (Individual); Bassoon (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Bassoon. May be repeated for credit.—F, W, S. [F, W, S]

131B. Applied Study of Music: Advanced (Individual); Piano (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Piano. May be repeated for credit.—F, W, S. [F, W, S]

131C. Applied Study of Music: Advanced (Individual); Harpsichord (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Harpsichord. May be repeated for credit.—F, W, S. [F, W, S]

131D. Applied Study of Music: Advanced (Individual); Organ (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Organ. May be repeated for credit.—F, W, S. [F, W, S]

131E. Applied Study of Music: Advanced (Individual); Violin (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Violin. May be repeated for credit.—F, W, S. [F, W, S]

131F. Applied Study of Music: Advanced (Individual); Viola (2)
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 Viola. May be repeated for credit.—F, W, S. [F, W, S]

131G. Applied Study of Music: Advanced (Individual); Double Bass (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Double Bass. May be repeated for credit.—F, W, S. [F, W, S]

131H. Applied Study of Music: Advanced (Individual); Oboe (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Oboe. May be repeated for credit.—F, W, S. [F, W, S]

131I. Applied Study of Music: Advanced (Individual); Clarinet (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Clarinet. May be repeated for credit.—F, W, S. [F, W, S]

131J. Applied Study of Music: Advanced (Individual); Saxophone (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Saxophone. May be repeated for credit.—F, W, S. [F, W, S]

131K. Applied Study of Music: Advanced (Individual); Clarinet (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Clarinet. May be repeated for credit.—F, W, S. [F, W, S]

131L. Applied Study of Music: Advanced (Individual); Violin (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Violin. May be repeated for credit.—F, W, S. [F, W, S]

131M. Applied Study of Music: Advanced (Individual); French Horn (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in French Horn. May be repeated for credit.—F, W, S. [F, W, S]

131N. Applied Study of Music: Advanced (Individual); Trumpet (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Trumpet. May be repeated for credit.—F, W, S. [F, W, S]

131O. Applied Study of Music: Advanced (Individual); Trombone (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Trombone. May be repeated for credit.—F, W, S. [F, W, S]

131P. Applied Study of Music: Advanced (Individual); Saxophone (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Saxophone. May be repeated for credit.—F, W, S. [F, W, S]

131Q. Applied Study of Music: Advanced (Individual); Double Bass (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Double Bass. May be repeated for credit.—F, W, S. [F, W, S]

131R. Applied Study of Music: Advanced (Individual); Classical Guitar (2)
Performance instruction—0.5 hour; independent practice—5 hours. Prerequisite: consent of instructor; admission by audition. Individual instruction in Classical Guitar. May be repeated for credit.—F, W, S. [F, W, S]

140. University Jazz Band (2)
Rehearsal—4 hours. Prerequisite: consent of instructor. Open to students in any major. Rehearsal, study, and performance of music for band. May be repeated for credit. (P/NP grading only.)—F, W, S. [F, W, S]

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.)—F, W, S. [F, W, S]

142. University Chamber Singers (2)
Rehearsal—3 hours. Prerequisite: admission subject to audition before first class meeting. Rehearsal and performance of works for small choral group. May be repeated for credit. (P/NP grading only.)—F, W, S. [F, W, S]

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.)—F, W, S. [F, W, S]

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.)—F, W, S. [F, W, S]

145. Early Music Ensemble (2)
Rehearsal—4 hours. Prerequisite: consent of instructor; admission by audition. Rehearsal and performance of Medieval, Renaissance, and Baroque music for vocal ensemble and keyboard instruments. May be repeated for credit. (P/NP grading only.)—F, W, S. [F, W, S]

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, piano, harpsichord, and organ. May be repeated for credit. (P/NP grading only.)—F, W, S. [F, W, S]

147. University Wind Ensemble (2)
Rehearsal—4 hours. Prerequisite: consent of instructor. 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.)—F, W, S. [F, W, S]

148. Hindustani Vocal Ensemble (2)
Rehearsal—2 hours. Prerequisite: consent of instructor. Basics of Hindustani music through theory and practice. Fundamentals of raga (mode) and tala (rhythm) with special emphasis on improvisation, a central feature of khyal (singing style). Five raga each quarter. May be repeated up to six times for credit. (P/NP grading only.)—F, W, S. [F, W, S]

150. Brazilian Samba School (2)
Rehearsal—2 hours. Prerequisite: consent of instructor. Practice of Brazilian music. Basic instrumental technique and repertoire. Focus on the percussion traditions of Rio de Janeiro and Bahia. May be repeated up to six times for credit. (P/NP grading only.)—F, W, S. [F, W, S]

151. Korean Percussion Ensemble (2)
Rehearsal—2 hours; listening to lecture—2 hours. Prerequisite: consent of instructor. Class size limited to 20 students. Practice of Korean percussion styles. Basic instrumental technique and repertoire. Focus on the percussion traditions of samul-nori and basic concepts of p'umungmal. (P/NP grading only.) May be repeated six times for credit. GE credit: AH.—F, W, S. [F, W, S]

192. Internship in Music (1-4)
Internship—3-12 hours. Prerequisite: consent of instructor or academic adviser. Student must submit a written proposal to an appropriate Music Department instructor. Internship outside the university related to music. May be repeated up to eight units of credit. (P/NP grading only.) May be repeated six times for credit. GE credit: AH.—F, W, S. [F, W, S]

194HA. Special Study for Honors Students (2-4)
Independent study—6-12 hours. Prerequisite: consent of instructor or academic adviser. Limited to 20 students. Practice of Korean percussion styles. Basic instrumental technique and repertoire. Focus on the percussion traditions of samul-nori and basic concepts of p'umungmal. (P/NP grading only.) May be repeated six times for credit. GE credit: AH.—F, W, S. [F, W, S]

194HB. Special Study for Honors Students (2-4)
Independent study—6-12 hours. Prerequisite: courses 273 and 276. Open only to students who qualify for the honors program and admission to Senior Honors Program. Preparation and presentation of a culminating project, under the supervision of an instructor, in any of the creative or scholarly areas of music. (Deferred grading only, pending completion of sequence.) GE credit: AH.—F, W, S. [F, W, S]
Native American Studies

The Major Program

Native American Studies provides a multi-disciplinary introduction to the indigenous cultures of North, Central, and South America. It challenges students to consider issues of sovereignty, and indigenous knowledge systems in preparation for living in a world of constantly increasing social and cultural complexity.

The Program. Students electing a major in Native American Studies may complete Plan I, Plan II, or Plan III. Plan I enables students to concentrate chiefly upon the Native experience in North America (north of Mexico). Plan II encourages interested students to focus upon Meso-American culture work integrating Meso-America with North America and South America. Plan III focuses upon South America with some course work integrating that region with areas to the north.

Career Alternatives. Native American Studies is excellent preparation for a scholarly career or professional career such as teaching, law, human services, health, tribal administration, social work, and inter-ethnic relations. Graduate schools and agencies in these and related areas are looking for students with broad interdisciplinary preparation and who possess knowledge and sensitivity relating to ethnic issues and cultural diversity.

A.B. Major Requirements:

Preparatory Subject Matter ............ 16-24
Native American Studies 1, 10 or 12 .... 8
One or two courses from: Native American Studies 5, 12, 32, 33, 34, 44 ........ 4-8
One or two courses from: African American Studies 2, 20, 24, Asian American Studies 1, 2, 4, Chicano/a Studies 10, 21, 23, Comparative Literature 25, Community and Regional Development 2, Environmental Science and Policy 10, History 7A, 7B, 7C, 17A, Linguistics 1, Religious Studies 90, Technocultural Studies 2 ........ 4-8

Depth Subject Matter ............ 24
Native American Studies 130A or 130B or 130C, 157, and 180 or 135 ........ 12
Note: If a course is counted for either Plans I, II, or III (below), it cannot also be counted as part of the 24 units of Depth Subject Matter.

Areas of Specialization (complete one plan)

Plan I—North American Emphasis ........ 20
Native American Studies 107 or 108 .... 4
One other upper division Native American Studies course, selected in consultation with adviser ........ 4

Plan II—Mexico-Central America Emphasis ........ 20
Native American Studies 107, 133 or 1338 ........ 8

Fall 2011 and on Revised General Education (GE): AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; AGCH—American Cultures; DD—Diverse Domains; OLQ—Other Qualities; SLQ—Scientific; VLQ—Visual; WCQ—World Cultures; WRT—Writing Experience
Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; ScEng—Science and Engineering; SocSci—Social Sciences; Div—Diverse Domains; Wrt—Writing Experience
Quarter Offered: F=Fall, W=Winter, S=Spring, Su=Summer; 2017-2018 offering in parentheses
Courses in Native American Studies (NAS)

Lower Division

1. Introduction to Native American Studies (4)
Lecture—3 hours; discussion—1 hour. Introduction to Native American Studies with emphasis upon basic concepts relating to Native American historical and political development. GE credit: SocSci, Div | ACGH, DD, SS, WC, WE. —F. W. S. Crum, Middleton

2. Introduction to Native American Literature (4)
Lecture/discussion—4 hours. Prerequisite: completion of Subject A requirement. Intensive focus on analysis of Native American literary texts, with frequent writing assignments to develop critical thinking and composition skills. GE credit: ArtHum, Div | Wrt | AH, DD, OL, WE. —F. W. S. Su

3. Indigenous and Minority Languages (4)
Lecture—3 hours; discussion—1 hour. Survey of the status of indigenous, immigrant, and other minority languages in the Americas and around the world. Topics include linguistic diversity, language endangerment and revitalization, heritage language maintenance in immigrant communities, and language change due to translational interactions. GE credit: ArtHum or SocSci, Div | Wrt | AH or SS, DD, WC, WE. —F. P. J. Spence

10. Native American Music and Dance (4)
Lecture—3 hours; film viewing; 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 | AH or SS, DD, WC, WE. —F. W. S. Su, Hernandez-Avila, Mendoza

11. Native American/Indigenous Film (4)
Lecture—3 hours, film viewing; discussion—1 hour. Lecture/discussion—4 hours. Prerequisite: consent of instructor. Study of contemporary and historical Native American language and cultural revitalization, indigenous language and cultural revitalization, and the contemporary responses by Native American/Indigenous filmmakers claiming visual sovereignty. Examines a range of filmic genres including documentary, features, shorts, festivals, tv and internet streaming. GE credit: ArtHum or SocSci | ACGH, AH or SS, DD, VL, WC, WE. —Tsininhajinnie

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 study secular native music and dance from a cross-section of regions and tribes. GE credit: Div

33. Introduction to Native American Art (4)
Lecture—4 hours. Introduction to Native American Art from throughout North America, inclusive of traditional forms, techniques and designs in a range of media including ceramics, basketry, fiberwork, carving, painting, sculpture and photography within a context of cultural and social history. GE credit: ArtHum | Div | ACGH, AH or SS, DD, OL, VL, WE. —F. Tsininhajinnie

34. Native American Art Studio (4)
Lecture—2 hours; studio—6 hours. Limited enrollment. Studio projects to be influenced by contemporary and traditional Native American arts. Examples of design and media will be based on indigenous origin. Introduction and familiarization with various materials and techniques. GE credit: ArtHum | Div | ACGH, AH or SS, DD, OL, VL, WE. —Tsininhajinnie

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. 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

101. Contemporary Native American Art (4)
Lecture—3 hours; extensive writing. Examination of contemporary artworks by selected Native American and Indigenous Master artists, in a wide range of media, including ceramics, metal arts, photography, video, painting, installation and performance within a context of political and social histories. Offered in alternate years. GE credit: ArtHum | Div | ACGH, AH or SS, DD, OL, VL, WE. —Tsininhajinnie

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. —W. S. Mendoza, Spence

108. Indigenous Languages of California (4)
Lecture/discussion—3 hours; term paper. Survey of the indigenous languages of the California region: linguistic prehistory, languages at first European contact, subsequent language loss, current efforts at language revitalization. May be repeated for credit when a different topic is studied. GE credit: Div. —W. S. Mendoza, Spence

109A. Quechua Language and Society, Beginning Level 1 (4)
Lecture/discussion—4 hours. Not open to students who took course 107 in the Fall quarter of 2007. Introduction to Quechua language and society emphasizing the practical use of the language. Provides the student with some basic Quechua communicative skills and with an initial knowledge about contemporary Andean society and the status of Quechua language today. GE credit: SocSci | SS. —Mendoza

110B. Quechua Language and Society, Beginning Level 2 (4)
Lecture/discussion—4 hours. Prerequisite: course 110A. Second Level of the teaching of Quechua language and society. Emphasis on development of conversational and reading skills. Continuation of the study of aspects of contemporary Andean society and the status of Quechua language. Offered in alternate years. GE credit: SocSci | SS. —W. Mendoza

110C. Quechua Language and Society, Intermediate Level 1 (4)
Lecture/discussion—4 hours. Prerequisite: courses 110A and B. Third level of the teaching of Quechua language and society. Emphasis on development of conversational and reading skills. Introduction to more complex grammatical structures. Continuing the study of contemporary Andean society and the status of Quechua language today. Offered in alternate years. GE credit: SocSci | SS. —W. Mendoza

110D. Quechua Language and Society, Intermediate Level 2 (4)
Lecture/discussion—4 hours. Prerequisite: course 110A, B and C. Fourth level of the teaching of Quechua language and society. Emphasis on complex structural patterns while emphasizing conversational and reading skills. Study of different sociopolitical processes that have affected Andean identity and the status of Quechua language. Offered in alternate years. GE credit: SocSci | SS. —S. Mendoza
115. Native Americans in the Contemporary World (4)
Lecture/discussion—4 hours. Prerequisite: upper division standing or consent of instructor. Important issues facing Native Americans in the contemporary world. Focus primarily on the diverse ways of life, historical realities, and cultural identity of indigenous people throughout the Americas as they develop their own cultural and political institutions. GE credit: ArtHum or SocSci, Div | AH or SS, AC|GH, DD, OL, WE. — W. Crum

116. Native American Traditional Governments (4)
Lecture—4 hours. Prerequisite: course 1; Anthropology 2. Study of selected Native American Tribal Governments, confederations, leagues, and alliances. Offered in alternate years. GE credit: SocSci, Div.

117. Native American Governmental Decision Making (4)
Lecture—4 hours. Prerequisite: course 116, Political Science 2. Anthropology 123 recommended. Native American governmental and community decision making with emphasis on federal and state programs, tribal sovereignty, current political trends and funding for tribal programs. Offered in alternate years. GE credit: SocSci, Div.

118. Native American Politics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing or consent of instructor. 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 | AC|GH, DD, SS, WC, WE.—Crum

119. Introduction to Federal Indian Law (4)
Lecture—3 hours; term paper. Introduction to the foundational cases and statutes of federal Indian law, from European Contact through the 20th century. GE credit: SocSci | AC|GH, SS, WE.—M. Mendoza

120. Ethnopolitics of South American Indians (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 10 or SS. 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. Sociolinguistic analysis of main indigenous areas and the political organization of national societies. GE credit: SocSci, Div, Wrt.

121. Corporate Colonialism (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 10 or 12 encouraged, but not required. Price of progress and its impact on native and non-native people. History of the corporation and neoliberalism, military and intelligence agencies, debt, Taylorism, education institutions, media, and law. Discussion of alternatives advocated by contemporary and indigenous social movements. GE credit: SocSci | AC|GH, DD, SS, WC, WE. —W (W) Granida

122. Native American Community Development (4)
Lecture—4 hours. Prerequisite: course 1 or 10. Application of community development theory and techniques to the development problems of Native American communities. Offered in alternate years. GE credit: AC|GH, DD, OL, SS, WE.

123. Native Foods and Farming of the Americas (4)
Lecture/discussion—2 hours. Prerequisite: course 7A concurrently; completion of course 16C or demonstrate required proficiency level on diagnostic exam. Crop domestication, agronomy, and cuisines of the Americas. Cultural and social history of native American foods like maize, potatoes, squash, beans, avocados, etc. Discussion of socio-economic, environmental, legal challenges facing indigenous and peasant farmers today. Offered in alternate years. GE credit: SciEng or SocSci, Wrt | DD, OL, SS, SE or SS, WC. —S. Granida

125. Performance and Culture Among Native Americans (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: upper division standing in division of humanities or social science instructor. Interdisciplinary study of public expressive forms among Native Americans. Comparison and analysis of music, dances, rituals, and dramas from throughout North, Central, and South America in social and cultural contexts. Not open for credit to students who have completed music 125. Offered in alternate years. GE credit: ArtHum or SocSci | AH or SS, WC, WE.—F. Crum

130A. Native American Ethno-Historical Development (4)
Lecture—4 hours. Prerequisite: upper division standing or consent of instructor. Study of Native American ethno-history in North America before 1770s. GE credit: SocSci, Div, Wrt | AC|GH, DD, SS, WC, WE.—F. Crum

130B. Native American Ethno-Historical Development (4)
Lecture/discussion—4 hours. Prerequisite: upper division standing or consent of instructor. Study of Native American ethno-history in North America after 1780. GE credit: SocSci, Div, Wrt | AC|GH, DD, SS, WC, WE.—S. Crum

133. Ethnohistory of Native People of Mexico and Central America (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 10 or SS. Ethnohistorical development of pre-colonial, colonial, post-colonial Mexican and Central American indigenous peoples; the impact of economic and political factors in 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.

133A. Ethnohistory of Native Peoples of Mexico and Central America to 1500 (4)
Lecture/discussion—4 hours; term paper. Prerequisite: course 1 or course 10 or consent of instructor. Ethnohistorical analysis of indigenous peoples of Mexico and Central America up to and including the earliest period of European contact. Focus is on indigenous written historical records of the Maya, Mesoamerican peoples. May be repeated one time for credit. This course can be repeated provided the student chooses a new topic for the term paper/project and for the PowerPoint presentation. (W.)

133B. Ethnohistory of Native Peoples of Mexico and Central America to 1500 (4)
Lecture/discussion—4 hours; term paper. Prerequisite: course 1 or course 10 or consent of instructor. Ethnohistorical analysis of indigenous peoples of Mexico and Central America up to and including the earliest period of European contact. Focus is on indigenous written historical records of the Maya, Mesoamerican peoples. May be repeated one time for credit. This course can be repeated provided the student chooses a new topic for the term paper/project and for the PowerPoint presentation. (W.)

135. Gender Construction in Native American Literature (4)
Lecture/discussion—4 hours; term paper. Prerequisite: course 1 or 10 or consent of instructor. Contemporary California Indian environmental policy issues, with a focus on water, minerals, contamination, and alliances. Issues will be placed within historical and political context, drawing on theories of Native environmental ethics, environmental justice, and Federal Indian law. Offered in alternate years. GE credit: AC|GH, DD, SS, WE.—M. Middleton

180. Native American Women (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 10, or Women's Studies 50. Native American women's life experiences, cross-cultural comparisons of gender roles, and Native women's contemporary feminist thought. Utilizes texts from literature, social science, and autobiography/biography. GE credit: ArtHum or SocSci | AH or SS, WC, WE.—W. (W) Granida

181A. Native American Literature (4)
Lecture/discussion—4 hours. Prerequisite: one from course 5, English 3, Comparative Literature 1, 2, 3. Works of fiction (short story, novel) by contemporary Native American authors, with an emphasis on writers from the United States. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AC|GH, AH, DD, OL, WE.—W. Hernández-Avia

181B. Native American Literature (4)
Lecture/discussion—4 hours. Prerequisite: one from course 5, English 3, Comparative Literature 1, 2, 3. Works by or about Native Americans including non-fiction novels, biographies and autobiographies. Explore ways Native Americans create and recreate their culture through the creative process in literature. Examine from a critical perspective autobiographies...
181C. Contemporary Native American Poetry (4)
Lecture—4 hours. Works of poetry by contemporary Native American/Indigenous poets, with some attention to traditional and cultural poetic expressions. GE credit: ArtHum, Div Wrt | AH, DD, OL, WE. — F., W. S. Hernández-Avila

184. Contemporary Indigenous Literature of Mexico (4)
Lecture/discussion—4 hours. Prerequisite: course 1 or 10; course 181A or 181C recommended; reading knowledge of Spanish required. Contemporary indigenous literature of Mexico, with a focus on the genres of history, narrative, essay, analysis of cultural, historical, and spiritual themes, imagery, styles and performances; biographies of and influences on the Native writers themselves. Offered irregularly. GE credit: ArtHum or SocSci | AH or SS, OL, WC. — Su. Hernández-Avila

185. Native American Literature in Performance (4)
Performance instruction—4 hours. Prerequisite: consent of instructor. Use of contemporary Native American literature onstage, through adaptations of selected literature as well as the creation of original pieces. May be repeated up to four units for credit. Offered in alternate years. GE credit: ArtHum or ArtHum Div Wrt | AH, DD, OL, WE. — S. Su. Hernández-Avila

188. Special Topics in Native American Literary Studies (4)
Lecture/discussion—4 hours; term paper. Prerequisite: upper division status and one of the following recommended: course 5, 10, 181A, 181C. Special topics drawn from Native American literature. May be repeated for credit when topic differs. Offered irregularly. GE credit: ArtHum, Div Wrt | AH, DD, OL, WE. — S. Su. Hernández-Avila

190. Seminar in Native American Studies (2)
Discussion—2 hours. Prerequisite: senior standing. Seminar of critical issues faced by Native American people. (P/NP grading only.)

191. Topics in Native American Studies (4)
Lecture/discussion—4 hours. Prerequisite: upper division standing. Selected topics in Native American Studies related to indigenous knowledge and worldviews from a historical, cultural, hemispheric perspective. May be repeated for credit when topic differs and/or when offered by a different instructor. Offered irregularly. GE credit: ArtHum or SocSci, Div | AH or SS, DD, OL, WE. — F., W., F. S. Hernández-Avila

192. Internship (1-12)
Internship—1 hour. Prerequisite: enrollment dependent on availability of internship position in Native American Studies or the CN Gorman Museum, with priority to Native American Studies minors/majors; consent of instructor. Restricted to upper division standing. Supervised internship in the CN Gorman Museum, community, and institutional settings related to Native American concerns. May be repeated up to 12 units for credit including 192 and other internships taken in other departments and institutions. (P/NP grading only.) GE credit: ArtHum | AH. — F., W., F. S. Su. Tsinhnahjinnie

194HA. Special Studies for Honors Students (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.)

194HB. Special Studies for Honors Students (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 (12)
Field work—36 hours. Prerequisite: senior standing and major in Native American Studies, completion of lower division requirements and course 161. 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/NP grading only.) — F., W., F., S.

196. Senior Project in Native American Studies (4)
Discussion—1 hour; independent study—3 hours. Prerequisite: major standing and major in course 195 (may be taken concurrently); consent of instructor. Guided research project that enables student to apply the theory and principles learned in major during upper division work. Final product is to be a major senior project or thesis. (P/NP grading only.) — F., W., S.

197C. Community Tutoring in Native American Studies (1-5)
Tutorial—3-15 hours. Prerequisite: consent of major committee; upper division standing; major in Native American Studies. Supervise tutoring in community. (P/NP grading only.) — F., W., S.

198. Directed Group Study (1-5)
Prerequisite: upper division standing; consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate

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. — Crum, Hernández-Avila, Middleton

202. Advanced Topics in Native American Studies (4)
Seminar—4 hours. Prerequisite: graduate standing. Advanced study of selected topics or themes 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. — W. S. Hernández-Avila, Perea

207. Leadership Skills and Strategies in California Language Documentation & Revitalization (4)
Seminar—3 hours; term paper. Introduction to the indigenous languages of the Americas, with a focus on California; an examination of how contemporary Native communities document and revitalize their heritage languages. Learn to assist and administer language programs. — Spero

212. Community Development for Sovereignty and Autonomy (4)
Seminar—4 hours. Prerequisite: graduate standing and consent of instructor. Examines a sample of contemporary indigenous communities 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. — Crum

213. Native Criminality and Deviance (4)
Seminar—4 hours. Prerequisite: graduate standing. Examination of “deviance” in Native communities with focus on Native criminality in North America. Analysis of the concept of deviance from several different world view points. Readings from a range of theories to incorporate varying theoretical perspective on criminality and deviance.

217. Public Law 83-280: Colonial Termination (4)
Seminar—4 hours. Prerequisite: graduate standing, including school of law students. Examination of the significance of the 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. — F., W., S. Crum

220. Colonialism, Neoliberalism, and Indigenous Self-Determination (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Historical, political economy and legacies of imperial/colonial systems. Continuities and discontinuities with corporate globalization and neoliberalism. Focus on resistance and self-determination, but with comparison to other groups. Offered in alternate years. — Granda

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, rituals and other forms of public expressive forms normally called “folklore” or “popular culture.” Not open for credit to students with credit in course 222. (Former course Music 224.) — Mendoza

233. Visual Sovereignty (4)
Seminar—3 hours; film viewing—2 hours; term paper. Extenesively examine the field of contemporary Native American and indigenous art held in museums and other public institutions, as well as privately-held collections. Includes onsite viewing and research of museum collections and archives. Offered in alternate years. — Tsinhnahjinnie

237. Native American Art Collections and Museums (4)
Seminar—3 hours; term paper. Research and examination of regional Native American/indigenous art held in museums and other public institutions, as well as privately-held collections. Includes onsite viewing and research of museum collections and archives. Offered in alternate years. — Tsinhnahjinnie

240. Native American Public Health: Topics and Issues (4)
Seminar—3 hours; term paper. Introduction to Native American public health issues and contributing causal factors (including environmental justice and historical trauma); the dimensions of cultural competency in diagnosis and service provision; the structure of Native health care institutions; and debates in Native treatment modalities. — W. Middleton

246. Native American/Indigenous Research Methodologies (4)
Seminar—3 hours; term paper. Introduction to advanced methodologies currently influencing research in Native American Studies and amongst Indigenous communities. Students will develop an original project and course assignments will guide them through the process of research design and implementation. Offered in alternate years. — W. (W) Perea

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 Mayas considering the modern theories and social/anthropological critiques of modern ethnographies. Offered in alternate years.

280. Ethnohistorical Theory and Method (4)
Seminar—3 hours; term paper. Discussion of the ethnographical method; the utilization of diverse types of data, especially documentary sources, to construct socio-cultural history. Particular attention to the
applied area of ethnology in the solution of contemporary social problems. Offered in alternate years. —(F) Lewis.

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

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—F, W, S.

Natural Sciences

See Earth and Planetary Sciences, on page 238.

Nematology

Please see the department of Entomology and Nematology, on page 322, for further information. (College of Agricultural and Environmental Sciences)

Steve Nadler, Ph.D., Chairperson of the Department
Joanna Chiu, Ph.D., Vice Chairperson of the Department
Department Office, 367 Briggs; 530-752-0300
Faculty
Edward P. Caswell-Chen, Ph.D., Professor
Edwin E. Lewis, Professor
Steven A. Nadler, Ph.D., Professor
Becky B. Westerdahl, Ph.D., Professor
Emeriti Faculty
Howard Ferris, Ph.D., Professor Emeritus
Bruce A. Jaffe, Ph.D., Professor Emeritus
Harry K. Kaya, Ph.D., Professor Emeritus (Entomology)

Minor Program Requirements:

UNITS
Nematology ....................................18-20
Nematology 100, 110, and Soil Science 100...............................................10
Two or three courses from one of the following areas: ...............................8-10
(a) Plant Science: Microbiology 102, Entomology 100, 135, 153, 156, 156L; Evolution and Ecology 112; Plant Pathology 120, 148; Plant Biology 121; Soil Science 111, 112
(b) Entomology: One upper division Entomology course; Evolution and Ecology 112; Microbiology 102; Plant Biology 121; Plant Pathology 120, 148; Soil Science 102, 111, 112
Minor Adviser, S. Nadler

Graduate Study. Graduate degrees specializing in Nematology are offered through the Departments of Entomology and Plant Pathology, and through various Graduate Groups (Biochemistry, Ecology, Genetics, Plant Protection and Pest Management). Refer also to the Graduate Studies chapter of this catalog.

Courses in Nematology (NEM)

Related Courses. See Entomology and Nematology, on page 322.

Lower Division

10V. General Biology (4)
Web virtual lecture—3 hours; web electronic discussion—1 hour. 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. Significant writing is required. Designed for students not specializing in biology. Not open for credit to students who have completed course Biological Sciences 1A, 1B, 1C, 2A, 2B, 2C, 10 or 10V. GE credit: SciEng, Wrt| SE, SL, WE. —S, F, W. (J. Westerdahl)

Upper Division

100. General Plant Nematology (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1B or 10. An introduction to the classification, morphology, ecology, and control of the nematodes attacking cultivated crops. GE credit: SciEng SE. —F, W.

110. Introduction to Nematology (2)
Lecture—2 hours. Prerequisite: Biological Sciences 1B or the equivalent or consent of instructor. The relationship of nematodes to human environment. Classification, morphology, ecology, distribution, and importance of nematodes occurring in soil and water as parasites of plants and animals. GE credit: SciEng SE. —W. (W.) Caswell-Chen, Nadler

150. Revising Scientific Prose (4)
Course—discussion—3 hours; term paper; Prerequisite: one course in English composition; understanding of English grammar and parts of speech; upper division standing in a science major; or consent of the instructor. Class size limited to 15 students. Principles of detailed revision; close analysis of writing styles in research papers, popular scientific articles, and other scientific reports; use of verb-based and noun-based writing styles. GE credit: Wrt. —W. (W.) Jaffe

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (F/NP grading only)

Graduate

201. Molecular and Physiological Plant Nematology (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: Biological Sciences 101; Plant Pathology 120, course 100 or 110. Molecular biology and physiology of nematodes using Caenorhabditis elegans as a model, but without emphasis on plant-parasitic species. Plant responses to nematodes. Discussion of current literature emphasized. Offered in alternate years. —W.

203. Ecology of Parasitic Nematodes (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: course 100 or 110 or Entomology 156; 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. —S. Caswell-Chen

204. Management of Plant-Parasitic Nematodes (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 100 or 110. Theory, foundation, principles and practices of nematode management. Techniques and equipment used to manage nematodes and methods used to analyze their effectiveness. Offered in alternate years. —S. Westerdahl

205. Insect Nematology and Biological Control (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: courses 100 and 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. —(F) Lewis.

206. Nematode Systematics and Evolution (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 100 or 110 or Entomology 156; Evolution and Ecology 100 recommended. Nematode diversity as revealed by morphological and molecular evidence. Laboratory experience focuses on structural features used in taxonomy. Phylogenetic relationships based on morphological and molecular data used to consider patterns of character change among taxa. Offered in alternate years. —(F) Nadler

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 Evolution and Ecology 210.) Offered in alternate years. —(F) Nadler

245. 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 problem strategies for control field plot design, and establishment in association with diverse California crops. (S/U grading only.)—F. (F.)

290. Seminar (1)
Seminar—1 hour. (S/U grading only.)—F, S. (S, S.)

290C. Advanced Research Conference (2)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Planning and results of research programs, proposals, and experiments. Discussion and critical evaluation of original research being conducted by the group. Discussion led by individual research instructors for research group. (S/U grading only.)

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Neurobiology, Physiology, and Behavior

(Resolved General Education (GE): AM—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; ACGH—American Cultures; DD—Domestic Diversity; DL—Dental Skills; DLQ—Quantitative; SL—Scientific; VL—Visual; WC—World Cultures; WE—Writing Experience)

Fall 2011 and Revised General Education (GE): AM—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; ACGH—American Cultures; DD—Domestic Diversity; DL—Dental Skills; DLQ—Quantitative; SL—Scientific; VL—Visual; WC—World Cultures; WE—Writing Experience

Pre-Fall 2011 General Education (GE): AM—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; Div—Domestic Diversity; Wrt—Writing Experience

Quarter Offered: F—Fall; W—Winter; S—Spring; Su—Summer; 2017-2018 offering in parentheses

Natural Sciences

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W. Martin Usrey, Ph.D., Chairperson of the Department
Department Office, 196 Briggs Hall; 530-752-0203; http://www.npb.ucdavis.edu

Faculty

Primary Department Members

Keith Baer, Ph.D., Associate Professor (Physiology & Membrane Biology)
Sue C. Bodine, Ph.D., Professor (Physiology & Membrane Biology)
Kenneth H. Britten, Ph.D., Professor (Physiology & Membrane Biology)
Rebecca M. Callis, Ph.D., Assistant Professor (Anesthesiology & Pain Medicine)
Natalia Caporale, Ph.D., Lecturer (Surgery)

Secondary Department Members

Earl A. Carstens, Ph.D., Distinguished Professor (Anesthesiology & Pain Medicine)
Hwai-Jong Cheng, M.D., Ph.D., Professor (Pathology & Laboratory Medicine)
Stacey Combes, Ph.D., Assistant Professor (Pathology & Laboratory Medicine)
Thomas P. Cosmas-Hahn, Ph.D., Professor (Pathology & Laboratory Medicine)
William DeBello, Ph.D., Associate Professor (Anesthesiology & Pain Medicine)
Sue M. Ewing, Ph.D., Associate Professor (Pathology & Laboratory Medicine)
Rebecca Findlay, Ph.D., Professor (Pathology & Laboratory Medicine)
Mark S. Goldman, Ph.D., Professor (Ophthalmology & Vision Science)
Neurobiology, Physiology, and Behavior

Aldrin V. Gomes, Ph.D., Associate Professor
(Physiology & Membrane Biology)
David A. Hawk, Ph.D., Professor
Barbara A. Horwitz, Ph.D., Distinguished Professor
(Physiology & Membrane Biology)
Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching Faculty Achievement
Mark O. Huisng, Ph.D., Assistant Professor
Andrew T. Ishida, Ph.D., Professor
(Ophthal physiology & Vision Science)
Kim McAllister, Ph.D., Professor (Neurology)
Lee Miller, Ph.D., Associate Professor
Gabrielle A. Nevitt, Ph.D., Professor
Alexander S. Nord, Ph.D., Assistant Professor
(Psychology & Behavioral Sciences)
Gregg H. Recanzone, Ph.D., Professor
Karen K. Ryan, Ph.D., Assistant Professor
(Physiology & Membrane Biology)
Mitchell L. Sutter, Ph.D., Professor
Gregg H. Recanzone, Ph.D., Professor
(Physiology & Membrane Biology)
Craig H. Warden, Ph.D., Professor
(Pediatrics)
(Neurology)
James S. Trimmer, Ph.D., Professor
Mitchell L. Sutter, Ph.D., Professor
Andrew T. Ishida, Ph.D., Professor
Mark O. Huising, Ph.D., Assistant Professor
(Animal Science)
William C. Adams, Ph.D., Professor Emeritus
(Arts and Humanities; Visual; Domestic Diversity; World Cultures; Writing Experience)
James D. Shaffrath, M.D., Lecturer
(Animal Science; Domestic Diversity; Domestic Diversity; World Cultures; Writing Experience)
Ann V. Hedrick, Ph.D., Adjunct Professor
(Physiology, Distinguished Professor
(Ophthalmology & Vision Science)
David A. Hawkins, Ph.D., Professor
(Physiology & Membrane Biology)
Aldrin V. Gomes, Ph.D., Associate Professor
(Physiology & Membrane Biology)
Mark O. Huising, Ph.D., Assistant Professor
(Animal Science; Domestic Diversity; Domestic Diversity; World Cultures; Writing Experience)

The Program. In the freshman and sophomore years, students majoring in Neurobiology, Physiology, and Behavior study a broad scientific background, taking courses in chemistry, biology, physics, and mathematics. As juniors or seniors, students can enroll in a variety of Neurobiology, Physiology, and Behavior courses and related upper division courses. The NPB major contains three tracks: the Neurobiology track, the Physiology track, and the Organism-Environmental Interactions track. If you wish to prepare to take these tracks for yourself, please meet with your master adviser who can approve such individualized plans. Students can also participate in a number of advanced laboratory courses and design an independent, independent project guided by a member of the faculty.

Career Alternatives. Completion of the Neurobiology, Physiology, and Behavior major provides the foundation for advanced study leading to careers in high school teaching, college level teaching or research. It also serves as the basis for further training in the health professions, including but not limited to human and veterinary medicine, medical technology, physical therapy, pharmacy, nursing, dentistry and optometry. The major is also appropriate for those intending to seek careers in biotechnology or other biologically related industries.

B.S. Major Requirements:

Preparatory Subject Matter: 56-66

Biology 2A-2B-2C ........................................ 15
Chemistry 2A-2B-2C ..................................... 15
Chemistry 8A-8B or 118A-118B .................... 118C
Mathematics 1A-1B-1C or 21A-21B (21C recommended) 6-12
Physics 7A-7B-7C ....................................... 12

Depth Subject Matter: 44-49

Biology 101, 105 (or 102+103) ......................... 10
Neurobiology, Physiology, and Behavior 101A-101B-110C ................................. 15
Three units of laboratory course work from the following tracks below: 3
Neurobiology track: Neurobiology, Physiology, and Behavior 101L
Organism-Environmental Interactions track: Neurobiology, Physiology, and Behavior 101L
Statistics 100 ............................................. 4
Additional Neurobiology, Physiology, and Behavior track-specific depth unit requirement from the following list: 12
Neurobiology track: Neurobiology, Physiology, and Behavior 124/Physiology, and Behavior 160/Neuroscience 160;
Human Development 100/Neuroscience 1000, 101L, 106, 107, 112, 161, 162, 163, 164, 165, 166, 167, 168, 169;
Psychology 130, 135, 137;
Human Physiology 124/Physiology, and Behavior 132;
Exercise Biology 106/Cell Biology and Human Anatomy 101;
Exercise Biology 106/Cell Biology and Human Anatomy 101L;
Exercise Biology 101, 103, 104, 110, 124, 126, 128, 132, 140, 141, 142, 143, 144, 145,
All other Neurobiology, Physiology, and Behavior courses not used in satisfaction of another requirement:

Total Units for Major: 100-115

Minor Program Requirements:

Exercise Biology: 18

At least 15 upper division units in exercise biology from the following courses: Exercise Biology 101, 102, 103, 110, 111, 112, 113, 115, 117, 124, 126
Exercise Biology or other upper division units from: Environ Science 123/Neurobiology, Physiology, and Behavior 101; Biological Sciences, 101, 104, 105

Master Adviser: Paul Saltsik for the Exercise Biology Major and Exercise Biology Minor

Human Physiology: 20

Choose a minimum of 14 units from the following:
Neurobiology, Physiology, and Behavior 101
Neurobiology, Physiology, and Behavior 101L
One course from: Exercise Biology 102, 110, 111, 113, 115, 117, 124
One course from: Neuroscience 106

Master Adviser: Dr. Hwai-Jong Cheng, M.D., Ph.D.

Advising Center, Biology Academic Success Center (BASC); 1023 Sciences Laboratory Building; 530/752-0410; http://basc.ucdavis.edu/

Graduate Study. Information on graduate study in neuroscience, physiology or behavior may be obtained by writing the Graduate Adviser, College of Biological Sciences, Graduate Academic Pro...
grams. See also the graduate course offerings listed under Animal Behavior (A Graduate Group), on page 146, Molecular, Cellular, and Integrative Physiology (A Graduate Group), on page 467, Neuroscience, on page 485 and Physiology, on page 511. See also Graduate Studies, on page 121.

Courses in Exercise Biology (EXB)

Lower Division

10. Exercise and Fitness: Principles and Practice (3)
Lecture—3 hours. Human movement from physiological, psychological, sociological, and historical perspectives. Biomechanics of exercise across the human lifespan. Not open for credit to students who have completed an upper division Exercise Biology course. GE credit: SciEng, Div [SE, SL, W] (F, W, S.)

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)—F, W, S. (F, W, S.)

90D. Lower Division Lecture—1-2 hours. Prerequisite: lower division standing and consent of instructor. Gives freshman or sophomore level students the opportunity to study a special topic in the general area of Exercise Biology in a small class setting. GE credit: SciEng [SE, SL.]

92. Exercise Biology Internship (1-5)
Internship—3-15 hours. Prerequisite: consent of instructor, dependent on availability of intern positions. Work experience in the application of physical activity programs to training, recreational, clinical or research situations under department faculty supervision. May be repeated one time for credit. (P/NP grading only)—F, W, S. (F, W, S.)

97T. Tutoring in Exercise Biology (1-5)
Tutor—1-15 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 courses 97TC, 197T and 197TC. No tutorial units will be counted towards the Exercise Biology major. (P/NP grading only)—F, W, S. (F, W, S.)

97TC. 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 one time for credit. (P/NP grading only)—F, W, S. (F, W, S.)

98. Directed Group Study
Prerequisite: consent of instructor and chairperson. (P/NP grading only)—F, W, S. (F, W, S.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only)—F, W, S. (F, W, S.)

Upper Division

101. Exercise Physiology (4)
Lecture—4 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101. Physiological responses to acute exercise, and physiologic adaptations to both chronic exercise training programs and selected environmental stressors. Emphasis on the muscular, metabolic, cardiovascular, respiratory and renal responses to exercise. Only 1 unit of credit allowed to students who have completed Exercise Science 101. Only 3 units of credit allowed to students who have completed Exercise Science 102. GE credit: SciEng [SE, SL, W] (F, S.) Bodine, Shaffrath

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 psychology. Emphasis on how motor skills are acquired and retained, and the social psychology and human motivation studies to human performance. Only 2 units of credit allowed to students who have completed Exercise Science 104. Only 2 units of credit allowed to students who have completed Exercise Science 105. Not open for credit to students who have completed Exercise Science 104 and 105. (Former Exercise Science 104 and 105.) GE credit: SciEng [SL, SS, W] (F, W) Salitsky

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 3 units of credit allowed to students who have completed Exercise Science 104. Only 1 unit of credit allowed to students who have completed Exercise Science 103 and 104. (Former Exercise Science 103 and 104.) GE credit: SciEng [QL, SE.—S. (S.) Hawkins

104L. Exercise Biology Laboratory (3)
Laboratory—3 hours; lecture—1 hour; discussion—1 hour. Prerequisite: course 101, 102, 103 (the last course may be taken concurrently). Principles and analytical procedures for assessing fundamental physiological, biomechanical, motor learning and motor control factors which underlie human movement and performance. Only 3 units 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: SciEng, Writ [SE, WE.—F, S. (F, S.) Shaffrath

106. Human Gross Anatomy (4)
Lecture—4 hours. Prerequisite: Biological Sciences 2A; concurrent enrollment in course 106L or Cell Biology and Human Anatomy 101 strongly recommended. Upper division students only; Pass One open to upper division Exercise Biology or Anthro- pology majors and seniors in any major; open enrollment at the start of the quarter for upper division students in any major. Detailed study of the gross anatomical structure of the human body, with emphasis on relevant anatomic knowledge for students entering health care professions. (Same course as Cell Biology and Human Anatomy 101.) GE credit: SciEng [SE, SL, W] (F, W, S.) Gross

106L. Human Gross Anatomy Laboratory (3)
Laboratory—9 hours. Prerequisite: Biological Sciences 2A; must take course 106 or Cell Biology and Human Anatomy 101 concurrently or have already completed. Upper division students only; Pass One open to upper division Exercise Biology or Anthropology majors only; Pass Two open to Seniors in any major; open enrollment at the start of the quarter for upper division students only; mandatory attendance on first day of lab. Detailed study of pro- sected human cadavers in small group format with extensive hands-on experience. (Same course as Cell Biology and Human Anatomy 101L.) GE credit: SciEng [SE, SL, W] (F, S.) Shaffrath

110. Exercise Metabolism (3)
Lecture—3 hours. Prerequisite: course 101 or Neuro- biology, Physiology and Behavior 101. Exercise metabolism, whole body protein and carbohydrate metabolism during activity and inactivity. Basics of bioenergetics, substrate utilization, and cell signaling; mechanisms that regulate these properties, and differences between skeletal muscle and cardiac muscle metabolism. GE credit: SciEng [SE, SS, W] (F, S.)

111. Environmental Effects on Physical Performance (3)
Lecture—2 hours; discussion/lab—3 hours. Prerequisite: courses 101 or consent of instructor. The effects of thermal, barometric conditions on physiological function and physical performance of humans. Acute and chronic effects, emphasizing physiological adaptations and limita- tions, will be studied. GE credit: SciEng [QL, SE, W] (W) Shaffrath

112. Clinical Exercise Physiology (4)
Lecture—3 hours; laboratory/discussion—3 hours. Prerequisite: courses 101 or consent of instructor. Physical activity as a therapeutic modality in normal and diseased populations (cardiovascular, pulmo- nary, diabetic). Effects of exercise and inactivity in terms of normal physiology, pathophysiology, and therapeutic benefit. GE credit: SciEng [SE, SL, W] (W) Shaffrath

115. Biomechanical Bases of Movement (3)
Lecture—2 hours; laboratory—3 hours to alternate weekly with discussion—1 hour. Prerequisite: course 103 or consent of instructor. Biomechanical bases of human movement investigated; topics include muscu- louskeletal mechanics, tissue mechanics, electromy- ography, and measurement techniques. Application made to sport, clinical, and work envi- ronments, including extensive analysis of locomotion. GE credit: SciEng [QL, SE, VL, WE.—F, F.] Liets

116. Nutrition for Physically Active Persons (3)

117. Exercise and Aging in Health and Disease (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 101 or 113 (concurrently), Ecology of and standard therapy for various diseases associated with aging (e.g., cardiovascular, pulmonary, and renal diseases, diabetes, obesity, lipemias, etc.). Exercise will then be considered as a protective and/or therapeutic modality. GE credit: SciEng [SE.—S. (S.) Shaffrath

120. Sport in American Society (3)
Lecture—3 hours. Sociological approaches to the study of sport and sport culture, including sport interaction with politics, economics, religion, gender, race, media and ethics. Socializa- tion factors involving youth, scholastic, collegiate, and Olympic sport. (Same course as Physical Education 120.) GE credit: SocSci, Div [SS.—F, S. (F, S.)

121. Advanced Sport Psychology (3)
Lecture—3 hours. Prerequisite: course 102; Psychol- ogy 1 recommended. Advanced study and consider- ation of major theoretical and practical issues in sport psychology. Emphasis on practical application to sport and human performance. —Salitsky

122. Psychological Effects of Physical Activity (3)
Lecture—3 hours. Prerequisite: Psychology 1; upper division standing. Physical activity is evaluated in terms of its ability to enhance the quality of life. Top- ics studied include: individual factors (self concept, type A); special populations (elderly, cardiovascu- lar); and mental health changes (depression, anxie- ty). —S. (S.) Salitsky

124. Physiology of Maximal Human Performance (4)
Lecture—3 hours; practice—4 hours. Prerequisite: course 101 or permission of instructor; Biological Sciences 101, 102, and 103 recommended. Molecu- lar mechanisms underlying adaptation to training. Learn how to exercise to maximize their own perform- ance as well as learning how the frequency, inten-
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 a neuromechanical, physiological, behavioral, and mechanical viewpoint. Topics include central vs. peripheral control mechanisms, open and closed loop theories, motor programming, cognition, and the effects of bio- and chemical influences. Offered irregularly. GE credit: SciEng | SE.

126. Tissue Mechanics (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. [Science and Engineering 126] GE credit: SciEng | QL, SE, SL, WE. —W. (W.) 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 health and diseased populations. [P/NP grading only] Offered irregularly. GE credit: SE. —Casazza

148L. Adult Fitness Testing Laboratory (1)
Laboratory—3 hours. Prerequisite: courses 148 (concurrently). Testing symptomatic and asymptomatic older adults for functional aerobic capacity, body composition, blood lipids, pulmonary function, and cardiovascular disease risk. Counseling adults in appropriate exercise programs and lifestyle modifications. Two quarters minimum; third quarter permitted. May be repeated twice for credit. [Former course Physical Education 148L] (P/NP grading only) Offered irregularly. GE credit: Qi, SE. —Casazza

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. GE credit: SciEng | SE. —S.

189. International Perspectives in Exercise Biology (4)
Lecture—4 hours. Prerequisite: course 10 or upper division standing in Exercise Biology; consent of instructor: students will be accepted based upon academic merit, as well as academic discipline in order to provide multidisciplinary perspectives. Restricted to 22 students. Compare and contrast exercise science issues between the US and an international location. Identifying political, economic, cultural, technological and environmental issues that impact human exercise, physical activity, wellness, and sport from a global perspective. Offered irregularly. GE credit: SciEng | SE.

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. Restricted to upper division students. 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) —F, W, S. (F, W, S.)

192. Exercise Biology Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor; enrollment dependent on availability of intern positions. Work experience in the application of physical activity programs to teaching, recreational, clinical, research, and program faculty supervision. Written report required. May be repeated up to 15 units of credit, including course 92. (P/NP grading only) —F, W, S. (F, W, S.)

194H. Research Honors (2)
Independent study—6 hours. Prerequisite: senior standing, minimum of 6 units of course 199, 3.50 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) GE credit: SciEng | SE. —F, W, S. (F, W, S.)

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 exercise biology course-related material. May be repeated up to 10 units of credit including courses 97T, 97TC and 197TC. No tutorial units can be counted toward the Exercise Biology major. (P/NP grading only) —F, W, S. (F, W, S.)

197T. 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 and 197TC. No tutorial units can be counted towards the Exercise Biology major. (P/NP grading only) —F, W, S. (F, W, S.)

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 and 197TC. No tutorial units can be counted towards the Exercise Biology major. (P/NP grading only) —F, W, S. (F, W, S.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only) —F, W, S. (F, W, S.)

Courses in Neurobiology, Physiology, and Behavior (NPB)

10. Elementary Human Physiology (3)
Lecture—3 hours. Introduction to physiology for non-science majors. Includes basic cell physiology and survey of major organ systems and how they function in homeostasis and human health. Not open for credit to students who have completed course 101. GE credit: SciEng | SE. —F, W, S. (F, W, S.)

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 101, 112, or Psychology 121. GE credit: SciEng | SE. —F, W, S. (F, W, S.)

14. Illusions: Fooling the Brain (3)
Lecture—3 hours. Introduction to perceptual processing in the human nervous system; illusions. GE credit: SciEng | QL, SE, SL. —W. (W.) Dittrich

15. The Biology and Physiology of Aging (4)
Lecture—3 hours; discussion—1 hour. Broad examination of age-associated changes in body functions. Includes basic cell physiology, survey of major organ systems and the age-induced alterations in system function. Some age-associated diseases will also be examined. Not open for credit to students who have completed course 15V. Offered irregularly. GE credit: SciEng | SE. —F, W, S. (F, W, S.)

15V. The Biology and Physiology of Aging (4)
Web virtual lecture—3 hours; web electronic discussion—1 hour. Broad examination of the biological and physiological basis of aging in animals and plants. Concepts in demographic, evolutionary, genetic, and cellular and molecular changes in organ systems, age-related alterations in system function, and age-related diseases. Intended for non-science majors. Not open for credit to students who have completed course 15T. Offered irregularly. GE credit: SciEng | SE, SL. —S. (S.)

17. The Path to Cyborgs: Introduction to Prostheses and Human Machine Interfaces (3)

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 contemporary society. Intended for non-science majors. Not open for credit to students having completed course 168. GE credit: SciEng. —S. (S.) Bautista

90A. Lower Division Seminar: Issues in Body Weight Regulation (2)
Seminar—2 hours. Prerequisite: lower division standing, consent of instructor. Limited enrollment. Critical examination of issues in body weight regulation through shared readings, discussions, written assignments, debates and oral presentations. —C. Warden

90C. Human Color Perception (3)
Seminar—2 hours; term paper. Prerequisite: lower division standing. Class size limited to 15 students with lower division standing. 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.—Werner

90C. Current Issues in Animal Behavior (2)
Seminar—2 hours. Prerequisite: lower division standing, limited enrollment. Current issues and implications of current research on the brain. Examination of research related to current issues. Offered irregularly.

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 those abnormalities. Offered irregularly.

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. Restricted to lower division students. Research findings and methods in neurobiology of addiction and the impact of drugs on contemporary society. Intended for non-science majors. Not open for credit to students having completed course 15V. Offered irregularly.GE credit: SciEng | SE. —F, W, S. (F, W, S.)

92. Internship (1-12)
Internship—3-36 hours. Prerequisite: lower division standing; consent of instructor. Work experience off and on campus in all subject areas offered in the Department of Neurobiology, Physiology, and Behavior. Internships supervised by a member of the faculty. May be repeated for credit. (P/NP grading only) —F, W, S. (F, W, S.)
98. Directed Group Study (1-5)
Prerequisite: lower division standing and consent of instructor. [P/ NP grading only.]—F, W, S. [F, W, S]

99. Special Undergraduates (1-5)
Prerequisite: lower division standing and consent of instructor. [P/ NP grading only.]—F, W, S. [F, W, S]

Upper Division

100. Neurobiology Laboratory (3)
Lecture—1 hour; laboratory—3 hours; term paper. Prerequisite: course 100 (may be taken concurrently). Experimental basis of neurobiology principles discussed in course 100. Topics include neurophysiology, sensory systems, motor systems, neural networks, cognitive neuroscience, and quantitative data analysis and modeling techniques. GE credit: SciEng | SE. —S. (S.) Goldman

100Q. 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 neuroscience—Offered irregularly. GE credit: QL, VL—Mongilder, Sutter

101. Systemic Physiology (5)
Lecture—5 hours. Prerequisite: Biological Sciences 1A, 1B, or 2A and Chemistry 2B, Physics 18 or 7C. Structural and functional aspects of mammalian systemic physiology with emphasis on aspects of human physiology. Functions of major organ systems, with the structure of those systems described as a basis for understanding the functions. GE credit: SciEng | SE. —F, W, S. [F, W, S]

101D. Systemic Physiology Discussion (1)
Discussion—1 hour. Prerequisite: course 101 (concurrently); consent of instructor. Discussion and problem solving related to fundamental principles of systemic physiology as presented in course 101. ([P/NP grading only].) —F, W, S. [F, W, S].

101L. Systemic Physiology Laboratory (3)
Laboratory—3 hours; discussion—2 hours; term paper. Prerequisite: course 101. Selected experiments illustrating characteristics of organ systems discussed in course 101. —F, W, S. [F, W, S]. Bautista, 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. The evolution of behavior, with special emphasis on behavior under natural conditions. Not open for credit to students who have completed course 155. [Former course 155.] GE credit: SL—F, S. [F, S]. Britten, Hahn, Nevitt

102Q. Quantitative Topics in Animal Behavior Undergraduate (1)
Autotutorial—1.5 hours; extensive problem solving—1.5 hours. Prerequisite: Mathematics 168; course 102 (may be taken concurrently). Study of the quantitative concepts and examplar models used in animal behavior. Offered irregularly. GE credit: SciEng. —Hahn

103. Cellular Physiology/Neurobiology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, 2A and Chemistry 2B; Physics 7C recommended. Cellular physiology with emphasis on membrane transport processes and neuronal physiology. Fundamental physical-chemical and biological mechanisms of membrane transport will be related to cytoplasmic homeostasis, communication between cells, and the cellular mechanisms of sensory and motor transduction. Not open for credit to students who have taken course 100B (Former course 100B) offered irregularly.

104L. Cellular Physiology/Neurobiology Laboratory (4)
Lecture—1 hour; laboratory—3 hours; discussion—1 hour; term paper. Prerequisite: courses 101 and 101L; Biological Sciences 103 or 105. Experiments in the physical and chemical processes of cells and tissues. Offered irregularly. GE credit: Wrt—Robertson

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 101T. Introduction to the ideas, mathematical techniques, and computer tools required for developing models of cellular processes in physiology and neurobiology. Applications include membrane transport, ionic channels, action potentials, Ca" oscillations, respiration, and muscle contraction. Offered irregularly.

106. Experiments in Neurobiology, Physiology, and Behavior: Design and Execution (3)
Laboratory—7.5 hours; discussion—0.5 hours. Prerequisite: courses 101, 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 a faculty member. May be repeated one time for credit to complete the project, with consent of instructor. An additional repeat is permitted for a different project under the guidance of another faculty member. ([P/NP grading only.] GE credit: OL, QL, VL, WRT—F, W, S. [F, W, S]. Rosenquist

107. Cell Signaling in Health and Disease (3)
Lecture—3 hours. Prerequisite: Biological Sciences 102 or 105. Basics of cell signaling pathways, their disruption in disease, and their current utility and future potential as therapeutic targets. Focus is on signaling pathways specific to nervous, endocrine, and immune systems, and those fundamental to all cells. GE credit: SL—S. (S.) Trimmer

110A. Foundations 1: From Molecules to Individuals (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A, 2B and 2C, Chemistry 2A and 2B, Physics 7A, 7B, and 7C at least concurrent. Pass One restricted to majors in Neurobiology, Physiology, and Behavior. Cell biology of learning and memory. Not open for credit to students who have completed course 100B (Former course 100B) offered irregularly. GE credit: SciEng | SE. —F, W, S. (F, W, S). Games, Hahn

110B. Foundations 2: Neurobiology (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: Physics 7C and course 110A completed with a grade of C- or above. Open to declared NB majors only. Core concepts of neurobiology including single-neuron biophysics, synapses and transmitters, neuronal development, motor systems, central pattern generation, neuronal circuits, intracellular signal transduction, sensory processing, multisensory integration, autonomic nervous system, neuromodulation, learning and memory, and higher cognition and disease. Credit limited to 2 units for students who have taken course 100. GE credit: SciEng | SE. —F, W, S. (F, W). Britten, Sutter

110C. Foundations 3: Physiology (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 110B completed with a grade of C- or above. Open to declared NB majors only. Focuses on the structure, function, and interactions of animal organ systems in homeostasis and reproduction, and the response to perturbations of homeostasis; neural and endocrine signaling; skeletal muscle and movement; cardiovascular and respiratory systems; renal, digestive, immune, and endocrine systems. Credit limited to two units for students who have taken course 101. GE credit: SciEng | SE. —W. S. (W. S.) Furlow, Utsey

111C. Advanced Systemic Physiology Laboratory (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: courses 101, 101T, Statistics 13; course 112, 113, or 114 recommended. Interfacing physiological recording equipment with the microcomputer; data acquisition and analysis using the microcomputer; data interpretation within the framework of physiological concepts. Offered irregularly. GE credit: QL, VL, WRT

111L. Advanced System Physiology Laboratory (4)
Lecture—1 hour; discussion—2 hours; laboratory—6 hours; term paper. Prerequisite: courses 101 and 101T, 104, and for selected comprehensive experiments in the autonomic nervous system and the cardiovascular, respiratory, and neuromuscular systems. Emphasis on conceptual and methodological approaches in demonstrating the physiology of organ systems. GE credit: WRT—W. (W.) Liets

112. Neuroscience (3)
Lecture—3 hours. Prerequisite: course 100 or 101. Presentation of concepts in neuroscience including sensory systems, motor systems, and higher neurointegration. Emphasis on mammalian nervous system. Offered irregularly. GE credit: SL

113. Cardiovascular, Respiratory, and Renal Physiology (4)
Lecture—4 hours. Prerequisite: course 101; Chemistry 88, Physics 78 and 7C recommended. An intense and advanced presentation of concepts in cardiovascular, respiratory, and renal physiology including discussion of acid-base balance.

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. —F. (F.) Bautista, Horwitz

117. Avian Physiology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 18, 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. —S. (S.) Hahn, Klasing

121. Physiology of Reproduction (4)
Lecture—4 hours. Prerequisite: course 101. Physiological mechanisms related to reproduction, including efficiency and fertility, with special reference to domestic animals. GE credit: QL, SL—W. (W.) Berger

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.] —W. (W.) Berger

122. Developmental Endocrinology (3)
Lecture—3 hours. Prerequisite: course 101. Restricted to upper division standing. Hormonal control of development, maternal and fetal physiology from the cellular to physiological level, with emphasis on the human. Prenatal and neonatal life, childhood and adolescence, adulthood and pregnancy, as well as the endocrinology of aging. Offered irregularly.

123. 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
114. Physiological Adaptation of Marine Organisms (3)
115. Physiological Adaptation of Marine Organisms Laboratory Topic (5)
Laboratory—12 hours; discussion—1 hour. Prerequisite: course 141 concurrently; residence at Bodega Marine Laboratory required. Students must submit application available at http://www.bml.ucdavis.edu. Training in scientific research from hypothesis to publication, including methods of library research. Research related to a topic covered in course 141. GE credit: W, VE.  
150. Advanced Animal Behavior (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 102 or Psychology 101. Advanced integrative survey of biological principles of behavior 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 Psychology 122.) Offered irregularly. —Hahn  
152. Hormones and Behavior (3)
Lecture—3 hours. Prerequisite: courses 101, and either course 102 or Psychology 101. Endocrine physiology with an emphasis on the principles of behavior. Fundamental relationships between 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 Psychology 123.) —S. (S.) Bales, Furlow, Hahn —S. (S.) Hahn.  
159. Frontiers in Behavior (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: courses 100, 101, 102. Lectures by leading authorities and discussion of the latest research in newly emerging areas in behavioral biology. Offered every fourth year. Offered irregularly. GE credit: SciEng | QL, SE.  
160. Molecular and Cellular Neurobiology (5)
Lecture—1.5 hours; discussion—1.5 hours. Prerequisite: course 100, Biological Sciences 101 and consent of instructor. Selected topics in neurobiology. Topics include channel biophysics, action potential propagation, ion channel function and interaction pathways, synaptic physiology and quantal analysis, cellular mechanisms of synaptic plasticity, and neuropeptidomics of synaptic circuitry. (Same course as Neuroscience 160.) Offered irregularly. GE credit: QL.  
160L. Advanced Cellular Neurobiology Laboratory (4)
Laboratory—12 hours. Prerequisite: course 160, Physics 7C recommended. Students will learn to record neural activity, to interpret their recordings, and to label neurons with antibodies against neuromodulators. Offered irregularly.  
161. Developmental Neurobiology (3)
Lecture—3 hours. Prerequisite: course 100 or 101. Issues, theoretical concepts, and methodologies in developmental neurobiology. Topics include prenatal and postnatal differentiation of neurons, and plasticity in the mature and aging brain. Integration of neurochemical, structural, physiological and behavioral perspectives. GE credit: SciEng | SE, —W. (W.) McAllister, Zito  
162. Neural Mechanisms of Behavior (3)
Lecture—3 hours. Prerequisite: course 100 or 101. The relationship between brain and behavior. Identification and analysis of the relevant neural circuits involved. Examples of systems to be considered are birdsong, locomotion, echolocation. —S. (S.) Britten  
163. Systems Neuroscience (3)
Lecture—3 hours. Prerequisite: course 100 or equivalent basic neuroscience training with consent of instructor. Concepts and techniques in systems neuroscience: e.g., measuring and manipulating neural activity, structure of neocortex, sensory processing, motor control, short-term and long-term storage of information, neural codes, neuronal mechanisms underlying cognitive functions. GE credit: SE, —S. (S.) Dittrich.  
164. Mammalian Vision (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100, 112, or Psychology 101. Structure and function of the mammalian visual system, from the formation of images on the retina through visually guided behavior and perception. Emphasis on biological mechanisms underlying vision. —W. (W.) Britten, Werner  
165. Neurobiology of Speech Perception (3)
Lecture—4 hours. Prerequisite: course 100 or permission of instructor; Math 16A, B, C or equivalent; Physics 7C strongly recommended. Introduction to mathematics techniques used in neuroscience. Applications to neuroscience of differential equations, linear algebra, Fourier transforms, correlation and convolution, and probability theory. Offered irregularly. GE credit: QL, —Goldman.  
166. Math Tools for Neuroscience (4)
Lecture—4 hours. Prerequisite: course 100 or permission of instructor; Math 17A, 17B, 17C, or equivalent; Physics 7A, B, C or equivalent strongly recommended; consent of instructor. Mathematical and computational techniques used to describe computations performed by nervous systems. Lectures include single neuron biophysics, neural coding, network dynam- ics, memory, plasticity, and learning. Lab topics include programming mathematical models and data analysis techniques in MATLAB. Offered irregularly. GE credit: SciEng | SE, QL, —Goldman.  
168. Neurobiology of Addictive Drugs (4)
Lecture—2 hours; discussion—1 hour. Prerequisite: courses 100 and 101 or the equivalent. Neurobiological basis for the effects and mechanisms of action of drugs with addictive potential, including opiates (morphine, heroin, methadone), alcohol, nicotine, marijuana (cannabinoids), alcohol, caffeine, and mind-altering drugs such as LSD and anti-depressants. GE credit: SL, VL, —S. (S.) Liets.  
169. Frontiers in Neurobiology (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: courses 100 and 101, course 102 [may be taken concurrently]. Lectures by leading authorities and discussion of the latest research in newly emerging areas in neurobiology. Offered every fourth year. Offered irregularly. GE credit: QL.  
190C. Research Conference (1)
Discussion—1 hour. Prerequisite: upper division standing in Neurobiology, Physiology, and Behavior or related biological sciences and consent of instructors for concurrent enrollment in course 199. Research findings and methods in neurobiology, physiology,
and/or behavior. Presentation and discussion of research by faculty and students. May be repeated for credit. (P/NP grading only)—F, W, S. (F, W, S.)

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 neurobiology, physiology, & behavior. May be repeated for credit. (P/NP grading only)—F, W, S. (F, W, S.)

194HA. Neurobiology, Physiology, and Behavior–Honors (1)
Laboratory—3-12 hours. Prerequisite: senior standing; minimum 3.500 GPA in courses counted toward major; approval by the Master Adviser. Honors project in Neurobiology, Physiology, and Behavior. Laboratory research on a specific question. The project is developed with the sponsoring faculty member and approved by the student's Honors Thesis Committee. Honors thesis is to be submitted upon completion of the project. (P/NP grading only)—F, W, S. (F, W, S.)

194HB. Neurobiology, Physiology, and Behavior–Honors (1-4)
Laboratory—3-12 hours. Prerequisite: senior standing; minimum 3.500 GPA in courses counted toward major; approval by the Master Adviser. Honors project in Neurobiology, Physiology, and Behavior. Laboratory research on a specific question. The project is developed with the sponsoring faculty member and approved by the student's Honors Thesis Committee. Honors thesis is to be submitted upon completion of the project. (P/NP grading only)—F, W, S. (F, W, S.)

194HC. Neurobiology, Physiology, and Behavior–Honors (2)
Laboratory—3-12 hours. Prerequisite: senior standing; minimum 3.500 GPA in courses counted toward major; approval by the Master Adviser. Honors project in Neurobiology, Physiology, and Behavior. Laboratory research on a specific question. The project is developed with the sponsoring faculty member and approved by the student's Honors Thesis Committee. Honors thesis is to be submitted upon completion of the project. (P/NP grading only)—F, W, S. (F, W, S.)

197. Tutoring in Neurobiology, Physiology, and Behavior—1 hour
Discussion—2-6 hours. Prerequisite: upper division standing and consent of instructor. Assisting the instructor by tutoring students in one of the Department's regular courses. May be repeated for credit. (P/NP grading only)—F, W, S. (F, W, S.)

198. Directed Group Study (1-5)
(P/NP grading only)—F, W, S. (F, W, S.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)—F, W, S. (F, W, S.)

Graduate

211. Advanced Topics in Neuroimaging (2)
Seminar—2 hours. Prerequisite: Psychology 210 or consent of instructor. Restricted to 15 students. Theory and critical presentation and discussion of the most influential advanced issues in neuroimaging, emphasizing fMRI design/analysis and the integration of fMRI with other imaging modalities (course as Neuroscience 211 and Psychology 211.) May be repeated for credit. (S/U grading only)—W. (W.)

212. Light and Fluorescence Microscopy (2)
Lecture—2 hours. Prerequisite: consent of instructor. Restricted to 15 students. Theory and practical application of light and fluorescence microscopy in the biological sciences. (S/U grading only)—W. (W.)

217. Advanced Avian Physiology (1)
Project—1 hour. Prerequisite: graduate standing and concurrent enrollment in course 117; consent of instructor. Study in depth of a topic in avian physiology through development of a lecture with associated instructional materials such as lesson plan readings, presentation, and evaluation aids. —S. (S.) Millan

221. Cellular Neuroscience (4)
Lecture—3 hours; discussion—1.5 hours. Advanced course on cellular and subcellular organization of the nervous system. Membrane channels, sensory transduction, synaptic transmission and cellular aspects of development and learning. —F. (F.) Burns, McAllister, Trimmer, Zito

222. Systems Neuroscience (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: graduate standing or consent of instructor. Integrative and information-processing aspects of nervous system organization. Topics include sensory systems, motor function, sensorimotor integration, the limbic system, and the neurobiology of learning and memory. (Same course as Neuroscience 222.)—W. (W.) DeBello, Dittrich, Usrey

245. Computational Models of Cellular Signaling (3)
Lecture—3 hours. Prerequisite: consent of instructor. Computational and mathematical techniques in modeling of regulatory and signaling phenomena in neurobiology and cell physiology, focusing on linear and nonlinear ordinary differential equation models. Applications include ion channel kinetics, electrical activity, signal transduction, calcium oscillations, and simple neural circuits. Offered irregularly.

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 involved in development and disease of the nervous system. (Same course as Neuroscience 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 Neuroscience 261A.) (S/U grading only)—F. (F.) 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 anatomy, biochemistry, electrophysiology, psychophysics, 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)—F. (F.) Britten

261C. Topics in Vision: Clinical Vision Science (2)
Lecture/discussion—2 hours. Prerequisite: courses 261A and 261B or consent of instructor. Causes and mechanisms 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 Molecular, Cellular, and Integrative Physiology 261C.) Offered irregularly. (S/U grading only)—F. (F.) Werber

263. Modeling in Systems Neuroscience (4)
Lecture—3 hours; lecture/laboratory—1 hour. Prerequisite: 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, electroreception, communications, and motor systems. Other topics include transforms, modeling assumptions, scales and linearity. Offered in alternate years.

267. Computational Neuroscience (5)
Lecture—4 hours; lecture/laboratory—3 hours. Prerequisite: one course in general neuroscience at the level of course 100; one year college-level Calculus at level of Math 16A, B, C; one year Physics at the level of Physics 7A, B, C, strongly recommended; students from other departments should contact the instructor. Mathematical models and data analysis techniques used to describe computations performed by nervous systems. Lecture topics include single-neuron biophysics, neural coding, network dynamics, memory, plasticity, and learning. Lab topics include programming mathematical models and data analysis techniques in MATLAB. Offered in alternate years. (Same course as Neuroscience 267.)—F. (F.) Goldman

270. How to Write a Fundable Grant Proposal in the Biomedical Sciences (2)
Lecture—discussion—2 hours. Prerequisite: consent of instructor. Restricted to members of the Neuroscience and BMCD& graduate groups; graduate students in other biomedical programs may enroll with instructor permission. Teaches the do's and don'ts of writing grants in the biomedical sciences and the mechanisms of the review process. Offered in alternate years. May be repeated for credit. (Same course as Neurobiology, Physiology and Behavior 270.)—F. (F.) Burns

285. Literature in Visual Neuroscience (2)
Seminar—2 hours. Literature in Visual Neuroscience. (Same course as Neuroscience 285.) May be repeated for credit. (S/U grading only)—F, W, S. (F, W, S.)

287A. Topics in Theoretical Neuroscience (2)
Seminar—2 hours. Prerequisite: consent of instructor. In-depth exploration of topics in theoretical neuroscience. Topics vary each year. Fall quarter (287A): foundational material from books and review articles. Spring quarter (287B): continuation of year's topic through readings of seminal articles from the primary literature. Offered in alternate years. May be repeated for credit. (Same course as Neuroscience 287A.) (S/U grading only)—F. (F.) Dittrich, Goldman

287B. Topics in Theoretical Neuroscience (2)
Seminar—2 hours. Prerequisite: consent of instructor. In-depth exploration of topics in theoretical neuroscience. Topics vary each year. Fall quarter (287A): foundational material from books and review articles. Spring quarter (287B): continuation of year's topic through readings of seminal articles from the primary literature. May be repeated for credit. (Same course as Neuroscience 287B.) (S/U grading only)—S. (S.) Dittrich, Goldman

291. Auditory Neuroscience (1)
Seminar—0.5 hours; discussion—0.5 hours. Prerequisite: course 100 or 112 or Neuroscience 222 or the equivalent. Exploration of various important aspects of auditory physiology, behavior and psychophysics through review of original literature. Each topic is repeated for credit with consent of instructor. (S/U grading only)—F, W, S. (F, W, S.)

Neuroscience

See Neurobiology, Physiology, and Behavior, on page 479; and Neuroscience (A Graduate Group).
Neuroscience (A Graduate Group)

W. Martin Usrey, Ph.D., Chairperson of the Group
Group Office. 148 Center for Neuroscience
530-757-8845; http://neuroscience.ucdavis.edu/grad

Faculty
Leonard J. Abbeduto, Ph.D., Professor
(Psychiatry and Behavioral Sciences)
David Amaral, Ph.D., Professor
(Psychiatry and Behavioral Sciences)
Robert Berman, Ph.D., Professor
(Neurological Surgery)
Laurea Baradinsky, Ph.D., Assistant Professor
(Physiology and Microanatomical Biology)
Kenneth H. Britten, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)
Marie Burns, Ph.D., Professor
(Ophthalmology and Vision Science)
Earl E. Carsten, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)
Cameron Carter, M.D., Professor
(Psychiatry and Behavioral Sciences)
Tsong-Yu Chen, M.D., Ph.D., Professor
(Neurology)
Hwai-Jong Cheng, M.D., Ph.D., Professor
(Neurobiology, Physiology, and Behavior)
Gino Curti, Ph.D., Professor
(Molecular Biosciences)
Jacqueline Crawley, Ph.D., Professor
(Psychiatry and Behavioral Sciences)
William DeBello, Ph.D., Associate Professor
(Neurobiology, Physiology, and Behavior)
Charles DeCarli, M.D., Professor (Neurology)
Wenbin Deng, Ph.D., Associate Professor
(Biochemistry and Molecular Medicine)
Elva Diaz, Ph.D., Associate Professor
(Pharmacology)
Jocelyne Ditterich, Ph.D., Associate Professor
(Neurobiology, Physiology, and Behavior)
Arne Ekstrom, Ph.D., Associate Professor
(Psychology)
Michael Ferris, M.D., Ph.D., Professor
(Anesthesiology and Pain Medicine)
Joy Geng, Ph.D., Associate Professor (Psychology)
Mark Goldman, Associate Professor
(Neurobiology, Physiology, and Behavior)
Qi Zhao Gong, Ph.D., Associate Professor
(Cell Biology and Human Anatomy)
Freddy Gorin, M.D., Ph.D., Professor (Neurology)
John Graff, M.D., Ph.D., Assistant Professor (Neurology)
Randi Hagerman, M.D., Professor (Pediatrics)
Hanks, Tim, Ph.D., Assistant Professor (Neurology)
Johannes Halstead, Ph.D., Professor (Pharmacology)
Andrew T. Ishida, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)
Li-En Jiao, Ph.D., Assistant Professor
(Cell Biology and Human Anatomy)
Petra Janata, Ph.D., Professor (Psychology)
Lee-Woo Jung, Ph.D., Professor
(Pathology and Laboratory Medicine)
Paul S. Knoepfler, Ph.D., Associate Professor
(Cell Biology and Human Anatomy)
Leah Krubitzer, Ph.D., Professor (Psychology)
Janine LaSalle, Ph.D., Professor
(Medical Microanatomical Immunology)
Pamela Lein, Ph.D., Professor
(Molecular Biosciences)
Steven Luck, Ph.D., Professor (Psychology)
Bruce Lyeth, Ph.D., Professors
(Neurological Surgery)
Kimberley A. McAllister, Ph.D., Professor (Neurology & Neurobiology, Physiology, and Behavior)
Lee Miller, Ph.D., Professor (Neurology, Physiology, and Behavior)
John Morrison, Ph.D. (Neurology)
Stephen Noctor, Ph.D., Assistant Professor
(Psychiatry and Behavioral Sciences)
Alex Nord, Ph.D., Assistant Professor
(Neurobiology, Physiology, and Behavior)
Christine Nordahl, Ph.D., Assistant Professor
(Psychiatry and Behavioral Sciences)
John Olichney, M.D., Professor
(Neurology)
Isaac N. Persaud, Ph.D., Professor
(Molecular Biosciences)
David Pleasure, M.D., Professor
(Neurology and Pediatrics)
Edward N. Pitch, Ph.D., Professor
(Cell Biology and Human Anatomy)
J. Daniel Ragland, Ph.D., Professor
(Psychiatry and Behavioral Sciences)
Charan Ranganath, Ph.D., Professor (Psychology)
Gregg H. Recanzone, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)
David Richman, M.D. Professor (Neurology)
Susan Rivera, Ph.D., Professor (Psychology)
Michael Rogawski, M.D., Ph.D., Professor
(Neurology)
Karen Ryan, Ph.D., Assistant Professor
(Neurobiology, Physiology, and Behavior)
Julie Schweitzer, Ph.D., Professor
(Psychiatry and Behavioral Sciences)
Kiarash Shafihaie, M.D., Ph.D., Assistant Professor
(Neurology and Surgery)
Frank Sharp, M.D., Professor (Neurology)
Jill Silverman, Ph.D., Assistant Professor
(Psychiatry and Behavioral Sciences)
Sergi Simo, Ph.D., Professor
(Cell Biology and Human Anatomy)
Tony Simon, Ph.D., Professor
(Psychiatry and Behavioral Sciences)
Danielle Stolzenberg, Ph.D., Assistant Professor
(Psychology)
Mitchell S. Sutter, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)
Brian Trainor, Ph.D., Associate Professor
(Psychology)
James Trimmer, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)
W. Martin Unger, Ph.D., Professor
(Neurobiology and Neurology, Physiology, and Behavior)
John S. Werner, Ph.D., Professor
(Ophthalmology and Vision Science)
Brian Willgen, Ph.D., Associate Professor
(Psychology)
Yang (Kevin) Xiang, Ph.D., Associate Professor
(Pharmacology)
Andrew Yonelinas, Ph.D., Professor (Psychology)
Konstantinos Zabalalis, Ph.D., Assistant Professor
(Pathology)
Min Zhao, M.D., Ph.D., Professor
(Physiology and Behavior)
Cheng Ji Zhou, Ph.D., Assistant Professor
(Cell Biology and Human Anatomy)
Karen Zito, Ph.D., Associate Professor
(Neurobiology, Physiology, and Behavior)

Emeriti Faculty
Leo M. Chalupa, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)
Edward G. Jones, M.D., Ph.D., Professor (Psychiatry)
Brian Mullaney, Ph.D., Professor
(Neurobiology, Physiology, and Behavior)
Karen Sigvardt, Ph.D., Adjunct Professor
(Neurology)
David Woods, Ph.D., Adjunct Professor
(Neurology)

Graduate Study. The Graduate Group in Neuroscience offers programs of study leading to the Ph.D. degree. Neuroscience is a broad, interdepartmental program with faculty interests ranging from molecular biology, cell and molecular biology, and physiology, and cognition. A major goal of the program is to prepare students for careers as research scientists.

Details of the program may be obtained from the Graduate Advisers.

Graduate Advisers. R. Berman (Neurological Surgery); E. Diaz (Pharmacology); A. Ishida (Neurobiology, Physiology, and Behavior); W.M. Usrey (Neurobiology, Physiology, and Behavior); B. Wiltgen (Psychology)

Courses in Neuroscience (NSC) Upper Division
160. Molecular and Cellular Neurobiology (3)
Lecture—1.5 hours; discussion—1.5 hours. Prerequisi- te: Neuroscience, Physiology, and Behavior 100, Biological Sciences 101 and consent of instructor. Selected topics in neurobiology. Topics include channel biophysics, action potential propagation, intra-cellular signal transduction pathways, synaptic physiology and quantal analysis, cellular mechanisms of synaptic plasticity, and neuroendodulation of synaptic circuitry. (Same course as Neuroscience, Physiology, and Behavior 160.) GE credit: Vl.—S. (S.) Burns

Graduate
200LA. Laboratory Methods in Neurobiology (6)
Laboratory—18 hours. Prerequisite: graduate standing in the Neuroscience Graduate Group. Individual research in the laboratory of a faculty member. Research problems emphasize the use of contemporary methods and good experimental design. May be repeated three times for credit. (S/U grading only)—F. W. (F. W. S.)

200LB. Laboratory Methods in Neurobiology (3)
Laboratory—9 hours. Prerequisite: graduate standing in the Neuroscience Graduate Group. Individual research in the laboratory of a faculty member. Research problems emphasize the use of contemporary methods and good experimental design. May be repeated for credit. (S/U grading only)—F. W. S. (F. W. S.)

201. Neuroanatomy (3)
Lecture—2 hours; laboratory/discussion—1 hour. Prerequisite: consent of instructor. Restricted to 16 students. Critic- al presentation and discussion of the most important advanced issues in neuroanatomy from a biological perspective, with comparisons between human and non-human brains. Emphasis on functional anatomy of the nervous system, integrated with cellular, molecular, cognitive, and developmental concepts. —F. (F.) Amador

Advanced Topics in Neuroimaging (2)
Seminar—2 hours. Prerequisite: Psychology 210 or consent of instructor. Restricted to 16 students. Critical presentation and discussion of the most important advanced issues in neuroimaging, emphasizing fMRI design/analysis and the integration of fMRI with EEG/MEG. (Same course as Neuroscience, Physiology, and Behavior 211) GE credit: VL—S. (S.) Miller

220. How to Give a Scientific Seminar (3)
Lecture/discussion—3 hours. Prerequisite: consent of instructor. Presentation of effective seminars. Must be presented in sequence, with an emphasis on seminars of interest to seminars in sem- baninar format. Must be taken in two consecutive quar- ters. Offered in alternate years. —F. S. (F. S.) DeBello, McAllister

221. Cellular Neurophysiology (4)
Lecture—4.5 hours. Prerequisite: graduate standing or consent of instructor. Physiological aspects of cell- lular and subcellular organization of the nervous sys- tem. Neuronal cell biology, the structure and function of ion channels, electrical excitability, signaling cascades, sensory transmission, and mechanisms of syn- aptic transmission, and the cellular basis of learning and memory. —F. (F.) Burns, Chen

222. Systems Neurobiology (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: graduate standing or consent of instructor. Integration and information-processing aspects of nervous system organization. Topics include sensory systems, motor function, sensorimotor integration, the limbic system, and the neurobiology of learning and mem- ory. (Same course as Neuroscience, Physiology, and Behavior 222.) —W. (W.) DeBello, Ditterich, Usrey
223. Cognitive Neuroscience (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing in Psychology or Neurosciences or consent of instructor. Graduate core course for neuroscience. Neurobiological bases of higher mental function including attention, memory, language, and emotion. One of three in three-quarter sequence.
(Same course as Psychology 261.)—S. (S.) Swaab

224A. Molecular and Developmental Neurobiology (2)
Lecture/discussion—2 hours. Prerequisite: consent of instructor. Key issues in developmental and molecular neurobiology. Discussion emphasis on critical evaluation of the experiments and methods described in research papers. Readings of seminal, primary research papers, reviews, and book chapters. Reading materials will be distributed one week in advance.—W. (W.) Cheng, Diaz

224B. Molecular and Developmental Neurobiology (2)
Lecture/discussion—2 hours. Prerequisite: course 224A or consent of instructor. Continuation of course 224A. Key issues in developmental and molecular neurobiology, focusing on developmental topics. Discussion emphasis on critical evaluation of experiments and methods described in associated literature. Offered in alternate years.—S. Cheng, Diaz

225. Translational Research in the Neurobiology of Disease (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: Past or concurrent enrollment in Neuroscience courses 221, 222, 223, or permission of instructor; restricted to current graduate student enrollment or permission of instructor. This course will provide an overview of major neuropsychiatric and neurological disorders from both the clinical and fundamental science perspectives. Offered in alternate years.—W. Carter, McAllister

226. Molecular and Developmental Neurobiology (4)
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Introduction to molecular and developmental neurobiology. Topics range from neurotubulation to development of sensory systems and include modern molecular methods and their application in developmental neuroscience.—W. (W.) McAllister

243. Topics in Cellular and Behavioral Neurobiology (2)
Discussion—1 hour; seminar—1 hour. Prerequisite: consent of instructor. An advanced examination of several current problems in neurobiology. Topics will vary in different years; may be repeated for credit. (S/U grading only.)—S. (S.) Ishida

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 involved in development and disease of the nervous system. (Same course as Neurobiology, Physiology, and Behavior 247.) Offered in alternate years.—W. Choudary

250. Biology of Neuroglia (2)
Lecture/discussion—1.5 hours. Prerequisite: consent of instructor. The properties and functions of non-neuronal cells in the mammalian central nervous system with relevance to neuronal development, physiology and injury response. Offered in alternate years. (S/U grading only.)—S. (S.) Ishida

261B. Topics in Vision: Systems, Psychophysics, Computational Models (2)
Lecture/discussion—2 hours. Prerequisite: consent of instructor, course 261A. Functions of the central visual pathways and their underlying mechanisms. Recent research on aspects of anatomy, biochemistry, psychophysics, development, and genetics of the visual system. (Same course as Neurobiology, Physiology, and Behavior 261B and Molecular, Cellular, and Integrative Physiology 261C.) (S/U grading only.) Offered in alternate years.—W. Britten

261C. Topics in Vision: Clinical Vision Science (2)
Lecture/discussion—2 hours. Prerequisite: courses 261A and B, 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 Neurobiology, Physiology, and Behavior 261C and Molecular, Cellular, and Integrative Physiology 261C.) (S/U grading only.) Offered in alternate years.—W. Britten

267. Computational Neuroscience (5)
Lecture—4 hours; lecture/laboratory—3 hours. Prerequisite: one course in general neuroscience at the level of course 100; one year college-level Calculus at level of Math 10A, B, C, one year Physics at the level of Physics 7A, B, C, strongly recommended; students from other departments should contact the instructor. Mathematical models and data analysis techniques used to describe computations performed by nerve systems. Lecture topics include single-neuron biophysics, neural coding, network dynamics, memory, plasticity, and learning. Lab topics include programming mathematical models and data analysis techniques in MATLAB. Offered in alternate years. (Same course as Neurobiology, Physiology & Behavior 267.)—(F.) Goldman

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.)—F, W, S. (F, W, S.)

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.)—F, S. (F, S.) Cheng

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.)—F, W, S. (F, W, S.) Britten, Goldman, Ursery

287A. Topics in Theoretical Neuroscience (2)
Seminar—2 hours. Prerequisite: consent of instructor. In-depth exploration of topics in theoretical neuroscience. Topic varies every year. Fall quarter (287A): foundational material from books and review articles. Spring quarter (287B): continuation of year’s topic through readings of seminal articles from the primary literature. May be repeated for credit. (Same course as Neurobiology, Physiology & Behavior 287A.) (S/U grading only.)—(F.) Ditterich, Goldman

287B. Topics in Theoretical Neuroscience (2)
Seminar—2 hours. Prerequisite: consent of instructor. In-depth exploration of topics in theoretical neuroscience. Topic varies each year. Fall quarter (287A): foundational material from books and review articles. Spring quarter (287B): continuation of year’s topic through readings of seminal articles from the primary literature. May be repeated for credit. (Same course as Neurobiology, Physiology & Behavior 287B.) (S/U grading only.)—S. (S.) Ditterich, Goldman

289. Topics in Molecular and Developmental Neurobiology (2)
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 polarity,” and “Glutamate receptors.” May be repeated ten times for credit when topic differs. (S/U grading only.)—F, S. (F, S.) Diaz, Zito

290C. Research Conference in Neurobiology (1)
Discussion—1 hour. Prerequisite: graduate standing in Neuroscience or consent of instructor; course 299 (concurrently). Presentation and discussion of faculty and graduate student research in neurobiology. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)

292. Cortical Plasticity and Perception (2)
Lecture/discussion—2 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101 or 112 or equivalent or consent of instructor. Examination of research articles on cortical plasticity and changes in perception. Examples drawn from studies of the somatosensory, visual, auditory, and motor cortex. Offered in alternate years. (S/U grading only.)—(W.)

298. Group Study (1-5)
(S/U grading only.)

299. Research (1-12)
(S/U grading only.)

Neurology
See Medicine, School of, on page 428.

Neurosurgery
See Medicine, School of, on page 428.

Nursing, Betty Irene Moore School of
Heather M. Young, Ph.D., R.N., F.A.A.N.; Associate Vice Chancellor for Nursing, UC Davis, and Dean, Betty Irene Moore School of Nursing
Theresa A. Harvath, Ph.D., R.N., F.A.A.N.; Associate Dean for Academics, Director for Clinical Education and Clinical Professor
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Mission Statement
The Betty Irene Moore School of Nursing at UC Davis cultivates academic excellence through immersive, interprofessional and interdisciplinary education and research that prepares graduates to serve all communities. Faculty, staff and students discover and disseminate knowledge to advance health, improve quality of care and shape policy.

Nursing Science and Health-Care Leadership Graduate Degree Program
Hosted by the Betty Irene Moore School of Nursing at UC Davis, the Nursing Science and Health-Care Leadership Graduate Degree Programs prepare nurse leaders, physician assistants, nurse practitioners, researchers and faculty in a unique interdisciplinary and interprofessional environment. The full-time, academic, doctoral program prepares gradu-
ates as leaders in health care, health policy and nurse faculty/researchers at the university level. The master’s-degree Physician Assistant Studies program prepares graduates to deliver care as physician assistants. Graduates of the professional master’s-degree leadership program are prepared for health-care leadership and management of organizations, and as nurse faculty at the community college and prelicensure education levels. Graduates of the master’s-degree Nurse Practitioner Program are prepared to deliver care as nurse practitioners.

Faculty

The UC Davis Nursing Science and Health Care-Leadership Graduate Group includes a wide cross-section of academic disciplines with faculty from the Betty Irene Moore School of Nursing as well as UC Davis Health System and other UC Davis schools, colleges and departments. Within the graduate faculty group are experts in nursing, medicine, health informatics, nutrition, biostatistics, public health and other fields. For a complete list of faculty, see http://nursing.ucdavis.edu.

Courses in Nursing (NRS)

Doctoral and master’s-degree leadership core courses are listed below.

Core Courses. For a current listing of courses offered through the School of Nursing, please see http://nursing.ucdavis.edu.

Graduate

201. Health Status and Care Systems (4)
Lecture/discussion—3 hours; laboratory/discussion—project. Prerequisite: current enrollment in the Nursing Science and Health Care-Leadership graduate program or consent of instructor. Compare health status data, major current health issues globally, nationally, regionally. Theoretical perspectives on social, political, economic determinants of health. Health care systems examined, linked to data, and evaluated in regards to outcomes. Aging, rural, ethnic minority populations highlighted.—F (F)

202. Implementation Science (4)
Lecture/discussion—4 hours. Prerequisite: current enrollment in the Nursing Science and Health Care-Leadership graduate program or consent of instructor. Change processes in health care from political, historic, economic and sociologic frameworks. Historical and current examples of transformative change in the health-care system. Skills for system transformation through health policy, practice, research and education are emphasized.—S (S)

203. Leadership in Health Care (4)
Lecture/discussion—3 hours; fieldwork. Prerequisite: current enrollment in the Nursing Science and Health Care-Leadership graduate program or consent of instructor. Critical examination of leadership from a variety of political and philosophical perspectives and focuses on specific challenges in health care leadership at various levels, e.g., patient, organizational, and policy levels.—W (W)

204. Research in Nursing Science and Health Care-Leadership (4)
Lecture/discussion—3 hours; laboratory/discussion—1 hour. Prerequisite: current enrollment in the Nursing Science and Health Care-Leadership graduate program or consent of instructor. Foundation for analyzing research, health, and systems data to answer clinical, systems, or policy questions. Use and examine multiple sources of data and information as a basis for plausible change and transformation in health care.—F (F)

205. Research Design in Nursing and Health Care (4)
Lecture/discussion—4 hours. Prerequisite: current enrollment in the Nursing Science and Health Care-Leadership graduate program or consent of instructor. Major types of quantitative and qualitative research design and their application to nursing and health-care research. Implications of choosing alternative research designs and critical analysis of philosophical underpinnings. Evaluation of control and validity, sampling, instruments to measure health concepts.—205A. Overview of Research in Nursing Science and Health Care (2)
Lecture—2 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health Care-Leadership Graduate Degree programs or by consent of instructor. Provides an overview of quantitative and qualitative paradigms in scientific inquiry and the major roles each paradigm has. First of a prerequisite series on research design and methods in nursing science and healthcare research.—F (F)

205B. Quantitative Research in Nursing Science and Health Care (4)
Lecture—4 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health Care-Leadership Graduate Degree programs or by consent of instructor. Introduces principles of quantitative research design and methods as applied to major study designs in nursing and health-care research. Provides a basic foundation for producing, interpreting, and applying quantitative research findings to answer clinical, system, and policy questions.—W (W)

205C. Qualitative Research in Nursing Science and Health Care (4)
Lecture—4 hours. Prerequisite: consent of instructor. Restricted to current Ph.D. students in NSHL or consent of instructor. Introduces principles of qualitative data collection and analysis as applied to major study designs in nursing and healthcare research. Provides a basic foundation for producing, interpreting, and applying qualitative research findings to answer clinical, system, and policy questions.—S (S)

206. Community Connections (2-5)
Prerequisite: current enrollment in the Nursing Science and Health Care-Leadership graduate program or consent of instructor. Open to NSHL MS students only. Community-based learning and experiences including community participation, assessment, data collection and analysis using multiple approaches, community health improvement projects, collabora- tive leadership practice, all with the guidance of community members and faculty. May be repeated for credit.—F, W, S (F, W, S)

210Y. Applied Health Informatics (4)
Lecture/discussion—1 hour; web virtual lecture—3 hours. Prerequisite: consent of instructor. Open to current students in the Nursing Science and Health Care-Leadership Graduate program or consent of instructor. Within the conceptual framework of the Foundation of Knowledge model, this course integrates nursing science, information science, computer science and engineering knowledge to acquire, process, generate and disseminate knowledge.—W (W)

211Y. Rural Health Care (2-3)
Lecture/discussion—2 hours; fieldwork. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health Care-Leadership Graduate Degree programs or by consent of instructor. Interprofessional graduate course provides an introduction to such topics as practice, policy, and practice, with an emphasis on rural health assets and disparities.—F (F)

220. Social, Cultural, and Behavioral Determinants of Health (2)
Lecture/discussion—3 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health Care-Leadership Graduate Degree programs or by consent of instructor. Introduces students to the complex social, cultural, and behavioral determinants of health.—F (F)

221. Biophysical Concepts in Nursing (3)
Lecture/discussion—3 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health Care-Leadership Graduate Degree programs or by consent of instructor. Focuses on the understanding and clinical application of human anatomy, physiology, histology, and nutrition.—F (F)

251A. Primary Health Care (8)
Lecture/discussion—6 hours; laboratory—3 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health Care-Leadership Graduation Degree programs or by consent of instructor. Focuses on the understanding and clinical application of human anatomy, physiology, histology, and nutrition.—F (F)

251B. Advanced Primary Health Care (4)
Lecture/discussion—2 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health Care-Leadership Graduation Degree programs or by consent of instructor. Further develops the basic knowledge and skills needed for the practice of primary health care.—F (F)

252A. Implementation Science for Clinicians (2)
Lecture/discussion—2 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health Care-Leadership Graduate Degree programs or by consent of instructor. Course focuses on the understanding and clinical application of human anatomy, physiology, histology, and nutrition.—F (F)

252B. Implementation Science for Clinicians (2)
Lecture/discussion—2 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health Care-Leadership Graduate Degree programs or by consent of instructor. Course focuses on the understanding and clinical application of human anatomy, physiology, histology, and nutrition.—F (F)
Degree programs or by consent of instructor. Course introduces primary health care concepts essential to the care of common medical problems seen in primary care settings. —W. (W)

251C. Primary Health Care (8)
Lecture/discussion—8 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Course introduces primary health care concepts essential to the care of common medical problems seen in primary care settings. —W. (W)

251D. Primary Health Care (6)
Lecture/discussion—6 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Course introduces primary health care concepts essential to the care of common medical problems seen in primary care settings. —S. (S)

260. Foundations of Behavioral Health (1)
Lecture/discussion—1 hour. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Focus on the theory, research and knowledge related to one of two fields of emphasis: population health or health systems. Emphasis placed on reading, critique and synthesis of classic and cutting-edge research in nursing and health care. May be repeated 10 times for credit. —F, W, S. (F, W, S)

291. Doctoral Seminar (2)
Discussion—2 hours. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership Graduate program or consent of instructor. Focus on the theory, research and knowledge related to one of two fields of emphasis: population health or health systems. Emphasis placed on reading, critique and synthesis of classic and cutting-edge research in nursing and health care. May be repeated 10 times for credit. —F, W, S. (F, W, S)

291D. Doctoral Seminar (2)
Discussion—2 hours. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership Graduate program or consent of instructor. Focus on the theory, research and knowledge related to one of two fields of emphasis: population health or health systems. Emphasis placed on reading, critique and synthesis of classic and cutting-edge research in nursing and health care. May be repeated 10 times for credit. —F, W, S. (F, W, S)

298. Special Topics in Nursing Science and Health-Care Leadership (1-4)
Lecture/discussion—1-2 hours. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership Graduate program or consent of instructor. In-depth study of topics in Nursing Science and Health-Care Leadership, selected from: policy and politics in health care, health-care disparities, current issues in health care, approaches to the conduct of science, or other related areas, with year to year variation. May be repeated for credit. Offered irregularly. —F, W, S. (F, W, S)

299. Research and Writing (1-12)
Extensive writing or discussion—3-36 hours. Prerequisite: consent of instructor. Students in the Nursing Science and Health-Care Leadership Graduate programs conduct research and writing under the supervision of a faculty member. [S/U grading only.] —F, W, S. (F, W, S, Su)

299D. Dissertation Research and Writing (1-12)
Extensive writing or discussion—3-36 hours. Prerequisite: consent of instructor. Students in the Nursing Science and Health-Care Leadership Graduate programs conduct dissertation research and writing under the supervision of a faculty member. May be repeated for credit. [S/U grading only.] —F, W, S. (F, W, S)

Professional

301. Learner Centered Teaching (3-4)
Lecture/discussion—3 hours; practice—1 hour. Open to current students in the Nursing Science and Health-Care Leadership graduate programs; outside students with prior educational or work experience in education may register for this class with the consent of instructor. Students will explore best practices in learner-centered teaching, including curriculum models, instructional design, and assessing/evaluating student learning. Students will have experience in planning learner-centered activities that are designed to achieve desired student performance. —W, S. (W, S)

302. Teaching Methods—Use of Emerging Technologies to Improve Student Learning (4)
Lecture/discussion—3 hours; practice—1 hour. Open to current students in the Nursing Science and Health-Care Leadership graduate programs; outside students with prior educational or work experience in education may register for this class with the consent of instructor. Students will examine, design and develop instructional strategies that use innovative and emerging technologies to promote motivation, performance and learning in health professions education. Research findings associated with use of various emerging technologies will be examined. —F, S. (F, S)

303. Professional Role Formation (2-4)
Lecture/discussion—2 hours; practice—2 hours. Exploration of the educator role. Open to current students in the Nursing Science and Health-Care Leadership graduate programs; outside students with prior educational or work experience in education may register for this class with the consent of instructor. Exploration of the educator role. Topics include Role Expectations, Legal and Regulatory Issues, Professional Ethics, Educational Scholarship, Individual Differences, Learning Environments, and Lifelong Learning. Placements for the optional practicum are arranged in a wide variety of settings. —F, W, (F, W) Professional

400. Basic Clinical Skills (1-4)
Lecture/laboratory—1-4 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Systems based pharmacology focused on classes of drugs used to treat disorders in specialty systems. —F, W, S. (F, W, S, Su)

271A. Pharmacology (2)
Lecture/discussion—1 hour; laboratory—3 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs by consent of instructor. Subject varies from quarter to quarter. Current knowledge and issues relevant to one of two fields of emphasis: population health or health systems. Emphasis placed on reading, critique and synthesis of classic and cutting-edge research in nursing and health care. May be repeated 10 times for credit. —F, W, S. (F, W, S)

271B. Pharmacology (2)
Lecture/discussion—1 hour; laboratory—3 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Course introduces student to the major concepts in pharmacology and relevant human physiology related to pharmacotherapeutics and toxicology. —Su. (Su)

271A. Pharmacology (2)
Lecture/discussion—1 hour; laboratory—3 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Course introduces student to the major concepts in pharmacology and relevant human physiology related to pharmacotherapeutics and toxicology. —Su. (Su)

273. Pharmacology Concepts in Nursing (2)
Lecture/discussion—2 hours. Prerequisite: courses 221, 272, 420, 421; consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Application of principles for safe and effective use of medications and natural products; use of current, reliable information to make clinical decisions. —F (F)

290. Master’s Seminar (2)
Discussion—2 hours. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership graduate program or instructor. Open to NSHL MS students only or by consent of course instructor. Subject varies from quarter to quarter. Current knowledge and issues relevant to one of two fields of emphasis: population health or health systems. May be repeated 10 times for credit. —F, W, S. (F, W, S)

291. Doctoral Seminar (2)
Discussion—2 hours. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership Graduate program or consent of instructor. Focus on the theory, research and knowledge related to one of two fields of emphasis: population health or health systems. Emphasis placed on reading, critique and synthesis of classic and cutting-edge research in nursing and health care. May be repeated 10 times for credit. —F, W, S. (F, W, S)

291D. Doctoral Seminar (2)
Discussion—2 hours. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership Graduate program or consent of instructor. Focus on the theory, research and knowledge related to one of two fields of emphasis: population health or health systems. Emphasis placed on reading, critique and synthesis of classic and cutting-edge research in nursing and health care. May be repeated 10 times for credit. —F, W, S. (F, W, S)

298. Special Topics in Nursing Science and Health-Care Leadership (1-4)
Lecture/discussion—1-2 hours. Prerequisite: current enrollment in the Nursing Science and Health-Care Leadership Graduate program or consent of instructor. In-depth study of topics in Nursing Science and Health-Care Leadership, selected from: policy and politics in health care, health-care disparities, current issues in health care, approaches to the conduct of science, or other related areas, with year to year variation. May be repeated for credit. Offered irregularly. —F, W, S. (F, W, S)

299. Research and Writing (1-12)
Extensive writing or discussion—3-36 hours. Prerequisite: consent of instructor. Students in the Nursing Science and Health-Care Leadership graduate programs conduct research and writing under the supervision of a faculty member. [S/U grading only.] —F, W, S. (F, W, S, Su)

299D. Dissertation Research and Writing (1-12)
Extensive writing or discussion—3-36 hours. Prerequisite: consent of instructor. Students in the Nursing Science and Health-Care Leadership Graduate programs conduct dissertation research and writing under the supervision of a faculty member. May be repeated for credit. [S/U grading only.] —F, W, S. (F, W, S)

401A. Advanced Clinical Skills (1-4)
Lecture/laboratory—1-4 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Continuation of focus on history taking and physical examination skills necessary for patient care comprise this course with a primary focus on principles of effective communication in establishing the therapeutic provider-patient relationship. —S. (Su)

401B. Basic Clinical Skills (1-4)
Lecture/laboratory—1-4 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content. —F, W, S. (F, W, S, Su)

410A. Advanced Clinical Skills (1-4)
Lecture/laboratory—1-4 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content. —F, W, S. (F, W, S, Su)

410B. Advanced Clinical Skills (1-4)
Lecture/laboratory—1-4 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content. —F, W, S. (F, W, S, Su)

410C. Advanced Clinical Skills (1-4)
Lecture/laboratory—1-4 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content. —F, W, S. (F, W, S, Su)

Continuation of focus on history taking and physical examination skills with advanced/specialized content related specified systems. — SS. (S.)

410D. Advanced Clinical Skills (1-4)
Lecture/laboratory—1-4 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content related specified systems. — SS. (S.)

410E. Advanced Clinical Skills (1-4)
Lecture/laboratory—1-4 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content related specified systems. — F. (F.)

410F. Advanced Clinical Skills (1-4)
Lecture/laboratory—1-4 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content related specified systems. — W. (W.)

410G. Advanced Clinical Skills (1-4)
Lecture/laboratory—1-4 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content related specified systems. — S. (S.)

420. Foundations of Clinical Nursing Practice (3)
Clinical activity—9 hours. Prerequisite: consent of the instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of the instructor. Foundational course introduces students to core concepts of clinical nursing, including clinical reasoning, professional ethics, therapeutic communication and activities of daily living. Develop skills for the provision of safe, high quality, culturally-sensitive, person-centered care across the lifespan. — SS. (S.)

421. Health Assessment Across the Lifespan (3)
Lecture/discussion—1 hour; clinical activity—6 hours. Prerequisite: consent of the instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of the instructor. Preceptor with expertise in that area. Preceptorship is designed to facilitate transition to professional practice. Opportunity to choose a clinical practice area of interest and to work with a preceptor with expertise in that area. — F. (F.)

422. Care of Adults with Chronic Conditions (6)
Lecture/discussion—3 hours; clinical activity—9 hours. Prerequisite: courses 221, 272, 420, and 421; consent of the instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of the instructor. Learn concepts central to the effective management of a variety of common chronic illnesses and disabilities across the lifespan in a variety of different settings. Practice conducting in-depth health assessments of individuals with chronic conditions. — F. (F.)

423. Psychosocial Wellness & Illness (5)
Lecture/discussion—3 hours; clinical activity—6 hours. Prerequisite: courses 221, 272, 420, and 421; consent of the instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of the instructor. Explore, psychological, cultural, societal, and environmental factors that affect psychological wellness and illness. Practice providing care to individuals and families experiencing disruptions in mental health secondary to physical or psychological illness. — SS. (S.)

424. Nursing Care of Older Adults (3)
Lecture/discussion—2 hours; clinical activity—3 hours. Prerequisite: courses 221, 272, 420, 421, 273, 422, 423, 425, 223, and 426; consent of the instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Preceptorship is designed to facilitate transition to professional practice. Opportunity to choose a clinical practice area of interest and to work with a preceptor with expertise in that area. — SS. (S.)

425. Family Focused Nursing (9)
Lecture/discussion—5 hours; clinical activity—12 hours. Prerequisite: courses 221, 272, 420, 421, 273, 422, and 423; consent of the instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Focuses on family as theunit of nursing and interprofessional care. Includes influences of family on health and illness, reproductive and gender/sexuality issues, pregnancy, birth and child-rearing, and the health and illness in children and youth. — W. (W.)

426. Nursing Care of Adults with Complex Illness or Injury (8)
Lecture/discussion—8 hours; clinical activity—12 hours. Prerequisite: courses 221, 272, 420, 421, 273, 422, 423 and 425; consent of the instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Preceptorship is designed to facilitate transition to professional practice. Opportunity to choose a clinical practice area of interest and to work with a preceptor with expertise in that area. — SS. (S.)

427. Fostering Healthy Communities (7)
Lecture/discussion—4 hours; clinical activity—9 hours. Prerequisite: consent of the instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Focuses on populations & communities, and emphasizes working with diverse communities in promoting health, chronic disease management, transitional support and crisis intervention. Develop skills to critically analyze and shape health policy and develop accessible community resources to reduce health disparities. — S. (S.)

428. Capstone Clinical Nursing Practicum (8)
Clinical activity—24 hours. Prerequisite: courses 220, 221, 222A, 272, 420, 421, 429A, 222B, 273, 422, 423, 425, 223, 426, 492D, 224, 424, 427, and 429E; consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Preceptorship is designed to facilitate transition to professional practice. Opportunity to choose a clinical practice area of interest and to work with a preceptor with expertise in that area. — F. (F.)

429A. Collaborative Practice A (1)
Clinical activity—3 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Preprofessional course uses experiential learning activities including simulation, role play, and case studies. Concepts include but are not limited to; communication, person-centered care, ethical decision making, end-of-life decisions, culturally appropriate care, quality and safety, social justice, and professionalism. — SS. (S.)

429B. Collaborative Practice B (1)
Clinical activity—8 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Interprofessional course uses experiential learning activities including simulation, role play, and case studies. Concepts include but are not limited to; communication, person-centered care, ethical decision making, end-of-life decisions, culturally appropriate care, quality and safety, social justice, and professionalism. — SS. (S.)

429C. Collaborative Practice C (1)
Clinical activity—3 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Interprofessional course uses experiential learning activities including simulation, role play, and case studies. Concepts include but are not limited to; communication, person-centered care, ethical decision making, end-of-life decisions, culturally appropriate care, quality and safety, social justice, and professionalism. — SS. (S.)

429D. Collaborative Practice D (1)
Clinical activity—3 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Interprofessional course uses experiential learning activities including simulation, role play, and case studies. Concepts include but are not limited to; communication, person-centered care, ethical decision making, end-of-life decisions, culturally appropriate care, quality and safety, social justice, and professionalism. — SS. (S.)

429E. Collaborative Practice E (1)
Clinical activity—3 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Interprofessional course uses experiential learning activities including simulation, role play, and case studies. Concepts include but are not limited to; communication, person-centered care, ethical decision making, end-of-life decisions, culturally appropriate care, quality and safety, social justice, and professionalism. — SS. (S.)

429F. Collaborative Practice F (1)
Clinical activity—3 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Interprofessional course uses experiential learning activities including simulation, role play, and case studies. Concepts include but are not limited to; communication, person-centered care, ethical decision making, end-of-life decisions, culturally appropriate care, quality and safety, social justice, and professionalism. — SS. (S.)

440. Preparation for Clinical Practice (1-3)
Clinical activity—3-9 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Students are placed in clinical settings and/or clinical simulation laboratories to observe and practice the integration of clinical skills with direct supervision by faculty. — SS. (S.)

450A. Supervised Clinical Practice-Primary Health Care (1-16)
Clinical activity—48 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Each of the required primary care rotations is a four-week supervised clinical practice experience in primary care, under the supervision of an appropriate community-based primary care provider per accreditation requirements. May be repeated five times for credit. — F. W. S. Su. (F. W. S. Su.)

450B. Supervised Clinical Practice-Primary Health Care (1-16)
Clinical activity—48 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Each of the required primary care rotations is a four-week supervised clinical practice experience in primary care, under the supervision of an appropriate community-based primary care provider per accreditation requirements. May be repeated five times for credit. — F. W. S. Su. (F. W. S. Su.)

Quarter Offered: F=Fall, W=Winter, S=Spring, Su=Summer; 2017/2018 offering in parentheses
munity-based primary care provider per accreditation requirements. May be repeated five times for credit. –F, W, S, Su. (F, W, S, Su.)

450C. Supervised Clinical Practice—Primary Health Care (1-16)
Clinical activity—48 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Each of the required primary care rotations is a four-week supervised clinical practice experience in primary care, under the supervision of an appropriate community-based primary care provider per accreditation requirements. May be repeated five times for credit. –F, W, S, Su. (F, W, S, Su.)

450D. Supervised Clinical Practice—Primary Health Care (1-16)
Clinical activity—48 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Each of the required primary care rotations is a four-week supervised clinical practice experience in primary care, under the supervision of an appropriate community-based primary care provider per accreditation requirements. May be repeated five times for credit. –F, W, S, Su. (F, W, S, Su.)

450E. Supervised Clinical Practice—Primary Health Care (1-16)
Clinical activity—48 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Each of the required primary care rotations is a four-week supervised clinical practice experience in primary care, under the supervision of an appropriate community-based primary care provider per accreditation requirements. May be repeated five times for credit. –F, W, S, Su. (F, W, S, Su.)

451. Supervised Clinical Practice—Pediatrics (1-16)
Clinical activity—48 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Four-week clinical rotation under the supervision of an appropriate community-based Pediatric Medicine provider per accreditation requirements. May be repeated five times for credit. –F, W, S, Su. (F, W, S, Su.)

452. Supervised Clinical Practice—Women’s Health (1-16)
Clinical activity—48 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Four-week clinical rotation under the supervision of an appropriate community-based women’s health and prenatal care provider per accreditation requirements. May be repeated five times for credit. –F, W, S, Su. (F, W, S, Su.)

453. Supervised Clinical Practice—Mental Health (1-16)
Clinical activity—48 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Four-week clinical rotation under the supervision of an appropriate community-based women’s health and prenatal care provider per accreditation requirements. May be repeated five times for credit. –F, W, S, Su. (F, W, S, Su.)

454. Supervised Clinical Practice—Emergency Health Care (1-16)
Clinical activity—48 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Four-week clinical rotation under the supervision of an appropriate Emergency Medicine provider per accreditation requirements. May be repeated five times for credit. –F, W, S, Su. (F, W, S, Su.)

455. Supervised Clinical Practice—Inpatient Surgery (1-16)
Clinical activity—48 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Four-week clinical rotation under the supervision of an appropriate surgical provider per accreditation requirements. May be repeated five times for credit. –F, W, S, Su. (F, W, S, Su.)

456. Supervised Clinical Practice—Inpatient Medicine (1-16)
Clinical activity—48 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Four-week clinical rotation under the supervision of an appropriate inpatient provider per accreditation requirements. May be repeated five times for credit. –F, W, S, Su. (F, W, S, Su.)

459. Supervised Clinical Practice—Other Specialties (1-16)
Clinical activity—48 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Each of the required inpatient rotations is a two-week supervised clinical practice experience in inpatient care, under the supervision of an appropriate inpatient provider per accreditation requirements. May be repeated five times for credit. –F, W, S, Su. (F, W, S, Su.)

470. Health Care Ethics (3-9)
Lecture/discussion—2 hours; laboratory/discussion—1 hour. Prerequisite: consent of instructor. Guided independent study of issues in biomedical ethics, with discussion of readings that are based on student interests and needs. Participation in ethics rounds. (Same course as General Medicine 470.) (S/U grading only.) –F, W, S, Su. (F, W, S, Su.)

471. Supervised Clinical Practice—Geriatrics (1-16)
Clinical activity—48 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Four-week clinical rotation under the supervision of an appropriate community-based Geriatric Medicine provider per accreditation requirements. May be repeated five times for credit. –F, W, S, Su. (F, W, S, Su.)

475. Supervised Clinical Practice—Acute Care (1-16)
Clinical activity—48 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Four-week clinical rotation that allows students to work directly with patients in acute care settings. May be repeated five times for credit. –F, W, S, Su. (F, W, S, Su.)

480. Supervised Clinical Practice—Rural Health (1-16)
Clinical activity—48 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Racial and ethnic health disparities and public health challenges in rural settings. Students will work with a primary care provider in a rural setting. May be repeated five times for credit. –F, W, S, Su. (F, W, S, Su.)

490. Supervised Clinical Practice—Quality and Safety (1-16)
Clinical activity—48 hours. Prerequisite: consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Degree programs or by consent of instructor. Clinical rotation that allows students to work directly with patient safety and quality improvement committees in various organizations. May be repeated five times for credit. –F, W, S, Su. (F, W, S, Su.)

493A. Improving Quality in Health Care (4)
Lecture/discussion—4 hours. Open to Nursing Science and Health-Care Leadership Graduate Students and/or consent of instructor. Working in interdisciplinary teams, will explore the theory and practical methods being employed to make improvement in health care systems from a public health perspective and offer opportunities for interprofessional educational experience. (S/U grading only; deferred grading only, pending completion of sequence.) –F, S.

493B. Improving Quality in Health Care (4)
Lecture/discussion—4 hours. Open to Nursing Science and Health-Care Leadership Graduate Students and/or consent of instructor. Working in interdisciplinary teams, will explore advanced theory and practical methods being employed to make improvement in health care systems while providing an opportunity for interprofessional educational experience (S/U grading only; deferred grading only, pending completion of sequence.) –F, W, Su.

493C. Enhancing Patient Safety in Health Care (3)
Seminar—1 hour; clinical activity—1 hour; discussion—1 hour. Prerequisite: Nursing Science and Health-Care Leadership graduate students, consent of instructor. Continuation of focus on history taking and physical examination methods being employed to make improvement in patient safety in health care while providing an opportunity for interprofessional educational experience. (Same course as Medical Sciences 493QC.) (S/U grading only.) –S, S.

Courses in Physicians Assistant Studies (PAS)
Graduate
299. Research and Writing (1-4)
Extensive writing or discussion—3–12 hours. Prerequisite: consent of instructor. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Students in the Nursing Science and Health-Care Leadership graduate programs conduct research and writing under the supervision of a faculty member. Students may repeat this course for credit in different quarters, depending on the length of their program of study to complete their Master’s Degree. (S/U grading only.) –F, W, S, Su. (F, W, S, Su.)

Professional
400. Basic Clinical Skills (1-4)
Lecture/discussion—1-4 hours. Prerequisite: consent of instructor. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content. –F, W, S, Su. (F, W, S, Su.)

401. Basic Clinical Skills (1-4)
Lecture/discussion—1-4 hours. Prerequisite: consent of instructor. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content. –F, W, S, Su. (F, W, S, Su.)

410A. Advanced Clinical Skills (1-4)
Lecture/discussion—1-4 hours. Prerequisite: consent of instructor. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content. –F, W, S, Su. (F, W, S, Su.)

410B. Advanced Clinical Skills (1-4)
Lecture/discussion—1-4 hours. Prerequisite: consent of instructor. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor.
Continuation of focus on history taking and physical examination skills with advanced/specialized content related to specified systems. – W (W).

410c. Advanced Clinical Skills (1-4)
Lecture/laboratory—1-4 hours. Prerequisite: consent of instructor. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content related to specified systems. – S (S).

410d. Advanced Clinical Skills (1-4)
Lecture/laboratory—1-4 hours. Prerequisite: consent of instructor. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content related to specified systems. – S (S).

440. Preparation for Clinical Practice (1-3)
Clinical activity—36 hours. Prerequisite: consent of instructor. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content related to specified systems. – W, F, W, S, Su. (F, W, S, Su.)

410f. Advanced Clinical Skills (1-4)
Lecture/laboratory—1-4 hours. Prerequisite: consent of instructor. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Continuation of focus on history taking and physical examination skills with advanced/specialized content related to specified systems. – F (F).

410g. Advanced Clinical Skills (1-4)
Lecture/laboratory—1-4 hours. Prerequisite: consent of instructor. Open to Graduate Students in the Nursing Science and Health-Care Leadership Graduate Degree programs, or by consent of instructor. Students are placed in clinical settings and/or clinical simulation laboratories to observe and practice the integration of clinical skills with direct supervision by faculty. – S (S).

Nutrition
See Clinical Nutrition, on page 217; Food Service Management, on page 343; Nutrition; Nutritional Biology (A Graduate Group), on page 495; Nutrition Science, on page 496.

Nutrition
[College of Agricultural and Environmental Sciences]
Francene M. Steinberg, Ph.D., R.D., Chair of the Department
Sheri Zidenberg-Cherr, Ph.D., Vice Chairperson of the Department
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Faculty
Elizabeth Applegate, Ph.D., Senior Lecturer (SOE)
Academic Senate Distinguished Teaching Award
Gary Cherr, Ph.D., Professor
[Nutrition, Environmental Toxicology]
Kathryn G. Dewey, Ph.D., Distinguished Professor
Nilesh W. Gaikwad, Ph.D., Associate Professor
[Nutrition, Environmental Toxicology]
Fawaz G. Haddad, Ph.D., Professor
[Nutrition, Internal Medicine]
Carl L. Keen, Ph.D., Distinguished Professor
[Nutrition, Internal Medicine]
Bo L. Lonnerdal, Ph.D., Distinguished Professor
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Patricia Oteiza, Ph.D., Professor
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Carolyn M. Slusak, Ph.D., Professor
[Nutrition, Food Science & Technology]
Francene M. Steinberg, Ph.D., R.D., Professor and Chair
Christine Stewart, Ph.D., Assistant Professor
Angela Zivkovic, Ph.D., Assistant Professor
Emeriti Faculty
Lindsay H. Allen, Ph.D., Professor Emerita
Kenneth H. Brown, M.D., Professor Emeritus
Andrew J. Clifford, Ph.D., Professor Emeritus
Louis E. Grivetti, Ph.D., Professor Emeritus
Lucia Kaiser, Ph.D., Specialist in Cooperative Extension Emerita
Janet King, Ph.D., Professor Emerita
Roger B. McDonald, Ph.D., Professor Emeritus
Robert B. Rucker, Ph.D., Professor Emeritus
Barbara O. Schneeman, Ph.D., Professor Emerita
Judith S. Stern, Sc.D., R.D., Professor Emerita
Affiliated Faculty
Sean Adams, Ph.D., Associate Adjunct Professor
Ellen Bonnel, Ph.D., Academic Administrator
Betty Burri, Ph.D., Adjunct Professor
Brit Burton-Freeman, Ph.D., Associate Research Nutritionist
Joan Frank, M.S., R.D., Academic Coordinator, Lecturer
Ellen Fung, Ph.D., R.D., Associate Adjunct Professor
Robert M. Hackman, Ph.D., Research Nutritionist
Marjorie Haskell, Ph.D., Associate Researcher
Peter Havel, Ph.D., D.V.M., Professor
Wayne Hawkes, Ph.D., Ph.D., Adjunct Professor
M. Jane Heining, Ph.D., Academic Administrator
Sonja Hess, Ph.D., Associate Research Nutritionist
Liping Huang, Ph.D., Adjunct Professor
Daniel Hwang, Ph.D., Adjunct Professor
Nancy Keim, Ph.D., Adjunct Professor
Darshan Kelley, Ph.D., Adjunct Professor
Kevin Laugero, Ph.D., Associate Adjunct Professor
Louise Lanohe, Ph.D., Project Associate Scientist
Roy Martin, Ph.D., Adjunct Professor
John Newman, Ph.D., Associate Adjunct Professor
Charles Stephensen, Ph.D., Adjunct Professor
Marilyn S. Townsend, R.D., Specialist in Cooperative Extension
Janet Uriu-Adams, Ph.D., Associate Research Nutritionist
Marta Van Loan, Ph.D., Adjunct Professor
Sheri Zidenberg-Cherr, Ph.D., Specialist in Cooperative Extension
Susan Zunino, Ph.D., Associate Adjunct Professor
Major Programs. See the majors in Clinical Nutrition, on page 217 and Nutrition Science, on page 496.

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 Requirement .......... 20
Preparation. Plan in advance to include the required course prerequisites.
Nutrition 111AY and 111B ............... 5
Nutrition 118, 192 (2 units) ............... 6
Nutrition 120AN or 120BN ............... 4

Nutrology, Physiology, and Behavior 101 ............... 5
Replacement courses; see note above:
Nutrition 114, 116A-116B, 116AL-116BL

Food Service Management ...................... 25
Preparation. Plan in advance to include the required course prerequisites.
Food Science and Technology 100A-100B, 101A-101B ............... 12
Food Service Management 120, 120L ............... 12
Agricultural and Resource Economics ............... 4
Replacement courses; see note above:
Nutrition 10, 111AY, 111B, 114, 116A-116B, 116AL-116BL, 120AN, or 120BN, Economics 1A-1B.

Nutrition and Food ........................... 22
Preparation. Plan in advance to include the required course prerequisites.
Nutrition 111AY and 111B ............... 5
Nutrition 120AN or 120BN ............... 4
Food Science and Technology 100A, 100B ............... 8
Nutrology, Physiology, and Behavior 101 ............... 5
Replacement courses; see note above:
Nutrition 114, 116A-116B, 116AL-116BL

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 111AY and 111B ............... 11-15
Nutrology, Physiology, and Behavior 101 ............... 5
Replacement courses; see note above:
Nutrition 114, 115, 116A-116B, 117, 120AN or 120BN, 122, 123, 124, 201, 204.

Minor Adviser. 3202 Meyer Hall 530-752-2512

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 (NUT)

Lower Division
10. Discoveries and Concepts in Nutrition (3)
Lecture—3 hours. Nutrition as a science; historical development of nutrition concepts of nutrients and foods. Not open for credit to students who have taken an upper division course in nutrition. GE credit: SciEng | SE, SL—F, W, S, Su; (F, W, S, Su) J Applegate
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: SciEng, Wrt|OL, SE, WE—F, W, S, Su.

Upper Division
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/toxictological 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 metabo-
ism. (Same course as Environmental Toxicology 104.) GE credit: SciEng | QL, SE, SL, S. (S.) Hajj, Olezka

105. Nutrition and Aging (3)
Lecture—3 hours. Prerequisite: course 111AV or 111AY and Animal Biology 103 or the equivalent. Role of nutrition in the aging process from both an organismal/cell perspective, including demographic, theories of aging, nutrition and evolution, nutri-
tional manipulation and life-span extension, and nutrition’s impact on the diseases of aging. GE credit: SciEng | SE, S. (S.)

110B. Recommendations and Standards for Human Nutrition (2)
Lecture—2 hours. Prerequisite: Chemistry 8B; Neur-
ology, Physiology, and Behavior 101 or the equiva-
ent, course 111AV or 111AY. Critical analysis of the development of nutritional recommendations for humans. Topics include history of modern recommen-
dations, development of the Recommended Dietary Allowance (RDA) and other food guides; the Dietary Reference Intakes (DRI); administrative structure of regulatory agencies pertinent to nutrition recommen-
dations; introduction to scientific methods used to determine the recommendations; food labeling laws; nutrition recommendations in other countries and cul-
tures. Not open for credit to students who have com-
pleted course 111S. (S.) Zidenbergh, Ostrzenski

111A. Introduction to Nutrition and Metabolism (3)
Web virtual lecture—3 hours; lecture/discussion—1 hour. Prerequisite: Chemistry 8B, Neurology, Physi-
ology, and Behavior 101 or the equivalent. Restricted to upper division or graduate level students only. Introduction to metabolism of protein, fat and carbo-
hydrate: the biological role of vitamins and minerals; nutrient requirements during the life rhythms of dietary intake and nutritional status. Not open for credit to students who have completed course 101 or 111AV. GE credit: SciEng | SE, SL, W. (W.)

112. Nutritional Assessment (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Animal Biology 102 and 103 or course 101, Nutri-
tion 111AV or 111AY. Statistics 13. Restricted to upper division or graduate level Nutrition students only. Methods of human nutritional assessment, including dietary, anthropometric, biochemical meth-
ods. Principles of precision, accuracy, and interpre-
tation of results and populations. GE credit: SciEng | QL, SE, S. (S.) Sater, Stewart

113. Principles of Epidemiology in Nutrition (4)
Lecture/discussion—4 hours. Prerequisite: Plant Sci-
culture or consent of instructor. Introduction to epide-
miology as it relates to the field of nutrition, including study design, principles of epidemiologic inference, criteria for causality, and interpreting measures of disease risk. GE credit: SciEng | QL, SE, S. (S.) Stewart

114. Developmental Nutrition (4)
Lecture—4 hours. Prerequisite: Animal Biology 102 and 103; course 111AV or 111AY, 111B. Role of nutritional factors in embryonic and postnatal develop-
ment. GE credit: SciEng, Wrt | SE, W, W'. (W')

115. Animal Nutrition (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 8B or 118B or consent of instructor. Com-
parison and differences among animals in digestive and metabolism of nutrients. Nutrient composition of feeds, digestive systems, digestion, absorption, feed-
ing strategies. GE credit: SciEng, Wrt | OL, QL, QL, SE, SL, W, W'. (W')

116A. Clinical Nutrition (3)
Lecture—3 hours. Prerequisite: course 111AV or 111AY, 111B, 112; Neurobiology, Physiology, and Behavior 101 or the equivalent. Biochemical and physiolo-
gical foundations of therapeutic diets. Problems in parenteral diets for normal and pathological condi-
tions. GE credit: SciEng | SE, S. (S.) Steinberg

116AL. Clinical Nutrition Prac-ticum (3)
Lecture—1 hour; laboratory—3 hours; discussion—1 hour. Prerequisite: course 116A (may be taken con-

116B. Clinical Nutrition Practicum (3)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 111AV or 111AY, 111B, 112; Neurobiol-
ogy, Physiology, and Behavior 101 or the equiva-

116BL. Clinical Nutrition Practicum (3)
Lecture—1 hour; laboratory—1 hour; discussion—1 hour. Prerequisite: course 116AL. 116A and 116B (may be taken concurrently). Fundamental principles of planning and evaluating therapeutic diets and patient education for pathological conditions covered in 116B. GE credit: SciEng | SE, W. (W')

117. Experimental Nutrition (6)
Lecture—3 hours; laboratory—6 hours; extensive writing. Prerequisite: course 111AV or 111AY, 111B, 111AY, 111B, 111B; Biology 102, 103; Molecular and Cellular Biology 120L or other laboratory course in biochemistry is recommended. Methods of assessing nutritional status. Application of chemical, microbiological, chromatographic and enzymatic techniques to current problems in nutrition. GE credit: SciEng, Wrt | SE, WE, W. (W') Gaikwad

118. Community Nutrition (4)
Lecture—4 hours. Prerequisite: course 111AV or 111AY, 111B, 111AY, 111B. Nutritional problems in con-
temporary communities and of selected target groups in the United States and in developing coun-

119A. International Community-Based Nutritional Assessment (1)
Lecture/discussion—1 hour. Prerequisite: course 112 (may be by consent of instructor) and consent of instructor. Issues and problems related to community-
based nutritional assessment in a low-income coun-
try, major nutritional problems in low-income coun-
tries; ethical issues in human investigation; survey design, data collection techniques, and data analy-
sis; preparation for international travel; cross-cultural communication, health, and safety while abroad.

119B. International Community-Based Nutritional Assessment (6)
Lecture—2 hours; fieldwork—12 hours. Prerequi-
tive: course 119A and consent of instructor. Restricted to students in Clinical Nutri-
tion, Community Nutrition, Dietetics, and Nutrition Science. A six-week summer course in Peru. Imple-
mentation of a community-based nutritional assess-
ment survey and development of the survey instrument, selection of the study sample, collection and verification of data, and analysis and interpreta-
tion of the results, the project will be carried out by paired participants and faculty members of UC Davis and the collaborating foreign institution.

120AN. Nutritional Anthropology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 10 and Anthropology 2 recommended. Nutri-
tional anthropological and contempo-
rarype research; the anthropological approach to food and diet; field work methods; case histories that explore food patterns and their nutritional implica-
tions. GE credit: SciEng or SocSci, Div | SE, SS, Su. (Su.) Kurzt

120BN. Nutritional Geography (4)
Lecture—3 hours; discussion—1 hour. Nutritional geography from historical and contemporary perspec-
tives; the geographical approach to food and diet; cultural and environmental factors that influence dietary practices; food-related landscapes and pat-
tens. GE credit: SciEng or SocSci, Div | SE, SS,
200. Vitamin and Cofactor Metabolism (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: one upper division nutritional biochemistry and physiology course. Reviews of studies and relationships involving the metabolic functions of vitamins. Comparative nutritional aspects and the metabolism and chemistry of vitamins and vitamin-like compounds.

204. Amino Acid Metabolism (2)
Lecture—2 hours. Prerequisite: upper division nutrition or biochemistry course. Studies of metabolic functions and nutritional interrelationships involving amino acids.

216. Selected Topics in Nutritional and Metabolic Research (3)
Lecture/discussion—2 hours. Prerequisite: courses 201 through 204; Physiological Sciences 205A-205B or the equivalent. Quantitative aspects of digestion and metabolism; principles of system analysis. Evolution of models of energy metabolism as applied in current feeding systems. Critical evaluations of mechanistic models used analytically in support of nutritional research.

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-catabolism, nitrogen transport-excretion, depending on current literature.

258. Field Research Methods in International Nutrition (3)
Lecture/discussion—3 hours. Prerequisite: graduate standing or consent of instructor. Issues and problems related to implementation of nutrition research in less-developed countries, including ethics; relationships with local governments, communities, and scientists; data collection techniques and quality assurance; field logistics; research budgets; and other administrative and personal issues. Offered in alternate years. — W. Dewey

259. Nutrition and Aging (2)
Lecture—2 hours. Prerequisite: consent of instructor; courses 201, 202, 203, 204, or the equivalent recommended. Interaction between nutrition and aging. Topics include physiological/biochemical basis of aging, age-related changes affecting nutritional requirements, nutrition and mortality rate, assessment of nutritional status in the elderly, and relationships between developmental nutrition and the rate of aging.

260. Nutrition During Pregnancy (6)
Lecture—5 hours; term paper. Prerequisite: acceptance into the Master’s Degree program in Maternal and Child Nutrition. Overview of the anatomical, physiological and biochemical changes that occur during pregnancy and early development. Discussion of evaluation of nutritional/lifestyle factors associated with pregnancy outcomes and nutrition programs/interventions for pregnant women. — F. (F.) Heining

261. Lactation and Infant Nutrition (6)
Lecture—5 hours; discussion—1 hour. Prerequisite: course 260. Restricted to students enrolled in the MAS program; Nutrition graduate students by consent of instructor. Overview of the physiological and biochemical processes underlying human lactation and nutritional needs of both mother and infant. Development of skills in assessment, nutrition counseling, education and support of new mothers and their families. — W. (W.) Heining

262. Child and Adolescent Nutrition (6)
Lecture—5 hours; discussion—1 hour. Prerequisite: course 261. Restricted to students enrolled in the MAS program; Nutrition graduate students by consent of instructor. Relationship among nutrition, growth, and development during childhood and adolescence. Nutritional assessment 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/adolescents, athletes, and eating disordered. — S. (S.) Heining

Lecture—3 hours; term paper. Prerequisite: graduate standing. Restricted to students enrolled in the MAS program; Nutrition graduate students by consent of instructor. Application of epidemiological principles to the study of maternal and child nutrition. Topics include quantitative and qualitative study procedures, including study design, data collection, and related analytical techniques. — F. (F.) Heining

Seminar—2 hours. Prerequisite: graduate standing. Restricted to students enrolled in the MAS program; Nutrition graduate students by consent of instructor. Current scientific literature related to Maternal and Child Nutrition in adult education settings. Topics include methods and theories of adult education and critical thinking skills related to research evaluation. Offered in alternate years. — W. (W.) Heinig

265. 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; Nutrition graduate students by consent of instructor. Current scientific literature related to Maternal and Child Nutrition. Topics include epidemiology, evidence-based practice, feeding promotion, and nutritional assessment of populations. Offered in alternate years. — W. (W.) Heinig

266. Current Topics in Maternal and Child Nutrition: Public Policy Development and Implementation (2)
Seminar—2 hours. Prerequisite: graduate standing. Restricted to students enrolled in the MAS program; Nutrition graduate students by consent of instructor. Current scientific literature related to Maternal and Child Nutrition. Topics include nutrition surveillance and monitoring, as well as public policy development and implementation. Offered in alternate years. — S. (S.) Heinig

270. Scientific Ethics in Biomedical Studies: Emphasis on Nutrition (3)
Lecture—1 hour; discussion—1 hour; term paper. Restricted to graduate standing or consent of instructor. Societal ethics in biomedical science and 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 4928 — Steinberg.

290. Beginning Nutrition Seminar (2) Lecture/discussion — 1 hour; seminar — 1 hour. Prerequisite: 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. — F (F).

290C. 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 presented and evaluated. Format will combine seminar and discussion style. (S/U grading only.) — F (F).

291. Advanced Nutrition Seminar (1) Seminar — 1 hour. Prerequisite: second-year graduate standing. Advanced topics in nutrition research. Multiple sections may be taken concurrently for credit. May be repeated for credit. (S/U grading only.) — F, W, S. (F, W, S.)

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. Principles of experimental design and scientific background for given article. Articles summarized for posting on Internet for use by healthcare professionals. May be repeated for credit with consent of instructor.

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 instructor. A continuation of course 293A, with additional special topics. May be repeated for credit up to 3 times with consent of instructor.

294A. Current Topics in Developmental Nutrition (2) Seminar — 2 hours. Prerequisite: course 114 or 252 or consent of instructor. Restricted to graduate standing or consent of instructor. Effects of nutrition on embryology, morphogenesis, and developmental mechanisms. May be repeated for credit when topic differs. — F (F).

297T. Supervised Teaching in Nutrition (1-3) Teaching under faculty supervision — 3-9 hours. Preparation and presentation of material. Assistance in teaching nutrition at the university level; curriculum design and evaluation. Faculty members present and evaluate. Format will combine seminar and discussion style. (S/U grading only.) — F, W, S. (F, W, S.)

298. Group Study (1-5) F, W, S. (F, W, S.)

299. Research (1-12) (S/U grading only.) — F, W, S. (F, W, S.)

Professional

492A. Professionalism: An Academic Perspective (2) Lecture/discussion — 2 hours. Prerequisite: graduate standing. For graduate students in their initial quarter of residence. Professionalism topics are presented and examples drawn from both the biological and social sciences.

492C. Grant Writing (3) Lecture — 1 hour; discussion — 1.5 hours. Prerequisite: graduate standing in Nutrition or consent of instructor. Preparation of grants for governmental agencies (particularly NIH and USDA) and private foundations. Students will write a research grant or fellowship application. May be repeated one time for credit with consent of instructor. Offered in alternate years.

Nutritional Biology (A Graduate Group)

Carolyn Slupsky, Ph.D., Chairperson of the Group
Graduate Group Office, 1249 Meyer Hall 530-754-7684; http://ggnb.ucdavis.edu

Faculty

Lindsay H. Allen, Ph.D., RD, Professor (Nutrition)
Lars Berglund, Ph.D., Professor (Endocrinology)
Kenneth H. Brown, M.D., Professor (Nutrition)
C. Christopher Calvert, Ph.D., Professor (Animal Science)
Edward J. DePeters, Ph.D., Professor (Nutrition)
Kathryn G. Dewey, Ph.D., Professor (Nutrition)
Kent L. Erickson, Ph.D., Professor (Cell Biology and Human Anatomy)
James G. Fadel, Ph.D., Professor (Animal Science)
Andrea J. Fassett, D.V.M., Ph.D., Associate Professor (Molecular Biosciences)
Nilesh W. Gaikwad, Ph.D., Associate Professor (Nutrition, Environmental Toxicology)
J. Bruce German, Ph.D., Professor (Food Science and Technology)
M. Eric Gershwin, M.D., Professor (Internal Medicine)
Ralph Green, M.D., Professor (Pathology)
Ian J. Griffin, M.D., Associate Professor (Pediatrics)
Jean-Xavier Guilnard, Ph.D., Professor (Food Science and Technology)
Robert M. Hackman, Ph.D., Research Nutritionist (Nutrition)
Fawaz G. Haj, Ph.D., Assistant Professor (Nutrition)
Peter J. Havel, M.D., Professor (School of Veterinary Medicine)
Liping Huang, Ph.D., Adjunct Professor (USDA, WHNRC)
Daniel Hwang, M.D., Adjunct Professor (USDA, WHNRC)
Lucia Kaiser, Ph.D., Professor (Nutrition)
Sidik E. Kasim-Karakas, M.D., Professor (Internal Medicine)
George A. Kaysem, M.D., Ph.D., Professor (Internal Medicine)
Carl L. Keen, Ph.D., Distinguished Professor (Nutrition, Internal Medicine)
Nancy L. Keim, Ph.D., Associate Adjunct Professor (USDA, WHNRC)
Darshan S. Kelley, Ph.D., Adjunct Professor (Nutrition)
Janet C. King, Ph.D., R.D., Professor (Nutrition)
Kirk C. Klaasing, Ph.D., Professor (Animal Science)
Jennifer A. Larsen, Ph.D., Assistant Professor of Clinical Nutrition (Molecular Biosciences)
Kevin D. Laugero, Ph.D., Assistant Adjunct Professor (USDA, WHNRC)
Bo L. Lonnendal, Ph.D., Professor (Nutrition, Internal Medicine)
Stanley L. Marks, B.V.Sc., Ph.D., Associate Professor (Medicine and Epidemiology)
Valentina Medici, M.D., Assistant Professor (Internal Medicine)
John W. Newman, Ph.D., Associate Professor (Nutrition)
James W. Ollsen, Ph.D., Professor (Animal Science)
Patricia Oteiza, Ph.D., Professor (Nutrition, Environmental Toxicology)
Anthony F. Philips, M.D., Professor (Pediatrics)
Jon J. Ramsey, Ph.D., Associate Professor (Molecular Biosciences)
Helen E. Raybould, Ph.D., Professor (Anatomy, Physiology and Cell Biology)
Heidi A. Rassow, Ph.D., Associate Professor (Nutrition, Environmental Toxicology)
Jennifer A. Rassow, Ph.D., Professor (Endocrinology)
Karen Ryan, Ph.D., Assistant Professor (Neurobiology)
Roberto D. Sainz, Ph.D., Associate Professor (Animal Science)
Carolyn M. Slupsky, Ph.D., Professor (Nutrition/Food Science)
Charles Stebbins, Ph.D., Professor (Cardiovascular Medicine)
Francesca M. Steinberg, Ph.D., R.D., Professor (Nutrition)
Charles B. Stephens, Ph.D., Adjunct Professor (USDA, WHNRC)
Christian P. Stewart, Ph.D., Assistant Professor (Nutrition)
Ameer Y. Tahb, Ph.D., Assistant Professor (Food Science)
Natalie Tork, Ph.D., Associate Professor (Gastroenterology & Hepatology)
Marta Van Loan, Ph.D., Adjunct Professor (Nutrition/USDA, WHNRC)
Craig H. Warden, Ph.D., Associate Professor (Neurobiology, Physiology, and Behavior)
Carl K. Winter, Ph.D., (Extension Food Toxicologist)
Heather M. Young, R.N., M.N.S., Associate Vice Chancellor and Dean (Betty Irene Moore School of Nursing)
Scheri A. Zidenberg-Cherr, Ph.D., Professor (Nutrition)
Angela M. Zivkovic, Ph.D., Assistant Professor (Nutrition)
Susan Zunino, Ph.D., Adjunct Associate Professor (Nutrition)

Emeriti Faculty

Betty Burr, Ph.D., Associate Adjunct Professor (Nutrition)
Andrew Clifford, Ph.D., Distinguished Professor Emeritus (Nutrition)
Harry W. Calvin, Jr., Ph.D., Professor Emeritus
Douglas E. Conklin, Ph.D., Professor Emeritus (Animal Science)
Paul Davis, Ph.D., Research Professor Emeritus (Animal Science)
Richard A. Freedland, Ph.D., Professor Emeritus
William N. Garrett, Ph.D., Professor Emeritus
Darothy W. Gietzen, Ph.D., Professor Emeritus
M.R.C. Greenwood, Ph.D., Distinguished Professor Emeritus (Nutrition)
Louis Grivetti, Ph.D., Professor Emeritus
Charles H. Halsted, M.D., Professor Emeritus
Robert J. Hansen, Ph.D., Professor Emeritus
Patricia R. Johnson, Ph.D., Emerita (Nutrition)
Amy Block Joy, Ph.D., Specialist in Cooperative Extension

Jinho Kang, D.V.M., Ph.D., D.V.Sc. (hc), Professor Emeritus
Janet King, Ph.D., Professor Emeritus
Verne E. Mendel, Ph.D., Professor Emeritus
Ray L. Martin, Ph.D., Adjunct Professor (Nutrition)
Judith S. Sern, Sc.D., R.D., Distinguished Professor (Nutrition, Internal Medicine)
Vincent A. Ziboh, Ph.D., Professor (Dermatology, Biological Chemistry)
Roger McDonald, Ph.D., Emeritus Professor Emeritus (Nutrition)
Verne E. Mendel (Neurobiology/Nutrition)
James G. Morris, Ph.D., Professor Emeritus
Ernesto Pollitt, Ph.D., Professor Emeritus
Robert B. Rucker, Ph.D., Professor Emeritus (Nutrition)
Barbara O. Schneeman, Ph.D., Professor Emeritus
Howard G. Schultz, Ph.D., Professor Emeritus
Donal A. Walsh, Ph.D., Professor Emeritus
Bruce M. Wolfe, M.D., Professor Emeritus
Judith S. Sern, Sc.D., R.D., Distinguished Professor (Nutrition, Internal Medicine)

Graduate Study. The Graduate Group in Nutritional Biology offers programs of study and research leading to the M.S. and Ph.D. degrees. The great diversity of research interests represented by the faculty members allows students to choose from a wide variety of themes: nutritional biochemistry, animal nutrition, nutrition and development, nutrient bioavailability, human/clinical nutrition, nutrition and behavior, nutritional energetics, community nutrition, community health, maternal and child nutrition, nutrition and endocrinology, international nutrition, obe-
sity/body composition, physiology of digestion, nutrition and chronic disease, culture and nutrition, nutrition and gene expression, nutrition and aging, food preferences, nutrition and immunity, diet and exercise, dietary assessment, protein and lipid metabolism, food intake regulation, nutrition education, and more.

Graduate Advisors. Consult the Nutritional Biology Graduate Group office.

Courses in Nutritional Biology (NUB)

Graduate

210A. Advanced Nutrition I: Nutrition and Metabolism—Macronutrients (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: admission to the Nutritional Biology Graduate Group or consent of instructor. Class size limited to 30 students. Advanced general nutritional concepts. Integrating nutrition with biological systems, population nutrition issues, and research approaches. Advanced concepts on lipid and protein metabolism. —F, W, S

210B. Advanced Nutrition II: Nutrition and Cell Biology, Micronutrients (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: admission to the Nutritional Biology Graduate Group or consent of instructor. Class size limited to 30 students. Effects of nutrients at the cellular level. Principles of cell signaling and signaling modulation by nutrients. Advanced concepts of mineral and vitamin metabolism and vitamin deficiencies and associated pathologies. —W, W, W

210C. Advanced Nutrition III: Nutrition in Health and Disease (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: admission to the Nutritional Biology Graduate Group or consent of instructor. Class size limited to 30 students. Integration of biochemical, physiological, and genetic aspects of nutrition in the context of clinical and epidemiological observations related to health and disease, including obesity and diabetes, cancer, vascular and neurodegenerative diseases, osteoporosis, and birth defects. Review and consideration of governmental. —S (J) Shuply

299C. Research Group Conference (1)
Discussion—1 hour. Prerequisite: graduate standing. Weekly conference on research problems, progress and techniques in animal sciences. May be repeated for credit. (S/U grading only.) —F, W, S

299B. Directed Study (1-5)
Prerequisite: graduate standing. Selection of courses must be made in consultation with a faculty adviser prior to or upon reaching the 120 unit level. —F, W, S

299A. Research (1-12)
Prerequisite: consent of instructor. May be repeated for credit. (S/U grading only.) —F, W, S

Nutrition Science

[College of Agricultural and Environmental Sciences]

Faculty
See the Department of Nutrition on page 492.

The Major Program

The study of nutrition encompasses all aspects of the consumption and utilization of food and its constituents. Knowledge of the study include: biochemical reactions important to the utilization of nutrients and food constituents; 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 biology and nutrition in public health.

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 physics (nutritional biology option) or economics (nutrition in public health 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 biology option take additional course work in biochemistry, physiology, and toxicology. Students in the nutrition in public health 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 biology option also provides preparation for technical work in nutrition in the animal, food, and pharmaceutical industries. The nutrition in public health option prepares students for jobs in administrative, teaching, or public health/public service positions.

B.S. Major Requirements:

Preparatory Subject Matter.......................63-66
Biological Sciences 2A, 2B & 2C..............15
Nutrition 10.......................................3
Plant Sciences 120................................4
Sociology 1 or Psychology 4 or Anthropology 41 or 121.....................4
The remaining preparatory subject matter is based on which major option you choose.
Nutritional Biology option
Anthropology 1 or Psychology 1 or Sociology 1 or 4 or 121...........4-5
Mathematics 16A-16B.........................6
Physics 1A-1B....................................6
Nutrition in Public Health option
Anthropology 2 or Sociology 1 or 4 or 121...........4-5
Economics 1A-1B...............................8
Psychology 1 or 4 or 121.....................4-5

Depth Subject Matter.........................77-82
Biological Sciences 101-102-103..............6
Food Science and Technology 100A and 100B........................................8
Microbiology 102 and 103L..........................5
Neurobiology, Physiology, and Behavior 101, 101L, 101L1, 101L2, 102L.............8
Nutrition in Public Health option
Nutrition in Public Health option
Exercise Biology 110, 111, 112, 113, 114, 115, 116, 117, 120AN, 120BN, 120B, 129, 130, 190, 192, 193
Restricted Electives..........................15-20
Selection of courses must also be added (some of which may meet restricted elective requirements): Agricultural and Resource Economics 1; Nutrition 116B, 116LAU; Food Management 120, 120B, 122, 123, 124, 127, 130, 139, 192, 193
Restricted Electives..........................8-12
Choose one of the following areas to complete the restricted elective units in:
Nutritional Biology
Nutrition Science
Community Health and Education: Communication 165, Education 110, 120, 133, Psychology 126, 130 or Sociology 154

Total Units for the Degree........................140-148

Major Adviser, Nilesh Gaikwad

Advising Center for the major is located in 3202 Meyer Hall, 330/752-2512.

Dietetics Internship. To fulfill the academic requirements for an internship in Dietetics, students are strongly advised to declare the Clinical Nutrition major. Within the Nutrition in Public Health option, students should also take English 3 or University Writing Program 1 and Communication 1. The following courses must also be added (some of which may meet restricted elective requirements): Agricultural and Resource Economics 112; Nutrition 116B, 116LAU; Food Management 120, 120B, 122, 123, 124, 127, 130, 139, 190, 192, 193. Students intending to apply for admission to a dietetic internship should contact the Advising Center 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 Graduate Studies, on page 121.

Obstetrics and Gynecology

See Medicine, School of, on page 428.

Oceanography

[College of Letters and Sciences]

Oceanography is the study of the earth’s oceans, investigating connections between geological, biological, chemical and physical processes in the marine realm, and the interactions between the Earth’s ocean/atmosphere system. The interdiscipli-

Minor Program Requirements:

Units

Geology 150A/Environmental Science and Policy 150A..........................4

Fall 2011 and on Revised General Education (GE) Areas: AH—Arts and Humanities; SC—Science and Engineering; SS—Social Sciences; QL—Quantitative; DL—Diverse; BI—Biological Sciences; VL—Visual; WC—World Cultures; WE—Writing Experience

Pre-Fall 2011 General Education (GE) Areas: AH—Arts and Humanities; SC—Science and Engineering; SS—Social Sciences; BI—Diverse; WE—Writing Experience

Quarter Offered: F=Fall; W=Winter; S=Spring; Su=Summer; 2017-2018 offering in parentheses

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Pathology, Microbiology, and Immunology

See Veterinary Medicine, School of, on page 583.

Pediatrics

See Medicine, School of, on page 428.

Performance Studies (A Graduate Group)

Joe Dunitz, Director

Marian Bilheimer, Graduate Coordinator

Arts Group Graduate Office, 2168 Arts Building; 530-754-6973; mbilheimer@ucdavis.edu
http://performancestudies.ucdavis.edu/

Faculty, Executive: Maxine Craig (Women and Gender Studies), Joseph Dunitz (Science and Technology Studies, Anthropology), Peter Lichtensels (Theatre and Dance), Halifu Osumare (African American and African Studies)

There are over 45 affiliated faculty in departments throughout HArCS and other faculty, all of whom offer courses relevant to the discipline.

Graduate Study. The Ph.D. in Performance Studies is a four-year program. In the first two years of study, students develop an understanding of performance by drawing from a range of regular course offerings in the field to identify, explore, and define a field or fields of research. Students are required to complete four core courses out of five in performance studies, and one colloquium course. Each individual program is then built from seminar and/or practice as research courses, as well as independent or group studies, developing one or more of the four strands of the program: Comparative Medias, Embodiments, Cultures/Ecologies, and History/Text. A wide range of affiliated faculty offer courses throughout the HArCS faculty, and Designated Emphases are available in Studies in Performance and Practice, African American and African Studies, Critical Theory, Feminist Theory and Research, Native American Studies, and Writing. Thematic and Composition Studies. Students are required to complete a minimum of 60 units before taking the qualifying examination. No more than 12 units may be taken below the graduate level unless specifically approved by the Ph.D. graduate program adviser.

Main Program Adviser. Lynette Hunter (Theatre and Dance)

Graduate Advisers. Emily Albu (Spanish & Classics), Susan Avila (Design), Seetha Chaganti (English), Maxine Craig (Women and Gender Studies), Halifu Osumare (African American and African Studies), Kris Ravetto (Cinema and Technocultural Studies), Henry Spiller (Music), Archana Venkatesan (Comparative Literature, Religious Studies), Hegnar Watkins (Art, Art History)

Courses in Performance Studies (PFS)

Graduate

200. Methods and Materials in Theatre Research (4)

Seminar—3 hours, term paper. Essential research tools in theatre and related fields; bibliographies, primary sources; methods of evaluating and presenting evidence; delineating research areas in the field. —F (F)

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, theatrical and political entitlements, and issues of spectatorship; e.g., “Brecht and After,” “British Theater,” “Race and Gender in Performance.” May be repeated five times for credit. —F, S, F (F, W, S)

265A. Performance Studies: Modes of Production (4)

Seminar—3 hours, term paper. Introduction 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. May be repeated three times for credit when topic differs. Offered in alternate years.

265B. Performance Studies: Signification and the Body (4)

Seminar—3 hours, term paper. Introduction to analysis of the body in performance, drawing on theoretical models from several fields. May be repeated three times for credit when topic differs. Offered in alternate years.

265C. Performance Studies: Performance and Society (4)

Seminar—3 hours, term paper. Introduction to the role of performance (broadly defined), in everyday life, sociopolitical negotiation, identity, social movements, the media, and the state. May be repeated three times for credit when topic differs. Offered in alternate years.

265D. Performance Studies: Theory, History, Criticism (4)

Seminar—3 hours, term paper. Introduction to the theory, history and criticism, informing performance studies. May be repeated three times for credit when topic differs. Offered in alternate years.

270A. Individually Guided Research in Performance Studies (4)

Discussion—1 hour; independent study; extensive writing. Prerequisite: course 200; one course 265A, B, C, or D, consent of instructor. Restricted to students in the Graduate Group PhD in Performance Studies. Individually guided research, under the supervision of a faculty member, on a Performance Studies topic related to the student’s proposed dissertation project to produce a dissertation prospectus.

270B. Individually Guided Research in Performance Studies (4)

Discussion—1 hour; independent study; extensive writing. Prerequisite: course 200; one of courses 265A, B, C, or D, consent of instructor. Restricted to students in the Graduate Group PhD in Performance Studies. Individually guided research, under the supervision of a faculty member, on a Performance Studies topic related to the student’s proposed dissertation project to produce a dissertation prospectus.

270C. Individually Guided Research in Performance Studies (4)

Discussion/lecture—2 hours, fieldwork; term paper. Prerequisite: course 200; one of courses 265A, B, C, or D, consent of instructor. Restricted to students in the Graduate Group PhD in Performance Studies. Individually guided research, under the supervision of a faculty member, on a Performance Studies topic related to the student’s proposed dissertation project to produce a dissertation prospectus.

290. Colloquia in Performance Studies (4)

Lecture/discussion—2 hours, discussion/laboratory—1 hour, term paper. Prerequisite: registration in Performance Studies Graduate Group and prior to Qualifying Examination. Designed to provide cohort identity and faculty exchange. Opportunity to present papers, hear guest lecturers, and see faculty presentations, gather for organizational and administrative new, exchange of information and make announcements. Course must be taken every year that a Performance Studies graduate is registered, prior to taking the Qualifying Examination. May be repeated four times for credit. Limited to four units per year. [S/U grading only.]—F (F)
Courses in Pharmacology and Toxicology (PTX)

Additional courses that satisfy the breadth and depth requirements of the program are taught under departments of faculty in the group.

Graduate

201. Principles of Pharmacology and Toxicology I (S)
   Lecture—3 hours. Prerequisite: Biological Sciences 102 and Neurobiology, Physiology, and Behavior 101. First of three courses presenting fundamental principles of pharmacology and toxicology. An introduction to the field of pharmacology/toxicology, followed by in-depth blocks on fate processes of chemicals in the body to emphasize tissue selective responses and toxicokinetics employed therapeutically. F. (F.) Puschner, K. Knott.

202. Principles of Pharmacology and Toxicology II (4)

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 function. S. (S.) Berman, Gelli.

215. Electrophysiology Techniques and Applications (3)
   Lecture—1 hour. Discussion—1 hour. Broad scope of topics in electrophysiology techniques and applications. [Same course as Molecular, Cellular and Integrative Physiology 215J] (S/U grading only). S. (S.) Chen

230. Advanced Topics in Pharmacology and Toxicology I-3 (3)
   Lecture/discussion/seminar—1 hour each [course format can vary by 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. F. W. S. (F. W. S.)

277. Molecular Mechanisms in Cancer and other Diseases (3)
   Lecture—discussion—2 hours, project. Prerequisite: undergraduate or graduate introductory course in cell biology (such as Biological Sciences 104), and general biochemistry (Molecular & Cellular Biology 121 or 122) required; course 202 recommended. Restricted to graduate standing or consent of instructor. Exploration of cutting edge investigations on the underlying mechanisms of cancer biology, cancer therapy and other diseases. Current medical research in Cancer and other diseases, as it spans the bench to bedside. S. (S.) Goldkorn

290. Seminar (1)
   Current topics in pharmacology and toxicology. [S/U grading only]. F. W. S. (F. W. S.)

290C. Advanced Research Conference (1)
   Lecture/discussion. Provide credit for participation in and attendance at research conferences. May be repeated three times for credit. (S/U grading only). F. W. S. (F. W. S.) Puschner

299. Research (1-12)
   (S/U grading only.)

Pharmacology and Toxicology

(A Graduate Group)

Kerrin L. Carraway, Chairperson of the Group

Group Office: 4117 Meyer Hall | Department of Environmental Toxicology
530-752-4516; http://ptx.ucdavis.edu/

Faculty

The more than 90 faculty in the graduate group represent at least 25 academic departments and organized research units within the College of Agricultural and Environmental Sciences, the College of Biological Sciences, the School of Medicine and the School of Veterinary Medicine.

Graduate Study

The program, which offers both the M.S. and Ph.D. degree, emphasizes an interdisciplinary approach that combines coursework and experimental training in modern approaches to pharmacological and toxicological problems. Areas of research span fundamental and translational research in a broad spectrum of areas within pharmacology and toxicology, including cardiovascular pharmacology, cancer therapeutics, neuropharmacology, drug discovery and design, neurotoxicology, pulmonary toxicology and environmental toxicology.

Students complete core courses in pharmacology and toxicology and carry out research rotations during their first year of study. All Ph.D. students receive financial support. For detailed information on the program, contact the Group office, graduate advisors, or the Group chairperson.

Graduate Advisers

Kerrin L. Carraway (Biochemistry & Molecular Biology), A. Gelli (Pharmacology), R. Harper (Pulmonary Medicine), P. Henderson (Hematology & Oncology), Mary Hone (Pharmacology), H. Krych (Molecular Biosciences), J. A. Last (Pulmonary Medicine), P. Lein (Molecular Biosciences), L. Miller (Anatomy, Physiology & Cell Biology), K. Pinkerton (Center for Health and Environment), B. Puschner (Molecular Biosciences), H. Wulf (Pharmacology)

Pharmacology and Toxicology

(A Graduate Group)

See Medical Pharmacology and Toxicology (PHA), on page 444; Molecular Biosciences (VMB), on page 583; and Pharmacology and Toxicology (A Graduate Group), on page 498.

Graduate

201. Principles of Pharmacology and Toxicology I (S)
   Lecture—3 hours. Prerequisite: Biological Sciences 102 and Neurobiology, Physiology, and Behavior 101. First of three courses presenting fundamental principles of pharmacology and toxicology. Introduction to the field of pharmacology/toxicology, followed by in-depth blocks on fate processes of chemicals in the body, fate processes in tissue selective responses, selective toxicology employed therapeutically. F. Puschner, K. Knott.

202. Principles of Pharmacology and Toxicology II (4)

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 function. S. Berman, Gelli.

215. Electrophysiology Techniques and Applications (3)
   Lecture—1 hour. Discussion—1 hour. Broad scope of topics in electrophysiology techniques and applications. [Same course as Molecular, Cellular and Integrative Physiology 215J] (S/U grading only). S. Chen

230. Advanced Topics in Pharmacology and Toxicology I-3 (3)
   Lecture/discussion/seminar—1 hour each [course format can vary by 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. F. W. S. (F. W. S.)

277. Molecular Mechanisms in Cancer and other Diseases (3)
   Lecture—discussion—2 hours, project. Prerequisite: undergraduate or graduate introductory course in cell biology (such as Biological Sciences 104), and general biochemistry (Molecular & Cellular Biology 121 or 122) required; course 202 recommended. Restricted to graduate standing or consent of instructor. Exploration of cutting edge investigations on the underlying mechanisms of cancer biology, cancer therapy and other diseases. Current medical research in Cancer and other diseases, as it spans the bench to bedside. S. Goldkorn

290. Seminar (1)
   Current topics in pharmacology and toxicology. [S/U grading only]. F. W. S. (F. W. S.)

290C. Advanced Research Conference (1)
   Lecture/discussion. Provide credit for participation in and attendance at research conferences. May be repeated three times for credit. (S/U grading only). F. W. S. (F. W. S.) Puschner

299. Research (1-12)
   (S/U grading only.)
on the history of philosophy, providing courses on the major figures and traditions of western philosophy.

Career Alternatives. Students of philosophy learn to understand and evaluate arguments and to think and write precisely and clearly. These analytical skills are assets in any career. Many of our majors have gone on to 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. Philosophers 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. Those wishing to attend law school or medical school should consider pursuing the Pre-Law and Pre-Med emphases, respectively.

A.B. Major Requirements:

General Emphasis

Preparatory Subject Matter: 

One course from any of the following areas: 

12

(a) General Philosophy: Philosophy 1
(b) Ancients: Philosophy 21
(c) Early Modern Philosophy: Philosophy 22
(d) Philosophy of Mind: Philosophy 13G
(e) Ethics: Philosophy 14, 15 or 24
(f) Philosophy of Science: Philosophy 30, 31, 32 or 38
(g) Philosophy of Language: Philosophy 17
(h) Metaphysics: Philosophy 101
(i) Theory of Knowledge: Philosophy 102
Philosophy 12 or Mathematics 108

Depth Subject Matter: 

Upper division units in philosophy: 

36

Note: Philosophy 101 and 102 may not be counted toward both preparatory and depth subject matter units.

Total Units for the Major: 

52

Pre-Law Emphasis

Preparatory Subject Matter: 

One course from any of the following three: 

4

Philosophy 14, 15, or 16
Philosophy 5
Philosophy 12
Philosophy 24

Depth Subject Matter: 

36

Any three courses from the following six: 

12

Philosophy 102, 116, 118, 128, 189C, or 189F
Philosophy 112
Philosophy 119

Additional upper division elective units in philosophy: 

16

Total Units for the Major: 

52

Pre-Med Emphasis

Preparatory Subject Matter: 

One course from any of the following four: 

4

Philosophy 24, 30, 31, or 32
Philosophy 12
Philosophy 15
Philosophy 38

Depth Subject Matter: 

36

One course from any of the following four: 

4

Philosophy 107, 108, 128, 189I
Philosophy 112
Philosophy 121

Additional upper division elective units in philosophy: 

24

Total Units for the Major: 

52

Note: Admission to medical schools requires additional coursework not included in the Pre-Med Emphasis.

Major Advisers. G.J. Mattey, M. Oshana

Advising Office. 101 Young Hall

Minor Program Requirements:

Students wishing to minor in Philosophy may choose a general minor or a minor specializing in logic. There are no courses required for the general minor, so students may create a program to suit their own interests. The range of choice in the logic specialization is limited to the courses listed.

Philosophy—General 

20

Twenty upper division units in philosophy. Philosophy 12 may be substituted for four of the upper division units.

Philosophy—Logic

20

Philosophy 12 or Mathematics 108
Philosophy 112
Philosophy 131, 133, 134, 135, 139, 140
Philosophy 189I
Minor Advisers. G.J. Mattey, M. Oshana

Honors Program. The department offers an honors program, which gives qualifying majors the opportunity to work closely with faculty and graduate students.

Courses for Non-Majors. Students majoring in most disciplines in the university will find courses relevant to their educational or career goals. Philosophy 1 is the introductory course for non-majors. Philosophy 21 is the introductory course for non-majors. Philosophy 21 is the introductory course for non-majors.

5. 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 for credit to students who have completed course 6. GE credit: Wrt|WE.

7. Philosophical Perspectives on Sexuality (3)

Lecture—3 hours. Philosophical issues related to sexuality, including, but not limited to, ethical and social issues regarding sexual practice, orientation, classification and identity. GE credit: ArtHum|AH. —W. (V) Semnet

7Y. Philosophical Perspectives on Sexuality (3)

Web virtual lecture—1.5 hours; discussion—1 hour. Philosophical issues related to sexuality, including, but not limited to, ethical and social issues regarding sexual practice, orientation, classification and identity. Not open for credit to students who have completed course 7. GE credit: ArtHum|AH, DD. —W. (V) Semnet

10. Introduction to Cognitive Science (4)

Lecture/discussion—4 hours. Introduction to the interdisciplinary cognitive scientific approach to the study of mind, drawing concepts and methods from psychology, philosophy, linguistics, artificial intelligence, and other disciplines. GE credit: SciEng|SE, SL—F (F) Molyneux

11. Asian Philosophy (4)

Lecture—3 hours; discussion—1 hour. Survey of the main philosophical systems of south and east Asia: Hinduism, Buddhism, Confucianism, and Taoism. Topics include the nature of reality, including God, the universe and the human self, human knowledge, and the proper conduct of human life. Offered in alternate years. GE credit: ArtHum, Div, Wrt|AH, WC, WE—F. Mattey

12. Introduction to Symbolic Logic (4)

Lecture—3 hours; discussion—1 hour. Syntax and semantics of the symbolic language sentence logic. Syntax and semantics of the symbolic language sentence logic. GE credit: ArtHum|AH.

13G. Minds, Brains, and Computers (3)

Lecture—3 hours. Computational theories of the nature of the mind. The mind as a computer process. The possibility of machine intelligence, consciousness, and mentality. Not open for credit to students who have completed course 13G for four units. GE credit: SciEng or SocSci|SE or SS, SL—S (S) Molyneux

13. Minds, Brains, and Computers with Discussion (4)

Lecture—3 hours; discussion—1 hour. Computational theories of the nature of the mind. The mind as a computer process. The possibility of machine intelligence, consciousness, and mentality. Not open for credit to students who have completed course 13. GE credit: ArtHum or SciEng|AH or SE, SL—W, WE—S (S) Molyneux

14. Ethical and Social Problems in Contemporary Philosophy (4)

Lecture—3 hours; discussion—1 hour. Philosophical issues and positions involved in contemporary moral and social problems. Possible topics include civil disobedience and revolution, discrimination, environment, population control, technology and human values, sexual morality, freedom in society. GE credit: ArtHum, Div, Wrt|AH, WE.
15. Introduction to Bioethics (4) Lecture—3 hours; discussion—1 hour. Critical analysis of normative issues raised by contemporary medicine and technology. Topics include euthanasia, abortion, reproductive technologies, genetic engineering, practitioner/patient relationship, allocation of medical resources, experimentation on human subjects. GE credit: ArtHum, Writ | AH, WE.—R. Fulil

16. Philosophical Foundations of American Democracy (4) Lecture—3 hours; discussion—1 hour. The philosophical underpinnings of democratic government and the tension between the goals of providing security and of preserving democracy and civil liberties. Illustration of the tension through focus on issues related to war and terrorism. GE credit: ACGH, AH, WE.—F. Copp

17. Language, Thought, and World (4) Lecture—3 hours; discussion—1 hour. Puzzles in the philosophy of language, such as what language is, how language conveys thoughts, whether we each speak our own private language, and what we can learn about the world by studying language. GE credit: SocSci | W, SS, WE.—M. Mulligan

21. History of Philosophy: Ancient (4) Lecture—3 hours; discussion—1 hour. Survey of Greek philosophy with special attention to the Pre-Socratics, Plato, and Aristotle. GE credit: ArtHum, Writ | WE.—S. Zafar

22. History of Philosophy: Early Modern (4) Lecture—3 hours; discussion—1 hour. Survey of major figures in the philosophy of the seventeenth and eighteenth centuries, with emphasis on Descartes, Hume, and Kant. GE credit: ArtHum, Writ | WE.—W. Husted

24. Introduction to Ethics (4) Lecture—3 hours; discussion—1 hour. Reading of historical and contemporary philosophical works in ethics. Topics include the nature of morality, the justification of moral claims, and major ethical theories, such as consequentialist, deontological, and virtue theories. GE credit: ArtHum, Writ | AH, WE.—S. J. Millstein, Oshana

30. Introduction to Philosophy of Science (4) Lecture—3 hours; discussion—1 hour. Basic problems in the philosophy of science, common to the physical, biological, and social sciences. Analysis of explanation, confirmation theory, observation, and counterfactual theories. GE credit: ArtHum, Writ | AH, WE.—S. J. Millstein

31. Approaching Scientific Reasoning (4) Lecture—3 hours; discussion—1 hour. Introduction to scientific hypotheses and the kinds of reasoning used to justify such hypotheses. Emphasis on adequate justification, criteria, and strategies for distinguishing scientific from pseudoscientific theories. Concrete historical and contemporary cases. GE credit: ArtHum or SciEng | AH or SE, SL, WE.—G. Grisemer

32. Understanding Scientific Change (4) Lecture—3 hours; discussion—1 hour. Concepts of scientific change in historical and philosophical perspective. Survey of models of growth of knowledge, 17th century to present. Relation between logic of theories and change. Kuhn’s revolution model. Examples from various sciences. GE credit: ArtHum or SciEng, Writ | AH or SE, WE.—G. Grisemer

38. Introduction to Philosophy of Biology (4) Lecture—3 hours; discussion—1 hour. Non-technical introduction to philosophical, social, and scientific ideas, methods and technologies in contemporary biological research such as evolution, genetics, molecular biology, ecology, behavior. Philosophical consideration of determination, reductionism, explanation, theory, modeling, observation, experimentation. Evaluation of scientific explanations of human nature. GE credit: ArtHum, Writ | AH or SE, SL, WE.—Grisemer

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.)

101. Metaphysics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: one course in philosophy recommended. Theories of being. Such topics as reality, substance, universals, space, time, causality, becoming, body, experience, persons, freedom, and determinism. Views of the nature and method of metaphysics. Anti-metaphysical arguments. GE credit: ArtHum, Writ | AH, WE.—Gilmore


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, Writ | AH, WE.—Molyneux

104. The Evolution of Mind (4) Lecture/discussion—3 hours; term paper. Prerequisite: one previous course in Philosophy recommended. The interpretation of human thought and behavior through evolutionary theory. Topics include the nature/nurture debate concerning cognitive and other mental capacities and traits, and the interaction between biology and cultural development. GE credit: SocSci | SS, WE.—S. J. Millstein

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 and problems. GE credit: ArtHum, Writ | AH, WE.—Gilmore, S. Zafar

107. Philosophy of the Physical Sciences (4) Lecture—3 hours; discussion—1 hour. Prerequisite: one philosophy course or a science background recommended. Nature of testability and confirmation of scientific hypotheses; nature of scientific laws, theories, explanations, and models. Problems of causality, determinism, induction, and probability; the structure of scientific theories. GE credit: ArtHum or SciEng, Writ | AH or SE, WE.—Landry, Molyneux

108. Philosophy of the Biological Sciences (4) Lecture—3 hours; discussion—1 hour. Prerequisite: one course in biology or one course in philosophy recommended. Nature of biological theories, explanations, and models. Problems of evolutionary theory, ecology, genetics, and sociobiology. Science and human values. GE credit: ArtHum or SciEng, Writ | AH or SE, SL, WE.—G. Grisemer, S. Millstein

109. Philosophy of the Social Sciences (4) Lecture—3 hours; discussion—1 hour. Prerequisite: one course in philosophy or a social science recommended. The nature of the social sciences, their subject matter and methods. Similarities to and differences from natural and life sciences. Predicting and explaining human behavior. Behaviorism, reductionism, holism, and individualism. Related moral issues. The social sciences and philosophy. GE credit: ArtHum or SocSci, Writ | AH or SS, WE.

111. Philosophy of Space and Time (4) Lecture/discussion—3 hours; term paper. Prerequisite: one upper division philosophy course recommended. Philosophical implications of space and time. The philosophical implications of space-time theories, such as those of Newton and Einstein. Topics may include the nature of space, time, determinism, absolutism versus relational views of space and time, philosophical impact of relativity theory. Offered in alternate years. GE credit: AH, WE.—W. (W.) Gilmore

112. Intermediate Symbolic Logic (4) Lecture/discussion—4 hours. Prerequisite: course 12 or consent of instructor. Predicate logic syntax and semantics. Transcription between predicate logic and English. Proof techniques, completeness, functions, and definite descriptions. Introduction to model theory. GE credit: AH.—W. (W.) Landry, Matthey

113. Metalogic (4) Lecture/discussion—4 hours. Prerequisite: course 12 or equivalent. The meta-logic of classical propositional and first-order predicate logic. Consistency, soundness and completeness of both propositional and predicate logic. The Löwenheim-Skolem theorem for predicate logic. Undecidability of predicate logic. GE credit: AH.—S. J. Antonelli

114. History of Ethics (4) Lecture/discussion—4 hours. Prerequisite: one previous philosophy course recommended. Study of some classic texts from the history of philosophical writing on central problems of ethics, taking the form either of a survey or concentrated examination of selected historical figures. Readings on major philosophers as Aristotle, Butler, Hume, Kant, Mill. GE credit: ArtHum, Writ | W.—Matthey, Oshana

115. Problems in Normative Ethics (4) Lecture/discussion—3 hours; term paper. Prerequisite: one previous course in philosophy recommended. Moral philosophy studied through examination of moral problems and the moral principles and common sense intuitions that bear on them. Problems discussed may include animal rights, fetal rights, euthanasia, justice and health care, war, nuclear deterrence, world hunger, environmental protection. GE credit: ArtHum, Writ | AH, WE.—S. (S.) Millstein

116. Ethical Theories (4) Lecture/discussion—3 hours; term paper. Prerequisite: one course in ethics recommended. Study of fundamental 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. GE credit: AH, WE.—W. (W.) Copp

117. Foundations of Ethics (4) Lecture/discussion—3 hours; term paper. Prerequisite: course 114, 115, 116, 101, or 137 recommended. Advanced investigation of questions about the nature and foundations of morality. Among the topics that may be discussed are moral realism and anti-realism, cognitivism and non-cognitivism, types of relativism, moral skepticism, moral knowability, moral belief and normative belief. GE credit: AH, WE.—Copp

118. Political Philosophy (4) Lecture—3 hours; discussion—1 hour. Prerequisite: one course in philosophy. Intensive examination of some central concepts of political philosophy such as the state, sovereignty, rights, obligation, freedom, law, authority, and responsibility. GE credit: SocSci, Div | Writ | AH, WE.—O. Glinert

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 | Writ | AH, WE.—O. Glinert
120. Environmental Ethics (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in philosophy recommended. Conceptual and ethical issues concerning the environment. Extension of ethical theory to animals, all life, and ecosystem wholes. Topics may include contemporary issues such as global warming, sustainability and biodiversity. Not open for credit for students who have completed course 115 prior to Fall 2011. GE credit: ArtHum | AH, WE — Millstein

121. Bioethics (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 15 recommended. In-depth coverage of topics in bioethics including resource allocation, medical ethics, health and disease, disability, public health, and ethical issues related to research on human subjects and emerging technologies. GE credit: AH, WE — Kulli

122. 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 of art to its environment. GE credit: ArtHum | AH, WE — Oshana

125. Theory of Action (4)
Lecture—3 hours; extensive writing or discussion — 1 hour. Prerequisite: one course in Philosophy recommended. Survey of prominent contemporary approaches to the major problems in action theory. Problems include issues about the nature of intentional action and the conceptual and historical clarification of the notion of action. GE credit: AH, WE — Lin

129. Knowledge and the A Priori (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in philosophy recommended. Self-evidence, intuitions and [in]defeasibility of a priori methods. Analytic, formalist and Kantian accounts of how knowledge can be acquired through reasoning and intuition alone, with particular focus on problems in logical methods. Offered in alternate years. GE credit: AH, WE — S. Molyneux

131. Philosophy of Logic and Mathematics (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 12 or one course for credit in mathematics. Nature of formal systems and mathematical theories. Selected topics include logic and semantical paradoxes; foundations of mathematics; set theory; type theory, and intuitionistic philosophy; philosophy of geometry; philosophical implications of Gödel's incompleteness results. GE credit: AH, WE — Lundy

134. Modal Logic (4)
Lecture—4 hours. Prerequisite: course 112 or 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. GE credit: AH, WE — Antonelli

135. Alternative Logics (4)
Lecture/discussion—4 hours. Prerequisite: course 12, Mathematics 108, or the equivalent. Alternatives to standard truth-functional logic, including many-valued logic, intuitionistic logic, relevance logic, and non-monotonic logics. GE credit: AH — Antonelli

136. Formal Epistemology (4)
Lecture/discussion—4 hours. Prerequisite: course 12. Formal (mathematical) approaches to belief revision, knowledge, and deduction; metaknowledge, (multi-agent) epistemic logic, Bayesian confirmation, Bayes nets, epistemic and probabilistic paradoxes. Offered irregularly — F. Molyneux

137A. Philosophy of Language: Theory of Reference (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in philosophy or linguistics recommended. Survey of issues and views concerning reference, or how words refer to things. Topics include names and descriptions, the distinction between sense and reference, the puzzle of non-referring terms, the nature of reference, and possibility and necessity. Only two units of credit for students who have completed course 137. GE credit: AH, WE — May, Sennet

137B. Philosophy of Language: Truth and Meaning (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in philosophy or linguistics recommended. Comparative treatment of theories about the relation between meaning and truth. 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. GE credit: AH, WE — May, Sennet

137C. Philosophy of Language: Semantics and Pragmatics (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in philosophy or linguistics recommended. Philosophical issues and positions concerning the meaning and use of language. Topics include the distinction between meaning and implication, the roles of context and convention in language use, speaker meaning versus linguistic meaning and speech act theory. Only two units of credit for students who have completed course 137. GE credit: AH, WE — May, Sennet

141. Socrates and the Socratic Dialogue (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 21 recommended. The philosophy of Socrates as found in the Socratic dialogues of Plato. Topics include the Socratic practice of refutation, its method, epistemological foundation, and moral purpose, Socratic eudaimonism and Socratic virtue theory, the paradoxes of Socratic intellectualism. GE credit: AH, WE — Szafir

143. Hellenistic Philosophy (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 21 recommended. Positions and arguments of the major schools of philosophy of the Hellenistic period: Stoicism, Epicureanism, and Skepticism. Focus is on the ethical, epistemological and metaphysical questions and their interconnectedness. GE credit: AH, WE — Szafir

145. Medieval Philosophy (4)
Lecture/discussion—4 hours. Prerequisite: course 21 recommended. Major philosophers in the medieval Christian, Islamic, and Jewish traditions. Offered in alternate years. GE credit: AH, WE — Szafir

151. Nineteenth Century European Philosophy (4)

156. Contemporary Analytic Philosophy (4)
Lecture/discussion—3 hours; term paper. Prerequisite: one course in philosophy recommended. Consideration of current issues such as meaning/reference, analytic/synthetic, reductionism, formal and ordinary language, essential properties, ontological commitment, possible worlds semantics; influential works by philosophers such as Russell, Moore, Wittgenstein, Austin, Carnap, Quine, Putnam, Kripke, van Fraassen. GE credit: AH, WE.

157. Twentieth Century European Philosophy (4)
Lecture/discussion—4 hours. Prerequisite: one course in philosophy recommended. Survey of the main movements in twentieth century philosophy on the European continent, including phenomenology, existentialism, post-structuralism and postmodernism. Philosophers covered are Husserl, Heidegger, Sartre, Foucault, Derrida. GE credit: ArtHum | AH, WE — Mattey

160. Pre-Socratics (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 21 recommended. Study of the metaphysical views of such pre-Socratic figures as the Milesians, the Pythagoreans, Heraclitus, Parmenides, Empedocles, Anaxagoras, and the atomists. GE credit: AH, WE — Szafir

161. Plato (4)
Lecture/discussion—3 hours, term paper. Prerequisite: course 21 recommended. Examines 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. GE credit: AH, WE — Szafir

162. Aristotle (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 21 recommended. An overview of Aristotle’s most central and influential writings. Topics selected from fields such as metaphysics, physics, ethics, logic, and psychology. GE credit: AH, WE — Szafir

168. Descartes (4)
Lecture/discussion—4 hours. Prerequisite: course 22 recommended. The philosophical writings of René Descartes. Topics include the distinction between the nature and existence of mind and body, the existence of God, and the foundations of science. Offered irregularly. GE credit: AH, WE — Mattey

172. Spinoza and Leibniz (4)
Lecture/discussion—4 hours. Prerequisite: course 22 recommended. Seventeenth-century philosophical writings of Spinoza and Leibniz. Topics drawn from both philosophers include: the nature and existence of God, the nature of mind and body, human freedom, metaphysical monism vs. pluralism. Offered in alternate years. GE credit: ArtHum | AH, WE — F. Mattey

174. Locke and Berkeley (4)
Lecture/discussion—4 hours. Prerequisite: course 22 recommended. Principal metaphysical works of John Locke and George Berkeley. Topics include abstract ideas, existence of matter, primary and secondary qualities, essence, substance, existence of God, and the nature of scientific knowledge. May be repeated for credit. Offered irregularly. GE credit: AH, WE — W. (WJ) Mattey

178. Hegel (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. Offered irregularly. GE credit: AH, WE — Mattey

179. Kant (4)
Lecture/discussion—4 hours. Prerequisite: course 22 recommended. 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. Offered irregularly. GE credit: AH, WE — S. (S.) Mattey

178. Frege (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one upper-division course in philosophy recommended; consent of instructor. Development of Gottlob Frege’s views about language and logic. Formulation of his grand project known as logicism and how it led to the philosophy of language. GE credit: AH, WE — May
189A. Special Topics in Philosophy: History of Philosophy (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in the area of the special topic recommended. Special topics in History of Philosophy. May be repeated up to eight units of credit. GE credit: ArtHum | AH, WE—Mattey, Szafir

189B. Special Topics in Philosophy (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in the area of the special topic recommended. Special topics in Metaphysics. May be repeated up to eight units of credit. GE credit: ArtHum | AH, WE—Gilmore

189C. Special Topics in Philosophy: Theory of Knowledge (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in the area of the special topic recommended. Special topics in Theory of Knowledge. May be repeated up to eight units of credit. GE credit: WE—S. (S.) Matley, Molyneux

189D. Special Topics in Philosophy: Ethics (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in the area of the special topic recommended. Special topics in Ethics. May be repeated up to eight units of credit. GE credit: ArtHum | AH, WE—Oshana

189E. Special Topics in Philosophy: Political Philosophy (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in the area of the special topic recommended. Special topics in Political Philosophy. May be repeated up to eight units of credit. GE credit: ArtHum | AH, WE—Oshana

189F. Special Topics in Philosophy: Political Philosophy by Area (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in the area of the special topic recommended. Special topics in Political Philosophy. May be repeated up to eight units of credit. GE credit: ArtHum | AH, WE—Oshana

189G. Special Topics in Philosophy: Aesthetics (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in the area of the special topic recommended. Special topics in Aesthetics. May be repeated up to eight units of credit. GE credit: ArtHum | AH, WE—Oshana

189H. Special Topics in Philosophy: Philosophy of Mind (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in the area of the special topic recommended. Special topics in Philosophy of Mind. May be repeated up to eight units of credit. GE credit: ArtHum | AH, WE—or Se, WE—Griesemer, Landry, Millstein

189I. Special Topics in Philosophy: Philosophy of Science (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in the area of the special topic recommended. Special topics in Philosophy of Science. May be repeated up to eight units of credit. GE credit: ArtHum or SocSci | AH or SE, WE—Griesemer, Landry, Millstein

189J. Special Topics in Philosophy: Philosophy of Language (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: one course in the area of the special topic recommended. Special topics in Philosophy of Language. May be repeated up to eight units of credit. GE credit: ArtHum | AH—S. (S.)

194HA. Honors Research Project (4)
Tutorial—3 hours; term paper. Prerequisite: consent of instructor; open to 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. F, W, S. (F, W, S.)

194HB. Honors Research Project (4)
Lecture—Tutoring—3 hours; term paper. Prerequisite: consent of instructor; open to 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. F, W, S. (F, W, S.)

198. Directed Group Study (1-5)
(P/NP grading only.)
Prerequisite: consent of instructor. (P/NP grading only.)
Graduate
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. F. (F.)

200B. Proseminar II (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor. Limited enrollment. Open 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. F. (F.)

201. Metaphysics (4)
Seminar—3 hours; term paper. Prerequisite: graduating standing or consent of instructor. 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 topic differs and with consent of instructor. —Gilmore

202. Theory of Knowledge (4)
Seminar—3 hours; term paper. Prerequisite: graduating standing or consent of instructor. 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 topic differs and with consent of instructor. —Gilmore

203. Philosophy of Mind (4)
Seminar—3 hours; term paper. Prerequisite: graduating standing or consent of instructor. Topics in the philosophy of mind such as the mind-body problem, mental representation, intentionality. May be repeated for credit with consent of instructor. —Mattey, Molyneux

203P. Philosophy of Mind Practicum (4)
Practicum—12 hours. Prerequisite: consent of instructor. Special topics in Philosophy of Mind prepared for publication by advanced students in a team setting. Topics include knowledge representation and learning in neural networks, the nature and formal properties of mental representations. May be repeated for credit when topic differs and with consent of instructor. (S/U grading only.)

207. Philosophy of Physics (4)
Seminar—3 hours; term paper. Prerequisite: graduating standing or consent of instructor. Intensive treatment of one or more topic(s) in the philosophy of physics, such as foundations of spacetime theories, the interpretation of quantum mechanics, or foundations of statistical mechanics. May be repeated for credit when topic differs and with consent of instructor. —Landry

208. Philosophy of Biology (4)
Seminar—3 hours; term paper. Prerequisite: graduating standing or consent of instructor. Intensive treatment of one or more topic(s) in the philosophy of biology, such as foundations of evolutionary theory, reducibility, reductionism in biology, sociobiology and cultural evolution. May be repeated for credit when topic differs and with consent of instructor.—Griesemer, Millstein

210. Philosophy of Science (4)
Seminar—3 hours; term paper. Prerequisite: graduating standing or consent of instructor. Treatment of one or more general topics of current interest in philosophy of science. Topics may include explanation, theories of confirmation, scientific realism, reduction in physics and biology. May be repeated for credit when topic differs and with consent of instructor. —Griesemer, Landry, Millstein

211. 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 foundations. 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 topic differs and with consent of instructor. —Antonelli, Landry

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. May be repeated two times for credit when topic differs. —F. (F.) Antonelli, Mattey

214. Ethics (4)
Seminar—3 hours; term paper. Prerequisite: graduating standing in philosophy 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 topic differs and with consent of instructor. —Copp, Oshana

217. Political Philosophy (4)
Seminar—3 hours; term paper. Prerequisite: graduating standing or consent of instructor. Advanced studies 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 topic differs and with consent of instructor. —Copp, Oshana

220. Environmental Ethics (4)
Seminar—3 hours; term paper. Prerequisite: graduating standing or consent of instructor. Intensive treatment of one or more topic(s) in environmental ethics, such as biodiversity, sustainability, composition of the community, invasive species, endangered species, applications of ethical theories to contemporary environmental issues. —Millstein

237. Philosophy of Language (4)
Seminar—3 hours; term paper. Prerequisite: graduating standing or consent of instructor. Study of philosophical issues raised by language, such as the nature of semantic content, proper semantics for verbs of propositional attitude, feasibility and limitations of formal semantics and pragmatics for natural languages. May be repeated for credit when topic differs and with consent of instructor. —May, Sennett

238. Philosophy of Language Workshop (4)
Seminar—3 hours; extensive writing. Open to graduate students only. Discussion of recently published, unpublished and in-progress research in philosophy of language, including work on the relation of language and mind, of language and logic, and linguistic theory. May be repeated for credit when topic differs. —May

261. Plato (4)
Seminar—3 hours; term paper. Prerequisite: graduating standing or consent of instructor. Advanced seminar designed for analysis of arguments, doctrines, and texts from Plato’s works. Methods of argumenta-
tion and interpretation are especially stressed. Topics vary according to instructor. May be repeated for credit with consent of instructor.—Szafler

262. Aristotle (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Advanced seminar designed for analysis of arguments, doctrines, and methods of argumentation from Aristotle. Methods of argumentation and interpretation are especially stressed. Topics vary according to instructor. May be repeated for credit with consent of instructor.—Szafler

275. Kant (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Topics in the history of philosophy. Topics vary according to instructor from quarter to quarter. May be repeated for credit when topics differ and with consent of instructor.—Mathey

290. History of Philosophy (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Intensive study of a topic in the philosophy of Kant, in such areas as meta-physics, theory of knowledge, ethics. May be repeated for credit with consent of instructor.—Mathey

296. Group Study (1-5) Professional

396. Teaching Assistant Training Practicum (1-4) Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—F, W, S, F (W, S, J)

Physical Education

[College of Letters and Science]
Barbara Jahn, M.S., Program Director
Program Office, 264 Hickey Gymnasium 530-752-1111

Committee in Charge
Keith Baar, Ph.D. (Neurobiology, Physiology, and Behavior)
Sue Bodine, Ph.D. (Neurobiology, Physiology, and Behavior)
Barbara A. Jahn, M.S. (Physical Education)
Susan Kauzlarich, Ph.D. (Chemistry)
Academic Senate Distributed Graduate Mentoring Award
Tonya Kuhl, Ph.D. (Chemical Engineering and Materials Science)
Ronald Manara, M.S. (Physical Education)
Dwayne Shaffer, M.A. (Physical Education/Intercollegiate Athletics)

Faculty
Barbara A. Jahn, M.S., Supervisor

Affiliated Faculty
Lloyd Acosta, M.Ed, Lecturer/Coach
Carissa Adams, Ph.D., Lecturer
Alex Antipa, B.S., Lecturer
Erin Bridges-Thorpe, M.B.A., Lecturer/Coach
Stephen T. Bronzan, M.S., Lecturer/Assistant Director
Greg Chapla, B.A., Lecturer
Daniel Connors B.A, Lecturer/Coach
Rozanne DeWeese, M.A., Lecturer
Steven Dozen, Ph.D., Lecturer
Adam Getchell, M.S., Lecturer
Ron Gould, B.A. Lecturer/Coach
Jayan Graves, B.S., Lecturer
Jennifer Gruss, M.A., Lecturer/Coach
Rick Henderson, B.S., Lecturer
Sara Jackson, M.S., Lecturer/Coach
Mark Johnson, M.S., Lecturer
Twilla Kaufman, M.A., Lecturer/Coach
Andrea Khoo, B.S., Lecturer
Christine Kilroe, B.S., Lecturer/Coach
Theresa Ladouceur, B.S., Lecturer/Coach
John Lavallee, M.Ed., Lecturer/Coach
Darryl Lee, M.S., Lecturer
James Les, B.S., Lecturer/Coach
Daniel Leyson, M.A., Lecturer/Coach
Ron Manara, M.S., Lecturer
Bill Maze, M.B.A., Lecturer/Coach
Peter Moketa, M.A., Lecturer/Coach
Kevin Nosek, M.S., Lecturer/Coach
Maryclaire Robinson, M.S., Lecturer
Dwayne Shaffer, M.A., Lecturer/Coach
Sandy Simpson, M.S., Lecturer
Eric Steidlmayer, J.D., Lecturer/Coach
Anna Temple, B.A., Lecturer/Coach
Lisa Varnum, B.S., Athletic Trainer/Lecturer
Matt Vaughn, B.A., Lecturer/Coach
Cy Williams, M.A.T., Lecturer
Jamey Wright, J.D., Lecturer/Coach
Karen Yoder, M.A., Lecturer/Coach
Karen Zufelt, Ph.D., Lecturer

The Program
The Program in Physical Education facilitates the development and offering of non-course related to physical activities and education, 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 lifetime health and fitness.

The basic activities series includes Physical Education 1, fitness, 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, health and fitness, and athletic training. Upper division courses include advanced classes in coaching, sociology of sports, and a series of courses that meet the mandated requirements for students pursuing teaching preparation and certification.

Teaching Credential Subject Representative. Barbara Jahn

Class and Recreational 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, tennis courts, athletic fields. 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
1. Physical Activities (0.5) Laboratory—2 hours. Physical Education Activities classes offered in the following areas: aquatics, personal fitness, martial arts, individual sports, and team sports. These academic classes are instructional rather than recreational and are intended to improve activity specific skills and knowledge. May be repeated, along with course 6, for a combined total of 6 units. Credit limited to 6 units in combination with course 6. (P/NP grading only)—F, W, S, F (W, S, J)

6. Preparation and Participation in ICA Competition (1) Practice—3 hours. Prerequisite: consent of instructor (head coach). Classes offered in all UC Davis intercollegiate athletic sports and are restricted to student-athletes who are members. May be repeated, along with course 1, for a combined total of 6 units. (P/NP grading only)—F, W, S, F (W, S, J)

7. Professional Physical Education Activities: Men and Women (1) Lecture—1 hour; laboratory—2 hours. Fundamental skills for: (a) coaching competitive athletics; (b) classroom teaching and coaching; and (c) classroom teaching and officiating. May be repeated for a total of six units.—F, W (F, W)

8. Student-Athlete Life Skills (1) Lecture—1 hour. Prerequisite: consent of instructor. Open to intercollegiate student-athletes only. For intercollegiate student-athletes only. Balancing academic and athletic demands. Academic, psychological, and sociocultural issues which influence success as a college student-athlete. (P/NP grading only)—F, W, F (W, W)

15. Administration of Intramural Sports (2) Lecture—2 hours. Planning and administering intramural sports programs at the high school and college level.

23. Theory of Lifesaving and Water Safety (2) Lecture—1 hour; laboratory—2 hours. Prerequisite: sound physical condition, and no physical handicap that would render student unable to perform the required skills and ability to pass preliminary swimming tests. Provides the student with the knowledge, organizational procedures, and skill development necessary to provide for water safety and save his/ her own life or the life of another in an aquatic emergency. (American Red Cross Advanced Lifesaving Certificate awarded upon successful completion of necessary requirements.)—S (S), J

27. Training Course for Water Safety Instructors (2) Lecture—1 hour; laboratory—2 hours. Prerequisite: advanced swimming (course 1) or consent of instructor; course 5 and current Advanced Life-Saving Certificate. Theoretical knowledge and practical experience necessary for the organization and teaching of swimming and lifesaving classes. (American Red Cross Water Safety Instructor’s Certificate awarded upon successful completion of necessary requirements.)—S (S), J

40. Drugs and Society (2) Lecture—2 hours; fieldwork—2 hours total; film-viewing—5 hours total. Pharmacology, methods of use, and effects of use of psychoactive and performance-enhancing drugs. Historical overview of drug use. Identification of behavior of “at-risk” and “user” populations. (P/NP grading only)—F, W, S, F (W, S, J)

92. Physical Education Internship (1-5) Internship—3-15 hours; written project proposal and evaluation. Prerequisite: consent of instructor; enrollment dependent on availability of intern positions, with priority given to Exercise Biology 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 credit once but no internship units will be counted toward Exercise Biology major. (P/NP grading only)—F, W, S, F (W, S, J)

97T. Tutoring in Physical Education (1-5) Tutorial—1 hour. Prerequisite: lower division standing and consent of Program Director. Tutoring of students in lower division physical activity courses. Weekly meetings with instructor in charge of courses. Written reports on methods and materials required. May be repeated one time for credit. (P/NP grading only)—F, W, S, F (W, S, J)

97TC. Tutoring in the Community (1-5) Tutorial—2-15 hours; discussion—1 hour. Prerequisite: lower division standing and consent of Program Director. Tutoring in the community in physical activity-related projects under the guidance of the Physical Education faculty. Regular meetings with instructor in charge and written report required. May be repeated one time for credit. (P/NP grading only)—F, W, S, F (W, S)

98. Directed Group Study (1-5) Prerequisite: consent of instructor and Program Director. (P/NP grading only)—F, W, S, F (W, S, J)
Upper Division

100. Field Experience in Teaching Physical Education (2)
Discussion—1 hour; fieldwork—4 hours. Prerequisite: upper-division standing and appropriate course 1 or 7. Tutoring or teacher’s aide in physical education activities, including athletic coaching, in public schools under the guidance of a regular teacher with supervision by a departmental faculty person. May be repeated one time for credit. (P/NP grading only)—F (F)

120. Sport in American Society (3)
Lecture—3 hours. Sociological approaches to the study of sport and contemporary American culture, including sport interaction with politics, economics, religion, gender, race, media, and ethics. Socialization factors involving youth, scholastic, collegiate, and Olympic sport. (Same as Exercise Biology 120.) GE credit: SocSci, Div SS—F, W, S, Su. (F, W, S, Su.) Adams, Bronzan, Doten, Simpson

131. Physical Activity and the Disabled (4)
Lecture—3 hours; laboratory—3 hours. The study of the diverse and complex nature of individuals with disabilities and how they adapt to their disabilities in daily living. Integration of individuals with disabilities into the community, schools, and physical activity and recreational programs. Not open to students who have completed Exercise Biology 131. (P/NP grading only.)—F, W, S, Su.

133. Prevention and Care of Sports Injuries (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Cell Biology and Human Anatomy 101 (may be taken concurrently). Prevention, care, and rehabilitation of injuries incurred by athletes. Laboratory on anatomy, emergency care, physical therapy methods, and taping techniques. Not open for credit to students who have completed Exercise Biology 133.—Su. (Su.)

135. Advanced Procedures in Evaluation and Management of Athletic Injuries (3)
Lecture—3 hours. Prerequisite: course 133 or Exercise Biology 133. Cell Biology and Human Anatomy 101, consent of instructor. Advanced study of the evaluation and management of athletic injuries, including mechanism of injury, biomechanics and pathophysiology. Current topics in athletic training. Not open for credit to students who have completed Exercise Biology 135.—Su. (Su.)

141. Coaching Principles and Methods (3)
Lecture/discussion—3 hours. Prerequisite: upper-division standing; course 143. Technical, tactical, and strategic aspects of coaching. Methods for organizing and delivering effective information in coaching. Biomechanics, training programs, and motor learning principles applied to coaching. Classroom development of coaching skills and outside observations of coaching required. —S. (S.) Bronzan

142. Physical Education in the Public Schools (3)
Lecture—3 hours. Analysis and study of the principles and methods basic to teaching physical education at the elementary and secondary levels.

143. Coaching Effectiveness (3)
Lecture—3 hours. Prerequisite: upper-division standing; 3 units of courses 1 and 6 combined. Synthesis and application of basic components of sport psychology, sport pedagogy, and sport physiology and basic management and administration of athletics in public high schools. (P/NP grading only)—F (F) Bronzan

144. Principles of Health Education (2)
Lecture—2 hours. Prerequisite: course 44 and upper division standing and consent of instructor. Principles of teaching health education in the public schools. (P/NP grading only)—S (S)

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 consent of instructor. 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 internships will be counted toward Exercise Science major. (P/NP grading only)—F, W, S, Su.

197T. Tutoring in Physical Education (1-5)
Tutorial—2-15 hours; discussion—1 hour. Prerequisite: consent of instructor and Department Chairperson. Tutoring of students in lower division physical activity courses. Written reports on methods and materials required. May be repeated one time for credit. (P/NP grading only)—F, W, S, Su.

197C. Tutoring in the Community (1-5)
Tutorial—2-15 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 one time for credit. (P/NP grading only)—F, W, S, Su.

199. Special Study for Undergraduates (1-5)
Professional

300. The Elementary Physical Education Program (2)
Lecture—1 hour; laboratory—2 hours. Prerequisite: consent of instructor. Restricted to senior standing or credential student. Introduction to principles, theories, material, and practices of elementary school physical education program. —S. (S.) Bronzan, Jackson, Motokaitis

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)—W (W)

Physical Medicine and Rehabilitation

See Medicine, School of, on page 428.

Physics

[College of Letters and Science]
Andreas Albrecht, Ph.D., Chairperson of the Department
Lori Lubin, Ph.D., Vice Chairperson of the Department (Administration and Undergraduate Matters)
Rena Zieve, Ph.D., Vice Chairperson of the Department (Graduate Matters)

Department Office, 174 Physics Building 530-752-1500; http://www.physics.ucdavis.edu

Faculty
Andreas J. Albrecht, Ph.D., Distinguished Professor Robert H. Becker, Ph.D., Distinguished Professor Patricia C. Beeshaat, Ph.D., Distinguished Professor Marusa Bradac, Ph.D., Associate Professor Manuel Calderon de la Barca Sanchez, Ph.D., Professor Steven Carlig, Ph.D., Professor Daniel A. Cebra, Ph.D., Professor Hsin-Chia Cheng, Ph.D., Professor Maxwell B. Chertok, Ph.D., Professor Shirley Chiang, Ph.D., Professor

Academic Senate Distinguished Teaching Award
John Conway, Ph.D., Professor Daniel L. Cox, Ph.D., Distinguished Professor James Crutchfield, Ph.D., Professor Nicholas Curro, Ph.D., Professor Sergey Dubovsky, Ph.D., Associate Professor Robin Erbacher, Ph.D., Professor Charles S. Fadley, Ph.D., Distinguished Professor Christopher D. Fassnacht, Ph.D., Professor Daniel Ferenc, Ph.D., Professor Ching-Yao Fong, Ph.D., Distinguished Professor John T. Fungion, Ph.D., Distinguished Professor Veronika Hubeny, Ph.D., Professor Nemanja Kaloper, Ph.D., Professor Lloyd E. Knox, Ph.D., Professor Kai Liu, Ph.D., Professor Lori Lubin, Ph.D., Professor Markus Luty, Ph.D., Professor Michael Mulhearn, Ph.D., Assistant Professor Emilija Pantle, Ph.D., Assistant Professor Warren T. Pickert, Ph.D., Distinguished Professor Mokunz Ranganami, Ph.D., Professor John B. Rundle, Ph.D., Distinguished Professor Sergey Savrasov, Ph.D., Professor Richard T. Scalletta, Ph.D., Professor Rajiv R.P. Singh, Ph.D., Professor Robert Svboda, Ph.D., Professor John Terning, Ph.D., Professor S. Mani Trapiathi, Ph.D., Professor Jaroslav Trnka, Ph.D., Assistant Professor J. Anthony Tyson, Ph.D., Distinguished Professor David J. Webb, Ph.D., Professor S. Dittrich, Ph.D., Professor Gergely Zimanyi, Ph.D., Professor

Emeriti Faculty
Franklin P. Brady, Ph.D., Professor Emeritus Thomas A. Cahill, Ph.D., Professor Emeritus Ling-Lieh Chau, Ph.D., Professor Emeritus Lawrence B. Coleman, Ph.D., Professor Emeritus J. Anthony Tyson, Ph.D., Distinguished Professor Emeritus Ron C. Cohen, Ph.D., Professor Emeritus "Academic Senate Distinguished Teaching Award" Linton R. Corrascini, Ph.D., Professor Emeritus James E. Draper, Ph.D., Professor Emeritus "Academic Senate Distinguished Teaching Award" Claude Garrod, Ph.D., Professor Emeritus James P. Hartley, Ph.D., Professor Emeritus Joseph E. Kirsch, Ph.D., Professor Emeritus Winston T. Koo, Ph.D., Professor Emeritus Barry M. Klein, Ph.D., Professor Emeritus Richard L. Landers, Ph.D., Distinguished Professor Emeritus Douglas W. McCollum, Ph.D., Senior Lecturer Emeritus, Academic Senate Distinguished Teaching Award and "Academic Senate Distinguished Teaching Award" David E. Pellett, Ph.D., Professor Emeritus David Pines, Ph.D., Distinguished Research Professor Wendell H. Potter, Ph.D., Senior Lecturer Emeritus and "Academic Senate Distinguished Teaching Award" Philip M. Yager, Ph.D., Professor Emeritus

Affiliated Faculty
Albert De Roeck, Ph.D., Adjunct Professor Harry B. Radousky, Ph.D., Adjunct Professor Ramona Vogt, Ph.D., Adjunct Professor Tom Weideman, Ph.D., Lecturer Dina Zhabinskaya, Ph.D., Lecturer
The Major Program
From the smallest subatomic particles to atoms, molecules, stars, and galaxies, the study of physics is the study of what makes the universe work. Knowledge gained using atomic-scale microscopes and high-energy particle accelerators and nuclear reactors teaches us not only what holds the atomic nucleus together but also how proteins function and why stars shine. The Program. The Department of Physics offers a Bachelor of Arts in Physics and two Bachelor of Science degree programs: in Physics (which also offers an emphasis in Astrophysics), and in Applied Physics. Each program provides a broad coverage of classical and modern physics while permitting a broader liberal arts education than is possible with the other two programs. The B.S. degree in either Physics or Applied Physics should be followed by the student who plans to enter physics as a profession, and also provides excellent training for a wide variety of technical career options. The B.S. in Applied Physics provides the student with a solid introduction to a particular applied physics specialty. For the student who plans to enter the job market upon completing a B.S. degree, the applied physics orientation would be an asset. Either B.S. program provides a solid foundation in physics for the student interested in graduate work in either pure or applied physics.

Career Alternatives. Careers in physics and applied physics lead to research and development, either in universities, government laboratories, or industry; teaching in high schools, junior colleges, and universities; management and administration in industrial laboratories; and in government agencies; and in production and sales in industry. A major in physics also provides a strong base for graduate-level work in such interdisciplinary areas as chemical physics, biophysics and medical physics, geo-physics and environmental physics, astrophysics and astronomy, and computer science, and materials science.

Physics

A.B. Major Requirements:

**UNITS**

<table>
<thead>
<tr>
<th>Preparatory Subject Matter</th>
<th>Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE</th>
<th>19-25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Units for the Major</td>
<td>76-84</td>
<td></td>
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</table>

B.S. Major Requirements:

**UNITS**

<table>
<thead>
<tr>
<th>Preparatory Subject Matter</th>
<th>Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE</th>
<th>19-25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Units for the Major</td>
<td>107-113</td>
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</tr>
</tbody>
</table>

**Applied Physics—Chemical Physics Concentration**

**B.S. Major Requirements:**

**UNITS**

<table>
<thead>
<tr>
<th>Preparatory Subject Matter</th>
<th>Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE</th>
<th>19-25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Units for the Major</td>
<td>112-127</td>
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</table>

**Applied Physics—Physical Electronics Concentration**

**B.S. Major Requirements:**

**UNITS**

<table>
<thead>
<tr>
<th>Preparatory Subject Matter</th>
<th>Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE</th>
<th>19-25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Units for the Major</td>
<td>112-127</td>
<td></td>
</tr>
</tbody>
</table>

**Program Variations.** Similar courses from other departments may be substituted for courses in the depth subject matter requirements by obtaining prior written permission from the Undergraduate Curriculum Committee Chairperson.
Total Units for the Major.............. 107-116

Program Variance. Similar courses from other
departments may be substituted for courses in the
depth subject matter requirements by obtaining prior
written permission from the Undergraduate Curricu-
lum Committee Chairperson.

Applied Physics—Geophysics

Concentration

B.S. Major Requirements:

Preparatory Subject Matter ............... 50-56
Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC,
9HD, 9HE ........................................ 19-25
Mathematics 21A, 21B, 21C, 21D, 22A,
22B .................................................. 22
Chemistry 2A or 2HA ................................ 5

Depth Subject Matter ..................... 60-61
Physics 104A, 105A, 110A, 110B, 112A,
115A, 116A, 116B ............................32
Laboratory Requirement ................. 4

Physics 122A or 122B or 116C

Concentration Courses .............. 13
Physics 104B; Geology 161, 162 (courses
offered in alternating years)
Additional Electives (choose three from the
following) ........................................ 32
Physics 105B or 116C or 151; Geology
146 or 163; Atmospheric Science 120 or
121A or 121B

Total Units for the Major..............113-119

Program Variance. Similar courses from other
departments may be substituted for courses in the
depth subject matter requirements by obtaining prior
written permission from the Undergraduate Curricu-
lum Committee Chairperson.

Minor Program Requirements:

All courses in the minor have prerequisites equiva-
 lent to Mathematics 21A-21B-21C-21D and 22A-
22B and Physics 9A-9B-9C-9D. Students considering
the possibility of enrolling in the minor should consult a
Physics major adviser before beginning course work in
the minor program.

UNITs

Physics ................................................. 24

At least 6 upper division courses in Physics
(excluding Physics 160, 161F, 161W, 161S, 169C, & 169F) ............24

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 three degrees, graduate
research, teaching assistantships, and research assistantships
may be obtained by writing to the Chairperson, Department of Physics, One
Shields Avenue, University of California, Davis, CA 95616.

Astronomy, In addition to the introductory Astron-
omy courses listed, upper division and graduate courses in Astronomy, Astrophysics and Cosmology are listed under Physics.

Courses in Astronomy (AST)

Lower Division

10G. Introduction to Stars, Galaxies, and the Universe (3)

Lecture—3 hours. Non-mathematical 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
beyond 9HA or 9A.

GE credit: SciEng|SE, SL, VL.

PHYSICS 111 B—F, W

Astronomy of the Solar System (3)

Lecture—3 hours. Emphasis on the night sky: posi-
tions of sun, moon, planets throughout the year.

Historical perspective on how our understanding of
the solar system expanded to current non-numerical
astrophysical interpretation of planetary systems.

Open for credit to students who have taken course 2, Physics 9 or 9H, or any upper-division physics course (other than 137 or 139).


Boeshaar

Astronomy

Lower Division

1A. Principles of Physics (3)

Lecture—3 hours. Prerequisite: trigonometry or con-
tent of instructor. Mechanics. Introduction to general
principles and analytical methods used in physics
with emphasis on applications in applied agricul-

Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Domestic Diversity; Writ—Writing Experience

Quarter Offered: F—Fall, W—Winter, S—Spring, Su—Summer; 2017-2018 offering in parentheses
tural and biological sciences and in physical education. Not open to students who have received credit for course 7B or 9A. GE credit: SciEng SE. F. W. (F. W.)

1B. Principles of Physics (3) Lecture—3 hours; discussion/laboratory—4 hours. Prerequisite: course 1A or 9A. Continuation of course 1A. Heat, optics, electricity, magnetism, and nuclear physics. Not open for credit to students who have received credit for course 7A, 7B, 7C, 9B, 9C, or 9D. GE credit: SciEng SE. W. (F. W.)

7A. General Physics (4) Lecture—1.5 hours; discussion/laboratory—5 hours. Prerequisite: concurrent enrollment in Mathematics 16B, 17B, or 21B. 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 1B or 9B. GE credit: SciEng SE. F. W. (F. W.)

7B. General Physics (4) Lecture—1.5 hours; discussion/laboratory—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. GE credit: SciEng SE. F. W. (F. W.)

9A. Classical Physics (5) Lecture—3 hours; laboratory—2.5 hours; discussion—1 hour. Prerequisite: Mathematics 21B. Inroduction to general principles and analytical methods used in physics. Heat and thermodynamics; fluids; electricity and magnetism including circuits and Maxwell’s equations. Only two units of credit allowed to students who have completed course 1A or 7B. Not open for credit to students who have completed course 9A; GE credit: SciEng SE. F. W. (F. W.)

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. Fluid mechanics, thermodynamics, wave phenomena, optics. Only two units of credit allowed to students who have completed course 7A; not open for credit to students who have completed course 9B, 9HC, or Engineering 105S. GE credit: SciEng SE. F. W. (F. W.)

9C. Classical Physics (5) Lecture—3 hours; laboratory—2.5 hours; discussion—1 hour. Prerequisite: course 9B, Mathematics 21D, 22A, 22E (may be taken concurrently). Continuation of course 9B. Fluid mechanics, thermodynamics, wave phenomena, optics. Applications to CA energy, water, and resource management policies. Physics underlying regional sports in CA. Not open for credit to students who have completed any quarter of Physics 9 or 9A, or any upper division physics course. GE credit: SciEng, WR. (F. W.)

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 area of physics. Some examples include black holes, space time, and relativity; physics of music; 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, WR. (F. W.)

10C. Physics of California (3) Lecture—2 hours. Atmospheric phenomena common in CA, including fog, tornadoes, and microclimates. Applications to CA energy, water, and resource management policies. Physics underlying regional sports in CA. Not open for credit to students who have completed any quarter of Physics 9 or 9A, or any upper division physics course. GE credit: SciEng SE. V, L. S. F. (F.) Bradac

12. Visualization in Science (3) Lecture—3 hours. Class size limited to 20-50 students. Problem solving, and use of images in physics, astronomy, biology, and chemistry as scientific evidence and for communication of research results. Offered irregularly. GE credit: SciEng SE. V, L. S. (F.) Zieve

30. Fractals, Chaos and Complexity (3) Lecture/discussion—3 hours. Prerequisite: Mathematics 16A or 21A. 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 Geology 20.] GE credit: SciEng, QL, SE. W. (F.)

49. Supplementary Work in Lower 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. GE credit: SciEng SE. F. W. (F. W.)

90X. Lower Division Seminar (2) Seminar—2 hours. Prerequisite: lower division standing; consent of instructor. Enrollment in the seminar is limited to 10. Examination of a special topic in Physics through shared readings, discussions, written assignments, or special activities such as laboratory work. May be repeated for credit. GE credit: SciEng SE.

98. Directed Group Study (1-5) Prerequisite: consent of instructor; primarily for lower division students. (F/P/NP grading only) GE credit: SE.

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (F/P/NP grading only) GE credit: SE.
and atmospheric science. Study of modern optical instrumentation. Open to non-majors. GE credit: SciEng | SE — S. (S.) 108L Optics Laboratory (1) Laboratory—3 hours. Prerequisite: course 108A concurrently. The laboratory will consist of one major project pursued throughout the quarter, based on modern applications of optical techniques. GE credit: SciEng | SE — S. (S.) 110A. Electricity and Magnetism (4) Lecture—3 hours. Prerequisite: courses 9B, 9C, 9D and Mathematics 210, 22A, and 22B with grade C- or better, or consent of department. Theory of electrostatics, electromagnetism, Maxwell's equations, electromagnetic waves. GE credit: SciEng | SE — W. (W.) Yu 110B. Electricity and Magnetism (4) Lecture—3 hours. Prerequisite: courses 104A and 104A with a grade of C- or better or consent of department. Theory of electrostatics, electromagnetism, Maxwell's equations, electromagnetic waves. GE credit: SciEng | SE — F. (F.) 110C. Electricity and Magnetism (4) Lecture—3 hours. Prerequisite: course 110B with a grade of C- or better, or consent of department. Theory of electrostatics, electromagnetism, Maxwell's equations, electromagnetic waves. GE credit: SciEng | SE — F. (F.) 112. Thermodynamics and Statistical Mechanics (4) Lecture—3 hours; extensive problem solving. Prerequisite: course 115A or the equivalent. Introduction to classical and quantum statistical mechanics and their connections with thermodynamics. The theory is developed for the ideal gas model and simple magnetic models. The course is designed to study topics such as solids, quantum fluids, and chemical equilibrium. GE credit: SciEng | SE — F. (F.) 115A. Foundation of Quantum Mechanics (4) Lecture—2 hours; extensive problem solving. Prerequisite: courses 104A and 105A passed with a grade of C- or better, or consent of department. Introduction to the methods of quantum mechanics with applications to, for example, solid state, nuclear and elementary particle physics. Extensive problem solving. GE credit: SciEng | SE — S. (S.) Carlip, Curro 115B. 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 spatial hydrogen atom and atomic spectra; perturbation theory; scattering theory. GE credit: SciEng | SE — F. (F.) Curro, Sackett 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 the operation of analog electronic circuits. Linear circuits, transmission lines, input impedance, feedback, amplifiers, oscillators, noise. GE credit: SciEng | SE — VI, F. (F.) Cebra 116B. Electronic Instrumentation (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: course 9C or Math 22B or consent of instructor. Continuation of course 116A. Introduction to the use of digital electronics and microcomputers in experimental physics. Nonlinear circuits, integrated circuits, analog-to-digital and digital-to-analog converters, transducers, actuators. GE credit: SciEng | SE — W. (W.) Trachten 116C. Introduction to Computer-Based Experiments in Physics (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: course 9D or Math 22B or consent of instructor. Introduction to techniques for making physical measurements using computer-based instrumentation. GE credit: SciEng | SE — WE, S. (S.) Mulhearn 122A. Advanced Laboratory in Condensed Matter Physics (4) Lecture—3 hours; project—1 hour. Prerequisite: course 104A, 105A, 110B, and 115B and 112 [may be taken concurrently] or consent of the department. Experimental techniques and measurements in solid-state physics. Student performs experiments depending on difficulty. Individual work is stressed. Thorough write-ups of the experiments are required. GE credit: SciEng | SE — W. (W.) Tyson, Zhu 122B. Advanced Laboratory in Particle Physics (SE) Lecture—8 hours. Prerequisite: course 104A, 105A, 110B, and 115B and 112 [may be taken concurrently] or consent of the department. Experimental techniques and measurements in nuclear and particle physics. Students perform each of six experiments depending on difficulty. Individual work is stressed. Thorough write-ups of the experiments are required. GE credit: SciEng | SE — W. (W.) Pantic, Tyson, Zhu 123. Signals and Noise in Physics (4) Lecture—3 hours; project—1 hour. Prerequisite: courses 9A, B, C, D and 104A, or consent of instructor. Techniques of measurement and analysis designed to avoid systematic error and maximize signal/noise ratio. Illustrative examples of optimal filters ranging from condensed matter to cosmology. Not open to students who have completed course 198. Offered in alternate years. GE credit: SciEng | SE — S. (S.) Tyson 129A. Introduction to Nuclear Physics (4) Lecture—3 hours. Prerequisite: course 115A passed with a grade of C- or better or consent of instructor. Survey of basic nuclear properties and concepts requiring introductory knowledge of quantum mechanics: nuclear models and forces, radioactive decay and detecting nuclear radiation and nuclear reaction products, alpha, beta and gamma decay. GE credit: SciEng | SE — S. (S.) Ferenc 129B. Nuclear Physics, Extensions and Applications (4) Lecture—3 hours; term paper. Prerequisite: course 129A. Continuation of course 129A. Nuclear reactions, neutrons, fission, fusion accelerators, introduction to meson and particle physics, nuclear astrophysics, and applications of nuclear physics and techniques to mass spectrometry, nuclear medicine, trace element analysis. GE credit: SciEng | SE — 130A. Elementary Particle Physics (4) Lecture—3 hours; extensive problem solving. Prerequisite: course 115A passed with a grade of C- or better or consent of instructor. Properties and classification of elementary particles and their interactions. Experimental techniques. Conservation laws and symmetries. Strong, electromagnetic, and weak interactions. Introduction to quantum mechanics. GE credit: SciEng | SE — W. (W.) Chertok 130B. Elementary Particle Physics (4) Lecture—3 hours; extensive problem solving. Prerequisite: course 115A passed with a grade of C- or better or consent of instructor. Properties and classification of elementary particles and their interactions. Experimental techniques. Conservation laws and symmetries. Strong, electromagnetic, and weak interactions. Introduction to quantum mechanics. GE credit: SciEng | SE — S. (S.) Svaboda 140A. Introduction to Solid State Physics (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 neutron diffraction, phonons, simple metals, energy bands and Fermi surface, semiconductors, optical properties, magnetism, superconductivity. GE credit: SciEng | SE — W. (W.) Fadley, Pickett, Zieve, Zimanyi 140B. Introduction to Solid State Physics (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 neutron diffraction, phonons, simple metals, energy bands and Fermi surface, semiconductors, optical properties, magnetism, superconductivity. GE credit: SciEng | SE — S. (S.) Fadley, Pickett, Zieve, Zimanyi 150. Special Topics in Physics (4) Lecture—3 hours; project. Prerequisite: courses 9A, B, C or 9HA, HB, HC, HD, HE or consent of instructor. Topics vary, covering areas of contemporary research in physics. May be repeated for credit. GE credit: SciEng | SE — F. (F.) 151. Stellar Structure and Evolution (4) Lecture—3 hours; project. Prerequisite: courses 9A, B, C or 105A concurrently or consent of instructor. The structure, contents, and evolution of stars, with equal emphasis on both observational data and theoretical models, including black holes, neutron stars and white dwarfs and the formation of substellar masses. Offered in alternate years. GE credit: SciEng | SE — F. Reckner, Bosmaar 152. Galactic Structure and the Interstellar Medium (4) Lecture—3 hours; project. Prerequisite: courses 9A, B, C, D and 105A concurrently or consent of instructor. The structure, contents, and evolution of galaxies and clusters of galaxies, including distance and mass determination, 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. GE credit: SciEng | SE — W. (W.) Fassnacht, Wittman 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 astrophysical settings such as the Big Bang, degenerate white dwarf and neutron stars, and solar neutrinos. Not open to students who have completed course 198. Offered in alternate years. GE credit: SciEng | SE — S. (S.) Bradac, Knox 155. General Relativity (4) Lecture—3 hours; project. Prerequisite: course 104A and 105A or 105B and 110A 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 and review of the key solutions, including black holes and expanding universes. Offered in alternate years. GE credit: SciEng | SE — W. (W.) Kaminer, Wittman 156. Introduction to Cosmology (4) Lecture—3 hours; project. Prerequisite: courses 9A, B, C and 105A concurrently or consent of instructor. Contemporary knowledge regarding the origin of the universe, including inflation, 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. GE credit: SciEng | SE — W. (W.) Knox 157. Astronomy Instrumentation and Data Analysis Laboratory (4) Laboratory—8 hours. Prerequisite: course 104A, 104B, 110A, 110B and 115A and 112 may be taken concurrently; consent of instructor. Open to Astrophysics Specialization majors. Experimental techniques, data acquisition and analysis involving laboratory astrophysics plus stellar, nebular and galactic digital
imaging, photometry and/or spectroscopy. Students perform three experiments. Individual work stressed. Minimum 10-15 page laboratory report. Two experiments are required. Offered in alternate years. GE credit: SciEng | SE, WE. — (S.) Boeshar, Tyson

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 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 considered. (Same course as Engineering 160.) GE credit: SciEng | SE. — (S.) Cox

185. Alumni Seminar Series (1)
Seminar—1 hour. Weekly guest speakers (usually a physics alumnus or alumnus) tell students about their careers. Speakers use their experience to give students valuable perspectives on life after a degree in physics. May be repeated two times for credit. (P/ NP grading only.) GE credit: SciEng | SE. — (S.) Knox

190. Careers in Physics (1)
Seminar—2 hours. Restricted to Physics and Applied Physics majors only. 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. (P/ NP grading only.) GE credit: — F. (F.)

194HA. Special Study for Honors Students (4)
Independent study—12 hours. Prerequisite: consent of instructor required. Open only to Physics and Applied Physics majors who satisfy the College of Letters and Science requirements for entrance into the Honors Program. Independent research project at a level significantly beyond that defined by the normal physics curriculum. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE, F, W, S, S. (F, W, S.)

194HB. Special Study for Honors Students (4)
Independent study—12 hours. Prerequisite: consent of instructor required. Open only to Physics and Applied Physics majors who satisfy the College of Letters and Science requirements for entrance into the Honors Program. Independent research project at a level significantly beyond that defined by the normal physics curriculum. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE, F, W, S, S. (F, W, S.)

195. Senior Thesis (5)
Independent study—15 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. GE credit: SciEng | SE. — F, W, S. (F, W, S.)

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 meeting with instructor. (P/ NP grading only.) GE credit: SE. — F, W, S. (F, W, S.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/ NP grading only.) GE credit: — F, W, S. (F, W, S.)

199. Special Study for Advanced Undergraduates (1-5)
(P/ NP grading only.) GE credit: — F, W, S. (F, W, S.)

Graduate

200A. Theory of Mechanics and Electromagnetics (4)
Lecture—3 hours; independent study—1 hour. Prerequisite: courses 140B, 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; Lagrange’s equations; symmetries, conservation laws, and Noether theorem; Lagrangian density; Hamilton formalism; canonical transformations; Poisson brackets; and Hamilton-Jacobi equations. — W. (W) Chiang

200C. Theory of Mechanics and Electromagnetics (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. — W. (W) Chiang

204A. Methods of Mathematical Physics (4)
Lecture—3 hours; independent study—1 hour. Prerequisite: course 104A or the equivalent. Linear vector spaces, operators and their spectral analysis, complete sets of functions, orthogonal functions, calculus of variations, introduction to numerical analysis. — F. (F.) Kaloper, Zieve

210. Computational Physics (3)
Lecture—3 hours. Prerequisite: knowledge of Fortran or C. Analytic techniques to solve differential equations and eigenvalue problems. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE, F, W, S, S. (F, W, S.)

215A. Quantum Mechanics (4)
Lecture—3 hours; independent study—1 hour. Prerequisite: courses 104A and 104B or the equivalent. Linear vector spaces, operators and their spectral analysis, complete sets of functions, complex variables, functional analysis, Green’s functions, calculus of variations, introduction to numerical analysis. — W. (W) Kaloper, Zieve

215B. Quantum Mechanics (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. — F. (F.) Cheng

221B. Statistical Mechanics (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. — S. (S.) Fang

229A. Advanced Nuclear Theory (3)
Lecture—3 hours. Prerequisite: course 224A. Advanced topics in nuclear theory; theory of quantum-mechanical scattering processes. Exact formal theory and models for two-body scattering. Offered irregularly.

229B. Advanced Nuclear Theory (3)
Lecture—3 hours. Prerequisite: course 229A. Advanced topics in nuclear theory; theory of quantum-mechanical scattering processes. Exact formal theory and models for three-body scattering. Offered irregularly.

230A. Quantum Theory of Fields (3)
Lecture—3 hours. Prerequisite: course 215C. Relativistic quantum mechanics of particles; techniques and applications of second quantization; Feynman diagrams; renormalization. — S. (S.) Luty

230B. Quantum Theory of Fields (3)
Lecture—3 hours. Prerequisite: course 230A. Continuation of 230A, with selected advanced topics, such as S-matrix theory, dispersion relations, axiomatic formulations. — F. (F.)

230C. Quantum Theory of Fields (3)
Lecture—3 hours. Prerequisite: course 230A and B, or consent of instructor. Renormalization theory and applications, including dimensional regularization, Ward identities, renormalizable and non-renormalizable group equations, coupling constant unification, and precision electroweak calculations. May be repeated for credit with consent of instructor. — W. (W) Gunion

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; electron transport; optical and transport properties of semiconductors; phonons, electron-phonon scattering. — F. (F.)

240B. Condensed Matter Physics B (3)
Lecture—3 hours. Prerequisite: course 215C, 219A; course 140AB or equivalent recommended. Topics in condensed matter physics: Crystal structure; electron transport; optical and transport properties of semiconductors; phonons, electron-phonon scattering.
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 of the Fermi surface and of phonon spectra.—W. (W.) Pickett

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.—S. (S.) Zimanyi

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. Offered irregularly.

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. Offered irregularly.

243A. Surface Physics of Materials (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 various spectroscopic and structural probes based on photons, electrons, ions, and scanning probes. Offered irregularly.

243B. Solid State Physics of Materials (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 various spectroscopic and structural probes based on photons, electrons, ions, and scanning probes. Offered irregularly.

243C. Surface Physics of Materials (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 various spectroscopic and structural probes based on photons, electrons, ions, and scanning probes. Offered irregularly.

245A. Elementary Particle Physics (3)
Lecture—3 hours. Prerequisite: course 245A. Electroweak interactions: phenomenology of the Standard Model of SU(2)\times U(1); weak interaction experiments; properties of and experiments with W and Z vector bosons; Glashow-Weinberg-Salam model and the Higgs boson; introduction to symmetry and other speculations.—W. (W.) Cheng

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 International Linear Collider phenomenology; collider and detector characteristics; extracting models from data; software tools for analyzing experimental data. May be repeated for credit with consent of instructor.—S. (S.) Terning

246A. Supersymmetry: Theory and Phenomenology (3)
Lecture—3 hours. Prerequisite: courses 230A-230B, 245A-245B recommended, or consent of instructor. Construction of supersymmetric models of particle physics; superfields; supersymmetry breaking the minimal supersymmetric standard model; supergravity; Collider phenomenology of supersymmetry. Dark matter phenomenology. Offered irregularly.—S. (S.) Terning

246B. Advanced Supersymmetry (3)
Lecture—3 hours. Prerequisite: course 246A. Advanced topics in supersymmetry. Topics include holomorphy, the Affleck-Dirac-Seiberg superpotential, Seiberg duality for SUSY QCD, dynamical SUSY breaking, Seiberg-Witten theory, superconformal field theories, supergravity, anomaly and gauging mediation, and the MSSM. Not offered every year.—S. (S.) Terning

250. Special Topics in Physics (3)
Lecture—3 hours. Prerequisite: consent of instructor. Topic varies. May be repeated for credit. Not offered every quarter.—F. W. S. (F. W. S.)

252A. 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. Offered irregularly.

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.—F. (F.) Erbacher

252C. Statistics and Data Analysis for Particle Physics (3)
Lecture—3 hours. Introduction to statistical data analysis methods in particle physics. Theoretical lectures combined with practical computer laboratory work.—W. (W.) Calderon, Conway

253. Signals and Noise in Physics (3)
Lecture—3 hours. Techniques for extracting signals from noise, systematic error. Offered irregularly.—W. (W.)

Lecture—3 hours. Prerequisite: course 200A or Mathematics 119A/B or Mathematics 219; course 204A or Mathematics 119A/B or Mathematics 219; course 219; course Mathematics 135A/B or Mathematics 235A. Exploring the unpredictable (deterministic chaos) and the emergence of structure in natural complex systems. Using statistical mechanics, information theory, and computation theory, the course develops a framework for analyzing dynamical and stochastic processes in terms of their causal architecture.—W. (W.) Crutchfield

260. Introduction to General Relativity (3)
Lecture—3 hours. Prerequisite: courses 200A, 200B. An introduction to general relativity. Differential geometry and curved spacetime; the Einstein field equations; gravitational fields of stars and black holes; weak field gravitational radiation; experimental tests; Big Bang cosmology.—F. (F.) Chertok

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.—W. (W.)

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 density, etc.] to constrain models of structure formation and fundamental physics.—S. (S.)
See Environmental Horticulture, on page 324; Plant Biology, on page 511; and Plant Biology (A Graduate Group), on page 513.

Plant Biology

College of Biological Sciences
William J. Lucas, Ph.D., Chairperson of the Department
Anne B. Britt, Ph.D., Vice Chairperson of the Department
Graduate Program. See Plant Biology (A Graduate Group), on page 513.

Department Office. 1002 Life Sciences
530-752-0617; http://www.plb.ucdavis.edu

Advising. 1032 Sciences Laboratory Building; 530-752-0610; http://basc.ucdavis.edu/

Committee in Charge of the Major
Bo Liu, Ph.D.
Anne Britt, Ph.D.
Steven Theg, Ph.D.

Faculty
Includes members of the Departments of Plant Biology, Molecular and Cellular Biology, and Evolution and Ecology in the College of Biological Sciences.

Primary Department Members
Siobhan Brady, Associate Professor
Anne Britt, Ph.D., Professor
Luca Comai, Ph.D., Professor
S. P. Dinesh-Kumar, Professor
John J. Harada, Ph.D., Professor
Academic Senate Distinguished Teaching Award Stacey Harmer, Ph.D., Professor
Bo Liu, Ph.D., Professor
William J. Lucas, Ph.D., Professor
Julin Maloof, Ph.D., Professor
Sharman O’Neill, Ph.D., Professor
Neelima Sinha, Ph.D., Professor
Venkatesan Sundaresan, Ph.D., Professor
Steven M. Theg, Ph.D., Professor

Secondary Department Members
Judy Callis, Ph.D., Professor
Academic Senate Distinguished Teaching Award
James A. Doyle, Ph.D., Professor
Marilyn E. Etzler, Ph.D., Professor
Charles S. Gasser, Ph.D., Professor
J. Clark Lagarias, Ph.D., Professor
Marcel Rejmanek, Ph.D., Professor
Raymond L. Rodriguez, Ph.D., Professor
Irwin Segel, Ph.D., Professor

Emeriti Faculty
Michael Barbour, Ph.D., Professor Emeritus
David E. Bayer, Ph.D., Professor Emeritus
Deborah Canington, Ph.D., Lecturer
Academic Federation Excellence in Teaching Award
Paul A. Castelfranco, Ph.D., Professor Emeritus
Deborah F. Delmer, Ph.D., Professor Emerita
Emanuel Epstein, Ph.D., Professor Emeritus
Richard H. Falk, Ph.D., Professor Emeritus
Donald W. Kiyoh, Ph.D., Professor Emeritus
Terence M. Murphy, Ph.D., Professor Emeritus
Thomas L. Ross, Ph.D., Professor Emeritus
Academic Senate Distinguished Teaching Award
Alan J. Stenmer, Ph.D., Professor Emeritus
Kenneth Wells, Ph.D., Professor Emeritus

Affiliated Faculty
John L. Bowman, Ph.D., Professor
Andrew Groover, Ph.D., Adjunct Associate Professor
Joel Ledford, Ph.D., Academic Coordinator

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 a Biosciences core covering the general principles of biology plus four plant-specific classes dealing with advanced aspects of plant biology including physiology, development, and anatomy. Two required electives allow students to tailor the degree 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 many genetic, 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 work in the laboratory, in the field, 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:

Preparatory Subject Matter .................................. 34
Biological Sciences 2A-2B-2C................................. 14
Chemistry 2A-2B-8A-BB.......................... 16
Statistics 13 or 100 or 102 or Plant Sciences 120 .................. 4

Depth Subject Matter ........................................ 41-42
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

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:

Preparatory Subject Matter .................................. 55-65
Biological Sciences 2A-2B-2C................................. 14
Chemistry 2A-2B-2C..................................... 15
Chemistry 8A-BB or 118A-118B-118C......................... 6-12
Mathematics 7A-7B-7C or 21A-21B (21C recommended)........ 8-12
Physics 7A-7B-7C........................................ 12

Recommended
Biological Sciences 20Q

Depth Subject Matter ......................................... 43-46
Biological Sciences 101, 102, 103, 104, 105 or equivalent .......... 10-13
92. Internship (1-12)  
Internship—3–6 hours. Prerequisite: consent of instructor. Technical and/or professional experience on or off campus 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.)

Upper Division  
For questions about courses numbered 102 through 126, see the Plant Biology Department office in 1002 Life Sciences. For questions concerning courses numbered 127, 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 Science. 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 phylegistic systematics. One Saturday field trip. (Same course as Plant Sciences 102.) GE credit: SciEng | SE, VL—S. (S.) Potter

105. Developmental Plant Anatomy (5)  
Lecture—3 hours; laboratory—6 hours. Prerequisite: Biological Sciences 2C or other similar preparation in plant biology. Restricted to 50 students; split equally into two lab groups. Structural anatomy of vascular plants. Training in basic tissue sectioning, staining, and use of the compound microscope. GE credit. SciEng | SE—F. (F.) O'Neill

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 worldwide basis. Current understanding of the origin of angiosperms and evolutionary relationships and trends within them based on morphological and molecular evidence. (Same course as Evolution and Ecology 108.) GE credit: SciEng—S. (S.) Doyle

111. Plant Physiology (5)  
Lecture—3 hours. Prerequisite: Biological Sciences 2A, 2B, and 2C, Chemistry 118B or 8B and Physics 7C (either may be taken concurrently). Plant Biology 105 recommended. The plant cell as a functional unit. The processes of absorption, movement, and utilization of water and minerals. Water loss, translocation, photosynthesis, respiration. —F (F.) Dehesh, Lucas

119. 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 the principles described in course 111 and will prepare answers to be delivered orally during class period. (P/NP grading only.)—F (F.) Dehesh

120. Plant Growth and Development (3)  
Lecture—3 hours. Prerequisite: Sciences 2A, 2B, and 2C, Chemistry 118B or 8B, Biological Sciences 101. 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 | GQ, SE, SL—W. (W.) Harada, Sundaresan

127. 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. will prepare answers to be delivered orally during class period. (P/NP grading only.)—W. (W.) Harada, Sundaresan

113. Molecular and Cellular Biology of Plants (3)  
Lecture—3 hours. Prerequisite: Biological Sciences 2A, 2B, 2C; Biological Sciences 101. 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. GE credit: QL, SL, VL—S. (S.) Harada

118. Plant Morphology and Evolution (5)  
Lecture—3 hours; fieldwork—3 hours. Prerequisite: Introductory plant biology (Plant Biology 105, Plant Sciences 2), introduction to the form, development and evolution of vascular plants. Emphasis given to the form and development of reproductive structures in ferns and seed plants using plants as a basis for determining evolutionary relationships. Not open for credit to students who have completed Plant Sciences 116. (Same course as Plant Sciences 116.) GE credit: SciEng | SE, VL—W. (W.) Jerne

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 fall field trips and brief study tour of class project required. (Same course as Evolution and Ecology 117.)—F (F.)

119. Population Biology of Invasive Plants and weeds (3)  
Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Sciences 1A, 1B, 1C, or 2A, 2B, 2C; introductory statistics recommended. Origin and evolution of invasive plant species and weeds, reproduction and dispersal, seed ecology, modeling of population dynamics, interactions between invasive species, native species, and crops, biological control. Laboratories emphasize design of competition experiments and identification of crop species. (Same course as Evolution and Ecology 119.) GE credit: SciEng | SE—S. (S.) Rejmanek

123. Plant-Virus-Vector Interaction (3)  
Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Sciences 2A, 2B, 2C; Biological Sciences 105; Plant Pathology 120, and Entomology 100 recommended. Analysis of interactions necessary for viruses to infect plants. Interactions among insect vectors and host plants in viral cycle. Evolutionary aspects of the molecular components in viral infection and modern approaches to the interdiction of viral movement. (Same course as Entomology 123 and Plant Pathology 123.) Offered in alternate years. GE credit: SE, SL, WE—F. (F.) Lucas, Gilbertson, Ullman

126. Plant Biochemistry (3)  
Lecture—3 hours. Prerequisite: Biological Sciences 101 or 103. The biochemistry of plants: photosynthesis and respiratory 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.) GE credit: SciEng | SE, SL—W. (W.) Callis, Tallis

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
methodological approaches, centers of crop biodi-
versity, dispersal of crops, genetic and physiological differences between crops and their wild proge-
tors, agriculture practiced by other organisms, and
role and ownership of crop biodiversity. GE credit:
SciEng or Sci; Div, Wrt | SE or SS, Wrt | SE—S. (S, J. Gen.
148. Introductory Mycology (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite:
Biological Sciences 1A, 1B, 1C. Limited enrollment.
Systematics, ecology, evolution, and morphology of
fungi. Importance of fungi to humans. (Same course
as Plant Pathology 148) GE credit: SE. F—Mac
Donald, Rizzo
189. Experiments in Plant Biology: Design
and Execution (3)
Laboratory/discussion—6 hours. Prerequisite: Bio-
logical Sciences 1A, 1B, 1C, or 2A, 2B, 2C, or
the equivalent courses in Plant Sciences, and consent
of the instructor. Provides an opportunity for under-
graduate students to formulate hypotheses and to
carry out research projects. May be repeated for
credit for a total of 12 units. (P/NP grading only) F, W,
S. (F, W, S.)
190C. Research Conference in Plant Biology (1)
Discussion—1 hour. Prerequisite: upper division
standing in Plant Biology or related discipline; con-
sent of instructor. Introduction to research methods in
plant biology. Design of field or laboratory research
projects, survey of appropriate literature, and discus-
sion of research by faculty and students. May be
repeated for credit. (P/NP grading only) F, W, S.
(F, W, S.)
192. Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of
44 units and consent of instructor. Technical and/or
professional experience on or off campus. Super-
vised by a member of the Plant Biology Department
faculty. May be repeated for credit. (P/NP grading
only) F, W, S, Su. (F, W, S, Su.)
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.)
197T. 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 Depart-
mant’s regular courses. May be repeated for credit.
(P/NP grading only) F, W, S. (F, W, S.)
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.)
Professional
396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing; consent of instruc-
tor. Practical experience in acting as teaching assist-
tant in Plant Biology courses. Learning activity:
Hands on experience in preparing for and conduct-
ing discussions, guiding student laboratory work,
and the formulation of questions and topics for
examinations. May be repeated for credit. (S/U
grading only) F, W, S, Su. (F, W, S, Su.)
Plant Biology (A Graduate Group)
Neelima Sinha, Ph.D., Chairperson of the Group
Graduate Office, 227A Life Sciences
530-752-2981; Fax 530-752-8822
http://pbi.ucdavis.edu/
Faculty
Diane Beckles, Ph.D., Associate Professor
(Plant Sciences)
Alan Bennett, Ph.D., Professor (Plant Sciences)
Alison Berry, Ph.D., Professor (Plant Sciences)
Arnold Bloom, Ph.D., Professor (Plant Sciences)
Edwardo Blumwald, Ph.D., Professor (Plant Sciences)
Richard Bostock, Ph.D., Professor (Plant Pathology)
Kent Bradford, Ph.D., Professor (Plant Sciences)
Siobhan Brady, Ph.D., Associate Professor
(Plant Biology)
Anne Brit, Ph.D., Professor (Plant Biology)
Patrick Brown, Ph.D., Professor (Plant Sciences)
Judy Callis, Ph.D., Professor
(Molecular and Cellular Biology) Academic
Senate Distinguished Teaching Award
Claire Cassel, Ph.D., Assistant Professor
(Plant Biology)
Gitta Cooker, Ph.D., Assistant Professor
(Plant Pathology)
Luka Comai, Ph.D., Professor (Plant Biology)
Douglas Cook, Ph.D., Professor (Plant Biology)
Carlos Crisosto, Ph.D., Professor (Plant Sciences)
Abhaya Dandekar, Ph.D., Professor (Plant Sciences)
Katyayoon Dehesh, Ph.D., Professor (Plant Biology)
Theodore De Jonge, Ph.D., Professor (Plant Biology)
Savithranna Dinesh-Kumar, Ph.D., Professor
(Plant Biology)
Georgia Drakakis, Ph.D., Assistant Professor
(Plant Sciences)
Jorge Dubcovsky, Ph.D., Professor (Plant Sciences)
Paul Gepts, Ph.D., Professor (Plant Sciences)
Matthew Gillb, Ph.D., Assistant Professor
(Plant Biology)
Thomas Gradziel, Ph.D., Professor (Plant Sciences)
Andrew Groover, Ph.D., Assistant Professor
(Plant Biology)
John Harada, Ph.D., Professor (Plant Biology)
Academic Senate Distinguished Teaching Award
Stacey Harmer, Ph.D., Professor (Plant Biology)
Kentaro Inoue, Ph.D., Professor (Plant Biology)
Marie Jasieniuk, Ph.D., Associate Professor
(Plant Biology)
Judy Jernstedt, Ph.D., Professor (Plant Sciences)
Daniel Klenkienstien, Ph.D., Professor
(Plant Sciences)
John Labavitch, Ph.D., Professor (Plant Sciences)
Clark Lagarias, Ph.D., Professor
(Molecular and Cellular Biology)
Bo Liu, Ph.D., Professor (Plant Biology)
William Lucas, Ph.D., Professor (Plant Biology)
Julin Maloof, Ph.D., Professor (Plant Biology)
Karen McDonald, Ph.D., Professor and Associate
Dean (Chemical and Material Engineering)
Maeli Melotto, Ph.D., Associate Professor
(Plant Biology)
Richard Michel, Ph.D., Professor
(Plant Sciences)
David Neale, Ph.D., Professor (Plant Sciences)
Sharman O’Neill, Ph.D., Professor (Plant Biology)
Kyaw Tha Pow, Ph.D., Professor
(Land, Air and Water Resources)
Daniel Potter, Ph.D., Professor (Plant Sciences)
Marcel Rejmanek, Ph.D., Professor
(Evolution and Ecology)
Elska Rejmanekova, Ph.D., Associate Professor
(Plant Biology)
James Richards, Ph.D., Professor
(Land, Air and Water Resources)
Pamela Ronald, Ph.D., Professor (Plant Pathology)
Jeffery Ross-Ibarra, Ph.D., Associate Professor
(Plant Sciences)
Johanna Schmitt, Ph.D., Professor
(Evolution and Ecology)
Ken Shackell, Ph.D., Professor (Plant Sciences)
Neelima Sinha, Ph.D., Professor (Plant Biology)
Dina St. Clair, Ph.D., Professor
(Plant Sciences)
Venkatram Sundaresan, Ph.D., Professor
(Plant Biology)
Steve Theg, Ph.D., Professor (Plant Biology)
Li Tian, Ph.D., Associate Professor (Plant Sciences)
M. Andrew Walker, Ph.D., Professor
(Viticulture and Enology)
John Yoder, Ph.D., Professor (Plant Sciences)
Florence Zakharov, Ph.D., Assistant Professor
(Plant Sciences)
Philipp Zerbe, Ph.D., Assistant Professor
(Plant Biology)
Emeriti Faculty
Don Durzan, Ph.D., Professor (Plant Sciences)
David Gilchrist, Ph.D., Professor Emeritus
(Plant Pathology)
Donald J. Nevins, Ph.D., Professor (Plant Sciences)
Donald Phillips, Ph.D., Professor (Plant Sciences)
Carlos Quiros, Ph.D., Professor (Plant Sciences)
Michael Reid, Ph.D., Professor (Plant Sciences)
M W Silk, Ph.D., Professor Emeritus
(Land, Air and Water Resources)
T Hisao, Ph.D., Professor Emeritus
(Land Air Water Resources)
Affiliated Faculty
Carlos Crisosto, Ph.D., Pomologist and Specialist
(Plant Sciences)
Andrew Groover, Ph.D., Associate Adjunct Professor
(Plant Biology)
Cai-Zhang Jiang, Research Plant Physiologist
(Crops Path & Genetic Research)
Takao Kasuga, Ph.D., Molecular Geneticist
(Plant Pathology)
Ann Powell, Ph.D., Professional Research Biochemist
(Plant Sciences)
Alan Rose, PhD, Associate Project Scientist
(Molecular & Cellular Biology)
Thomas Tai, Ph.D., Associate in the Agricultural
Experiment (Plant Sciences)
Allen Van Deynze, Ph.D., Professional Researcher
(Plant Sciences)
Graduate Study. The Graduate Group in Plant Biology
offers programs of study and research leading to
the M.S. and Ph.D. degrees. The program pre-
pares students for careers in teaching and research at
universities and colleges, government and indus-
trial laboratories. The graduate curriculum provides
both a breadth in the discipline and in-depth study
and research in one of the areas of specialization:
cell and developmental biology; environmental and
integrative biology; molecular biology, biochemistry
and genomics; and systems and evolutionary biology.
These areas of specialization permit individ-
ual study and research into diverse aspects of plant
biology, including anatomy, biochemistry, biotech-
nology, cell biology, cytology, developmental bio-
logy, ecology, genetics, genomics, molecular
biology, morphology, paleobotany, physiology,
population biology, systematics, and weed science.
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.
Preparation. For both the M.S. and Ph.D. pro-
grams, a level of scholastic development equivalent to
a Bachelor’s degree in biological sciences from a
recognized college or university is required. Courses
in the following areas are considered to be prerequi-
site to the advanced degrees in Plant Biology: biol-
ogy, inorganic chemistry, organic chemistry, intro-
ductive physics, genetics, plant development and
structure, biochemistry, introductory plant physi-
ology, calculus, introductory statistics, ecology/sys-
tematics/evolution, and cell/molecular biology.
Limited deficiencies can be made up after admis-
sion.
Graduate Adviser. Contact the Group office.
Courses in Plant Biology (PBI) Graduate

200A. PBGG Core Course Series-Fall quarter (S)
Lecture—3 hours; discussion—2 hours. Prerequisite: course 200A. The second of three PBGG graduate core courses. Coverage includes (1) leaf development, (2) sexuality, (3) cell walls, (4) cell growth, and (5) the evolution of flowering plants.—F (Fl) Gatti, Gepts, Jernstedt, Poter

200B. PBGG Core Course Series-Winter quarter (S)
Lecture—3 hours; discussion—2 hours. Prerequisite: course 200A and 200B. The third of three PBGG graduate core courses. Coverage includes (1) plant water relations, (2) cellular & long distance transport processes, (3) mineral nutrition, (4) environmental impacts on growth & development, (5) stress perception & responses, (6) canopy processes, and (7) plant interactions with other organisms.—S. (S) Blumwald, Brown, Cook, Dejong, Gilbert, Shackel

203N. Biology of the Plant Cell (4)
Lecture—3 hours; discussion/laboratory—2 hours. Prerequisite: Plant Biology 111 or Biological Sciences 104, or the equivalent. Open to senior undergraduate students in Plant Biology major. Recent progresses in plant cell biology. Intracellular motility in plant cells. Common techniques associated with the progress of plant cell biology. Offered irregularly. ([U] grading only)—Liu

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.—W.

212. Physiology of Herbicidal Action (3)
Lecture—3 hours. Prerequisite: Plant Biology 112, 122. Study of the fundamental processes involved in the physiological action of herbicides. Detailed consideration of the fate of herbicides in plants. Offered in alternate years.—S.

214. Higher Plant Cell Walls (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Plant Biology 111. 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 lectured topics. Offered in alternate years.—F. Drakakaki, Labavitch

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.—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. ([U] grading only)—F (F) Bradford

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. Offered in alternate years.—Britt,

229. Molecular Biology of Plant Reproduction (4)
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 special topics related to control and regulation of flowering. Offered in alternate years.—O'Neill

290A. Faculty Seminar (1)
Discussion—1 hour. Restricted to Plant Biology (PBGG) graduate students. Discussion of research area of seminar speakers in Plant Biology Graduate Group Seminar Series. May be repeated six times for credit. ([U] grading only)—F, W, S. (F, W, S)

290B. Seminar (1)
Seminar—1 hour. Seminars presented by visiting scientists on research of current interest. ([U] grading only)—F, W, S. (F, W, S)

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. ([U] grading only)—F, W, S. (F, W, S)

291. Graduate Student Seminar in Plant Biology (1)
Seminar—1 hour. Prerequisite: graduate student standing. Student-presented 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. ([U] grading only)—F, W, S. (F, W, S)

292. Seminars in Plant Biology (1)
Seminar—1 hour. Prerequisite: consent of instructor. Review of current literature in botanical disciplines. Disciplines and special subjects to be announced quarterly. Students present and analyze assigned topics. May be repeated for credit. ([U] grading only)—F, W, S. (F, W, S)

293. Seminar in Postharvest Biology (1)
Discussion—1 hour. Prerequisite: consent of instructor; open to advanced undergraduates. Intensive study of selected topics in the postharvest biology of fruits, vegetables, and ornamentals. May be repeated for credit. ([U] grading only)—F, W, S. (F, W, S)

297T. Tutoring in Plant Biology (1–5)
Tutorial—3–15 hours. Offers graduate students, particularly those in plan. Opportunity to gain teaching experience. ([U] grading only.)—R.M. Bostock

Plant Pathology

[College of Agricultural and Environmental Sciences]

David M. Rizzo, Ph.D., Chairperson of the Department

Department Office. 354 Hutchison Hall 530-752-0300; http://plantpathology.ucdavis.edu/

Faculty

Richard M. Bostock, Ph.D., Professor Gitta Cook, Ph.D., Associate Professor Clare Casteel, Ph.D., Assistant Professor Douglas R. Cook, Ph.D., Professor Lynn Epstein, Ph.D., Professor Bryce W. Falk, Ph.D., Distinguished Professor Robert L. Gilbertson, Ph.D., Professor Thomas R. Gordon, Ph.D., Professor Johan Leveau, Ph.D., Associate Professor James D. MacDonald, Ph.D., Emeritus Neil McRoberts, Ph.D., Associate Professor David Rizzo, Ph.D., Professor Pamela C. Ronald, Ph.D., Professor Ioannis Stergiopoulos, Ph.D., Assistant Professor Neal K. VanAlfen, Ph.D., Professor Emeritus

Emeriti Faculty

George Bruneinig, Ph.D., Professor Emeritus Robert N. Campbell, Ph.D., Professor Emeritus R. Michael Davis, Ph.D., Professor Emeritus John M. Dunway, Ph.D., Professor Emeritus Raymond G. Grogan, Ph.D., Emeritus Professor Clarence T. Kade, Ph.D., Emeritus Professor Sreek John M. Mirzeli, Ph.D., Emeritus Professor Emerita (USDA)

Jerry K. Uyemoto, Ph.D., Emeritus Professor (USDA)

Robert K. Webster, Ph.D., Professor Emeritus Valerie Williamson, Ph.D., Professor Emerita

Affiliated Faculty

Kendra Baumgartner, Ph.D., (USDA)
Greg Browne, Ph.D., (USDA)
Daniel Kluepfel, Ph.D., (USDA)
Deborah A. Golina, Ph.D., Lecturer and Specialist in Cooperative Extension
W. Douglas Gubler, Ph.D., Lecturer and Specialist in Cooperative Extension

Themis Michailides, Ph.D., Lecturer and Plant Pathologist in the Agricultural Experiment Station
Adib Rowhani, Ph.D., Lecturer and Project Scientist
Krishna Subbarao, Ph.D., Lecturer and Specialist in Cooperative Extension
Mysore Sudarshanad, Ph.D., (USDA)
Takao Kasuga, Ph.D., Lecturer (USDA)
Foren Trouillas, Ph.D., Lecturer and Assistant Specialist in Cooperative Extension

Related Major Program. See the major in Plant Biology, on page 511.

Graduate Study. 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 graduate advisor. See also the Graduate Studies, on page 121.

Graduate Advisers. L. Epstein, G.L. Cooker, R.M. Bostock

Courses in Plant Pathology (PLP) Lower Division

40. Edible Mushroom Cultivation (2)
Lecture—1 hour; laboratory/discussion—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. —W. (W.)
90. Introduction to Global Disease Biology (1)
Seminar—1 hour. Introduction to the Global Disease Biology major, research and internship opportunities, and potential career paths in human, animal, and plant health. Communication, ethics and the nature of science. (P/NP grading only.)—F. (R.) Rizzo

Upper Division
101. Epidemiology (4)
Lecture—2 hours, laboratory—3 hours, discussion—1 hour. Prerequisite: Science and Society 13; Biological Sciences 2A, 2B, 2C; Statistics 13, 100 or Plant Sciences 120. Principles and practice of epidemiology as applied to human, animal, and plant populations. Analysis of the factors in which these populations co-exist. Quantitative analysis of both infectious and non-infectious disease. Inter-dependence between epidemiological analysis, decision-making and policy formulation will be highlighted. GE credit: SciEng—Wrt1 SL—S. (F.) Cook

148. Introductory Mycology (4)
Lecture—2 hours; laboratory—6 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.—W. (W.) Gordon

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.—W. (W.) Gordon

185. Advanced Mushroom Taxonomy (2)
Lecture—2 hours; discussion—3 hours; fieldwork—1 hour. Prerequisite: course 135 or 148, and Biological Sciences 101 or the equivalent. Class size limited to 12 students. Microscopic and molecular methods used in the identification of mushroom species; molecular characterization including PCR-amplication of ribosomal nuclear DNA, deciphering product with restriction enzymes, and DNA sequencing; a one-day field trip is required. Offered in alternate years.—F.

192. Internship (1-12)
Internship—3-40 hours. Prerequisite: course 120 and consent of instructor. Work experience off and on campus, supervised by a member of the faculty. (P/NP grading only.)

199. Directed Group Study (1-5)
(P/NP grading only.)

Graduate
201A. Impacts, Mechanisms and Control of Plant Disease (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 120, graduate student status in the Plant Pathology Graduate Program and consent of instructor. A case-studies approach to analysis of plant diseases caused by bacteria, fungi, oomycetes, and viruses, including impacts, etiology, pathogen taxonomy and epidemiology, and disease aspects of pathogen-host interactions, virulence and resistance, and approaches to disease control.—W. (W.) Leveau

201B. Impacts, Mechanisms and Control of Plant Disease (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 120, course 201A, and graduate student status in the Plant Pathology Graduate Program, or consent of instructor. A case-studies approach to analysis of plant diseases, including emerging diseases, caused by bacteria, fungi, oomycetes, and viruses; impacts, etiology, pathogen taxonomy, epidemiology, biochemical and genetic aspects of pathogen-host interactions, virulence, resistance, disease control and statistical analysis. Offered in alternate years.—S. (S.) McRoberts

205A. Diseases of Vegetable and Field Crops (3)
Lecture/discussion—3 hours; fieldwork—3 hours. Prerequisite: course 120. Clinical study of diseases of vegetable and field crops with emphasis on etiology, epidemiology, diagnosis, and control. Field trips required. Offered in alternate years.—S. Gilbertson

205B. Diseases of Vegetable and Field Crops—Summer (4)
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.) Offered in alternate years.—S. (S.) McRoberts

206A. Diseases of Fruit, Nut, and Vine Crops (3)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 120; Plant Biology 119. Course 205 may be taken concurrently. Clinical study of fruit, nut, and vine crops diseases with emphasis on etiology, epidemiology, diagnosis, and control. Deferred grading only, pending completion of sequence.) Offered in alternate years.—S. (S.) Kirkpatrick

206B. Diseases of Fruit, Nut, and Vine Crops (1)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 120; Plant Biology 119. Course 205 may be taken concurrently. Clinical study of fruit, nut, and vine crops diseases with emphasis on etiology, epidemiology, diagnosis, and control. Deferred grading only, pending completion of sequence.)—Su. (S.)

210. Biochemistry and Molecular Biology of Plant-Microbe Interaction (4)
Lecture/discussion—3 hours. Prerequisite: Biological Sciences 101, 103, 109, or 104, or the equivalent. Discussion of plant-microbe interactions, focused on the underlying cellular, biochemical, and molecular events that determine the diseased state.—W. (W.) Bastock, Cooke

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 genetics of filamentous fungi and yeasts, including gene structure, organization and regulation; plant pathogenesis; secretion; control of reproduction; molecular evolution; transformation; and gene manipulation. (Same course as Biological Chemistry 217.) Offered in alternate years.—W. (W.) Rizzo

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 modern 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.—S. Epstein, 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 pathogenic association with higher and lower plants. Clinical and molecular methods for identification and classification of these bacteria. Offered in alternate years.—F. (F.) Epstein

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 diseases and as tools for manipulating plants; structures of virus particles; mechanisms of transmission, replication, and spread in the plant; cytology and molecular biology in susceptible and resistant reactions to viral and 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 226. Offered in alternate years.—W. (W.) Bruening, Falk

290. Seminar (1)
Seminar—1 hour. Review and evaluation of current research in plant pathology. (S/U grading only.)—F, W, Wrt. (F, W, S.)

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 advanced plant pathology; primarily designed for graduate students. (S/U grading only.)—F, W, S. (F, W, S.)
Plant Physiology

See Plant Biology, on page 511; and Plant Biology (A Graduate Group), on page 513.

Plant Sciences

[College of Agricultural and Environmental Sciences]

Chris van Keel, Ph.D., Chairperson of the Department

Department Office, 1210 Plant and Environmental Sciences 530-752-1703; http://www.plantsciences.ucdavis.edu/

Faculty

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Arnold J. Bloom, Ph.D., Distinguished Professor
Eduardo Blumwald, Ph.D., Professor
Kent J. Bradford, Ph.D., Distinguished Professor
Patrick H. Brown, Ph.D., Professor
E. Charles Brummer, Ph.D., Professor
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Richard W. Michelmore, Ph.D., Distinguished Professor
David B. Neale, Ph.D., Professor
Daniel Potter, Ph.D., Professor
Jeffrey S. Rossbach, Ph.D., Associate Professor
Daniel E. Runcie, Ph.D., Assistant Professor
Dina F. Saed, Ph.D., Professor
Kenneth A. Shackel, Ph.D., Professor
Venkatraman Sundaresan, Ph.D., Professor
Kenneth W. Tate, Ph.D., Professor
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Truman P. Young, Ph.D., Professor
Florence Zakharov, Ph.D., Associate Professor
Maciei Zwieniecki, Ph.D., Associate Professor

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Michael G. Baldwin, Ph.D., Professor Emeritus
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Vito S. Polito, Ph.D., Professor Emeritus
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Lin L. Wu, Ph.D., Professor Emeritus
Masatoshi Yamaguchi, Ph.D., Professor Emeritus

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Jeffrey P. Mitchell, Ph.D., Lecturer, Horticulturist and Specialist in Cooperative Extension
Lorence R. Oki, Ph.D., Lecturer and Associate Specialist in Cooperative Extension
Trevor V. Sulsol, Ph.D., Lecturer, Postharvest Horticulturist and Specialist in Cooperative Extension
Allan Van Deynze, Ph.D., Lecturer and Researcher

Major Programs. See Biotechnology, on page 197, Ecological Management and Restoration, on page 251, Environmental Horticulture and Urban Forestry, on page 325.

Related Courses. See the Biotechnology, Environmental Horticulture, Horticulture and Agromny, and Plant Biology course listings.

Graduate Study. For related graduate study, see the M.S. degree program in International Agricul- tural Development, and the Ph.D. degree programs in the graduate groups of Horticulture and Agronomy, Plant Biology, Ecology, Genetics, Geog- raphy, and Soils and Biogeochemistry. See also Graduate Studies, on page 121.

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 provided new insights 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 Sci- ences 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, management systems and environmental inputs on crop development and productivity are emphasized along with the postharvest preservation and market- ing of plant products. Study area development and use of specialty with options in Crop Production,
Plant Genetics and Breeding, or Postharvest Biology and Technology. An individual option is also available for those with specific subject matter or career goals in the plant sciences. All students gain practical experience through a combination of practical laboratory courses and internships. Students may also pursue careers 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; 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 education in agricultural sciences, such as plant biology, genetics, breeding, horticulture, agronomy, biotechnology, ecology, environmental studies, pest management, education, or business management.

B.S. Major Requirements:

Preparatory Subject Matter...............................51-68
Biological Sciences 2A, 2B ................................10
Plant Sciences 2 ...........................................4
Chemistry 2A, 2B, 2C ......................................15
Chemistry 1A, 1B, 18A, 18B .............................118C ..................................................6-12
Physics 1A, 1B, 2A, 7B, 7C .................................6-12
Mathematics 1A, 16A, 16B, 17A, 17B .................6-8
Plant Sciences 110 ...........................................4
Applied Biological Systems Technology 49 or Plant Sciences 49 (recommended) ..................2-3

Depth Subject Matter......................................36-39
Plant Sciences 100A, 100B, 100C .......................9
Plant Sciences 100AL, 100BL, 100CL .................6
Plant Sciences 152 ..........................................4
Evolution and Ecology 100 or Plant Biology 102 or 108 or 143 ............................................3-5
Plant Biology 147 or Plant Sciences 147 or Environmental Horticulture 160 and 160L ............3-5
Plant Pathology 120or Entomology 110or Nematology 100or Plant Sciences 105 or 176 ..................................................1-3
Plant Sciences 101 .........................................3
Internship or research, must be approved by master-adviser ..............................................3

Areas of Specialization (choose one)

Crop Production Option..................................23-28
Complete two courses in pest management not completed for the depth subject matter:
Plant Pathology 120, Entomology 110, Nematology 100 or Plant Sciences 105 or 176, Viticulture and Enology 118 ........................................6-9
Soil Science 100 .............................................5
Plant Sciences 171 ...........................................4
Agricultural and Resource Economics 1A or Economics 1A ....................................................4
Select two courses from:

Plant Breeding and Genetics Option.........................23-28
Biological Sciences 101 ......................................4
Plant Sciences 154 .......................................4
Biotechnology 160 .........................................3
Biotechnology 161 .........................................3
Plant Sciences 171 .......................................4
Restricted Electives ..........................................4
Select two courses from:

Postharvest Biology and Technology Option..................23
Plant Sciences 172 .......................................4
Plant Sciences 173 .......................................4

Plants Laboratory (2)

Lecture—3 hours; discussion/lab—3-4 hours. Prerequisite: high school biology. Introduction to plant cellular biology. Not open for credit to students who have completed Plant Biology 11.

Plant Sciences 174 .......................................3
Plant Sciences 196 .......................................3
Restricted Electives .........................................9
Select from: Agricultural and Resource Economics 100A, 130, Food Science and Technology 107, 109, 131, Plant Sciences 212

Individual Option........................................23
Select a minimum of 25 upper division units, with approval from a faculty adviser, to form a coherent program of study resulting in expertise and competence in a sub-discipline of plant sciences.

Total Units for the Major ..............................110-135

Major Adviser. Daniel Potter

Advising Center for the major is located in 1220 Plant and Environmental Sciences 530-752-1715.

Courses in Plant Sciences (PLS)

(Formerly courses in Agricultural Management and Rangeland Resources, Agronomy, Crop Science and Management, Plant Biology, Pomology, Range Science and Vegetable Crops.)

Lower Division

1. Agriculture, Nature and Society (3)

Lecture—2 hours; discussion/lab—1 hour. Multiple perspectives on the interactions between natural sciences, social sciences, and agriculture. Emphasizes agriculture's central position between nature and society and its key role in our search for a sustainable, just food environment. Several full-period field trips provide hands-on learning. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 1. (Formerly course Agricultural Management and Rangeland Resources 1.) GE credit: ScEng | SE. — F. (F.) Gradziel

2. Botany and Physiology of Cultivated Plants (4)

Lecture—3 hours; discussion/lab—3-4 hours. Prerequisite: high school course in biology and chemistry recommended. An holistic introduction to the underlying botanical and physiological principles of cultivar 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.) GE credit: ScEng | SE, ScEng | DivSciEng | SE. — F., W. (W.) Marrush, Zakharov, Van Horn, Frank

5. Plants for Garden, Orchard and Landscape (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: for non-majors. Hands-on experience with plants cultivate for landscaping and personal satisfaction. Topics include establishing a vegetable garden, planting 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.) GE credit: ScEng | SE, ScEng | DivSciEng | SE. — S. (S.) Marrush

6. Flower Power—Art and Science of Flowers and Their Uses (2)

Lecture/discussion—2 hours. Prerequisite: high school biology. Introduction to the art and science of using and growing flowers to harness the power that is representation, impact, influence and personal satisfaction. Focuses on planting techniques and flower management. Not open for credit to students who have completed Plant Biology 1 or Plant Sciences 2. (Former course Plant Biology 1.) GE credit: ScEng | SE, ScEng | DivSciEng | SE. — S. (S.) Marrush

12. Plants and Society (4)


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 societal issues, 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: ScEng, W, DivSciEng, SE, W.

15. Introduction to Sustainable Agriculture (4)

Lecture—3 hours; laboratory—3 hours. Multidisciplinary introduction to agricultural sustainability with a focus on the role of a plant sciences education in developing sustainability concepts and perspectives. Agricultural evolution, history, resources and functions. Diverse agricultural systems and practices and their relative sustainability. Laboratories provide direct experience with selected agricultural practices and systems. GE credit: ScEng | SE. — S. (S.) Van Horn, Williams

21. Application of Computers in Technology (3)

Lecture—2 hours; laboratory/discussion—2 hours. Prerequisite: high school algebra. Concepts of computing and applications using personal computers, spreadsheets, database management, word processing and communications. Not open for students who have completed Agricultural Management and Rangeland Resources 21. (Former course Agricultural Management and Rangeland Resources 21.) GE credit: ScEng | SE, ScEng | DivSciEng | SE, W. (W.) Frank

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, seedling, 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.) GE credit: SE. — F., S. (S.) Van Horn

92. Internship (1-12)

Internship—3-36 hours. Prerequisite: consent of instructor. Work experience on or 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.) — F., W, S. (F., W, S., Su.)

98. Directed Group Study (1-5)

Prerequisite: consent of instructor; primarily for lower division students. (P/NP grading only.) — F., W, S. (F., W, S., Su.)

99. Special Study for Undergraduates (1-5)

Prerequisite: consent of instructor; primarily for lower division students. (P/NP grading only.) — F., W, S. (F., W, S., Su.)

Upper Division

100A. Metabolic Processes of Cultivated Plants (3)

Lecture—3 hours. Prerequisite: course 2 or Biological Sciences 1C or consent of instructor. Principles of energy capture and photosynthesis, water use, and nutrient cycling. Conversion of these resources into products (carbohydrates, proteins, lipids, and other chemicals) by plants. Emphasis on the relationships between environmental resources, plant metabolism and plant growth. GE credit: ScEng | SE. — S. (S.) Licht

100AL. Metabolic Processes of Cultivated Plants Laboratory (3)

Laboratory/discussion—3 hours. Prerequisite: course 100A or the equivalent (may be taken concurrently). Techniques and instruments used to study plant metabolic processes, including water relations,
10A. Principles of Agronomic Crop Production in Temperate and Tropical Systems

Lecture—3 hours. Prerequisite: course 2 in general botany or course 2 recommended. Fundamentals of field crop production in temperate and tropical climates. Resource management, 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 Plant Biology 173. (Former course Plant Biology 173.) GE credit: SciEng | SE, SL.

10B. Growth and Yield of Cultivated Plants

Lecture—2 hours. Prerequisite: course 100A or consent of instructor. Principles of the cellular mechanisms and hormonal regulation underlying plant growth, development, and reproduction. Emphasis on how the plant may be manipulated to increase the harvest yield of cultivated plants and can be managed to increase crop productivity and quality. GE credit: SciEng | SE, SL. — W. (W.) Bradford, Melotto

100B. Growth and Yield of Cultivated Plants Laboratory

Laboratory/discussion—3 hours. Prerequisite: course 100B or equivalent (may be taken concurrently). Laboratory exercises in plant growth and development, including techniques in plant taxonomy and phylogenetic systematics, plant development, photosynthesis, plant growth regulators, plant anatomy, seed germination, fruit ripening and senescence. Includes field trips to illustrate relationships to cropping and marketing systems. GE credit: SciEng | SE, SL. — W. (W.) Bradford

100C. Environmental Interactions of Cultivated Plants (3)

Laboratory/discussion—3 hours. Prerequisite: course 100C (may be taken concurrently). Techniques and instruments used to study plant interactions with their physical and biological environments and their acquisition of the resources needed for growth and reproduction. Emphasis on how management practices and cultivation affect crop productivity. GE credit: SciEng | SE, SL. — S. (S.) Brown

100CL. Environmental Interactions of Cultivated Plants Laboratory (2)

Laboratory/discussion—3 hours. Prerequisite: consent of instructor. Techniques and instruments used to study plant interactions with their physical and biological environments, including light responses, transpiration, microclimate, nutrient availability and utilization, biomass accumulation. Quantitative methods and modeling are emphasized. GE credit: SciEng | SE, SL. — S. (S.) Shackle

101. Agriculture and the Environment (3)

Lecture—3 hours. Prerequisite: course 2 or consent of instructor. Interaction between agriculture and the environment. Focus on the interaction between agriculture and the environment to address the principles required to maintain sustainable and productive systems. GE credit: SciEng | SE, SL. — W. (W.) Van Kessel

102. California Floristics (5)

Lecture—3 hours; laboratory—8 hours. Prerequisite: course 100, Biological Sciences 1C, 2C, or equivalent course in Plant Science. Survey of the flora of California, emphasizing recognition of important vascular plant families and genera and use of taxonomic keys for field identification. Current understanding of relationships among families. Principles of plant taxonomy and phylogenetic systematics. One Saturday field trip. (Same course as Plant Biology 102.) GE credit: SciEng | SE, SL. — S. (S.) Potter

105. Concepts in Pest Management (3)

Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: Biological Sciences 1C or course 2, Chemistry 8B. Introduction to the ecological principles of pest management, biology of different classes of pests and the types of losses they cause, population assessment, evaluation of advantages and disadvantages of different techniques used for pest control, principles of IPM programs. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 105. (Former course Agricultural Management and Rangeland Resources 105.) GE credit: SciEng | SE, SL. — F. (F.) Fahle

110. 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 management, 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 Plant Biology 173. (Former course Plant Biology 173.) GE credit: SciEng | SE, SL. — W. (W.) Bradford, Melotto

110C. Crop Management Systems for Vegetable Agriculture

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 110A. (Former course Agricultural Management and Rangeland Resources 110C.) — F. Mitchell

110L. Principles of Agronomy Laboratory (1)

Laboratory/discussion—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.) — F. Mitchell

112. Forage Crop Ecology (3)

Lecture—3 hours. Prerequisite: course 2, Biological Sciences 1C, 2C, or consent of instructor. Foragers as a world resource in food production. Ecological principles governing 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. GE credit: SciEng | SE, SL. — W. (W.) Brummer

113. Biological Applications in Fruit Tree Management (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 2, Biological Sciences 1C, 2C, or equivalent. Physiology, growth, development and environmental requirements of fruit trees and the cultural practices used to maintain tree health and productivity. Application of biological principles in the culture of commercially important temperate zone fruit tree species. Not open for credit to students who have completed Plant Biology 173. (Former course Plant Biology 173.) GE credit: SciEng | SE, SL. — W. (W.) De Jong

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 tree crop species. Biological principles of fruit production, tree nutrition and orchard management for optimizing cropping. Laboratories emphasize 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.) GE credit: SciEng | SL, SV. — S. (S.) De Jong

116. Plant Morphology and Evolution (5)

Lecture—3 hours; laboratory—4 hours. Prerequisite: introductory plant biology [e.g., Biological Sciences 2C, Plant Sciences 2]. Introduction to the form, development, and reproduction of plants. Emphasis given to the form and development of reproductive structures in ferns and seed-producing plants as a basis for determining evolutionary relationships. Not open for credit to students who have completed Plant Biology 116. [Same course as Plant Biology 116.] GE credit: SciEng | SE, SL. — W. (W.) Jordan

120. Applied Statistics in Agricultural Science (4)

Lecture—3 hours; discussion/laboratory—3 hours. Prerequisite: upper division standing. Application of statistical methods to the analysis of research trials for plant, animal, behavioral, nutritional, and consumer sciences. Basic concepts and statistical methods are presented in lectures, laboratory emphasizes data processing, techniques, problem solving, and interpretation in specialized fields. 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 | SL. — F. (F.) Laca, Medrano

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 concepts underlying 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.) Offered in alternate years. GE credit: SE, SL. — W. (W.) Blum

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 in the fall and 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. GE credit: SciEng | SE, SL. — W. (W.) DeNitto

135. Ecology and Community Structure of Grassland and Savannah Herbivores (3)

Lecture—3 hours. Prerequisites: courses 1A or 1B and course 2, or Biological Sciences 1C, general ecology course [Environmental Science and Policy 100] recommended. Feeding ecology of grassland and savanna herbivores and the application of ecological principles in the culture of commercially important temperate zone grass tree species. Not open for credit to students who have completed Plant Biology 175. (Former course Plant Biology 175.) GE credit: SciEng | SE, SL. — W. (W.) Potter

141. Ethnobotany (4)

Lecture—3 hours; laboratory/discussion—2 hours. Prerequisite: course 2, Biological Sciences 1C or 2C. Relationships and interactions between plants and people, including human uses of plant 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 ethical considerations 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 or SacSci, Wrt | OL, SL, SS, WE, VL. — W. (W.) Potter

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 pheno-logy, photosynthesis, respiration, soil processes, life activities.
157. Physiology of Environmental Stresses in Plants (4)
Lecture—2 hours; discussion—2 hours. Prerequisite: course 100C or Plant Biology 111 or 112 or Environmental Horticulture 102 or Viticulture and Enology 110. Stress concepts and principles; molecular, physiological, and cellular mechanisms; and morphological characteristics enabling plants to avoid or tolerate environmental stresses; stress acclimation and adaptation processes; responses of wild and cultivated species to drought, salinity, low oxygen, cold, and other environmental stresses. Not open for credit to students who have completed Plant Biology 157. (Former course Plant Biology 157.) GE credit: SciEng [SE].

158. Minimal 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 plant nutrition; essential elements; mechanisms of absorption and membrane transporters; translocation and allocation processes; mineral metabolism; deficiencies and toxicities; genetic variation in plant nutrition; applications to management and understanding ecological effects of nutrient availability or deficiency. Not open for credit to students who have completed Plant Biology 158. (Former course Plant Biology 158.) Offered in alternate years. GE credit: SciEng [SE].

160. Agroforestry: Global and Local Perspectives (3)
Lecture/discussion—3 hours. Prerequisite: course 2 or Biological Sciences 1C or 2C; course 142 or 150 or Biological Sciences 2B or 2C; course 148 or 248; GE credit: SciEng [SE].

162. Urban Ecology (3)
Lecture/discussion—3 hours. Prerequisite: course in general or plant ecology (course 142, Plant Biology 117 Environmental Science and Policy 100, or Evolution and Ecology 101). Application of fundamental concepts and approaches in landscape and ecosystem ecology to the study of urban systems, including the physical, social, and economic forces that shape urban environments. Not open for credit to students who have previously taken Agricultural Management and Rangeland Resources 160. (Former course Agricultural Management and Rangeland Resources 160.) Offered in alternate years. GE credit: SciEng [SE].

163. Ecosystem and Landscape Ecology (4)
Lecture/discussion—4 hours. Prerequisite: course in general, plant, or soil ecology; Evolution and Ecology 117, Plant Biology 117, Environmental Science and Policy 100, Evolution and Ecology 101, Soil Science 112. Integration of concepts to understand and manage ecosystems in a complex and changing world. Focus on interactions among biotic, abiotic, and human factors and changes over space/time. Local to global controls over water, carbon and nutrient cycles. Not open for credit to students who have completed Ecology 201. —W. W. Cadnesso

164. Practicum in Ecological Restoration (1)
Fieldwork—3 hours. Prerequisite: Environmental Horticulture 160 or previous field course that exposes students to various aspects of ecological restoration through the seasonal restoration cycle with real-world practitioners. Emphasis on grassland/rangeland and oak woodland communities. May be repeated three times for credit. —F. W. S. [F. W. S. Young]

170A. Fruit and Nut Cropping Systems (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 2, Biological Sciences 1C or 2C; Chemistry 8B or 118B; course 100C, Plant Biology 111, Environmental Horticulture 102, or Hydrologic Science 122 recomb...
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 survey, hypothesis generation, design of experiments, data analysis planning, proposal outline and preparation. (Same course as Bio-technology 188.) GE credit: SciEng/Writ|OL, SE, WE, VS. S. (J.) Kleibeinest

189L. Laboratory Research in Plant Sciences (2-5)
Laboratory—3-12 hours; discussion—1 hour. Prerequsite: course 188 and consent of instructor. Formulating experimental approaches to current questions in Plant Sciences; performance of proposed experiments. May be repeated up to 12 units for credit. (P/NP grading only)—F, W, S, Su. (F, W, S, S.)

190. Seminar on Alternatives in Agriculture (2)
Seminar—1 hour; discussion—1 hour. Prerequisite: upper division standing and consent of instructor. Seminar on topics related to alternative theories, practices and systems of agriculture and the relationship of agriculture and food systems to human health, scientific, technological, social, political and economic perspectives. May be repeated for two times for credit for a total of three times. GE credit: SciEng/Writ|OL, SE, VS. F, W, VS (F, W, S, S.)

190C. Research Group Conference (1)
Discussion—1 hour. Prerequisite: advanced standing; consent of instructor. Weekly conference on research problems, progress and techniques in the plant sciences. May be repeated for credit. (P/NP grading only)—F, W, S, F, W, S.

190E. Independent Study (1-2)
Independent study—1-5 hours. Prerequisite: consent of instructor. May be repeated for credit. (P/NP grading only). GE credit: SciEng/OL, SE, WE. VS. S. (S.)

190H. Senior Honors Thesis (1-2)
Independent study—1-5 hours. Prerequisite: senior standing; consent of master adviser. 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) GE credit: SE, VS. F, W, S, Su. (F, W, S, S, S.)

190K. Independent Study (1-12)
Independent study—1-12 hours. Prerequisite: consent of instructor; completion of course being tutored or the equivalent, consent of instructor. Leading 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)—F, W, S, Su. (F, W, S, S, S.)

191. 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)—F, W, S, Su. (F, W, S, S.)

192. Internship (1-12)
Internship—36 hours. Prerequisite: upper division consent of instructor. Methods of teaching children and youth about fruit and vegetable production and consumption. Level and activity planning for garden and farm field trips. Basic biology, ecology, plant science, and crop management practices. Mentorship in experiential learning. Preparation of garden site. (P/NP grading only) GE credit: SciEng/Writ|OL, SE, VS. F, W, VS (F, W, S, S.)

193. Garden and Farm-Based Experiential Education Methods (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: upper division standing or consent of instructor. Methods of teaching children and youth about fruit and vegetable production and consumption. Level and activity planning for garden and farm field trips. Basic biology, ecology, plant science, and crop management practices. Mentorship in experiential learning. Preparation of garden site. (P/NP grading only) GE credit: SciEng/Writ|OL, SE, VS. F, W, VS (F, W, S, S.)

194. Senior Honors Thesis (1-2)
Independent study—3-6 hours. Prerequisite: senior standing; consent of master adviser. 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) GE credit: SE, WE, VS. F, W, S, Su. (F, W, S, S.)

196. Postharvest Technology of Horticultural Crops (3)
Lecture/discussion—45 hours; fieldwork—45 hours. Prerequisite: graduate student standing. Intensive study of postharvest considerations and current procedures and challenges in postharvest handling for fruits, nuts, vegetables, and ornamentals in California. Scheduled for 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) GE credit: SE—SE. (S.) Mitcham

197. Tutoring in Plant Sciences (1-5)
Tutorial—1-5 hours. Prerequisite: upper division standing, completion of course being tutored or the equivalent, consent of instructor. Leading 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)—F, W, S, Su. (F, W, S, S.)

198. Directed Group Study (1-5)
(P/NP grading only)—F, W, S, Su. (F, W, S, S.)

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only)—F, W, S, Su. (F, W, S, S.)

Graduate

205. Experimental Design and Analysis (5)
Lecture—3 hours; discussion/labatory—2 hours. Prerequisite: course 120 or equivalent. Introduction to the research process and statistical methods to plan, conduct and interpret experiments. Not open for credit to students who have completed Agronomy 205. (Former course Agronomy 205.)—F, W, S. Dubcovsky, Runcie

206. Applied Multivariate Modeling in Agricultural and Environmental Sciences (4)
Lecture—3 hours; discussion/labatory—2 hours. Prerequisite: one of course 120, Statistics 106, 108, course 205 or equivalent. Multivariate linear and nonlinear models. Model selection and parameter estimation. Analysis of manipulational and observational experiments. Discriminant, principal component, and path analyses. Logistic and biased regression. Bootstrapping. Exercises based on actual research by UC Davis students. Not open for credit to students who have completed Agronomy 206. (Former course Agronomy 206.)—F, S. Loca

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 approaches. Not open for credit to students who have completed Pomology 212. Offered in alternate years.—S. (S.) Crisosto, Mithchen, Zakharov

213. Postharvest Physiology of Vegetables (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: course 172 or course 100B or Plant Biology 112. Comparative physiology of harvest vegetables; emphasis on maturation, senescence, compositional changes, physiological disorders and effects of enviromental factors and research procedures. Not open for credit to students who have completed Vegetable Crops 212. (Former course Vegetable Crops 212.) Offered in alternate years.—S. (S.) Salvestre

220. Genomics and Biotechnology of Plant Improvement (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101 or the equivalent. Integration of modern biotechnology with 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)

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 important vegetable crops. 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)

222. Advanced Plant Breeding (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 154 and 205; Genetics 201 or Animal Genetics 257 recommended. Philosophy, methods, and problems in developing improved plant species. Topics include: inbreeding, heterosis, 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.—S. (S.) Brummer

230. Forest Biology (4)
Lecture—3 hours; seminar—1 hour. Prerequisite: graduate standing or advanced undergraduate with consent of instructor. Cross-disciplinary review of forest biology, including physiology, genetics, pathology, ecology, and silviculture.—S. (S.) Neale, North, Rizzo, Schwartz

290. Seminar (1-2)
Seminar—1-2 hours. Topics of current interest related to Plant Sciences. (S/U grading only).—F, W, S. (S.)

290C. Research Conference (1)
Discussion—1 hour. Prerequisite: consent of instructor. (S/U grading only).—F, W, S, Su. (F, W, S, S.)

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. Same 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)—F, W, S, Su. (F, W, S, S.)

Professional

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: consent of instructor; graduate standing. (S/U grading only).—F, W, S, Su. (F, W, S, S.)

Plastic Surgery

See Medicine, School of, on page 428.

Political Science

[College of Letters and Science]

John T. Scott, Ph.D., Interim Chairperson of the Department
Department Office. 469 Kerr Hall 530/752-0966
Political Science Undergraduate Student Matters. 466 Kerr Hall 530/752-6241
International Relations Undergraduate Student Matters. 464 Kerr Hall 530/754-8098
Graduate Student Matters. 472 Kerr Hall 530/752-0969
http://ps.ucdavis.edu

Faculty

James F. Adams, Ph.D., Professor
Josephine T. Andrews, Ph.D., Associate Professor
Cheryl L. Boudreau, Ph.D., Associate Professor
Amber Boydston, Ph.D., Associate Professor
Erik Engstrom, Ph.D., Professor
Quentin Garcia-Pence, Ph.D., Assistant Professor
Christopher Hare, Ph.D., Assistant Professor
Benjamin Highton, Ph.D., Professor
Adrienne Hosel, Ph.D., Assistant Professor
Syan Hubert, Ph.D., Assistant Professor
Robert Hucklefeld, Ph.D., Distinguished Professor
Bradford S. Jones, Ph.D., Professor
Brandon Kinne, Ph.D., Assistant Professor
Daniel Y. Kono, Ph.D., Associate Professor
Scott MacKenzie, Ph.D., Assistant Professor
Zeev Maoz, Ph.D., Distinguished Professor
Heather McBibens, Ph.D., Assistant Professor
Jeanette Money, Ph.D., Associate Professor
Gabriella R. Montinala, Ph.D., Associate Professor
Miroslav Nincic, Ph.D., Professor
Larry L. Wade, Ph.D., Professor Emeritus
Randolph M. Siverson, Ph.D., Research Professor
Larry Berman, Ph.D., Professor Emeritus
Alexander J. Gorah, Ph.D., Professor Emeritus
Stuart L. Hill, Ph.D., Lecturer
John R. Owens, Ph.D., Professor Emeritus
Ralphond M. Seriverson, Ph.D., Research Professor and Professor Emeritus
Larry L. Wade, Ph.D., Professor Emeritus
Geoffrey A. Wandesforde-Smith, Ph.D., Professor Emeritus

Emeriti Faculty

Larry Berman, Ph.D., Professor Emeritus
Edmond Costantini, Ph.D., Professor Emeritus
John B. Gates, Ph.D., Lecturer
Alexander J. Gorah, Ph.D., Professor Emeritus
Stuart L. Hill, Ph.D., Lecturer
John R. Owens, Ph.D., Professor Emeritus
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Larry L. Wade, Ph.D., Professor Emeritus
Geoffrey A. Wandesforde-Smith, Ph.D., Professor Emeritus

The Political Science Major Program

Political science is the study of politics and political systems at the local, national, and international levels. It concerns not only the institutions of government but also the analysis of such phenomena as political behavior, political values, political change and stability, parties, pressure groups, bureaucracies, administrative behavior, justice, national security, and international affairs.

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 political science; Core Program courses with at least two courses in each field selected at least 1/2 of the units must be in political science; Core Program courses may not be counted toward this requirement.

Fields of Concentration

Political Science—Public Service

A.B. Major Requirements:

<table>
<thead>
<tr>
<th>Course</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparatory Subject Matter</td>
<td>24</td>
</tr>
<tr>
<td>Political Science</td>
<td>4</td>
</tr>
<tr>
<td>Three courses from: Political Science 2, 3, 4</td>
<td>12</td>
</tr>
<tr>
<td>Statistics 13 (or equivalent)</td>
<td>4</td>
</tr>
<tr>
<td>Political Science</td>
<td>4</td>
</tr>
<tr>
<td>Depth Subject Matter</td>
<td>12</td>
</tr>
<tr>
<td>Four courses in one of the fields of concentration listed below</td>
<td>16</td>
</tr>
<tr>
<td>Three courses in another field of concentration listed below</td>
<td>12</td>
</tr>
<tr>
<td>Two courses in another field of concentration listed below</td>
<td>8</td>
</tr>
<tr>
<td>Two other upper division courses in Political Science</td>
<td>9</td>
</tr>
</tbody>
</table>

Total Units for the Major: 64-65

Political Science—Public Service

A.B. Major Requirements:

<table>
<thead>
<tr>
<th>Course</th>
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</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
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</tr>
<tr>
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</tr>
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<td>4</td>
</tr>
<tr>
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<td>12</td>
</tr>
<tr>
<td>Four courses in one of the fields of concentration listed below</td>
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</tr>
<tr>
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</tr>
<tr>
<td>Two other upper division courses in Political Science</td>
<td>9</td>
</tr>
</tbody>
</table>

Total Units for the Major: 68-70

Major Advisers. Consult Department office.

Minor Program Requirements:

<table>
<thead>
<tr>
<th>Course</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political Science</td>
<td>24</td>
</tr>
</tbody>
</table>

Six upper division Political Science courses.

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 467 Kerr Hall.

Graduate Study. The Department of Political Science offers a program of graduate study and research leading to a Ph.D. or an A.M./J.D. joint degree. The M.A./J.D. joint degree is done only in conjunction with UC Davis School of Law. Information concerning admission to these programs and financial aid is 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: 11, 101, 102, 104, 105, 106, 108, 109, 113, 130, 131, 160, 163; see also under University requirements.

The International Relations Major Program

Ethan Scheiner, Ph.D., Program Director

Program Office. 464 Kerr Hall 530-754-8098

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 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 other modern language. Students choose one of four tracks that encompass major topical areas in combination with an 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 coursework 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 coursework 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 and UC Center Sacramento arrange internships and run full-credit academic programs in Washington, D.C. and Sacramento respectively with a full range of opportunities for International Relations majors (see also UC Washington Center (UCDC), on page 578). International relations graduates are prepared for employment in government agencies (such as the Foreign Service), state agencies, international or non-governmental organizations (such as the United Nations),
Agricultural and Resource Economics 138, Anthropology 127, Community and Regional Development 118, 121, Economics 102, 110B, International Relations 104, Political Science 130, 140A, 140B, 140C, 140D, 140E, Sociology 123B, 139, 141, 183


Track II: Peace and Security

Focuses on political and security relationships among states and non-state actors, examining questions of war, peace, and diplomacy.

Select five courses spanning two disciplines: Economics 162, History 120, 174B, 174C, Political Science 120, 121, 130, or 132.

Three additional courses from at least two departments selected from: Comparative Literature 157, Economics 122, History 145, 146A, 146B, Philosophy 118, Political Science 112, 122, 124, 126, 131, 140A, 140B, 140C, 140D, Religious Studies 131, 134, Sociology 100, 118, 157, Women’s Studies 102.

Four courses to fulfill Area Studies Requirement

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
Political Science 112 ................................ 4
Environmental Science and Policy 161 or 162 ........................................ 4
Select one from Anthropology 101, 131, Environmental Science and Policy 164, Philosophy 120 ........................................ 4
Select two from Agricultural and Resource Economics 147, 175, 176, Anthropology 102, Applied Biological and Agricultural Technology 182, Economics 115A, 125, Environmental Science and Policy 164, International Agricultural Development 170, Philosophy 120, Physics 160, Political Science 107, 175, Sociology 160 ........................................ 7-8
Select two from one of the following groups ........................................ 4

Atmospheric and Marine Environments: Atmospheric Science 116, 149, Environmental and Resource Sciences 131, Environmental Science and Management 120, 121, Environmental Science and Policy 166N, Geology 116N


Four courses to fulfill Area Studies Requirement

Track IV: Peoples and Nationalities

Examines social and cultural foundations of national development and international relations.

Select two courses from: Anthropology 102, 123AN, 130A, Sociology 118, or 181.

Select one course each from the following four groups: 12

The Mixing of Peoples: Anthropology 130BN, 139AN; Human Development 115; International Relations 176; International Relations 104; Political Science 126

Women: Anthropology 126B, 139BN; Women’s Studies 120, 122

Religion: Anthropology 124, 134; Philosophy 105; Religious Studies 106, 161, 170; Sociology 118

Development and Its Impact on Social Cleavages: Anthropology 122B, 126A, 126B; Community and Regional Development 180; Political Science 124, 142A; Science and Society 121, Sociology 145A, 145B

Four courses to fulfill Area Studies Requirement

Education/Internship Abroad for a minimum of one quarter

Area Studies Requirement

Four 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. Tracks I, II and III students who choose to take advantage of an Education Abroad experience may fulfill the Area Studies requirement by completing the 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 153, 157, 162, Art History 150, Comparative Literature 147, 166, Dramatic Art 155A, French 124, Jewish Studies 111

East and South Asia


Latin America

History: History 159, 162B, 163B, 164, 166B, 167, 168


Prerequisite: upper division standing and consent of instructor. [P/NP grading only.]

Courses in Political Science (POL) Lower Division

1. American National Government (4)
   Lecture—3 hours; discussion—1 hour. Survey of American national government, including the constitutional system, political culture, parties, elections, the presidency, Congress, and the courts. GE credit: SocSci, Wrt|ACGH, SS, WE.

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|SS, WC, WE.

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, SocSci, Wrt|SS, WC, WE.

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 natural law as developed in the works of the major political philosophers. GE credit: AthHum or SocSci, Wrt|AH or SS, WC, WE.

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|ACGH, SS, WE.

6. Contemporary Issues in Law and Politics (4)
   Seminar—4 hours. Limited enrollment; open to students having more than 40.1 units. Seminar focusing on the political dimensions of American law and institutions. Examines the role of courts in resolving contemporary issues of law and politics including abortion, capital punishment, and civil rights. Offered irregularly. GE credit: SocSci, Wrt|ACGH, SS, WE.

12Y. Data Visualization in the Social Sciences (4)
   Lecture—2 hours; laboratory—1.5 hours; web virtual lecture—1.5 hours. Introduction to quantitative data across the social sciences (Communications, Political Science, Psychology, Sociology, and other disciplines). Transforming data, describing data, generating visualizations, and interpreting results. GE credit: Global, AthHum or SocSci, Wrt|AH or SS, WC, WE.

51. Scientific Study of Politics (4)
   Lecture—3 hours; discussion—1 hour. Introduction to the basic principles of the 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: AthHum or SocSci, Wrt|AH or SS, QL, SE, VL, WE.

90X. Lower Division Seminar (4 hours
   Seminar—4 hours. Prerequisite: lower division standing and consent of instructor. Limited enrollment. Examine fundamental issues and concepts that shape the study and practice of politics. Students will read, discuss, analyze, and critique the most significant texts in political science in order to develop a foundation for the study of politics.

100. Local Government and Politics (4)
   Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 recommended. The processes of formulating public policy, including individual and collective decision making; political procedures, dispute, competition, bargaining, coalition formation, and the allocation of public goods, resources, and opportunities. Offered irregularly. GE credit: SocSci, Wrt|ACGH, QL, SS, WE.
110. The Strategy of Politics (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 recommended. Introduction to game theory. Exploration of the behavior of individuals in strategic interaction. Rational and behavioral approaches. Applications to political science and other fields. Offered irregularly. GE credit: SocSci, Wrt I|GL, SS, WE.

112. Contemporary Democratic Theory (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 4 recommended. Major contemporaries attempt to reformulate traditional democratic theory. Exposition of attempts to replace traditional theory by conceptual models derived from modern social science findings. Offered irregularly. GE credit: ArtHum or SocSci, Wrt I|AH or SS, WE.

113. American Political Thought (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 4 recommended. Origins and nature of American political thought. Principles of American thought as they emerge from the founding period to the present. Offered irregularly. GE credit: ArtHum or SocSci, Wrt I|ACGH, AH or SS, WE.

114. Quantitative Analysis of Political Data (4)  
Lecture—2 hours; term paper or discussion—1 hour. Prerequisite: course S1 recommended. Logic and methods of analyzing quantitative political data. Topics covered include central tendency, probability, correlation, and non-parametric statistics. Practical emphasis throughout the use of statistics in political science research. Offered irregularly. GE credit: ArtHum or SocSci, Wrt I|AH or SS or SC, VL, WQ.

115. International Political Thought (4)  
Lecture—3 hours; term paper. Prerequisite: course 4 recommended. Examination of the ideas central to medieval political thinking. Emphasis will be upon the thoughts of the major political thinkers of the period, rather than upon political history. Offered irregularly. GE credit: ArtHum or SocSci, Wrt I|AH or SS, WE.

116. Foundations of Political Thought (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 4 recommended. Analysis and evaluation of the seminal works of a major political philosopher or of a major problem in political philosophy. May be repeated one time for credit when topic differs. Offered irregularly. GE credit: ArtHum or SocSci, Wrt I|AH or SS, WQ, WE.

117. Topics in the History of Political Thought (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 4 recommended. The political thought of a specific historical period. Topics may include: Ancient Athens, the Italian Renaissance, the Enlightenment, or Nineteenth Century Germany. May be repeated once for credit. Offered irregularly. GE credit: SocSci, Wrt I|SS, WE.

118A. History of Political Theory: Ancient (4)  
Lecture—2 hours; term paper or discussion—1 hour. Prerequisite: course 4 recommended. Critical analyses of classical and medieval political philosophers such as Plato, Aristotle, Cicero and St. Thomas. Offered irregularly. GE credit: ArtHum or SocSci, Wrt I|AH or SS, WQ, WE.

118B. History of Political Theory: Early Modern (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 4 recommended. Critical analyses of the works of late modern political philosophers such as Rousseau, Kant, Hegel, Tocqueville, Mill, Marx and Nietzsche. Offered irregularly. GE credit: ArtHum or SocSci, Wrt I|AH or SS, WQ, WE.

118C. History of Political Theory: Late Modern (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 4 recommended. Critical analyses of the works of late modern political philosophers such as Rousseau, Kant, Hegel, Tocqueville, Mill, Marx and Nietzsche. Offered irregularly. GE credit: ArtHum or SocSci, Wrt I|AH or SS, WQ, WE.

119. Contemporary Political Thought (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 4 recommended. 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 critics, theories of distributive justice, feminist theory. Offered irregularly. GE credit: ArtHum or SocSci, Wrt I|AH or SS, WE.

120. Theories of International Politics (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 3 recommended; 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. Offered irregularly. GE credit: SocSci, Wrt I|AH or SS, WE.

121. Scientific Study of War (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 3 recommended. An analysis of political processes involved in the initiation, conduct and termination of modern interstate wars. Offered irregularly. GE credit: SocSci, Wrt I|GL, SS, WE.

122. International Law (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 5 recommended. Selection of topics in international law: territory, sovereignty, immunity, responsibility, the peaceful settlement or non-settlement of international disputes. Offered irregularly. GE credit: SocSci, Wrt I|AH or SS, WE.

123. The Politics of Interdependence (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 3 recommended; consent of instructor. In the past several decades, growing economic interdependence has generated new problems in international relations. Course deals with difficulties in managing complex interdependence and its implication on national politics and policies. Offered irregularly. GE credit: SocSci, Wrt I|AH or SS, WE.

124. The Politics of Global Inequality (4)  
Lecture—3 hours; term paper or discussion. Prerequisite: course S1 recommended. Analysis of current economic and political international relations resulting from a long standing division of the global system into rich and poor regions. Offered irregularly. GE credit: SocSci, Div I|WL, SS, WE.

125. Ethnic Self-Determination and International Conflict (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 3 recommended. Comparison of 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. Offered irregularly. GE credit: SocSci, Div I|WL, SS, WE.

129. Special Studies in International Politics (4)  
Lecture—3 hours; term paper. Prerequisite: course 3 recommended. Intensive examination of one of more special problems in international politics. May be repeated one time for credit when different topic is studied. Offered irregularly. GE credit: SocSci, Wrt I|SS, WE.

130. Recent U.S. Foreign Policy (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 3 recommended; consent of instructor. Broad survey of the development of U.S. foreign policy in twentieth century with emphasis on transformation of policy during and after World War II, and the international system and concepts useful for understanding of current foreign policy issues. Offered irregularly. GE credit: SocSci, Wrt I|ACGH, SS, WE.

131. Analysis of U.S. Foreign Policy (4)  
Lecture—3 hours; term paper. Prerequisite: course 3 recommended; consent of instructor. Detailed presentation and examination of a current situation in U.S. foreign policy. Survey of numerous factors influencing policy outcomes and how such determinants vary according to the situation. Offered irregularly. GE credit: SocSci, Wrt I|SS, WE.

132. National Security Policy (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 3 recommended. Development of national security policies since 1945. Analysis of decision-making and assumptions upon which it is based. Effects of nuclear weapons upon conduct of war, alliance systems, and the international system. Prospects of security and stability through arms control. Offered irregularly. GE credit: SocSci, Wrt I|SS, WE.

134. Africa and U.S. Foreign Policy (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 recommended; consent of instructor. Overview of African political policy toward Africa. Relations to global adversaries. Legacies of colonialism. Challenges of national self-determination and white racism. Policies on non-alignment, producer cartels, multinational corporations, developmental integration and trade and aid relations. Offered irregularly.

135. International Politics of the Middle East (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 3 recommended; consent of instructor. Restricted to 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. Offered irregularly. GE credit: SocSci, Wrt I|SS, WQ, WE.

136. The Arab-Israeli Conflict (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 3 recommended. Causes, course, and implications of Arab-Israeli conflict. Competing Israeli and Arab narratives, policies of force, diplomacy, Domestic politics and A-I conflict, the superpowers and the A-I conflict, A-I conflict and world politics, potential solutions. Offered irregularly. GE credit: SocSci, Wrt I|SS, WE.

137. International Relations in Western Europe (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 3 recommended. Analysis of European unity, problems of the Atlantic alliance, Atlantic political economy, Eastern Europe, European integration, communism in Western Europe and the relationship between domestic politics and foreign policy. Offered irregularly. GE credit: SocSci, Wrt I|SS, WE.

139. Special Studies in Foreign Policy (4)  
Lecture—3 hours; term paper. Prerequisite: course 3 recommended; consent of instructor. Extensive examination of one or more special problems in foreign policy. May be repeated one time for credit. Offered irregularly.

140A. Comparative Political Institutions: Electoral Systems (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2 recommended. Works of electoral institutions, focusing on systems used to elect presidents and assemblies, pass laws, and generally make decisions. Examples from systems throughout the world, including cases from both the advanced industrial and developing worlds. Offered irregularly. GE credit: SocSci, Wrt I|QL, SS, WE.

140B. Comparative Political Institutions: Parties (4)  
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2 recommended; consent of instructor. The factors shaping political parties and their role in democratic representation. Offered irregularly. GE credit: SocSci, Div I|WL, SS, WE.
140C. Comparative Political Institutions: Legislatures (4)
Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 2 recommended; consent of instructor. Examination of legislatures from a comparative perspective. Offered irregularly. GE credit: SocSci, Div, Wrt|SS, WE.

140D. When Institutions Fail (4)
Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 2 recommended. Examination of factors contributing to the success and failure of political institutions. Offered irregularly. GE credit: GQ, SS, WE.—F, S. (F, S.)

140E. Policy-Making Processes (4)
Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 2 recommended. Comparative analysis of policy-making in the U.S. and other countries. Offered irregularly. GE credit: QL, SS, WE.—F, S. (F, S.)

142A. Comparative Development: Political Development in Modernizing Societies (4)
Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 2 recommended; consent of instructor. Nature and sequence of political development, its economic and social concomitants; role of elites, military, bureaucracy, and party systems; social stratification and group politics; social mobilization and political participation; instability, violence, and the politics of integration. Offered irregularly. GE credit: SocSci, Div, Wrt|SS, WC, WE.

142B. Comparative Development: Politics and Inequality (4)
Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 2 recommended; consent of instructor. 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 irregularly. GE credit: SocSci, Div, Wrt|SS, WC, WE.

142C. Comparative Political Development: Democracy and Democratization (4)
Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 2 recommended. Examination of conditions relating to democratization and democratic stability. Offered irregularly. GE credit: SS, WE.—F, S. (F, S.)

143A. Latin American Politics (4)
Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 2 recommended. Issues related to democratic consolidation in Latin America, with a regional focus on South America. Topics include transitions to democracy, the role of the military-political establishments and political behavior. Offered irregularly. GE credit: SocSci, Div, Wrt|SS, WC, WE.

143B. Mexican Politics (4)
Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 2 recommended. Introduction to the politics of contemporary Mexico. Focus on relative, fall, and aftermath of Mexico’s one-party dominant system. Offered irregularly. GE credit: SocSci, Div, Wrt|SS, WC, WE.

144A. Politics of Post-Communist Countries: East European Politics (4)
Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 2 recommended. Postwar democratization, political restructuring, and economic reform in East European states. Offered irregularly. GE credit: SocSci, Div, Wrt|SS, WC, WE.

144B. Politics of Post-Communist Countries: Russia (4)
Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 2 recommended. Democratization, state-building and economic reform; creation of new institutions; impacts of Soviet rule. Offered irregularly. GE credit: SocSci, Div, Wrt|SS, WC, WE.

Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 2 recommended. African politics since the end of the Cold War. Topics include: Strat-...
audiences and the effect of the media on attitudes and behavior; the relationship of the government to the media [freedom of press, government regulation]; the media in election campaigns. Offered irregularly. GE credit: SocSci, Writ|SS, WE.

166. Women in Politics (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 recommended. The role of women in American politics. Historical experiences; contemporary organizations and strategies; areas of legislation and the impact of differences in social class, race, and ethnicity upon the involvement of women in politics. Offered irregularly. GE credit: SocSci, Writ|ACGH, DD, SS, WE.

168. Chicano Politics (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 recommended. Political aspects of Chicano life in America; examines the Chicanos political role as it has been historically defined by different currents in society and Chicano responses to his/her political environment. Offered irregularly. GE credit: SocSci, Writ|ACGH, DD, SS, WE.

170. Political Psychology (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 recommended. Overview to the growing literature on political psychology. Introduction to how psychological concepts (personality, attitudes, stereotypes, affects, identity, group dynamics) help us understand how citizens think about politics. Offered irregularly. GE credit: SocSci, Writ|SS, WE.

171. The Politics of Energy (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 recommended. Nature and performance of political processes for making energy choices at the international, national and state levels. Interaction of energy policy with other national politics and the ability of governmental institutions to overcome constraints on policy innovation. Offered irregularly. GE credit: SocSci, Writ|SS, WE.

172. American Political Development (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 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 action. Democratization, cultural change, party formation, state building, constitutionalism, race relations. Offered irregularly. GE credit: SocSci, Writ|ACGH, DD, SS, WE.

174. Government and the Economy (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 recommended. Political basis of economic policy, expertise, spending and regulation; impact of prices, employment and growth on political demands; elite responses to economic conditions; policy alternatives and the public interest. Offered irregularly. GE credit: SocSci, Writ|ACGH, DD, WE.

175. Science, Technology, and Policy (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 recommended; consent of instructor. Analysis of policymaking for science and the use of expert advice for making decisions about technology. Topics include funding of basic research, relationships of science to technological development, science and military policy, technological risks, technology assessment and scientists and politics. Offered irregularly. GE credit: SocSci, Writ|OL, SS, WE.

176. Racial Politics (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 recommended. Race, racial attitudes and racial policies in the United States with a specific emphasis on African Americans. Offered irregularly. GE credit: SocSci, Div, Writ|ACGH, DD, SS, WE.

179. Special Studies in Comparative Politics (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 2 recommended; consent of instructor. Intensive examination of one or more special problems appropriate to comparative politics. Coverage of formal and informal political institutions, economically developing and developed countries, and non-democratic, democratic, and democratizing countries. May be repeated one time for credit. Offered irregularly. GE credit: SocSci, Writ|SS, WE.

180. Bureaucracy in Modern Society (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 or course 2 recommended; consent of instructor. Role of bureaucracy in a complex society, with emphasis upon changing relationships between government and the economy; consequences of rapid technological and social change for bureaucratic structures and processes; the problems of reconciling expertise and democracy and increasing the responsiveness of public bureaucracy. Offered irregularly. GE credit: SocSci, Writ|ACGH, SS, WE.

183. Administrative Behavior (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1 recommended. The implications for American public administration of evolving concepts about bureaucracies. Offered irregularly. GE credit: SocSci, Writ|ACGH, SS, WE.

187. Administrative Theory (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 4 recommended. Historical and critical analysis of the principal theories of organization and specialization in light of such concepts as decision making, bureaucracy, authority and power, communication and control; examination of the role of government bureaucracies in the total society. Offered irregularly. GE credit: SocSci, Writ|SS, WE.

190. International Relations (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 3 recommended; consent of instructor. And international relations: the study of substantive issues in international international relations. Readings drawn from current and academic and non-academic periodicals. GE credit: SocSci, Writ|SS, WE.

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: ACGH, SS, WE.

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: ACGH, SS, WE.

193W. Washington Center Research Seminar (4)
Lecture/discussion—1 hour; independent study—3 hours; tutorial—0.5 hour. Prerequisite: course 192W concurrently. Core academic component of Washington Program. Directed with internships. Research draws on resources uniquely available in Washington, DC. Supervised preparation of extensive paper. (Same course as UC Davis Washington Center 193.) GE credit: SocSci, Writ|OL, SS, WE.

194HA. Special Study for Honors Students (4)
Seminar—2 hours; independent study—2 hours. Prerequisite: major in Political Science with upper division standing and a GPA of 3.500 in the major. Directed reading, research and writing culminating in preparation of a senior honors thesis under the direction of faculty adviser. (Deferred grading only, pending completion of sequence.) Offered irregularly. GE credit: SocSci|OL, SS, VI, W.

194HB. Special Study for Honors Students (4)
Seminar—2 hours; independent study—2 hours. Prerequisite: major in Political Science with upper division standing and a GPA of 3.500 in the major. Directed reading, research and writing culminating in preparation of a senior honors thesis under the direction of faculty adviser. (Deferred grading only, pending completion of sequence.) Offered irregularly. GE credit: SocSci|OL, SS, VI, W.

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. May be repeated one time for credit when topics differ. GE credit: SocSci|ACGH, SS, WE.

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 one time for credit when topics differ. GE credit: SocSci|ACGH, SS, WE, F, W.

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 across countries, political development, or other topics that are more specialized than normal course offerings. May be repeated one time for credit when topics differ. GE credit: SocSci|SS, WE.

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, or NATO) or interstate relations (war, trade) or other topics with more specialized content than normal course offerings. May be repeated one time for credit when topics differ. GE credit: SocSci|SS, WE.

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 one time for credit when topics differ. GE credit: SocSci|SS, WE.

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, writing in research methods. Topics may include study of selected topics in research methods such as research design, statistics, game theory. May be repeated one time for credit when topics differ. GE credit: SocSci|OL, SS, VI.

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)

Fall 2011 and on Revised General Education (GE): AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; ACGH—American Cultures, Diversity; VL—Visual; WC—World Cultures; WE—Writing Experience

Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Domestic Diversity; Writ—Writing Experience

Quarter Offered: F—Fall, W—Winter, S—Spring, Su—Summer; 2017/2018 offering in parentheses
Graduate

201. Urban Government and Politics (4)
Seminar—4 hours. Survey and analysis of the literature in the field of local 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.

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—3 hours; term paper. Restricted to graduate students only. 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.

203B. American Government: Congress (4)
Seminar—3 hours; term paper. Restricted to graduate students only. Thorough overview 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.

207. Environmental Public Policy (4)
Seminar—4 hours. Analysis of the interface between the world of environmental issues and the world of political action. Evaluation of alternative approaches to public policy and recreation. 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 formulation and evaluation.

209. The American Political System (4)
Seminar—3 hours; discussion/laboratory—1 hour. Prerequisite: graduate standing. Analysis of the current political issues and events in American government and politics.

210. Research Design in Political Science (4)
Seminar—3 hours; discussion/laboratory—1 hour. Prerequisite: graduate standing. Pass One open to graduate majors; Pass Two open to graduate students. Introductory seminar on the foundations of probability theory and mathematical statistics that are necessary to empirical investigations in political science. —F. P. Joyce

211. Research Methods in Political Science (4)
Seminar—3 hours; laboratory/discussion—1 hour. Prerequisite: courses 211, 212. Pass One open to graduate majors; pass 2 open to graduate students. More advanced topics in the use of statistical methods, with emphasis on political applications. Topics include: properties of least squares estimates, problems in multiple regression, and advanced analysis, simultaneous equations, time-series analysis, etc.

214A. Research in Political Science (4)
Discussion—2 hours; lecture—1 hour; term paper. Prerequisite: course 213. 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, pending completion of sequence.

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, pending completion of sequence.

215. Introduction to Modeling Political Behavior (4)
Seminar—3 hours; term paper. Prerequisite: courses 211, 212. Pass One open to graduate majors; pass 2 open to graduate students. Introduction to formal and game theoretic analyses of politics. Students will learn basic game theory and modeling skills. We examine the benefits of modeling, and look at examples of formal analysis in a variety of political science subfields.

216. Qualitative Research Methods (4)
Seminar—3 hours; term paper. Methodology for utilizing theoretically-oriented case studies and controlled comparison of a small number of cases to develop and test theories. Examination of how the case study method compliments experimental, statistical and deductive modes of research. Offered in alternate years.

217. Social Choice Theory and Spatial Modeling (4)
Seminar—4 hours. Introduction to social choice theory and formal spatial modeling including Arrow’s Theorem, the paradox of voting, cycling and agenda control. Focus on mastering modeling techniques as well as interpretation of classic works. Offered in alternate years.

218. Topics in Political Theory (4)
Seminar—3 hours; term paper. Topics vary and may be the work of a single theorist, time period, or political concept, such as justice. May be repeated three times for credit when topic differs.

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.

219B. Political Theory Sequence (4)
Seminar—3 hours; term paper. Survey of the great works in early modern to contemporary political theory including such writers as Machiavelli, Hobbes, Locke, Rousseau, Marx, Mill, Nietzsche, and Rawls. Discussion of various interpretations of these authors. Offered in alternate years.

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.

220. Seminar in Political Theory (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Open to graduate students only. 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.

223. International Relations (4)
Seminar—3 hours; term paper.

225. The International System (4)
Seminar—3 hours; term paper. Research seminar sequence required of all Ph.D. students. Examination of international political economy. Structure of the global economy, its specific dimensions of international economic relations, including trade, capital flows, global production structures, and migration. Offered in alternate years.

230. American Foreign Policy (4)
Seminar—3 hours; term paper.

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 linkages between foreign policy behavior and democratic process. Offered in alternate years.

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.

243. Comparative Institutional Change (4)
Seminar—3 hours; term paper. Restricted to graduate students. 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.

246. Policymaking in Third-World Societies (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Included in an analysis of policymaking processes in Third-World countries are such topics as political resources, institutional resources, decision making, resource allocations, planning, and budgeting, implementation, and distribution of world resources. Offered in alternate years.

250. Policy Development and Impact in U.S. Courts (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Through an 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.

Fall 2011 and on Revised General Education (GE) Areas: Arts and Humanities; Social Sciences; Science, Technology, Engineering, and Mathematics; World Cultures; World Languages and Literatures; Writing Experience Quarter Offered: F,W,S,Su. 2011/2012 offering in parentheses.
260. Political Parties (4)
Seminar—3 hours; term paper. Survey of selected topics in American and comparative parties.

261. Political Problems (4)
Seminar—3 hours; term paper. Survey of selected topics in political behavior and public opinion. May be repeated three times for credit when topic differs.

274. Political Economy (4)
Seminar—3 hours; term paper. Restricted to graduate students. Political economy 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.

279. Political Networks: Methods and Applications (4)
Seminar—3 hours, term paper. Prerequisite: graduate standing. Structure of political networks, sociomatrixes 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.

280. Bayesian Methods: for Social and Behavioral Sciences (4)
Seminar—3 hours; term paper. Prerequisite: course 212 or equivalent. Pass One open to graduate majors only; Pass Two open to graduate students. Methodology seminar introducing Bayesian quantitative methods to issues and problems in political science and other social and behavioral sciences. Offered in alternate years.

281. Statistical Computing Issues in Political Science (4)
Seminar—3 hours; discussion/laboratory—1 hour. Prerequisite: course 213 or equivalent. Restricted to graduate standing. Methodology seminar introducing computing issues in empirical models for political science and other social and behavioral sciences. Offered in alternate years.

282. Advanced Modeling of Political Behavior (4)
Seminar—3 hours; term paper. Prerequisite: course 212 or equivalent. Restricted to graduate standing or with instructors permission. 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.

283. Organizational Behavior (4)
Seminar—4 hours. Organizational behavior as it relates to public sector decision making.

284. Advanced Network Analysis (4)
Seminar—3 hours; term paper. Prerequisite: course 211, 212, 279. Exponential Random Graph Models (ERGMs) of networks, game theoretic models of network formation and network dynamics, diffusion processes, shocks and network contagion, cross-network spillover processes, social and political applications of advanced network models. Offered in alternate years.—Maaz, Zeev

290A. Research in American Government and Public Policy (4)
Seminar—3 hours, term paper. Restricted to graduate students. Special research seminar on problems and issues in the study of American government and public policy. May be repeated up to 6 times for credit if topic differs.

290B. 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.

290C. Research in Comparative Government and Policy (4)
Lecture—3 hours; term paper. Restricted to graduate students only. Special research seminar on selected problems and issues in the study of comparative government and policy. May be repeated six times for credit if topic varies.

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.

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.

290F. Research in Comparative Government and Policy (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.

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)
Seminar—1 hour. Prerequisite: graduate student of teaching political science at the undergraduate level. (S/U grading only.)

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)

Pomology
See Plant Sciences, on page 516.

Population Biology
(A Graduate Group)

Alan M. Hastings, Ph.D., Chairperson of the Group

Faculty
Marissa L. Baskett, Ph.D., Associate Professor (Environmental Science and Policy)
David J. Begun, Ph.D., Professor (Evolution and Ecology)
Monique Berger-Mulder, Ph.D., Professor (Anthropology)
Louis W. Boteford, Ph.D., Professor (Wildlife, Fish, and Conservation Biology)
Tim Caro, Ph.D., Professor (Wildlife, Fish, and Conservation Biology)
Graham M. Coop, Ph.D., Associate Professor (Evolution and Ecology)
Hanspeter C. Kopp, Ph.D., Professor (Environmental Science and Policy)
Jonathan A. Eisen, Ph.D., Professor (Evolution and Ecology)

Valerie Eviner, Ph.D., Associate Professor (Plant Sciences)
Jennifer Gremer, Ph.D., Assistant Professor (Evolution and Ecology)
James R. Griesemer, Ph.D., Professor (Philosophy)
Richard K. Grosberg, Ph.D., Professor (Evolution and Ecology)
Academic Senate Distinguished Teaching Award, UC Davis Prize for Teaching and Scholarly Achievement
Susan P. Harrison, Ph.D., Assistant Professor (Environmental Science and Policy)
Alan M. Hastings, Ph.D., Professor (Environmental Science and Policy)
Brian R. Johnson, Ph.D., Assistant Professor (Entomology and Nematology)
Richard Karban, Ph.D., Professor (Entomology)
Daniel Kliebenstein, Ph.D., Professor (Plant Sciences)
Artym Kopp, Ph.D., Professor (Evolution and Ecology)
Charles H. Langley, Ph.D., Professor (Evolution and Ecology)
Sharon P. Lawler, Ph.D., Professor (Entomology)
Susan E. Lott, Ph.D., Assistant Professor (Evolution and Ecology)
Richard McElreath, Ph.D., Professor (Anthropology)
Brian R. Moore, Ph.D., Assistant Professor (Evolution and Ecology)
David B. Neale, Ph.D., Professor (Plant Sciences)
Gail L. Patricelli, Ph.D., Professor (Evolution and Ecology)
Santiago Ramirez, Ph.D., Assistant Professor (Evolution and Ecology)
Bruce H. Rannala, Ph.D., Professor (Evolution and Ecology)
Jay Rosenheim, Ph.D., Professor (Entomology)
Academic Senate Distinguished Teaching Award
Jeffrey Ross-Ibarra, Ph.D., Associate Professor (Plant Sciences)
Eric D. Sanford, Ph.D., Professor (Evolution and Ecology)
Johanna Schmitt, Ph.D., 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 (Environmental Science and Policy)
Academic Senate Distinguished Teaching Award
Arthur M. Shapiro, Ph.D., Professor (Evolution and Ecology)
Academic Senate Distinguished Teaching Award
Andrew Sih, Ph.D., Professor (Environmental Science and Policy)
John J. Stachowicz, Ph.D., Professor (Evolution and Ecology)
Academic Senate Distinguished Teaching Award
Maureen L. Stanton, Ph.D., Professor (Evolution and Ecology)
UC Davis Prize for Teaching and Scholarly Achievement
Sharon Y. Strauss, Ph.D., Professor (Evolution and Ecology)
Donald R. Strong, Ph.D., Professor (Evolution and Ecology)
Michael Turelli, Ph.D., Professor (Evolution and Ecology)
Geera J. Vermeij, Ph.D., Professor (Department of Earth and Planetary Sciences)
Paul C. Wainwright, Ph.D., Professor (Evolution and Ecology)
Academic Senate Distinguished Teaching Award
Philip S. Ward, Ph.D., Professor (Entomology)
Andrew Whitehead, Ph.D., Associate Professor (Environmental Toxicology)
Louie H. Yang, Ph.D., Assistant Professor (Entomology)
Truman P. Young, Ph.D., Professor (Plant Sciences)

Emeriti Faculty
Hugh Dingle, Ph.D., Professor Emeritus
John H. Gillespie, Ph.D., Professor Emeritus
Kevin J. Rice, Ph.D., Professor Emeritus
Judy A. Stamps, Ph.D., Professor Emeritus

Fall 2011 and on Revised General Education (GE): AH—Arts and Humanities; SC—Science and Engineering; SS—Social Sciences; AC—American Cultures; DD—Diverse Diversity; OL—Oral Skills; QA—Quantitative; VS—Visual; WC—Writing Experience
Pre-Fall 2011 General Education (GE): ArHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Diverse Diversity; Wrt—Writing Experience
Quarter Offered: F—Fall; W—Winter; S—Spring; Div—Summer; 2017:2018 offering in parentheses
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. Interface between animal behavior, ecological theory, and ongoing research in evolutionary biology. May be repeated for credit. (S/U grading only.)—F, W, S (F, W, S.)

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.)—F, W S (F, W, S.)

271. Research Conference in Ecology (1)
Seminar—1 hour. Prerequisite: consent of instructor. Critical presentation and evaluation of current literature and ongoing research in ecology. Requirements include active participation in weekly discussions and the presentation of a paper or chapter once per quarter. May be repeated for credit. (S/U grading only.)—W (W) Schoener, Schreiber

287. 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 two times for credit.

290. Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Seminar presented by visiting lecturers, UC Davis graduate students and faculty. May be repeated for credit. (S/U grading only.)—F, W S (F, W, S.)

290C. Research Conference in Population Biology (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Seminar presented by visiting lecturers, UC Davis graduate students and faculty. May be repeated for credit. (S/U grading only.)—F, W S (F, W, S.)

292. Topics in Ecology and Evolution (1)
Seminar—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.)—F, W S (F, W, S.)

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. (Same course as Geog 214.) (S/U grading only.)—S. (S.) Shapiro

298. Group Study (1-5)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)—F, W S (F, W, S.)

299. Research (1-12)
Prerequisite: graduate standing and consent of instructor. (S/U grading only.)—F, W S (F, W, S.)

Population Health and Reproduction

See Veterinary Medicine, School of, on page 383.

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, pesti-
Preventive Veterinary Medicine

Minor Program Requirements:
This minor acquaints students with recent developments and their applications to agriculture, in geographical 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.

Precision Agriculture .................................. 18

Applied Biological Systems Technology/ Landscape Architecture 150 and Environmental remote Sensing 186 and 186L ........................................... 9
Select 9 or more units from Applied Biological Systems Technology 181N, 182, Plant Sciences 100A, 100AL, 100B, 100BL, 100C, 100CT, 110A, 110B, 110BL, 110C, Plant Sciences 120 or Statistics 100, Environmental and Resource Sciences 186, Soil Science 109 ............................... 9

Minor Advisers. S.K. Upadhyaya, D.K. Gile

Psychiatry

See Medicine, School of, on page 428.

Psychology

(College of Letters and Science)
Paul Hastings, Ph.D., Chairperson of the Department

Department Office. 135 Young Hall
530-752-1880; http://psychology.ucdavis.edu

Faculty
Karen L. Bates, Ph.D., Professor
Wiebke Blindern, Ph.D., Assistant Professor
Shelley A. Blais, Ph.D., Associate Professor
Lindsay C. Bowman, Ph.D., Assistant Professor
Cameron S. Carter, M.D., Professor
Melanie A. Caspary, Ph.D., Associate Professor
Robert A. Emmans, Ph.D., Professor
Emilio Ferrer-Caja, Ph.D., Professor
Maria Fernandez, Ph.D., Professor
Joy Geng, Ph.D., Associate Professor
Simona Ghetti, Ph.D., Professor
Gail S. Goodman, Ph.D., Professor
Katharine Graf, Ph.D., Assistant Professor
Paul Hastings, Ph.D., Professor
John M. Henderson, Ph.D., Professor
Gregory M. Herve, Ph.D., Professor
Camelia H. Hostinar, Ph.D., Assistant Professor
Petra Junata, Ph.D., Professor
Leah A. Kurz, Ph.D., Professor
Kristin H. Lagattuta, Ph.D., Professor
Alison M. Ledgewood, Ph.D., Associate Professor
Debra L. Long, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Steven J. Luck, Ph.D., Professor
George R. Mangun, Ph.D., Distinguished Professor
Lisa M. Oakes, Ph.D., Professor
Cynthia Pickett, Ph.D., Associate Professor
Charan Ranganath, Ph.D., Professor
Philippe Rast, Ph.D., Associate Professor
Susan M. Rivera, Ph.D., Professor
Richard W. Robins, Ph.D., Professor
Jeffrey Schank, Ph.D., Professor
Eva Scheepers, Ph.D., Continuing Lecturer
Jeffrey W. Shiffrin, Ph.D., Professor
Danielle S. Stonel, Ph.D., Assistant Professor
Tamar Y. Swaab, Ph.D., Professor
Ross A. Thompson, Ph.D., Professor
Brian J. Wiltgen, Ph.D., Associate Professor
Matthew T. Waxler, Ph.D., Professor
Simone Vazire, Ph.D., Associate Professor
Brian J. Wiltgen, Ph.D., Associate Professor
Andrew P. Yonelinas, Ph.D., Professor
Nolan W. Zane, Ph.D., Professor

Emeriti Faculty
Linda P. Academic, Professor Emerita
Jasmin R. Bastian, Ph.D., Professor Emeritus
Rand D. Conger, Ph.D., Professor Emeritus
(Human Ecology)
Richard Q. Boone, Ph.D., Professor Emeritus
Alan C. Elms, Ph.D., Professor Emeritus
Karen P. Erickson, Ph.D., Professor Emerita
Albert A. Harrison, Ph.D., Professor Emeritus
Kenneth B. Henry, Ph.D., Professor Emeritus
Joel T. Johnson, Ph.D., Professor Emeritus
Neal E. Kroll, Ph.D., Professor Emeritus
William A. Mason, Ph.D., Professor Emeritus
Susan Mendoza, Ph.D., Professor Emeritus
G. Mitchell, Ph.D., Professor Emeritus
Robert M. Murphy, Ph.D., Professor Emeritus
Thomas Natsoulas, Ph.D., Professor Emeritus
Theodore E. Park, Ph.D., Professor Emeritus
Robert B. Post, Ph.D., Professor Emeritus
Phillip R. Shaver, Ph.D., Professor Emeritus
Dean K. Simon, Ph.D., Distinguished Professor
Emeritus UC Davis Prize for Teaching and Scholarly Achievement
Robert Sommer, Ph.D., Professor Emeritus
Stanley S., Ph.D., Professor Emeritus
Charles T. Tart, Ph.D., Professor Emeritus

Affiliated Faculty
Eve A. Isham, Ph.D., Assistant Adjunct Professor
Joanna E. Scheib, Ph.D., Associate Adjunct Professor

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:

Perception, Cognition, and Cognitive Neuroscience (PCCN) involves the study of perception and thought, and includes such topics as perception, learning, memory, language and cognition.

Biological Psychology covers a broad spectrum of topics including evolutionary, neurobiological, and molecular mechanisms of behavior.

Social-Personality Psychology involves the study of the individual in his or her social environment and includes such topics as personality and individual differences, emotions, stereotyping and prejudice, intergroup relations, the psychology of religion and psychological health and dysfunction.

Developmental Psychology involves the study of changes in behavioral, cognitive, emotional, and social abilities that occur throughout the lifespan. Typical and atypical development are examined using a variety of methods including behavioral, neuroimaging, and physiological assessments.

Quantitative Psychology involves the study of linear and nonlinear models, psychometrics, mixed-effects models, and models, including experimental design, analysis of variance, regression, multivariate analysis, latent growth models, time series models, and factor analytic models.

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 a broad introduction to the scope of contemporary psychology. In addition, a number of common core courses for their degree, students may take approved elective courses from a wide range of topics including Educational Psychology, Interpersonal Communication, and Psychological Anthropology, to name a few. The department strongly encourages students to become involved in individual research projects under the direction of faculty members to participate in our internship program to broaden experience and understanding of the field of psychology.

Preparatory Requirements. Before declaring a major in Psychology, students must complete the following two courses with a combined grade point average of at least 2.500. Both courses must be taken for a letter grade.

UNITS
Psychology 1, 41 ................................. 8
If 2.500 GPA in a minimum of three upper division Psychology courses is also acceptable for major declaration.

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, teaching, business, management and counseling. An undergraduate education in psychology also provides excellent preparation for graduate study. 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 many other professions.

A.B. Major Requirements:

Preparatory Subject Matter............17-20
Psychology 1 or the equivalent........ 4
Psychology 41 ................................. 4
Statistics 13 or 100..................... 4
Strongly recommended that Psychology 41 and Statistics 13 or 100 be completed in the first year.

Preparatory Subject Matter............40
Two courses from two of the following four groups and one course from the remaining two groups. .................. 20-24
Group A: Psychology 100 or 100Y, 130, 131, 132, 135, 136
Group B: Psychology 101, 113, 121, 122 (same course as Neurobiology, Physiology, and Behavior 101, 123, same course as NB 152), 124 (same course as Neurobiology, Physiology, and Behavior 124), 125, 126, 137, 159
Group C: Psychology 151, 152, 154, 158, 161, 162, 168
Group D: Psychology 140, or (Human Development 100A or 100B*). Psychology 141 (same course as Human Development 101), Psychology 142 (same course as Human Development 102), 143, 146, 148
Approved Electives ......................... 16-18
Additional units chosen among Psychology courses and/or approved electives to achieve a total of 40 upper division units.

Total Units for the Major ............57-60

Biological Emphasis

B.S. Major Requirements:

Preparatory Subject Matter............53-61
Psychology 1 or the equivalent........ 4
Recommended B.S. Major Requirements:

Quantitative Emphasis

Chemistry 8A-8B or 118A-118B or 128A-128B ................................................ 10

Psychology topic, Anthropology 154A, 101 ...................................................... 5

units chosen from Psychology courses and/or Approved Electives .......................... 12-14

146, 148.............................................. 4

Development 101), Psychology 142 (same (or Human Development 100A or 100B*), 10-12

Psychology 152, 124, 125, 126, 127, 137, 139-6-8

Group C: one course from: Psychology 151, 152, 154, 158, 161, 162, 168 ............... 4

Group D: one course from: Psychology 140 (or Human Development 100A or 100B*), 10-12

Psychology 141 (same course as Human Development 101), Psychology 142 (same course as Human Development 102), 143, 146, 148, 151, 152, 158 may be used. .......................... 4

Approved Electives ............................................ 12-14

Additional units to achieve 40 upper division units chosen from Psychology courses and/or approved electives. See list of approved electives below.

Biological Sciences 101 .............................................. 4

Psychology, Physiology, and Behavior 101 .............................................. 5

Total Units for the Major .......................... 90-103

Recommended for All Majors. Students who plan to do graduate work in any area of psychology are strongly encouraged to gain experience through research and internship activities.

Major Advisers. See staff advisers in 101 Young Hall; psychadvising@ucdavis.edu

http://psychology.ucdavis.edu/undergraduate/advising

* Students who have completed Human Development 100A or 100B prior to Psychology 140 will receive 2 units of credit for Psychology 140.

Minor Program Requirements: UNITS

Psychology 41 [Please note that Psychology 1 is a prerequisite for Psychology 41 and all upper division Psychology courses]................. 4

One course from each of the following four groups: ............................................. 15-16

Group A: Psychology 100 or 100Y, 130, 131, 132, 135, 136

Group B: Anthropology 151, 113, 121, 122/NPB 150, 123/NPB 152, 124/NPB 124, 125, 126, 127, 137, 159

Group C: Psychology 151, 152, 154, 158, 161, 162, 168

Group D: Human Development 100A, 100B, Psychology 140, 141/Human Development 101, 142/Human Development 102, 143, 146, 148

Approved Electives ............................................ 4-5

Additional units to achieve 20 upper division units chosen from Psychology courses and/or approved electives. See list of approved electives below.

Approved Electives:

Any Psychology courses inside or outside Core Groups:

AAS 141—Psychology of African American Experience ............................................. 3

ANT 132—Psychological Anthropology ..................................................... 4

CHI 120—Chicana/o Psychology ..................................................... 4

CHI 121—Chicana/o Community Mental Health ..................................................... 4

CHI 122—Psychological Perspectives on Chicana/o and Latina/o Family .......................... 4

CHI 123—Psychological Perspectives on Chicana/o and Latina/o Family and Adolescents .......................... 4

CMN 120—Interpersonal Communication ..................................................... 4

CMN 122—Nonverbal Communication ..................................................... 4

CNS 100—Consumer Behavior ..................................................... 3

EDU 110—Educational Psychology ..................................................... 4

EXB 102—Introduction to Motor Learning and the Psychology of Sport and Exercise ..................................................... 4

HDE 100A—Infancy and Early Development ..................................................... 4

HDE 100B—Middle Childhood and Adolescence ..................................................... 4

Inequality .............................................. 4

Honor and Honors Program. In order to be eligible for high or highest honors in Psychology, the student must both meet the college criteria for honors and complete a research project involving a mini-
mum of six units of course work over at least two quarters which represents an original analysis of data on psychological phenomena. Course 194HA-194HB or other approved courses can be used to satisfy the unit requirement. This project is to be writ-
ten in thesis form and approved by the department. The quality of the thesis work will be the primary determinant for designating high or highest honors at graduation.

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 through our website.

Graduate Adviser. See http://psychology.ucdavis.edu/graduate.

Courses in Psychology (PSC)

Lower Division

1. General Psychology (4)

Lecture—4 hours. Introduction emphasizing empiri-
cal approaches. Focus on perception, cognition, per-
sonality and social psychology, and biological
aspects of behavior. Only two units allowed to those
who have taken course 15 or 16; no credit allowed
to those who have taken both courses 15 and 16.

son, Thompson, Traxler

12Y. Data Visualization in the Social Sciences (4)

Lecture—2 hours; laboratory—1.5 hours; web vir-
tual lecture—1.5 hours. Introduction to quantitative data across the social sciences (Communications, Political Science, Psychology, Sociology, and other disciplines). Transforming raw data, producing graphs, visual reasoning, and interpreta-
tions. [Same course as Communications 12Y, Sociol-

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; extensive writing. Prerequisite:
course 1 or the equivalent; completion of Statistics
13 or 102 strongly recommended. Introduction to experimental design, interviews, questionnaires, field and observational methods, reliability, and sta-

415. Research Methods in Psychology (4)

Lecture/lab—10 hours; web virtual lecture—10 hours. Prerequisite: course 1 or equivalent. Class size limited to 100 students. Introduction to experi-
mental design, interviews, questionnaires, observa-
functional research, qualitative approaches, case
studies, content analysis, sampling, descriptive statis-

100. Introduction to Cognitive Psychology (4)
Lecture—4 hours. Prerequisite: courses 1 and 41. Introduction to information processing, mental representation and transformation, imagery, attention, memory, language processing, concept formation, problem solving, and computer simulation. Not open to students who have completed former course 136. F, W, S. (F, W, S.) Ekstrom, Ferreira, Henderson, Long, Luck

101. Introduction to Biological Psychology (4)
Lecture—4 hours. Prerequisite: courses 1, 41. Pass One open to majors. Survey and integration of the relationships between behavior and biological processes, including physiology, genes, development, ecology, and evolution. Two units of credit for those students who have completed Neurobiology, Physiology and Behavior 100. F, W, S. (F, W, S.) Krubitzer, Stolzenberg, Trainor

103A. Statistical Analysis of Psychological Data (5)
Lecture/lab—4 hours; laboratory—2 hours; term paper. Prerequisite: courses 1, 41 and Statistics 13 or 102. Pass One open to Psychology majors. Design and statistical analysis of psychological investigations and the interpretation of quantitative data in psychology. Not open for credit to students who have completed course 103. GE credit: QL. F, W, F (W, W, W.) Blizis

103B. Statistical Analysis of Psychological Data (5)
Lecture—4 hours; laboratory—2 hours. Prerequisite: course 103A; Statistics 13 or 102. Pass One open to Psychology majors. Probability theory, sampling distributions, statistical inference, and hypothesis testing using standard parametric and nonparametric approaches. Simple regression analysis, multiple regression analysis, non-parametric statistics, introduction to multivariate statistics, with applications in psychology. Not open for credit to students who have completed course 105. GE credit: QL. F, W, (F, W, W.) Blizis, Ferrer

104. Applied Psychometrics: An Introduction to Measurement Theory (4)
Lecture—4 hours. Prerequisite: upper division standing in Psychology, courses 41 and 103, Statistics 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. Offered irregularly. GE credit: QL.
157. Stereotyping, Prejudice, and Stigma (4)
Lecture—discussion—4 hours. Prerequisite: courses 1 and 41. Social psychological understandings 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. GE credit: DD—W. (W.) Sherman

158. Sexual Orientation and Prejudice (4)

159. Gender and Human Reproduction (4)
Lecture—4 hours. Prerequisite: course 1, 41. Pass One 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)—S. (S.) Scheib

161. Psychology of the Self (4)

162. Introduction to Personality Psychology (4)
Lecture—3 hours; term paper. Prerequisite: course 1, 41. Pass One Open to Psychology majors. Scientific study of personality. Methods of research. Overview of current research and theory in the field of personality psychology. Not open for credit to students who have completed former course 147. GE credit: SocSci, Writ | SS, WE. —F, S. (F, S.) Robbins

165. Introduction to Clinical Psychology (4)
Lecture—4 hours. Prerequisites: courses 1, 41, 168, and either 140 or 151. Major theoretical formulations in the history of clinical psychology, from classical psychoanalysis to contemporary existentialism and behavior therapy. Special emphasis based on lectures, films, and tapes, of what clinical psychologists do, including methods of appraisal, professional roles, and approaches to treatment. —S. (S.) Zane

168. Abnormal Psychology (4)

170. Psychology of Religion (4)
Lecture—4 hours. Prerequisites: courses 1 and 41. Major theories, issues, data, and research methodologies of the psychology of religion. Religious experience and expression; religious development in childhood, adolescence, and adulthood; conversion; religious influences on physical and mental health; cross-cultural perspectives. GE credit: Div, Writ | WE. —W. (S.) Emery

175. Genius, Creativity, and Leadership (4)
Lecture—3 hours; term paper. Prerequisite: course 1 and 41 or the equivalent or consent of instructor. The phenomenon of genius examined from a diversity of theoretical, methodological, disciplinary perspectives, with an emphasis on outstanding creativity and leadership in art, music, literature, philosophy, science, war, and politics. GE credit: SocSci, Writ | SS, WE. —F, S. (F, S.) Simonton

180A. Research in Cognitive and Perceptual Psychology (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: course 41, and upper division Psychology courses and consent of instructor. Empirical research on selected topics in general experimental psychology (person perception, memory, perception, cognition, cognitive development, etc.). Specific content will vary from quarter to quarter. May be repeated one time for credit when content differs. Offered irregularly.

180B. Research in Psychobiology (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: course 101, three additional upper division courses in Psychology, and consent of instructor. Empirical research on selected topics in psychobiology (animal learning, animal behavior, physiological and sensory psychology, developmental psychobiology, computer modeling of neural systems). Content varies. May be repeated one time for credit when content differs. Offered irregularly.

180C. Research in Personality and Social Psychology (4)
Lecture—2 hours; laboratory—4 hours. Prerequisite: course 41, and four upper division Psychology courses and consent of instructor. Empirical research on selected topics in personality and social psychology (personality, social psychology, organizational psychology, etc.). Content varies from quarter to quarter. May be repeated one time for credit when specific content differs. Offered irregularly.

185. History of Psychology (4)
Lecture—3 hours; term paper. Prerequisite: courses 1, 41, upper division standing or consent of instructor. Focus on key historical figures and events from the development of psychological thought and research in context of history of philosophy and science. Not open for credit to students who have completed course 120. (Former course 120.) GE credit: SocSci, Writ | SS, WE. —F. (F.) Simonton

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. —F, W, S. (F, W, S.)

190X. Upper Division Seminar (1-2)
Seminar—1-2 hours. Prerequisite: upper division standing and consent of instructor. Limited enrollment. Supervised independent study on campus, in community and institutional settings. Maximum of four units may be used toward satisfaction of upper division major requirement. May be repeated one time for credit. (Deferred grading only)

194HA. Special Study for Honors Students (3)
Independent study—9 hours. Prerequisite: senior standing in Psychology and qualifications for admittance 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.) GE credit: WE. —F, W, S. (F, W, S.)

194HB. Special Study for Honors Students (3)
Independent study—9 hours. Prerequisite: senior standing in Psychology and qualifications for admittance 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.) GE credit: Social (S). P-GE: SocSci II—Div. 3.

197. Tutoring in Psychology (1-3) Seminar—1 hour. Prerequisite: consent of instructor. Intended for students who are taking graduate student status. Overview of the research process and its application in psychology. Not open for credit to students who have completed course 210A.—S. (S.) Ghetti, Goodman, Graf Estes, Miller—W. (W.) Trainor—S. (S.)}

Fall 2011 and on Revised General Education (GE): AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences, AGCM—American Cultures, DD—Domestic Diversity, DL—Global Skills, DL—Quantitative, LS—Scientific; VL—Visual; WC—World Cultures; WE—Writing Experience
Pre-Fall 2011 General Education (GE): ArtH—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; Div—Domestic Diversity; WrtW—Writing Experience Quarter Offered: Fa-Fall, W—Winter, S—Spring, Su—Summer; 2017/2018 offering in parentheses
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 behavior, such as course 101, 122, 123, Neurobiology, Physiology and Behavior 102, 150, 152, Wildlife, Fish, and Conservation Biology 141, Entomology 104, or Animal Science 105. Survey of the phenomena and theory of animal behavior from the perspectives of multiple biological disciplines, including evolution, ecology, psychology, genetics, neurobiology, endocrinology, and animal science. (Same course as Animal Behavior 218A.)—F, S. (F.) Shih

218B. Fundamentals of Animal Behavior (5)
Lecture/discussion—4 hours; discussion—1 hour. Prerequisite: consent of instructor; course 209A. Survey of the phenomena and theory of animal behavior from the perspectives of multiple biological disciplines, including evolution, ecology, psychology, genetics, neurobiology, endocrinology, and animal science. (Same course as Animal Behavior 218B.)—W (W. S.)

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 psychology emphasizing critical analysis of key psychological theory and research to contemporary investigations. Offered in alternate years.—Simonton

221. Academic Writing in Psychology (4)
Lecture/discussion—3 hours; term paper. Prerequisite: consent of instructor. Class size limited to 15 students. Strategies for developing and honing academic writing skills and writing productivity, with a particular focus on how to write a clear and compelling empirical journal article in psychology. May be repeated four times for credit with consent of instructor if student chooses to focus on a substantially different writing project. Offered irregularly.—F. Underwood

230. Cognitive Psychology (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Analysis of the mental processes by which knowledge is acquired, manipulated, stored, retrieved and used. Offered in alternate years.—F. Long, Mangun

231. Sensation and Perception (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Analysis of the role of sensory processes and perception in experience and their effects on behavior. Offered in alternate years.—S.

241. Attitudes and Social Influence (4)
Lecture/discussion—3 hours; term paper. Prerequisite: consent of instructor. Survey of theory and research in the field of attitudes and social influence. Topics include attitude definition and measurement, major theories of attitude formation and change, the relationship between attitudes and behavior, and recent directions and controversies. Offered irregularly.—Lederwood

243. Social Cognition (4)
Lecture/discussion—3 hours; term paper. Prerequisite: consent of instructor. Processes underlying the perception, memory, and judgment of social stimuli, the effects of social and affective factors on cognition, and the interpersonal consequences of those processes. Topics include automaticity/control, motivated cognition, person perception, stereotyping, attitudes, and persuasion. Offered irregularly.—Pickett, Sherman

244. Stereotyping, Prejudice, and Stigma (4)
Lecture/discussion—3 hours; term paper. Prerequisite: consent of instructor. This course examines the social psychological underpinnings of stereotyping, prejudice, and stigmatization, including sociocultural, motivational, and cognitive factors. Offered irregularly.—Herek, Sherman

245. Social Psychology (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Theory and research in social psychology.—S. (F.) Pickett, Robins

247. Personality (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Theory and empirical research in the study of personality.—W (W. S.)

251. Topics in Genetic Correlates of Behavior (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Theory and empirical research in the genetic contributions to animal and human behavior. May be repeated for credit when topic differs. Offered in alternate years.

252. Topics in Psychobiology (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Critical study in a selected area of psychobiology. May be repeated for credit when topics differ. Offered in alternate years.

261. Cognitive Neuroscience (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate student standing in Psychology or Neuroscience or consent of instructor. Graduate core course for neuroscience. Neurobiological bases of higher mental functions, memory, memory, language. One of three in three-quarter sequence. (Same course as Neuroscience 223.)—S. (S.) Ranganath, Swaab

263. Topics in Cognitive Psychology (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Selected topics in language processing, memory, perception, problem solving, and thinking, with an emphasis on the common underlying cognitive processes. May be repeated for credit when credit differs. Offered in alternate years.

264. Topics in Psycholinguistics (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Discussion of fundamental issues in the psychology of language. May be repeated for credit when content differs. Offered in alternate years.

270. Topics in Personality and Social Psychology (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Critical study of a selected area of personality or social psychology. May be repeated for credit when topics differ.—F. (F.)

272. Topics in Developmental Psychology (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Selected topics in developmental psychology or related areas. Discussion of fundamental issues in the psychology of language. May be repeated for credit when content differs. Offered in alternate years.

289A. Current Research in Psychology (3)
Seminar—2 hours. Prerequisite: graduate standing in Psychology or consent of instructor. Contemporary theory and empirical research in specialized topics in psychology. Topics include developmental attachment, social neuroscience, moral development, child maltreatment, children and law, perceptual development, emotion at risk, and adolescence, with emphasis on developmental processes and theoretical developments. May be repeated for credit. Offered irregularly.

289A. Current Research in Psychology (3)
Seminar—2 hours. Prerequisite: course 289A; graduate standing in Psychology or consent of instructor. Intensive examination of contemporary theory and empirical research on a specialized topic in psychology. Sample topics include developmental attachment, social neuroscience, culture and mental health, electrophysiology and cognitive neuroscience, emotion, implicit cognitive processes, sexual orientation and identity, and attention. May be repeated for credit if content differs. (Deferred grading only, pending completion of sequence.)

290. Seminar (4)
Seminar—4 hours. Prerequisite: graduate standing in psychology or consent of instructor. Seminar devoted to a highly specific research topic in any area of basic psychology. Special topic selected for a quarter will vary depending on interests of instructor and students.—F. W. S. (F. W. S.)

298. Group Study (1-5)
(S/U grading only.)—F, W, S. (F, W, S.)

299. Research (2-9)
(S/U grading only.)—F. W. S. (F, W, S.)

299D. Dissertation Research (1-12)
Prerequisite: consent of instructor. (S/U grading only.)

Professional

390A. The Teaching of Psychology (6)
Discussion—6 hours; lecture—6 hours; practice—6 hours. Prerequisite: advanced graduate standing in psychology or a closely related discipline and consent of instructor. Methods and problems of teaching psychology at the undergraduate and graduate levels; curriculum design and evaluation. Practical experience in the preparation and presentation of material. (S/U grading only; deferred grading only, pending completion of sequence.)—W. S. (W. S.) Simonton

390B. The Teaching of Psychology (6)
Discussion—6 hours; lecture—4 hours; practice—2 hours. Prerequisite: advanced graduate standing in psychology or a closely related discipline and consent of instructor. Methods and problems of teaching psychology at the undergraduate and graduate levels; curriculum design and evaluation. Practical experience in the preparation and presentation of material. (S/U grading only; deferred grading only, pending completion of sequence.)—W. S. (W. S.) Simonton

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—F. W. S. (F. W. S.)

Quantitative Biology and Bioinformatics

(Conference 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 develop the skills to 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:

Quantitative Biology and Bioinformatics

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<th>Course</th>
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<td>289A. Current Research in Psychology</td>
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<td>290. Seminar</td>
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<td>298. Group Study</td>
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<td>299D. Dissertation Research</td>
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Quantitative Biology and Bioinformatics

Pre-Fall 2011 General Education (GE) ARTS=Arts and Humanities; SCI=Science and Engineering; SS=Social Sciences; ACCH=American Cultures; DD=Dominant Diversity; D=Design; SE=Science; QL=Quantitative; SL=Social; VL=Visual; WC=World Cultures; WE=Writing Experience

Fall 2011 and on Revised General Education (GE) ARTS=Arts and Humanities; SCI=Science and Engineering; SS=Social Sciences; ACCH=American Cultures; DD=Dominant Diversity; D=Design; SE=Science; QL=Quantitative; SL=Social; VL=Visual; WC=World Cultures; WE=Writing Experience

Quarter Offered: F=Fall; W=Winter; S=Spring; Su=Summer; 2017-2018 offering in parentheses
Quantitative and Computational Preparation.................................4
Complete one course from the following: Applied Science Engineering 115; Biomedical Engineering 105; Computer Science Engineering 122, 130; Mathematics 125, 126B, 128C, 135A; Statistics 130A, 131A, 141A
* 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.

Restricted Electives. 6-8
Complete two or more courses from the following list to achieve a total of 18-24 units: Biological Sciences 134, 180, 181, 183; Biomedical Engineering 102, 117, 140, 141, 151; Biotechnology 150; Computer Science Engineering 165A, 166; Evolution and Ecology 102, 103, 104, 175; Microbiology 105; Molecular and Cellular Biology 123, 143, 182; Neurobiology, Physiology, and Behavior 166, 167; one course from: Environmental Science and Policy 121 or Wildlife, Fish, and Conservation Biology 122

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 minor requirement may be applied toward a student's major.

Minor Adviser. Consult the Biology Academic Success Center (BASC). 1023 Sciences Laboratory Building. 530-752-0410; http://basc.ucdavis.edu/

Radiation Oncology

See Medicine, School of, on page 428.

Radiology

See Medicine, School of, on page 428.

Range Science

[College of Agricultural and Environmental Sciences]
Faculty. See Plant Sciences, on page 516.
Related Program. See Ecological Management and Restoration, on page 251.
Related Courses. See Plant Sciences 101, 112, 130, 131, 135; Nutrition 115; Soil Science 105, 120; Wildlife, Fish, and Conservation Biology 151.

Religious Studies

[College of Letters and Science]
Archana Venkatesan, Ph.D., Chair
Program Office. 213 Sprout Hall 530-752-1219; http://religions.ucdavis.edu
Faculty
Allison Coudert, Ph.D., Professor
Mark Elmore, Ph.D., Assistant Professor
Nanami Jansmita, Ph.D., Professor
Maeghan O’Keefe, Ph.D., Assistant Professor
W. Flagg Miller, Ph.D., Professor
Eva Mroczek, Ph.D., Assistant Professor
Seth Soto, Ph.D., Professor
Mairaj U. Syed, Ph.D., Assistant Professor
Archana Venkatesan, Ph.D., Associate Professor
Keith Watenpaugh, Ph.D., Professor

Emeriti Faculty
Whalen W. Iai, Ph.D., Professor Emeritus

The Major Program
Religion is a major force in human experience. It has shaped the world’s history, literature, art, culture, politics, ethics, and economics. In addition to offering courses in all the major religious traditions (Judaism, Christianity, Islam, and Hinduism, etc.), the Religious Studies Program has developed cross-cultural courses dealing with religious symbols, myths, and rituals in written texts, art, theater, and film, and the Internet, as well as courses dealing with such topics as religion and the body, the rise of fundamentalism, religion and science, religion and ethics, and religion and violence.

The Program. The major introduces students to the academic study of religion. Students can choose from a broad range of courses both in the program itself and in other departments and programs-history, philosophy, psychology, sociology, anthropology, American studies, classics, and medieval studies. In addition to studying religious thought per se, students in the major can also study the way religion has shaped human behavior in such matters as family life, gender roles, ethics, artistic life, concepts of individual freedom, the pursuit of science, and economics. For some students, Religious Studies is an appropriate second major and combines well with anything from photobiolical agricultural development, political science, and the physical sciences.

Career Alternatives. Because of the program’s focus on developing critical thinking, writing, and reading skills, students who major in Religious Studies are well prepared to enter a variety of careers, including teaching, the health professions, law, business, and government. In an increasingly global society, knowledge of the world’s religious traditions and practices has become an essential part of a student’s education.

A.B. Major Requirements:

UNITs
Preparatory Subject Matter.......................... 20
(A) One course from the Religious Studies 1 series.............................................4
(B) Four courses from other Religious Studies lower division offerings......................................16
Depth Subject Matter .......................... 40
Religious Studies 100 .......................... 4
Nine upper division Religious Studies courses..........................................................26
* Four of these upper division courses related to religion that are offered by other departments and taken with the approval of a Religious Studies adviser.

Total Units for the Major.......................... 60

Recommended. A reading knowledge of a foreign language is recommended.

Course Equivalents. The major advisers have a list of lower and upper division courses that can be substituted for courses suggested above.

Major Advisers. Consult the Program office.

Minor Program Requirements:

UNITs
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.

Minor Advisers. Same as major advisers.

Honors and Honors Program. A student becomes eligible for graduation with honors by meeting the minimum grade requirement established by the College of Letters and Science. Upon successful completion of the additional requirements of the College of Letters and Science Honors Program, individual students may be recommended by the program for graduation with high honors or highest honors on the basis of an evaluation of their academic achievements in the major.

Education Abroad Program. The Religious Studies program encourages students to study in the Summer Abroad program, the Quarter Abroad program, or the Education Abroad program. With the approval of a major adviser, a course taken abroad may be accepted in the major or minor programs.

Teaching Credential Subject Representative. See the Teaching Credential/M.A. Program on page 672.

Hebrew. Students interested in Hebrew courses should see http://classics.ucdavis.edu/hebrew.


Courses in Religious Studies (RST)

Lower Division

1. Survey of Religion (4)
   Lecture—3 hours; discussion—1 hour. Basic concepts introduced through readings of the primary religious literature. Discussion of central ideas (creation, history, law, prophecy, suffering, mysticism, asceticism, karma, reincarnation, moksha, etc.); readings from the Bible, Bhagavad Gita, the Koran, selections from Plato and early Buddhist writings. GE credit. ArtHum, Div, Wrt|ACGH, AH, DD, OL, VL, WE.

1A. Pilgrimage (4)
   Lecture—3 hours; discussion—1 hour. Introduction to comparative religion, focusing on the theme of death and the afterlife in different religious traditions. Not open to students who have taken course 3A. GE credit. ArtHum, Div, Wrt|AH, WE, WC.

1B. Death and Afterlife (4)
   Lecture—3 hours; discussion—1 hour. Introduction to comparative religion, focusing on the theme of death and the afterlife in different religious traditions. Not open to students who have taken course 3B. GE credit. ArtHum, Div, Wrt|AH, OL, VL, WC, WE.

1C. Sacrifice (4)
   Lecture—3 hours; discussion—1 hour. Introduction to comparative religion, focusing on the theme of sacrifice in different religious traditions. Not available to those who have taken course 3C. GE credit. ArtHum, Div, Wrt|AH, OL, WE, WC, WE.

1D. Conversion (4)
   Lecture—3 hours; discussion—1 hour. Introduction to comparative religion, focusing on the theme of conversion in different religious traditions. Not available to those who have taken course 3D. Offered irregularly. GE credit. ArtHum, Div, Wrt|AH, WE, WC.

1E. Fundamentalism (4)
   Lecture—3 hours; discussion—1 hour. Introduction to comparative religion, focusing on the idea of fundamentalism in different religious traditions. Not available to those who have taken course 3E. GE credit. ArtHum or SocSci, Div, Wrt|AH or SS, OL, VL, WE—Miller, Watenpaugh.

1F. Religion Today (4)
   Lecture—3 hours; discussion—1 hour. Introduction to comparative religion, focusing on different religious traditions in the contemporary world. GE credit. ArtHum, Div, Wrt|AH, AD, DD, WC, WE—Miller.

1G. Myth, Ritual, and Symbolism (4)
   Lecture—3 hours; discussion—1 hour. Myths, rituals and religious symbols found in a variety of religious traditions including examples from ancient and contemporary religious life. Variety of religious phenomena; validity of different approaches to the study of religion. Not open to students who have taken and received unit credit for course 2. GE credit. ArtHum, Div, Wrt|AH, OL, VL, WC, WE—F, W, F; WJ Janowitz.
1H. Sex, Marriage, and Divorce in Medieval and Modern Society (4)
Lecture—3 hours; discussion—1 hour. Methods used in the study of religion, focusing on a particular theme in a number of religious traditions. GE credit: ArtHum | AH, OL, WC, WE.—Syed

1J. Music, Voice, and the Word (4)
Lecture—3 hours; discussion—1 hour. Exploration of the interaction between religious traditions and musical traditions in various cultures. Investigation of ways music, vocal performance and sound production reflect and shape modern religious sensibilities. Special attention to gender, race, class, nationalism, secularism, and mass media. GE credit: ArtHum | AH, WC.—Venkatesan

10. Contemporary Ethical Issues (2)
Lecture—2 hours. Presents challenging, contemporary ethical issues from a multicultural perspective. Rotating topics will include Ethical Eating, Capital Punishment, Euthanasia, Poverty, and Animal Rights. May be repeated for credit. GE credit: ArtHum, Div, Wrt|AH, WE.—Coudert, Janowitz, O’Keefe

10A. Contemporary Ethical Issues (2)
Discussion—1 hour; extensive writing. Prerequisite: Concurrent enrollment in course 10 required. GE credit: topical breadth and diversity credit only with concurrent enrollment in course 10. Restricted to students enrolled in course 10. Discussion of the readings assigned for course 10 and completion of a major research paper. May be repeated for credit. GE credit: ArtHum, Wrt|Div, Wrt|AH, WE.—Coudert, Janowitz, O’Keefe

11. Ethical Eating (4)
Lecture—3 hours; term paper or discussion—1 hour. Introduction to the complex and varied ethical, religious, and cultural dimensions that food has had across the centuries and globe. GE credit: ArtHum, Div, Wrt|AH, OL, VL, WC, WE.—Coudert

12. The Emergence of Judaism, Christianity and Islam (4)
Lecture—3 hours; discussion—1 hour. History of religion in the ancient Near East and Mediterranean, from the Persian period through the rise of Islam. Emphasis on historical and social contexts of the formation of new traditions, in particular Judaism, Christianity, and Islam. GE credit: ArtHum, Div, Wrt|AH, OL, VL, WC, WE.—Coudert

157. Reading War/Fighting War (4)
Lecture—2 hours; web electronic discussion—1 hour; extensive writing. Introduction to both classical religious texts about war and a set of actual scenarios drawn from the experience and training of soldiers in recent military conflicts. GE credit: ArtHum, Div, Wrt|AH, OL, CDCH, AH, DD, OL, VL, WC, WE.—Janowitz

21. Hebrew Scriptures (4)
Lecture—3 hours; term paper or discussion. Selected texts from the Hebrew Scriptures (Genesis 1-1 Chronicles) and review of modern scholarship on the texts from a variety of perspectives (historical, literary, sociological, psychological). Course work is based on an English translation and no knowledge of Hebrew is required. GE credit: ArtHum, Div, Wrt|AH, WC, WE.

23. Introduction to Judaism (4)
Lecture/discussion—3 hours; term paper. Introduction to the study of religion using examples from the rituals, art and artifacts of Judaism. No prior knowledge of either Judaism or the study of religion is necessary. GE credit: ArtHum, Div, Wrt|ACGH, AH, DD, WC, WE.—Miller, O’Keefe

30. Religions of South Asia (4)
Lecture—3 hours; discussion—1 hour. Introduction to South Asian religions, including Hinduism, Buddhism, Islam, Jainism and Sikhism. Traces historical developments from Vedic texts and their ascetic reformations such as Jainism and Buddhism as well as Vedic and early religious traditions in the Indian subcontinent. GE credit: ArtHum, Div, Wrt|AH, VL, WC, WE.—Elmore, Venkatesan

40. New Testament (4)
Lecture—3 hours; discussion—1 hour. New Testament literature from critical, historical, and theological perspectives. GE credit: ArtHum, Wrt|AH, WC, WE.

42. Religion and Science Fiction (4)
Lecture—3 hours; term paper. Representations of actual and fictional religious movements in science fiction and fantasy reflecting and informing. Examination of the characteristics of religion and religiosity in fictional religious movements; the relationship between religion, science, and technology in modern speculative fiction. GE credit: ArtHum, Div, Wrt|AH, VL, WE.

45. Christianity (4)
Lecture/discussion—3 hours; term paper or discussion. Major concepts and practices in the Christian tradition. Survey of the history of Christianity and Christian expansion from antiquity to modern times. Course pays particular attention to Christianity in China, India, Africa, the Middle East, and Latin America. GE credit: ArtHum, Div, Wrt|AH, VL, WE.—Coudert

60. Introduction to Islam (4)
Lecture/discussion—3 hours; term paper or discussion—1 hour. Introduction to topics central to the Islamic tradition. Muhammad, the Qur’an, Islamic law, theology, politics, mysticism, and devotion. GE credit: ArtHum or SociSci, Div, Wrt|Div, Wrt|AH or SS, VL, WC, WE.—Syed

65C. The Qur’an and Its Interpretation (4)
Lecture/discussion—3 hours; extensive writing. The Qur’an, its history, its various functions in the lives of Muslims, and its different interpretations. Quranic themes have such holy nature among believers, nature among non-believers, and enabling of behavior. GE credit: ArtHum, Div, Wrt|AH, VL, WE.—Coudert

68. Hinduism (4)
Lecture—3 hours; writing. Hindu tradition from ancient to modern. Multiplicity of religious forms within Hinduism with mention of Jainism, Buddhism, and Sikhism and their relation to the mainstream of Hindu religion. GE credit: ArtHum, Div, Wrt|AH, OL, VL, WC, WE.—Venkatesan

69. Introduction to Hindu Mythology (4)
Lecture/discussion—3 hours; term paper or discussion—1 hour. Survey of the major narrative traditions within Hinduism, including epic literature and local stories in oral, textual, visual and performative forms. GE credit: ArtHum, Div, Wrt|AH, VL, WC, WE.—Venkatesan

70. Religion and Language (4)
Lecture/discussion—3 hours; term paper. Basic tools for studying religious discourse in a variety of traditions. Concentration on the sacred and profane, the wondrous and ordinary, and the mystical and reasonable. Offered in alternate years. GE credit: ArtHum, Div, Wrt|AH, OL, VL, WC, WE.—Miller, O’Keefe

75. Introduction to Chinese Philosophy (4)
Lecture/discussion—4 hours. Introduction to Chinese philosophy from classical pre-modern times; emphasis on basic concepts and their impact on social constructivist and Chinese civilization thought. The Han synthesis, the medieval Buddhist contribution.

80. Religion, Gender, Sexuality (4)
Lecture/discussion—3 hours; term paper. Constructions of gender and sexuality within one or more religious traditions from ancient to modern. Emphasis on the interaction between religious, medical, and ethical definitions of the human body and sexual behavior. GE credit: ArtHum, Div, Wrt|AH, VL, WE.—Coudert

98. Directed Group Study (1-5)
Prerequisite: consent of instructor; primarily for lower division students. (P/NP grading only.)—F, W, S. (F, W, S)

99. Special Study for Lower Division Undergraduates (1-5)
(P/NP grading only.)—F, W, S. (F, W, S)

Upper Division

100. Study of Religion: Issues and Methods (4)
Lecture—3 hours; term paper. Principal issues and methods of religious studies and associated fields. GE credit: ArtHum or SociSci | AH or SS, WC, WE.—Janowitz

102. Christian Origins (4)
Lecture/discussion—3 hours; term paper. Prerequisite: consent of instructor. Development of Christianity from the first century to the early fifth century. Focus on the development of Catholic and Orthodox traditions in the second and third centuries. GE credit: ArtHum, Div, Wrt|AH, WC, WE.

103. Medieval and Byzantine Christianity (4)
Lecture/discussion—3 hours; term paper. GE credit: topical breadth and diversity credit only with concurrent enrollment in course 10. Restricted to students enrolled in course 10 and completion of a major research paper. May be repeated for credit. GE credit: ArtHum, Div, Wrt|AH, WC, WE.

105. Christianity 1450-1700 (4)
Lecture/discussion—3 hours; term paper. History of Reformations conflicts over the authority of scripture, the nature of man and the universe, and the basis of morality with the goal of understanding how these conflicts laid the foundations for the modern world. GE credit: ArtHum, Div, Wrt.—Coudert

105. Christianity and Modernity, 1700-1920 (4)
Lecture—3 hours; term paper. Reaction of Christian critics and apologists to the profound cultural and scientific transformations resulting from the Scientific Revolution, the Enlightenment, and the advent of the modern critical study of religion. Offered in alternate years. GE credit: ArtHum, Div, Wrt|AH, OL, VL, WC, WE.—Coudert

106. Christianity in the Contemporary World (4)
Lecture—3 hours; term paper. Christianity in the 20th and 21st centuries. Relationship of Christianity to globalization, industrialization, mass media, and the contemporary secular state. Focus on Christianity in America and developing nations, and on the relationship of established Christian institutions to new Christian movements. GE credit: ArtHum, Div, Wrt|ACGH, AH, WC, WE.—Coudert, O’Keefe

110. Life, Meaning and Identity (4)
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing. Study of religious lives, the quest for meaning and for personal identity; how religions frame the problems of life; how cultural and personal crises affect youthful identity; the nature and structure of dreams, myths, and ideals. GE credit: AH, WE.—Elmore, Janowitz

111. Persuasion and Conviction in Religious Tradition (4)
Lecture/discussion—4 hours; term paper. Selected topics in religious argument. Familiarizes students with the discourse structures of religious persuasion and enables them to perform analysis of such texts. Covers argument styles and structures used in ethics, theology, and preaching. GE credit: ArtHum | ACGH, AH, OL, WC, WE.—Miller, O’Keefe, Syed

115. Mysticism (4)
Lecture—3 hours; term paper. Prerequisite: one lower division Religious Studies course and a course in historical and descriptive analysis of selected key figures in
Religious Studies

mystical traditions and readings of representative mystical texts. Analytic term paper. GE credit: ArtHum, Div, Wrt|AH, WC, WE.

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 thinking. (Same course as Science and Technology Studies 120.) GE credit: ArtHum, Div, Wrt|AH, OL, VL, WC, WE.—Coudert

122. Studies in Biblical Texts (4)
Lecture—3 hours; term paper. Prerequisite: course 21. Study of biblical stories. The Prophets or writings from critical, historical, and religious perspectives. May be repeated one time for credit in different subject area. GE credit: ArtHum | AH, WE.—Janowitz

124. Topics in Judaism (4)
Lecture—3 hours; term paper. Prerequisite: course 21, 23. Examination of selected aspects of Jewish life, religion, or literature. Potential topics include: Jewish Perspectives on Jesus; The Golem: History and Legend; Sexuality and Gender in Late Antique Judaism and Early Christianity. May be repeated for credit when topics differ.—Janowitz

125. Dead Sea Scrolls, Apocrypha, and Pseudepigrapha (4)
Lecture—discussion—3 hours; term paper. Prerequisite: course 21 or consent of instructor. Survey of the Dead Sea Scrolls, apocryphal and pseudepigraphical writings of Judaism and Christianity and their historical and cultural significance. GE credit: ArtHum, Wrt|AH, WC, WE.—Janowitz

126. The Formation of the Rabbinic Tradition (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 other cultural phenomenon. Topics may include archaeology and the Bible, women and religion, religion and violence. May be repeated for credit when topics differ. GE credit: W, WC, WE.

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 other cultural phenomenon. Topics may include archaeology and the Bible, women and religion, religion and violence. May be repeated for credit when topics differ. GE credit: W, WC, WE.

131. Genocide (4)
Lecture—discussion—3 hours; term paper or discussion—1 hour. Prerequisite: upper division standing. Comparative and critical study of the modern phenomenon of mass murder. The religious, ethical, and historical perspectives. (Same course as Human Rights 131.) GE credit: ArtHum or SocSci, Div, Wrt|AH or SS, VL, WC, WE.—W. (W.) Waterpanah

132. Topics in Mediterranean Ancient Religion (4)
Lecture—discussion—3 hours; term paper. Prerequisite: course 21, 40 or consent of instructor. Thematic study of specific sociological, literary or theological themes across the religious traditions of the ancient Mediterranean/Near East: Greek and Roman religions, Judaism, Christianity, Zoroastrianism, Manichaeanism, etc. Topics may include creation, sacrifice, pious practices, holy books, the afterlife. May be repeated twice for credit when topics differ. GE credit: ArtHum | AH, WC, WE.

134. Human Rights (4)
Lecture—discussion—3 hours; term paper or discussion—1 hour. Introduction to the interdisciplinary study of the origins, evolution, denial and protection of Human Rights. No credit for students who have completed Religious Studies 90. (Same course as Human Rights 134.) GE credit: ArtHum or SocSci, Div, Wrt|AH or SS, WC, WE.—F. (F.) Waterpanah

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, ideological and allegorical themes, and the problems of religious conviction.

138. Human Rights, Gender, and Sexuality (4)
Lecture/discussion—3 hours; term paper. Gender and sexuality in the formation of human rights. Topics include women's participation in the public sphere, the right to change gender, the right for family privacy, and the right to marriage. (Same course as Human Rights 21B.) GE credit: ArtHum, Wrt|AH, WC, VE.—F. W., S. Su; (F. W. S., Su) O'Keefe

140. Christian Theology (4)
Lecture—discussion—3 hours; term paper. Prerequisite: consent of instructor. Historical and systematic introduction to Christian doctrine, with attention to divergent traditions and the problem of orthodoxy and heresy. GE credit: ArtHum | AH, WC, WE.

Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor. 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, 141C. GE credit: ArtHum, Wrt|AH, WC, WE.

141B. New Testament Literature: John (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor. Life and thought of the early Church as reflected by the Gospel of John. Offered every third year to alternate with courses 141A and 141C. GE credit: ArtHum, Wrt|AH, WC, WE.

141C. New Testament Literature: Paul (4)
Lecture—3 hours; term paper. Prerequisite: consent of instructor. Life and thought of the early Church as reflected by the Pauline tradition—the letters of Paul. Offered every third year to alternate with courses 141A, 141B. GE credit: ArtHum, Wrt|AH, WC, WE.

143. New Testament Apocrypha (4)
Lecture—3 hours; term paper. Prerequisite: consent of instructor. Extra-canonical Christian writings and their relationship to the Bible. GE credit: ArtHum, Wrt|AH, WC, WE.

144. History of the Bible (4)
Lecture—3 hours; term paper. Prerequisite: course 21 or 40. History of the formation of the Christian biblical canon, with emphasis on differences between Christianity and other ancient religions, translations and adaptations of biblical narrative in Christianity, Judaism, and Islam, as well in contemporary culture. GE credit: ArtHum, Div, Wrt|AH, WC, WE.

145. Contemporary American Religion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40 or 60. Examination of several major movements and phenomena in twentieth-century American religion. GE credit: ArtHum | ACGH, AH, DD, WE.

150. Religious Ethics (4)
Lecture/discussion—3 hours; term paper or discussion. Prerequisite: course 10 recommended. Study of the religious bases of ethics through examination of ethical problems that arise in different religious cultures around the world and in nations where multiple religious cultures face similar issues. GE credit: ArtHum, Div, Wrt|AH, WC, WE.—O’Keefe, Syed

154. The Hindu Temple (4)
Lecture—3 hours; term paper. Comparative study of architecture and symbolism of the Hindu Temple in India, Southeast Asia and the United States. Attention to the temple as expression of religious knowledge, political authority, and cultural heritage through the lens of postcolonialism. (Same course as Art History 154.) GE credit: ArtHum or SocSci | AH or SS, VL, WC, WE.—Venkatesan

156. Religion and the Performing Arts in India (4)
Lecture—3 hours; term paper. Prerequisite: course 30, 68, or consent of the instructor. Survey of religious and performing arts in India. Emphasis on the influence of colonialism, nationalism, and regionalism on the history of Indian performing arts. GE credit: ArtHum, Div, Wrt|AH, WC, WE.—Venkatesan

157. Hindu Women and Goddesses (4)
Lecture—3 hours; term paper. Prerequisite: course 10 recommended. Hindu goddesses and the religious lives of Hindu women in India and the diaspora. GE credit: ArtHum, Div, Wrt|AH, VL, WC, WE.—Venkatesan

158. The Ramayana (4)
Lecture—3 hours; term paper. Exploration of the Indian epic, Ramayana, through the lens of literature, performance, and visual art. Emphasis on the text's diversity and its contemporary global relevance. Topics include Ramayanas in Southeast Asia, and various South Asian diaspora communities. (Same course as Comparative Literature 156.) GE credit: ArtHum, Div, Wrt|AH, WE, WC.—Venkatesan

160. 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, Islamic history, historiography, political and social phenomena, theological thought, philosophy and ethics, 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 history of reformist movements, human rights. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|AH or SS, OL, WC, WE.—Miller

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 history of reformist movements, human rights. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrt|AH or SS, OL, WC, WE.—Miller

163. The Social Life of Islam (4)
Lecture—3 hours; term paper. Prerequisite: course 60 and History 12 recommended. Introduction to culture and social life in Muslim societies. Focus on the plurality of traditions in Muslim faith, reason, and everyday practice. Special attention to Muslim rituals, ethical values, verbal and nonverbal communication, gender roles, and intercultural communication. GE credit: ArtHum or SocSci, Div, Wrt|AH or SS, OL, WC, WE.—Miller

165. Islam in Asia (4)
Lecture/discussion—3 hours; extensive writing. Islam as a lived religion in the Indian sub-continent, Central Asia, China, and Southeast Asia. Emphasis is on primary sources studied comparatively and historically. GE credit: ArtHum, Div, Wrt.
166. Religion and Media in Arab World (4)
Lecture—4 hours. Exploration of the role and experience of media technologies in the Arab world. Study of digital and electronic media as well as alternative media practices. Investigation of new trends in political activism and identity formation. (Same course as Middle East/South Asian Studies 131C) GE credit: SocSci, Div | AH, VL, WC, WE. —Miller

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, neocolonialism, terrorism and resistance. —Waterspough

170. Buddhism (4)
Lecture—3 hours; term paper. Buddhism in its pan-Asian manifestations, from its beginnings in India to its development in Sri Lanka and Southeast Asia, Central Asia, China and Japan; teachings and practices, socio-political and cultural impact. GE credit: Arthum | AH, VL, WC. —Ehlert

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.

173A, Chinese Intellectual Traditions: Daoist Traditions (4)
Lecture/discussion—4 hours. Prerequisite: a course in Chinese history recommended. English-language survey of key Daoist texts and scholarship. Topics include Daoist concepts of the cosmos, the natural world, scripture, the body, and immortality; Daoist divinities; Daoism and the state. (Same course as Chinese 100A) GE credit: Arthum, Div | AH, WC, VL. —Halperin

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.

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.

194HA. Special Study for Honors Students (1-5)
Independent study. Prerequisite: consent of instructor. 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.)

194HB. Special Study for Honors Students (1-5)
Independent study. Prerequisite: consent of instructor. 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

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. —Coardt, Sanders

205. Religion and Media (4)
Lecture/discussion—3 hours; term paper. This course examines how religious revitalization is historically situated. A phenomenological approach will enable students to situate media and religion within the social and material world of practitioners. —Miller

210. Religion and Postcoloniality, Savagery, Civilization, and Spirituality (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. This course examines relations between religion and colonialisms. Using specific historical situations it explores some of our theoretical problems. Students acquire a solid understanding of postcolonial theory and the historical tools to critically engage religion in the present. —Elmore

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 resistance. —Waterspough

215. Topics in the History of Christianity (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Selected topics in the history of Christianity. Intended for graduate students seeking to do advanced work in the study of Christianity. May cover issues in Christian thought from antiquity, the middle ages, the early modern or modern period. May be repeated for credit when topic differs. —Couard

299. Directed Research (1-12)
(S/U grading only)

Professional

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)

Russian

(College of Letters and Science)
Jaimey Fisher, Ph.D., Chairperson of the Department
Program Office. 213 Sproul Hall 530-752-1219; http://russian.ucdavis.edu

Committee in Charge
Carlee Arnett, Ph.D. (German and Russian)
Jenny Kaminer, Ph.D. (German and Russian)
Elizabeth Krimmer, Ph.D. (German and Russian)
Olga Stuchebrukhov, Ph.D. (German and Russian)

Faculty
Jenny Kaminer, Ph.D. (German and Russian)
Olga Stuchebrukhov, Ph.D. (German and Russian)

Affiliated Faculty
James Gallant, Ph.D., Lecturer Emeritus
Daniel Rancour-Lafonriere, Ph.D., Professor Emeritus
Valerie A. Tumins, Ph.D., Professor Emerita

Emeriti Faculty
Liliana Avramenko, Lecturer

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 program major 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:

Preparatory Subject Matter: UNITS
Russian 1-6; or the equivalent.................. 0-27

Depth Subject Matter: UNITS
Russian 101A, 101B, 101C............................ 12
Russian 102 or 103 or 104 or 105........... 4
Additional upper division courses with adviser from the following selection of Literature and Culture courses taught in Russian and Slavic studies.......................... 10
Russian 122, 124, 126, 127, 129, 130, 133, 139, 140, 141, 142, 143, 150
The elective upper-division courses in English can be satisfied in part by one or more courses in Literature and Culture, Comparative Literature, Comparative Literature and Culture, other departments after consultation with, and prior approval of, the major adviser.

The total of 36 upper-division units may include units earned in the Education Abroad Program.

Total Units for the Major.......................... 36-63

Major Adviser. Olga Stuchebrukhov

Minor Program Requirements:

Russian ........................................... 20
Russian 101A, 101B, 101C............................ 12
Other upper division Russian courses........ 8

Honors and Honors Program. The honors program comprises at least one quarter of study under course 194H, which will include a research paper. For details consult the major adviser.

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 the summer, semester, and year-long programs sponsored by CIEE and ACTR in St. Petersburg and Moscow.

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
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 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.) GE credit: Arthum | AH, WC. —F (F)
103. Literary Translation (4)
Lecture/discussion—3 hours. Prerequisite: course 101C. Translation of Russian literary texts into stiltishly equivalent idiomatic English. GE credit: ArtHum | AH, WC, W. [W]

104. Advanced Russian Conversation (4)
Lecture/discussion—3 hours; practice—1 hour. Prerequisite: course 101C. Intensive conversational practice and discussion based on current events and contemporary texts. GE credit: ArtHum | AH, OL, WC.

122. 19th-Century Russian Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101C when the course offered in Russian; no prerequisite when offered in English. Not open to students who have taken course 121 and 127. Study of Russian literature (prose fiction, drama, poetry) from the period between 1800 and the end of the 19th century. May include authors like Pushkin, Lermontov, Gogol, Turgenev, Dostoevsky, Tolstoy. Offered alternately in English or Russian. GE credit: ArtHum, Wrt | AH, OL, VL, WC, WE—Stuchebrukhov.

124. Twentieth-Century Russian Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101C when offered in Russian; no prerequisite when offered in English. Study of Russian literature (prose fiction, drama, poetry) from the period between 1900 and the end of the 20th century. Authors like Y. Olesha, M. Bulgakov, D. Kharns, L. Petrushkovaia. Taught in Russian. Not open for credit to students who have taken courses 123 or 128. GE credit: ArtHum | AH, OL, VL, WC, WE—Kaminer.

126. The Russian Theater (4)
Lecture—3 hours, term paper. Prerequisite: course 101C or consent of instructor. Examination of Chekhov's works from Fonvizin to the present, including Gogol, Turgenev, Tolstoy, Ostrovsky, Chekhov, Blok, Mayakovsky, Kharns. Conducted in Russian. GE credit: ArtHum | AH, OL, WC, WE—Kaminer.

129. Russian Film (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: completion of Subject A requirement. History of Russian film, film and social revolution, the cult of Stalin, dissident visions; film and the collapse of the Soviet empire; gender and the nation in Russian film. Course taught in English; films are in Russian with English subtitles. (Same course as Film Studies 129.) GE credit: ArtHum, Div, Wrt | AH, VI, VL, WE.

130. Contemporary Russian Culture (4)
Lecture—3 hours; term paper. Prerequisite: consent of instructor. Current trends in Russian culture and the relationship between artists and the government. Topics include recent changes in the cultural scene, postmodernist trends in literature, visual art, film, and theater. Offered in alternate years. GE credit: ArtHum | AH, OL, WC, WE—S. [S] Avramenko.

133. Post-Soviet Literature (4)

139. Pushkin in Russian Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 101C or consent of instructor. Three major periods of Pushkin’s poetic works: his early Lyceum verse; his poetry of the early 1820s; and the mature period. Further study of Pushkin’s prose fiction, drama, and journalism. GE credit: ArtHum, Div | AH, OL, WC, WE—Stuchebrukhov.

140. Dostoevsky (in English) (4)
Lecture—3 hours. Reading and analysis of Dostoevsky’s principal works, including Crime and Punishment, The Idiot, The Brothers Karamazov, and The Diary. Study of social and political views as reflected in Dostoevsky’s works. GE credit: ArtHum, Div | AH, WC, WE—Stuchebrukhov.

141. Tolstoy (in English) (4)
Lecture—3 hours; term paper. Study of Leo Tolstoy’s literary evolution and moral quest. Readings include his Confession, a major novel such as War and Peace or Anna Karenina, and representative shorter fiction. GE credit: ArtHum, Div, Wrt | AH, OL, WE—Stuchebrukhov.

142. Women in Russian Culture (4)
Lecture/discussion—3 hours; term paper. Prerequisite: any introductory course in literature. Study of the representation of [and by] women in contemporary Russian fiction and film. Exploration of issues such as family dynamics, motherhood, sexuality, work, and women’s relationship to the state. Offered in English. GE credit: ArtHum | AH, WC, WE—Kaminer.

143. Chekhov (in English) (4)
Lecture/discussion—3 hours; extensive writing. Examination of Chekhov’s short stories and major plays, such as The Seagull, Uncle Vanya, The Three Sisters, The Cherry Orchard, and Ivanov, in the broader cultural context of European and Russian fin de siècle. GE credit: ArtHum, Div, Wrt | AH, OL, WC, WE—Stuchebrukhov.

150. Russian Culture (4)
Lecture-discussion—3 hours, term paper. Knowledge of Russian not required. Study of Russian culture in nineteenth and twentieth centuries. Brief introduction of the beginnings up to nineteenth century. Russian art, music, philosophy, church, traditions, and daily life. GE credit: ArtHum, Div, Wrt | AH, WC, WE.

192. Research Essay (2)
Prerequisite: A Russian literature course (may be taken concurrently). A research essay, based on primary and secondary sources, dealing in depth with a topic arising from or related to the prerequisite literature course. May be repeated for credit. GE credit: ArtHum | AH, WC, WE.

194H. Special Study for Honors Students (1-5)
Independent study—4 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 Russian studies.

195H. Honors Thesis (4)
Independent study—4 hours. Prerequisite: course 194H. Writing an honors thesis, under the direction of a faculty member, on a topic in Russian studies.

197. Tutoring in Russian (1-4)
Seminar—1-2 hours; laboratory—1-2 hours. Prerequisite: upper division standing; consent of instructor. Tutoring in undergraduate courses, including leadership in small voluntary discussion groups affiliated with departmental courses. May be repeated six times 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

299. Individual Study (1-12)
Prerequisite: graduate standing, Restricted to graduate students. May be repeated for credit. (S/U grading only)

Professional

396. Teaching Assistant Training Practicum (1-4)
May be repeated for credit. (S/U grading only)

Science and Society
Wrt|SE or SS.—

30. Mushrooms, Molds, and Society (3)

41. Understanding Performance: Appreciation of Modern Theatre, Dance, Film and Performing Art for the Humanities and Sciences (3)

42. Earth, Water, Science, Song (3)

SL, VL, WC, WE.—

cannot take both course 025 and 025V for credit.

affairs. Decision making under uncertainty. Students include societal issues and plant germplasm conservation, comparisons to animal conservation issues, and the economics of and justification for preserving endangered species. —F. W. (F, W.)

25V. Global Climate Change: Convergence of Biological, Geophysical, & Social Sciences (3)


25. Global Climate Change: Convergence of Biological, Geophysical, & Social Sciences (3)


10A. Genetic Engineering in Medicine, Agriculture, and Law (5)

Lecture—5 hours. Not open to students who have taken Biological Sciences 1A, Biological Sciences 2A or equivalent, or course 20; concurrent enrollment in Plant Biology 98 required. Historical and scientific study of the impact of genetic engineering in medicine, agriculture and law. Emphasis on examination of social, ethical, and legal issues raised. Offered in a distance-learning format. GE credit: SciEng or SocSci|SE or SS, SL, WE.—F, W. (F, W.) Silk

10B. Observing and Writing in Biology (2)

Seminar—2 hours; two Saturday field trips. Prerequisite: 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. —F. W. (F, W.)

9C. Herbal Medicine: Relevance for the 21st Century (2)

Seminar—2 hours. Medicinal usage of plants from biological, historical, and cultural perspectives. Broad contexts of holistic and scientific paradigms for understanding herbal medicine. Saturday field trip to teach herb identification. —W. (W.)

9D. 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 species. —F. Farkh

9E. Biotechnology—A New Era, a New Struggle (2)

Seminar—2 hours. Animal biotechnology and its applications. Discussion topics include potential societal impacts of various uses of recombinant DNA technology on society; legal, moral, and ethical issues raised. —F. Farkh

9F. Food Distribution in a Hungry World (2)

Seminar—2 hours. Class size limited to 15 students. The biological, technological, environmental, and socioeconomic factors related to food distribution systems at local, national, and international levels. The potential for increasing world food supply by reducing losses between harvest and consumption. —F. Farkh

9G. Science, Society and the Environment (2)

Seminar—2 hours. Contemporary environmental issues, scientific approaches to addressing these issues, and accompanying societal and ethical considerations. —F. Farkh

9X. Lower Division Seminar (1-4)

Seminar—1-4 hours. Prerequisite: lower division standing; consent of instructor. Limited enrollment. 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. —F, W. (F, W.)

91A. Explorations in Science and Society: Cultures and Identities (2)

Seminar—1 hour; extensive writing or discussion—1 hour. Prerequisite: participation in the summer Specialized Transfer Enrichment Program (STEP) course led by instructor; course 1 concurrently. Exploration of linkages among identity and culture, multi-disciplinary inquiry, and agricultural and environmental science issues. —F. Farkh

91B. Explorations in Science and Society: Leadership and Collaboration (2)

Seminar—1 hour; extensive writing or discussion—1 hour. Prerequisite: course 91A or consent of instructor. Exploring understanding of culture and identity to issues of leadership, collaboration, and social action in science and society. Includes a mandatory two and half day retreat. —W. (W.)

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. —S. (S.)

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 discussions and supplementing instructor(s) and teaching assistants. Acting as liaison between the students and course instructor(s) to foster effective communication and interaction. May not be repeated. —P. (P.)

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

110. Applications of Evolution in Medicine, Human Behavior, and Agriculture (4)

Lecture—2 hours; discussion—1 hour; term paper. Prerequisite: Biological Sciences 2A, 2B, and 2C. Class size limited to 60 students. Applications of evolutionary biology in medicine, human behavior, and agriculture. Examination of the imprint of evolution on the human life cycle from conception to death. GE credit: SciEng|SE, SL, WE.—S. (S.)

120. Science and Contemporary Societal Issues (3)

Lecture/discussion—3 hours. Prerequisite: upper division standing. Study of a contemporary societal 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. Topic will vary. May be repeated one time for credit. Offered irregularly. GE credit: SciEng or SocSci|Wrt|1E or SS.—S. (S.)

121. Global Poverty: Critical Thinking and Taking Action (4)

Lecture—3 hours; discussion—1 hour. Social science and engineering analysis of causes and effects of world poverty and of policies to reduce it via economic growth, foreign aid, and community-level interventions, e.g., in village water, sanitation, and nutrition.
ing, small scale energy, irrigation, health and microf

130. Contemporary Leadership (4) Lecture—3 hours; seminar—1 hour. Prerequisite: consent of instructor. Class size limited to 40 stu

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; water and issues; ecolourism. Weekend and other field trips. Offered irregularly. GE credit: SciEng or SociSc, Div, W, SE or SS. — W. Cramton, Gullan

140. Genetics and Social Issues (4) Lecture—4 hours. Prerequisite: Biological Sciences 1A, 1B, 1C. Social issues arising from the development and use of modern methods of biotechnology. Presentation, evaluation, and critical examination of the present and future impact of genetics on society. Not open for credit to students who have completed course 20. GE credit: SociSc, Wrt, — W. Epstein

190X. Science & Society Seminar (1-4) Seminar—1 hour. Prerequisite: upper division standing; consent of instructor. GE credit: SciEng or SociSc, Div, W, SS. — W. W. Epstein

192. Internship in Science and Society (1-12) Internship—3-36 hours. Prerequisite: upper division standing and consent of instructor. Supervised internship on or off campus, in the community, or in institutional settings. (P/NP grading only)

197T. Tutoring in Science and Society (1-5) Tutoring—3-15 hours. Prerequisite: upper division standing; completion of course being tutored or the equivalent. Tutoring of students in Science and Society courses. Assistance with discussion groups and laboratory sections under supervision of instructor. May be repeated for credit if tutoring another Science and Society course. (P/NP grading only)

198. Directed Group Study (1-5) Prerequisite: upper division standing; consent of instructor. Restricted to Sustainable Agriculture and Food Systems major or with consent of instructor. Group study on focused topics in Sustainable Agriculture and Food Systems. Varies according to instructor. Course plan is adapted to student need and interest in conjunction with the expertise of the instructor. May be repeated for credit if tutoring another Science and Society course. (P/NP grading only)

199. Special Study in Science and Society (1-5) Independent study—3-15 hours. Prerequisite: upper division standing; consent of instructor. Under faculty supervision, advances students pursue an organized or individualized course of study related to Sustainable Agriculture and Food Systems. (P/NP grading only) — F, W, S, Su. — W, S, Su.

Graduate

298. Group Study (1-5) Prerequisite: consent of all instructor. May be repeated for credit when topic changes. (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)

Science and Technology Studies

College of Letters and Science

Timothy Chay, Ph.D., Program Director
Program Office, 101 Young Hall; staadvising@ucdavis.edu; http://sts.ucdavis.edu

Committee in Charge

Mario Biagioli, Ph.D. (Science and Technology Studies, School of Law)
Patrick Carroll, Ph.D. (Sociology)
Timothy Chay, Ph.D. (Anthropology, Science and Technology Studies)
Joseph Dumit, Ph.D. (Anthropology, Science and Technology Studies)
Kathleen Frederick, Ph.D. (English)
Colin Milburn, Ph.D. (English, Science and Technology Studies)
Robert Millstein, Ph.D. (Philosophy)
Kris Ravetta-Biagioli, Ph.D. (Cinema and Digital Media, Science and Technology Studies)
Daniel Stolzenberg, Ph.D. (History)

The Major Program

The Science and Technology Studies (STS) major brings the perspectives of the humanities and social sciences to bear on the analysis and synthesis of science, technology, and medicine. It considers science, technology, and medicine, in tandem with their social, political, economic, and cultural contexts and implications. The 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, and Science and Technology Studies. The major is suitable for students pursuing a broader understanding of science than is available within a traditional science major and for students in the social sciences interested in the role of science 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 (plus prerequisites) providing depth, concentration and fieldwork opportunities 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; (4) Medicine, Society, and Culture. Courses in the modules require careful selection to make the best use of the 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 faculty and staff advising to plan their course of study. Career Alternatives. The STS major will create an opportunity to analyze science and allied prac-

tices from historical, philosophical, sociological, political, anthropological, and cultural perspectives. STS prepares students for careers that must address the broader social, cultural and political ramifications of science, technology and medicine such as law, journalism, public policy, economics, government, and science education. Students of STS from many universities nationwide have pursued, in addition to academic careers in STS, include employment in: systems engineering, website design, science museums, science education, governmental 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

Science and Technology Studies 1 .............. 4
Science and Technology Studies 20 .......... 4

Eight units selected from American Studies 1A, 1E, 5; Environmental Sciences; Humanities 3; Philosophy 30, 31, 32; Science and Society 1, 2, 3, 5; Science and Technology Studies 32; Lower-division science courses from the Approved Science Electives list below 

Depth Subject Matter

Twelve units each from two of the following four modules:

1. Cultural Studies of Science: American Studies 101G, 158; Community and Regional Development 118, 162; History 139A, 139B; Science and Technology Studies 108, 109, 120, 130A, 131, 150, 160, 162, 165, 173, 176; Sociology 150, 175; 

2. Ethics, Values, and Science Policy: Agricultural and Resource Economics 120, 147; American Studies 125; Communication 170; Computer Science 188; Environmental Science and Policy 165; History 1858; Philosophy 116, 120; Physics 137, 160; Plant Pathology 140; Political Science 171, 175; Science and Technology Studies 109, 120, 162, 164, 170; Veterinary Medicine 170; 

3. History and Philosophy of Science: History 135A, 135B, 136, 185A, 185B; Philosophy 104, 105, 106; Science and Technology Studies 120, 130A, 130B, 131, 160, 161, 163, 164, 

4. Medicine, Society, and Culture: American Studies 101G; Communication 165; Public Health Sciences 101, 160; History 139A, 139B; Science and Technology Studies 109, 120, 121; Sociology 154; 

Note: Although a course may be listed in more than one module, that course may satisfy only one requirement.

Science and Technology Studies 175 ....... 4
Science and Technology Studies 180 or 190 ....... 4

Science Electives: Select twelve units, at least eight of which must be science electives, from the Approved Science Electives list below. [Unit totals will vary with required prerequisites] 

Note: Students are strongly advised to choose science elective courses in consultation with faculty or staff advisors. Some courses in some areas may require prerequisites too extensive to be used for this major.

Total Units for the Major............. 60-80

Approved Science Electives. Courses may be drawn from any of the following approved subject areas:

Aeronautical Science and Engineering; Animal Genetics; Animal Science; Anthropology, Applied Behavioral Sciences;
50. **Ancient Science (4)**

Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16A or the equivalent. Study of science in ancient Greece and Rome; consideration of its social context; concentration on the basic concepts of physics, the world of medicine and biology, the history of mathematics, and the development of astronomy, astrology and meteorology. (Same course as Classics 50.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, WC, WE. —Webster

51. **Ancient Medicine (4)**

Lecture—3 hours; discussion—1 hour. Medicine in ancient Greece and Rome; physiological conceptions of the body within scientific and social frameworks; exploration of sanitation technology and health in antiquity; medical treatment of the female body; medicine and the economy. (Same course as Classics 51.) Offered in alternate years. GE credit: AH, WC, WE. —Webster

90. **Directed Group Study (1-5)**

Prerequisite: consent of instructor. Work experience off and on campus in all subject areas in the program. GE credit: ArtHum, Wrt | AH and/or SS, OL, VL, WE. —Webster

99. **Special Study for Undergraduates (1-5)**

Prerequisite: consent of instructor. GE credit: ArtHum, Wrt | AH and/or SS, VL, WE. —Webster

### Upper Division

108. **Intellectual Property in Science (4)**

Lecture/discussion—4 hours. Prerequisite: course 1, or other Social Science or Humanities writing course. Historical and conceptual framework for contemporary debates about intellectual property and science. Topics include US patent system and copyright law, interaction between patents and industrial policy, credit in academic and industrial science, role of IP in global knowledge. GE credit: SocSci, Wrt | ACHG, SS, WE. —Biagioli

109. **Visualization in Science (4)**

Lecture—3 hours; extensive writing or discussion—1 hour. Course 1 or 20 or Anthropology 2 recommended. 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 how visualizations are used socially to make claims. (Same course as Anthropology 109.) Offered in alternate years. GE credit: SocSci, Wrt | SS, VL, WE. —Dumit

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 as Religious Studies 120.) Offered in alternate years. GE credit: ArtHum, Div | Wrt | AH, OL, VL, WE. —Coudert

121. **Special Topics in Medical Anthropology (4)**

Lecture/discussion—4 hours. Prerequisite: Anthropology 2 recommended. Introduction to critical medical anthropology. Topics include anthropological analysis of bio-medicine, psychiatry, systems of knowledge and healing, the body, emotions, and clinical encounters in a cross-cultural perspective. (Same course as Anthropology 121.) GE credit: SocSci, Div, Wrt | SS, WC, WE. —Giordano

129. **Health and Medicine in a Global Context (4)**

Lecture/discussion—4 hours, term paper. Prerequisite: Anthropology 2 recommended. Recent works in medical anthropology and the science studies of medicine dealing with global health issues such as AIDS, pandemics, clinical trials, cultural differences in illnesses, diabetes, organ trafficking, medical technology and delivery, illness narratives, and others. (Same course as Anthropology 129.) GE credit: SocSci, Div, Wrt | SS, WE. —Dumit

130A. **From Natural History to the History of Nature (4)**

Lecture/discussion—3 hours; term paper. Prerequisite: History 135A recommended. Evolution and demise 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 offered in alternate years. GE credit: ArtHum or SciEng, Wrt | AH or SE, WE.

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 among evolutionists. Topics include such genetics, paleontology, embryology, ecology, systematics and molecular biology. GE credit: ArtHum or SciEng, Wrt | AH or SE, WE. —Griesemer

131. **Darwin (4)**

Lecture—3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Students will explore the life and times of Charles Darwin and will trace the development of evolutionary thinking before and after the Origin of Species to appreciate its place in Victorian society and in the corpus of Darwin’s thought. GE credit: ArtHum or SciEng, Wrt | AH or SE, WE. —Griesemer

150. **Gender and Science (4)**

Lecture—3 hours; discussion—1 hour; film viewing—3 hours; extensive writing. Critical and theoretical approaches to the emergence of new technologies since the invention of photography. Examine various approaches to media (formalist, semiotic, structuralist, Frankfurt School, cybernetics, visual and gamer theory). (Same course as Cinema and Technocultural Studies 150.) GE credit: ArtHum or SS, OL, VL, WE.


Lecture—3 hours; extensive writing or discussion—1 hour. Historical, aesthetic and critical approaches to how information technologies produced ghost effects or a sense of terror in response to new media like the photograph, gramophone, film, typewriter, computer, Turing Machine. Focus on technological media transforms sense perception. Offered in alternate years. (Same course as Technology of Allied Studies 160.) GE credit: ArtHum or SocSci | ACHG, AH or SS, VL, WE. —Ravetto-Biagioli

161. **Time: Mechanism and Measurement (4)**

Lecture—3 hours; discussion—1 hour; film viewing—3 hours; extensive writing. Critical and theoretical approaches to the emergence of new technologies since the invention of photography. Examine various approaches to media (formalist, semiotic, structuralist, Frankfurt School, cybernetics, visual and gamer theory). (Same course as Cinema and Technocultural Studies 150.) GE credit: ArtHum or SS, OL, VL, WE.

162. **Surveillance Technologies and Social Media (4)**

Lecture—3 hours; film viewing—3 hours; term paper. Prerequisite: Technocultural Studies 1 or course 20. Study of the ubiquitous presence of CCTV, face recognition software, global tracking systems, biosensors, and data mining practices that have made surveillance a fact of life. Exploration of the boundary between security and control, information and spying. (Same course as Cinema &
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 | SS, WE.

164. Writing Science (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: English 3 or course 1, 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.) Offered in alternate years. GE credit: ArtHum, Wrt | AH, SL, WE. —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 turning knowledge of nature into social assets. Historical constellations of knowledge, social order, and power. Offered in alternate years. GE credit: SocSci | SS, WE.

172. Video Games and Culture (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 1 or Technocultural Studies 1 or English 3 or equivalent. Critical approaches to the study of video games, focusing on formal, historical, and cultural modes of analysis. History of software and hardware in North American and global contexts. Relations of games to society, politics, economics, literature, media, and the arts. (Same course as Cinema and Technocultural Studies 172 and English 172.) GE credit: ArtHum or SocSci | ACGH, AH or SS, VL.

173. Science Fiction (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or equivalent. 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 culture. (Same course as English 173.) GE credit: ArtHum, Wrt | AH, WE.

175. Laboratory Studies Lab (4)
Lecture/discussion—4 hours. Prerequisite: upper division standing or consent of instructor. Hands-on training in Science and Technology Studies fieldwork, interviewing, archival research and data analysis. Techniques of laboratory studies include informed consent procedures, ethics, and care of the data. Individual and group projects possible. GE credit: SocSci | SS, WE.

176. Sociology of Knowledge, Science, and Scientific Knowledge (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: Sociology 1, 2, or 3 recommended. Social, cultural, and historical dimensions of knowledge—socially constructed 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 Sociology 176.) GE credit: SocSci | SS, WE. —Carroll

180. Topics in History and Philosophy of Science (4)
Seminar—3 hours; term paper. Prerequisite: course in History and Philosophy of Science or other coursework relevant to topic. In depth treatment of selected topics in the history and philosophy of science. Possible topics include history of modern physics, history of molecular biology, science and society, science and power, scientific explanation, technology and culture, theory testing. May be repeated for credit with consent of instructor.

190. Seminar in Science, Technology and Medicine Studies (4)
Lecture/discussion—3 hours; term paper. Prerequisite: open to junior and senior Science and Technology Studies majors only. Intensive reading, discussion, research and writing by small groups in selected topics of science, technology, and medicine studies scholarship. Emphasis on individual research projects.

192. Internship (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Work experience off and on campus in all subject areas in Science & Technology Studies under the supervision of a member of the faculty. May be repeated three times for up to 12 units 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

200. Theories and Methods in Science & Technology Studies (4)
Seminar—3 hours; term paper. Theories and methods of Science & Technology Studies as a field of critical and empirical scholarship, and examination of various contexts of which STS has emerged worldwide. May be repeated one time for credit with consent of instructor.

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

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)

Sexuality Studies

[College of Letters and Science]
http://gsws.ucdavis.edu/sexualitystudies

The interdisciplinary minor in Sexuality Studies explores the racial, ethnic, class and gender aspects of human relations in the modern world. Students study human sexuality and cultures from a multi-ethnic perspective and across established academic departmental lines. The minor is jointly sponsored by African American and African Studies, Asian American Studies, Chicana/o Studies, Women's Studies, 1200 Hart Hall, and the Program in Gender, Sexuality and Women's Studies.

Minor Program Requirements:

Sexuality Studies

[College of Letters and Science]

Select one course from each of the following six groups to total 24 units:

(A) African American and African Studies 100, 157, 180
(B) African American and African Studies 123, 133, 145A
(C) Asian American Studies 1, 2, 100, 110, 130
(D) Chicana/o Studies 130, 132
(E) Native American Studies 1, 10, 115, 119, 130A, 1308, 130C, 157, 180
(F) Women's Studies 103, 104, 180

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 Seminar 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.

Social and Ethnic Relations

[College of Letters and Science]

The interdisciplinary minor in Social and Ethnic Relations explores the cultural, racial, ethnic, class and gender aspects of human relations in the modern world. Students study human sexuality and cultures from a multi-ethnic perspective and across established academic departmental lines. The minor is jointly sponsored by African American and African Studies, Asian American Studies, Chicana/o Studies, Women's Studies, 1200 Hart Hall, and the Program in Gender, Sexuality and Women's Studies.

Minor Program Requirements:

Sexuality Studies

[College of Letters and Science]

Select one course from each of the following six groups to total 24 units:

(A) African American and African Studies 100, 157, 180
(B) African American and African Studies 123, 133, 145A
(C) Asian American Studies 1, 2, 100, 110, 130
(D) Chicana/o Studies 130, 132
(E) Native American Studies 1, 10, 115, 119, 130A, 1308, 130C, 157, 180
(F) Women's Studies 103, 104, 180

Restrictions.

(A) Students may take no more than one lower division course to satisfy requirements for the minor.

(B) Students may take no more than one lower division course to satisfy requirements for the minor.

(C) Students may petition the minor adviser to accept Special Topics courses and Capstone/Senior Seminar 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.

Social and Ethnic Relations

Select one course from each of the following six groups to total 24 units:

(A) African American and African Studies 100, 157, 180
(B) African American and African Studies 123, 133, 145A
(C) Asian American Studies 1, 2, 100, 110, 130
(D) Chicana/o Studies 130, 132
(E) Native American Studies 1, 10, 115, 119, 130A, 1308, 130C, 157, 180
(F) Women's Studies 103, 104, 180

Restrictions.

(A) Students may take no more than one lower division course to satisfy requirements for the minor.

(B) Students may take no more than one lower division course to satisfy requirements for the minor.

(C) Students may petition the minor adviser to accept Special Topics courses and Capstone/Senior Seminar 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.

Social and Ethnic Relations

Select one course from each of the following six groups to total 24 units:

(A) African American and African Studies 100, 157, 180
(B) African American and African Studies 123, 133, 145A
(C) Asian American Studies 1, 2, 100, 110, 130
(D) Chicana/o Studies 130, 132
(E) Native American Studies 1, 10, 115, 119, 130A, 1308, 130C, 157, 180
(F) Women's Studies 103, 104, 180

Restrictions.

(A) Students may take no more than one lower division course to satisfy requirements for the minor.

(B) Students may take no more than one lower division course to satisfy requirements for the minor.

(C) Students may petition the minor adviser to accept Special Topics courses and Capstone/Senior Seminar 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.
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. Simmons, Ph.D., Professor Emeritus
Kenneth Thompson, Ph.D., Professor Emeritus

The Program of Study
The Program in Social Sciences promotes the develop-
ment of innovative curricular initiatives across the social
sciences, including offering broadly con-
deived, integrative undergraduate-level and gradu-
ate-level courses. Faculty affiliated with the program
are often engaged in interdepartmental teaching and research.

Social Theory and Comparative History

[College of Letters and Science]
This designated emphasis was disestablished effective
September 19, 2011.

Program Office. Center for History, Society, and
Culture, 5211 Social Sciences and Humanities Build-
ing 530-752-3046

Courses in Social Theory and
Comparative History (STH)

Graduate

250. Research in Social Theory
and Comparative History (4)
Seminar—3 hours; term paper. Prerequisite: admi-
sion to Social Theory and Comparative History Des-
ignated Emphasis. Theoretical and empirical research
in comparative history. Students read exemplary
works and learn to frame their own research proj-
ects. Presentations include Center for History, Soci-
ey, and Culture faculty and visitors discussing
current research. —S. (S.)

290. Advanced Topics in Social Theory
and Comparative History (4)
Seminar—3 hours, term paper. Prerequisite: consent
of instructor and History 242A. Interdisciplinary study of partic-
tular substantive problems in social theory and comparative history. Topics
vary.—F, W. S. (F, W. S.)

295. Directed Research in Social Theory
and Comparative History (1)
Discussion—1 hour. Prerequisite: consent of instruc-
tor. 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.)—F, W. S. (F, W. S.)

296. Theory and Society Journal Editorial
Workshop (1-4)
Workshop—1 hour; independent study—3 hours. Reading and offering written criticism of works 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) —F, W. S. (F, W. S.)

Gouldner

Sociology

[College of Letters and Science]
Vicki Smith, Ph.D., Chairperson of the Department
Department Office. 1283 Social Sciences and
Humanities Building 530-752-0782; http://sociology.ucdavis.edu

Faculty
Thomas D. Beamish, Ph.D., Professor
Patrick Carroll, Ph.D., Associate Professor
Robert Faris, Ph.D., Associate Professor
Ryan Finningar, Ph.D., Associate Professor
T. Ryken Grattet, Ph.D., Professor
Laura Grindstaff, Ph.D., Professor
Drew Halffman, Ph.D., Associate Professor
Eric R. Hamilton, Ph.D., Associate Professor
Bruce D. Haynes, Ph.D., Associate Professor
Jacob Hibel, Ph.D., Associate Professor
David J. Kyle, Ph.D., Associate Professor
Ming-Cheng Lo, Ph.D., Assistant Professor
Bill McCarthy, Ph.D., Professor
David McCourt, Ph.D., Assistant Professor
Stephanie L. Mudge, Ph.D., Assistant Professor
Caillan Paller, Ph.D., Assistant Professor
Kimberlee A. Shauman, Ph.D., Professor
Xiaoing Shu, Ph.D., Professor
Chris Smith, Ph.D., Assistant Professor
Vicki Smith, Ph.D., Professor
Eddy U. Ph.D., Associate Professor
Diane L. Wolff, Ph.D., Professor

Emeriti Faculty
Fred Block, Ph.D., Research Professor and Professor Emeritus
Lawrence E. Cohen, Ph.D., Professor Emeritus
James C. Cramer, Ph.D., Professor Emeritus
Diane H. Felmanee, Ph.D., Professor Emerita
John R. Hall, Ph.D., Professor Emeritus
Carole E. Joffe, Ph.D., Professor Emerita
Carl C. Jorgensen, Ph.D., Professor Emeritus
John F. Lolland, Ph.D., Professor Emeritus
Lyn H. Lolland, Ph.D., Research Professor and
Professor Emerita
John T. Walton, Ph.D., Professor Emeritus

Affiliated Faculty
Laila Kibouri, Ph.D., Lecturer

The Major Programs
Sociology is the study of human society in all its man-
ifestations. Its aim is to discover the process and struc-
ture of human interaction, to identify the main
forces that sustain or weaken social groups, and to
determine the conditions that transform social life.
Sociology, like any science, is a disciplined, intellec-
tual 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 one of the options in the
major. The General Sociology emphasis allows stu-
dents to obtain a broad understanding of the con-
cepts, methods, and theories of sociology. Students with a special interest in law and Soci-
ey or Social Services may choose a more special-
ized program of courses and practical experience
within the sociology major. The Comparative Studies
and World Development emphasis provides a socio-
logical perspective on social and economic changes
throughout the world, with a stress on relationships
between “developed” and “developing” societies. In
their junior year, students are encouraged to con-
sider the Education Abroad Program—especially
one in a developing country.

The Sociology–Organizational Studies major devel-
ops a broad understanding of the political, social,
and economic organizations that comprise modern
society. This major emphasizes a sociological per-
spective, but incorporates a multidisciplinary field
of study. The major introduces students to a range of
theories and methods used by social scientists in the
analysis of organizations.

Career Opportunities. In the Sociology major, the
General option is for students desiring a solid lib-
eral arts education as well as those interested in
graduate work in the social sciences. Options in Law
and Society or Social Services 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. The Organizational Studies (OS) major is designed
to provide a broad understanding of the political, social,
and economic organizations that make up modern
society. Whether thinking about the structure
government bureaucracies, legal systems, eco-
nomic markets, educational systems, or workplaces, OS
offers an interdisciplinary framework to under-
stand the contemporary world in which com-
plex and formal organizations are ubiquitous. For-
mal organizations influence how we feel, what we
think, and what we can accomplish. As such, OS
major provides both a basic understanding of the
field as well as enhancing your ability to pursue their
more specialized career interests.

At the upper-division level, you can choose one of
two specialized tracks, any one of which will help
to better identify and inform your career goals—
whether that be in postgraduate education or a spe-
cific type of job—and pursue them after graduation. Wheth-
ether you select the “Business and Society,” “Pub-
lic Policy and Social Welfare,” “Nonprofit and Social Change Organiza-
tions” or the “Student-Initi-
ated Theme” track, once completed you will have a
unique and valuable area of expertise.

Students who plan to enroll in graduate programs in
business, public policy, public administration, and
education are advised to develop proclivities in stan-
ts and calculus (such as the Math 16 series).

Track 1: The Business and Society track is for stu-
dents who hold an interest in or wish to pursue
careers in management or corporate professions
and who are interested in economic institutions
and commerce, management and administration, work
and workplaces, and labor markets. Courses in this
cluster analyze businesses, firms, corporations, and
markets—nationally and globally—and their place
in society, historically and in the present, from a criti-
cal perspective. The BAS exposes students to the origins
of business corporations and economic markets (and
relations); the power relations, inequalities, and
stratification associated with contemporary business
organizations (firms and corporations); why business
organizations rely on particular organizational struc-
tures to increase their efficiencies and effectiveness;
and overviews of the role business and regulatory
organizations play in the economy.

Postgraduate training and careers that follow from
this cluster:
• Professional training: MBA programs; mediation
programs; law; public policy.
• Graduate training: sociology; economics; Ph.D.
business school programs (with concentrations in
organizational behavior, entrepreneurship, indus-
trial relations, economic analysis, policy analysis,
labor relations).
• Career paths: managers, human resources profes-
sionals, project managers, diversity personnel,
corporate social responsibility personnel, lobby-
ists, business entrepreneur, labor relations spe-
cialists, creative professionals, research staff at
policy institutes such as Economic Policy Institute,
Urban Institute.

Track 2: Public Policy and Social Welfare (PPSW)
The PPSW track is for students who hold an interest in
or plan to pursue careers in government and/or social
welfare organizations. Courses in this track emphasize how formal organizations and institutions emerge
to address key social problems and the poli-
cies they generate and utilize to solve them; the
unique challenges that government and other policy
oriented organizations confront in addressing and
managing public problems and promoting the com-
mon good; and the dynamics and special circum-
stances that specific organizational/institutional
policy fields such as education, health care, and
social welfare confront in seeking to fulfill their
charge.

Postgraduate training and careers that follow from
this track:
• Professional training: programs in public policy,
administration, public governance, social wel-
fare, counseling, public affairs, law, leadership
institutes,...
A.B. Degree Requirements:

Track 4: Student-Initiated Track: Select a combination of courses taken from the following four categories:

(C) Select three upper division courses from one of the following clusters, not counting courses taken in the NSMO track:

1. Individual, Culture and Society:
   Sociology 102, 120, 122, 125, 126, 128, 129, 131, 132, 134, 135, 137, 143B, 148, 150, 152, 153, 172, 173, 174, 175, 176

2. Stratification and Social Differentiation:
   Sociology 118, 128, 129, 130, 132, 133, 134, 140, 145A, 145B, 148, 150, 156, 157, 158, 185Y, 186, and not more than one of the following courses: African American and African Studies 123; Asian American Studies 100; or Native American Studies 115

3. Organizations and Institutions:
   Sociology 118, 124, 131, 133, 139, 146, 149, 150, 151, 154, 159, 160, 180A, 180B, 181, 182, 183, 185, 185Y

4. Social Dynamics:
   Sociology 104, 123, 125, 138, 143A, 145A, 145B, 148, 149, 157, 158, 170

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 above.

(E) One additional elective upper division Sociology course not already used to fulfill other major requirements. May use Sociology 190X, 191, 192/193, 194H, 195.

Total Units for the Major

73-74

Law and Society emphasis:

Preparatory Subject Matter: Sociology 1, 3, 4, or 11, 46A & 46B.

Select from Anthropology 2, 20; Political Science 1, 3, 4, 7.

Select from History 4A, 4B, 4C, 6, 7A, 7B, 7C, 8, 9A, 9B, 100C, 105, 17A, 178.

Philosophy 5, 14, or 24.

Depth Subject Matter

43-44

Sociology 100 and 155.

Select courses from the following categories:

Individual Culture and Society: Sociology 125, 126, 135.

Stratification and Social Differentiation: Sociology 130, 132, 140.

Organizations and Institutions: Sociology 118, 131, 136, 160, 180A.

Crime and Social Dynamics: Sociology 120, 150, 151, 152, 171.

Stratifications and Social Dynamics: Sociology 118, 137, 148, 156, 157, 158.

African American and African Studies 123, 145A, 145B.

Chicana/o Studies 130, 132.

Native American Studies 117, 118.

Legal Studies: Asian American Studies 155.


Environmental Science and Policy 161.

Environmental Toxicology 138, 139, 146, 148.

Philosophy 110; Political Science 122, 130, 151, 152, 154.

Psychology 153.

Women's Studies 156.

One additional elective upper division Sociology course not already used to fulfill other major requirements. May use Sociology 190X, 191, 192/193, 194H, 195.

Total Units for the Major

73-74

Social Services emphasis:

Preparatory Subject Matter: Sociology 1; choose one course from: 2 or 3; 46A and 46B.

Psychology 17.

Select two courses from: African American and African Studies 10, 15; Asian American Studies 1, 2; Chicana/o Studies 10, 50; Native American Studies 1, 10; Sociology 4, 110.

Depth Subject Matter

44

Sociology 100, 131, 140, and 185 or 185Y.

Psychology 140, 142, 151, or 168.

Select courses from the following categories:


Race and Ethnicity (choose one): African American and African Studies 100; Asian American Studies 102, 131, 150, 150B, 150C, 150D, 150E; Chicana/o Studies 110; Community and Regional Development 176; Native American Studies 115; Sociology 129, 130, 134, 137, 172.


Organizational Behavior (choose one): Sociology 139, 146, 151, 154, 159.


Total Units for the Major

72-74

Comparative Studies and World Development emphasis:

Preparatory Subject Matter

Sociology 1, 5, 46A and 46B.

Economics.

Anthropology 2 or 20.

History 10C or Political Science 2.

Course work in one modern foreign language at the two-year level or provide proof of proficiency.

Total Units for the Major

48

Sociology 100, 104, 141, 145A, 170.

Anthropology 126A, 126B, or Economics 115A.

Anthropology 127; Sociology 118, 130, 131, 143A, 144, 145B, 158, 158.

Regional focus, three courses from the following groups.


2. Latin America: African American and African Studies 107A, 180; Anthropology 144, 146; History 159, 161A, 161B, 162, 163A, 163B, 165, 166A, 166B, 167, 168; Native American Studies 120, 133; Political Science 143; Sociology 158; Spanish 170, 172, 173.

3. Middle East: Anthropology 142; History 112A, 112B, 113, 190A, 190B, 190C, 193A, 193B; Jewish Studies [see an adviser]; Middle Eastern Studies [see an adviser]; Religious Studies 162; Women’s Studies 184.


Total Units for the Major

78-108
Sociology—Organizational Studies

A.B. Degree Requirements:

1. UNITS

Preparatory Subject Matter ................. 30
Sociology 1; 2; 4; 5 or 11; 46A & 46B .......... 22
Economics 1A and 1B ........................ 8

Depth Subject Matter..................... 45
Sociology 100 ............................... 10
Sociology 180A .............................. 4
Sociology 106 (or equivalent Statistics 103) .............................. 5
Select one course from Communication 134, 136, 172; Sociology 126 .............................. 4
Select five courses from one of the following tracks; at least three of the five courses must be from Sociology: 20
Track 3: Nonprofit and Social Movement Organizations. Choose from: Chicano Studies 132, Community and Regional Development 152, 154, 156, 158, 164; Economics 111B, 115A, 116; History 185B, 194D; Political Science 180, 187; Sociology 103, 140, 156, 160, 181, 182, 183; Women and Gender Studies 187
Track 4: Student Initiated Track. Select a combination of courses from any of the above 3 themes (at least three courses should be from SOC). Students choosing this track must work with a SOC undergraduate adviser to obtain approval of selected courses.
Select one course from: Sociology 128, 130, 132, 134, 140, 145A, 145B, 172 .............................. 4
One additional elective upper division Sociology course not already used to fulfill other major requirements. May use Sociology 192/194H, 193 .............................. 4

Total Units for the Major .................. 75


Minor Program Requirements:

1. UNITS

Sociology .................................. 20

Choose any five upper division courses in Sociology, except the following: SOC190X, 191, 192/193, 194H, 195, 197T, 198, 199

2. Minor Advisers. Consult the departmental Advising office in 1282 Social Sciences and Humanities Building.

Honors Program. An Honors Program is available 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 3.50 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 course. Honors students write an honors thesis and take two quarters (8 units) of Honors coursework [SOC194H]. Successful completion of the Honors Program, when combined with College GPA requirements, enables the student to graduate with High or Highest Honors. Students should apply for the program before they begin their fourth year.

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 office or on our website.

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, or Feminist Theory and Research. See the heading for further details on these interdisciplinary programs.

Graduate Advisers. Consult the Graduate Program Coordinator in 327 Young Hall.

Courses in Sociology (SOC)

Lower Division

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 exchange, the self and personality. GE credit: SociSci | AGCH, DD, SS. — F, W, S. (F, W, S.)

2. Self and Society (4)

LECTURE—3 hours; DISCUSSION—1 hour. Exploration of how self and identity are formed and transformed by socialization and social interaction in relation to roles, groups, institutions, power, and social change. Consideration of how people make decisions, fall in love, and come to blows. GE credit: SociSci, Wri | AGCH, DD, SS, — F, W, S. (F, W, S.)

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 improvements in society. GE credit: SociSci, Wri | AGCH, DD, SS, — F, W, S. (F, W, S.)

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; immigration, assimilation, and social change; multicultural societies. Detailed study of immigration into the United States, with comparative studies of Europe, Australia, and other host countries. GE credit: SociSci, Wri | AGCH, DD, SS, — W, S. (F, W, S.)

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. Examines population and family, technological change and economic development, power and status, culture and identity. GE credit: SociSci, Wri | AGCH, DD, SS, — W, S. (F, W, S.)

6. 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 employees, labor market discrimination and the role of social policies in shaping labor markets. GE credit: SociSci, Wri | SS.

12Y. Data Visualization in Social Sciences (4)

LECTURE—2 hours; LABORATORY—1.5 hours; WEB VISUAL TUTORIAL—1.5 hours. Introduction to quantitative data across the social sciences [Communications, Political Science, Psychology, Sociology, and other disciplines]. Transforming data, describing data, producing graphs, visual reasoning, and interpretations. (Same course as Communications 12Y, Sociology 12Y, Political Science 12Y) GE credit: QL, VL—F, W, S. (F, W, S.) Cross

25. Sociology of Popular Culture (4)

LECTURE—3 hours; DISCUSSION—1 hour. Social mechanisms that shape modern popular culture. High, folk, and mass culture: historical emergence of popular culture. Mass media, commercialization, ideology and cultural styles. Theories and methods for analyzing cultural expressions in popular art, film, television, and advertising. GE credit: SociSci, Wri | SS, VL.

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: SociSci, Div | AGCH, DD, SS.

30B. Intercultural Relations in Multicultural Societies (3)

LECTURE—1 hour; DISCUSSION—1.5 hours. Prerequisite: course 30A or consent of instructor. Social-psychological analysis of personal experiences living in a multicultural society; conforming to or rejecting group identity stereotypes; managing and reducing conflict; cross-cultural communication; promises and problems of diversity. GE credit: SociSci, Div | AGCH, DD, SS.

46A. Introduction to Social Research (4)

LECTURE—3 hours; DISCUSSION—1 hour; TERM PAPER. Examination of the methodological problems of social research. Selection and definition of problems of investigation, data-gathering techniques, and sampling. GE credit: SociSci | SS.

46B. Introduction to Social Research (5)

LECTURE—4 hours; DISCUSSION—1 hour. Data-analysis techniques, measurement, scaling, multivariate analysis, and quantitative measures of association. GE credit: SociSci | QL, SS.

90X. Lower Division Seminar (1-2)

Seminar—1-2 hours. Prerequisite: lower division standing; consent of instructor. Limited enrollment. Examination of a special topic in sociology through shared readings, discussions, written assignments, or special activities such as fieldwork, laboratory work, etc. May not be repeated for credit. Offered irregularly. GE credit: SociSci | SS.

98. Directed Group Study (1-5)

Prerequisite: consent of instructor. Primarily intended 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

100. Origins of Modern Sociological Theory (4)

LECTURE—3 hours; TERM PAPER or discussion—1 hour. Prerequisite: course 1, 2, or 3 recommended. The origins of modern sociological thought. Special emphasis on three major theorists from the classical tradition of nineteenth century European social thought: Karl Marx, Max Weber, and Emile Durkheim. GE credit: SociSci | SS.

102. Society and Culture of California (4)

LECTURE—3 hours; TERM PAPER or discussion—1 hour. Prerequisite: course 1, 2, or 3 recommended. California’s distinctive society and culture; sociological analyses of topical issues concerning diversity, environment, cities. Offered irregularly. GE credit: SociSci | AGCH, DD, SS.

103. Evaluation Research Methods (4)

LECTURE—3 hours; DISCUSSION—1 hour; TERM PAPER; PROJECT. Prerequisite: course 1 or 2 or 3 recommended. 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. Offered irregularly. GE credit: SociSci | SS.
104. The Political Economy of International Migration (4)
Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 1, 2, or 3 recommended. Analysis of worldwide migration patterns, and social scientific theories of international and transnational migration. Focus on economic, political, and social impact of immigration and potential for international and regional cooperation. (Same course as Interna-
tional Relations 104). GE credit: SocSci | SS, WC.

106. Intermediate Social Statistics (5)
Lecture—4 hours; discussion—1 hour. Prerequisite:
course 4AB or consent of instructor. Intermediate level course in statistical analysis of social data, emphasizing the logic and use of statistical me-
asures, procedures, and mathematical models especially relevant to sociological analysis. GE credit:
SocSci | QL, SL, SS.

118. Political Sociology (4)
Lecture—3 hours; term paper or discussion—1 hour;
project: Prerequisite: course 1, 2, or 3 recommended. Relation of social cleavages and social cohesion to the functioning of political institutions; the social bases of local and national power struc-
tures; social sources of political movement, analysis of causes of conflict and revolution, ideology, ruling class, and elite. GE credit: SocSci | SS.

120. Deviance (4)
Lecture—3 hours; term paper or discussion. Prerequi-
tice: course 1, 2, or 3 recommended. Social struc-
tural sources. Selected microprocesses associated with illegality, evil, dis-
ease, immorality, disability, and social difference, citizenship, and the body. Special emphasis on expert cultures. Generational succession and the ag-
agement of social difference. GE credit: SocSci, 
Wrt|SS.

122. Sociology of Adolescence (4)
Lecture—3 hours; term paper or discussion—1 hour;
project: Prerequisite: course 1, 2, or 3 recommended. Chronological age and social status; anal-
ysis of social processes bearing upon the socialization of children and adolescents. The emer-
gence of youth cultures. Generational succession as a cultural problem. GE credit: SocSci | SS.

123. American Society (4)
Lecture—3 hours; discussion—1 hour; term paper;
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 issues. Offered irregularly. GE credit: SocSci, 
ACGH, DD, SS.

124. Education and Inequality in the U.S. (4)
Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 1, 2, or 3 recommended. Func-
tions of schools in contemporary U.S. society. Racial, ethnic, social class, and gender inequalities in student outcomes. Consideration of classic and current controversies in the sociology of education and educational policy. GE credit: SocSci | SS.

125. Sociology of Culture (4)
Lecture/discussion—3 hours; term paper. Prerequi-
tice: course 1, 2, or 3 recommended. Sociological approaches to study of historical and contemporary culture. Use of school as a case study in understanding of rela-
tion to social actors, institutions, stratification, power, the production of culture, audiences, and the signifi-
cance of culture in processes of change. GE credit: 
SocSci, ACGH, DD, SS.

126. Social Interaction (4)
Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 1, 2, or 3 recommended. Every-
day interaction in natural settings; ethnographic approaches to the understanding of social mean-
ings, situations, personal identity and human rela-
tionships. Particular attention to the work of Erving Goffman and to principles of field observation and qualitative analysis. GE credit: SocSci, Wrt|SS.

128. Intercrass Interpersonal Dynamics (4)
Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 1, 2, or 3 recommended. Analy-
sis of interpersonal interactions and microprocesses as sources of social differentiation and social stratification on interpersonal interaction in instru-
mental settings (e.g., work, education, political act-
ions) will also be emphasized. Minority/majority relationships. Offered irregularly. GE credit: SocSci, Div, Wrt|SS.

129. Sociology of Black Experience in America (4)
Lecture—3 hours; discussion—1 hour; term paper;
project: Prerequisite: course 1, 2, or 3 recommended. Survey of historical and contemporary the-
oretical sociological perspectives on the Black experience in United States. Emphasis on comparati-
ons of Black sociological perspectives and main-
stream perspectives of specific sociologists. GE credit:
SocSci, Div | ACGH, DD, SS.

130. Race Relations (4)
Lecture—3 hours; term paper or discussion—1 hour. Functions and characteristics 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 relationships within the U.S. GE credit: SocSci, 
Div | ACGH, DD, SS.

131. The Family (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 1, 2, or 3 recommended. Contemporary fam-
ily life in historical and comparative perspective. How different family forms arose, their significance today and prospects for further family change. Atten-
tion to power relations within and beyond the family and to the social implications of family transfor-
mation. GE credit: SocSci, Div | ACGH, DD, SS.

132. The Sociology of Gender (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 1, 2, or 3 recommended. Analysis of biologi-
cal, psychological, cultural and structural conditions underlying the status and roles of men and women in contemporary society, drawing on a historical and comparative perspective. GE credit: SocSci, Div | ACGH, DD, SS.

133. Sexual Stratification and Polities (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 1, 2, or 3 recommended; consent of instruc-
tor. Analysis of origins, dynamics, and social impli-
cations of sexual stratification. Examination of classical and contemporary theorists such as Engels, Freud, J.S. Mill, de Beauvoir, Juliet Mitchell, D. Din-
nertson. Attention to selected issues in social move-
ments for and against women. Offered irregularly. GE credit: SocSci, Div | SS.

134. Sociology of Racial Ethnic Families (4)
Lecture—3 hours; discussion—1 hour or term paper.
Prerequisite: course 1, 2, or 3 recommended. Asian American, Black, Chicano, and Native American family life in comparative historical perspective. Family structure and gender roles are considered in relation to socio-historical dynamics. Offered irregu-
larly. GE credit: SocSci, Div | ACGH, DD, SS.

135. Social Relationships (4)
Lecture—3 hours; discussion—1 hour or term paper.
Prerequisite: course 1, 2, or 3 recommended. Social and cultural factors influencing friendships and inte-
racial relationships. Topics of the relationship develop-
ment, relationship maintenance, and relationship loss. GE credit: Div, SocSci, Wrt|SS.

137. African American Society and Culture 1790-1990 (4)
Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 1, 2, or 3 recommended. Restricted to upper division standing. Political and social transformations of African American communi-
ties between 1790 and 1990, as seen through film, 
literature, and music. Topics include: Black con-
sciousness, Afro-Slave culture, The Harlem Renais-
sance, and contemporary Hip Hop. Offered irregularly. GE credit: SocSci | ACGH, DD, SS.

138. Economic Sociology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 1, 2, or 3 recommended. Overview of the 
rapidevolving field of economic sociology. Focus on variations in the ways that markets are orga-
nized. The relationship between individual and col-
l ective rationality will also be emphasized. GE credit:
SocSci | ACGH, SS, WC.

139. Corporations and Society (4)
Lecture—3 hours; term paper or discussion—1 hour.
Prerequisite: course 1, 2, or 3 recommended. Study of the history and power of the modern corporation; corporate organization, control of the state, and the cor-
poration; labor unions and the labor process; competi-
tion, regulation and international markets; the multinationals and conglomerate corporation; and mass markets and consumerism. GE credit:
SocSci | ACGH, SS.

140. Social Stratification (4)
Lecture—3 hours; term paper or discussion—1 hour;
project: Prerequisite: course 1, 2, or 3 recom-
medned. Systems of social ranking, theories of strati-
fication; power, prestige, culture, and styles of life of various social classes; social mobility and its conse-
quences for social structure. GE credit: 
SocSci | ACGH, DD, SS.

141. Industrialization and Social Change (4)
Lecture—3 hours; term paper or discussion—1 hour;
project: Prerequisite: course 1, 2, or 3 recom-
medned. Critical dissection of the "loss of commu-
nity" issue. Analysis of the organization of primary 
ties in the city, of the culture of urban public life and of the learning of city skills. GE credit: SocSci, 
Wrt|SS.

143A. Urban Society (4)
Lecture—3 hours; discussion—1 hour; term paper;
project: Prerequisite: course 1, 2, or 3 recom-
medned. Theories of city origins. Analysis of the his-
toric process of urbanization and of varying city 
types. Comparison of American and European 
ctiveconomic and cultural differences in the city.

143B. Sociology of City Life (4)
Lecture—3 hours; discussion—1 hour; term paper;
project: Prerequisite: course 1, 2, or 3 recom-
medned. Critical dissection of the "loss of commu-
nity" issue. Analysis of the organization of primary 
ties in the city, of the culture of urban public life and of the learning of city skills. GE credit: SocSci, 
Wrt|SS.

145A. Sociology of Third World Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 1, 2, or 3 recommended. Introduction to the-
etories and methodologies in the sociology of de-
velopment. 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. Offered irregularly. GE credit: SocSci, Div, 
Wrt|SS, WC.

145B. Gender and Rural Development in the Third World (4)
Seminar—4 hours. Prerequisite: course 1, 2, or 3 recom-
medned. Analysis of the learning of city skills. GE credit: SocSci, Div, Wrt|SS, WC.

146. Sociology of Religion (4)
Lecture—3 hours; discussion—1 hour; term paper;
project: Prerequisite: course 1, 2, or 3 recom-
medned. Relationship between social structures and 
religions. The social setting of the major world reli-
gions. Religious innovators and institutionalization
147. Sociological Perspectives on East Asia (4)
Lecture—3 hours; discussion—1 hour; term paper; project. Prerequisite: course 1, 2, or 3 recommended. Sociological theories and concepts applied toward understanding East Asian society. Emphasis on the political structure, stratification, and economy in China and Japan. Analysis of historical and contemporary similarities and differences. Offered irregularly. GE credit: SocSci | SS, WC.

148. Collective Behavior (4)
Lecture—3 hours; discussion—1 hour; term paper or discussion. Prerequisite: course 1, 2, or 3 recommended. Study of behavior of human crowds and masses in extraordinary circumstances, including crowd panics, mass scares, collective protests, riots, revolutionary situations, ectasic and revivalist gatherings, crazes, fads, and fashions. GE credit: SocSci | SS.

149. Religion and American Society (4)
Lecture—3 hours; project. Prerequisite: course 1, 2, or 3 recommended. Historical, contemporary survey of religious organizations and their relation to U.S. social and cultural patterns. Civil religion, religious pluralism, minority and deviant communities, religious migration, U.S. religion as a social institution, and politics, and social stratification. Offered irregularly. GE credit: SocSci, Div, Wrt | ACGH, DD, SS.

150. Criminology (4)
Lecture—3 hours; term paper or discussion—1 hour; project. Prerequisite: course 1, 2, or 3 recommended. Introduction to the study of human populations and their relation to the criminal justice system, the contemporary roles and functions of the police, criminal courts and correctional institutions. GE credit: SocSci | SS.

151. The Criminal Justice System (4)
Lecture—3 hours; term paper or discussion—1 hour; project. Prerequisite: course 1, 2, or 3 recommended. Sociological analysis of the different components of the criminal justice system including the emergence and interpretation of criminal laws, the contemporary roles and functions of the police, criminal courts and correctional institutions. GE credit: SocSci | SS.

152. Juvenile Delinquency (4)
Lecture—3 hours; term paper or discussion—1 hour; project. Prerequisite: course 1, 2, or 3 recommended. Study of juvenile delinquency in relation to the family, peer groups, community, and institutional structures. Consideration of processing of the delinquent by official agencies of control. GE credit: SocSci | SS.

153. The Sociology of Childhood (4)
Lecture—3 hours; term paper. Prerequisite: course 1, 2, or 3 recommended. Contemporary childhood in historical, theoretical, and global perspectives. Examine changes in understanding of the nature of childhood and “best interests of the child” by class, race, gender, geographic region, and historical period. Offered irregularly. GE credit: SocSci | ACGH, DD, SS, WC.

154. Health and Illness (4)
Lecture—3 hours; term paper or discussion—1 hour; project. Prerequisite: course 1, 2, or 3 recommended. Contemporary social theory and the sociology of health, illness, and health care. Consideration of the social determinants of health and health care, including such topics as health policy, social sources of illness, social construction of illness, medicalization, social disparities in health, and the illness experience. GE credit: SocSci | SS.

155. Sociology of Law (4)
Lecture—3 hours; term paper or discussion—1 hour; project. Prerequisite: course 1, 2, or 3 recommended. Law considered sociologically in relation to legal institutions to society as affecting judicial decision making and administration of justice. Lawyers as an occupational group. Legal reform. GE credit: SocSci | SS.

156. Social Movements (4)
Lecture—3 hours; discussion—1 hour; term paper; project. Prerequisite: course 1, 2, or 3 recommended. Analysis of social movement perspectives: mobilization, forms of organization, ideology, recruitment, leadership, strategies and tactics, development, and evolution of sound and film materials. GE credit: SocSci | SS.

157. Social Conflict (4)
Lecture—3 hours; discussion—1 hour; term paper; project. Prerequisite: course 1, 2, or 3 recommended. Analysis of the causes, dynamics, and regulation of social and economic variations among kinds of social groupings with particular reference to nonviolent methods of waging and regulating conflict. Offered irregularly. GE credit: SocSci | SS.

158. Women and Social Movements in Latin America (4)
Lecture—3 hours; term paper. Prerequisite: course 1, 2, or 3 recommended. Contemporary women’s social movements in Latin America, focusing on Honduran, El Salvadorian, and Nicaraguan visions of exploitation and oppression in Latin America. Offered irregularly. GE credit: SocSci | DD, SS, WC.

159. Work, Employment, and Careers in the 21st Century (4)
Lecture—3 hours; term paper or discussion—1 hour; project. Prerequisite: course 1, 2, or 3 recommended. Examination of the causes, dynamics, and regulation of social and economic variations among kinds of social groupings with particular reference to nonviolent methods of waging and regulating conflict. Offered irregularly. GE credit: SocSci | SS.

160. Sociology of the Environment (4)
Lecture—3 hours; term paper. Prerequisite: course 1, 2, or 3 recommended. Production, consumption, and urban expansion. Basic social logics surrounding current problems of resource scarcity (environmental extractions) and excess wastes (environmental additions). Ways that society can change and re-organize itself to become more environmentally conscious and hence ecologically sustainable. GE credit: SocSci | ACGH, DD, SS, WC.—Beamish

161. The Civil Justice System (4)
Lecture—3 hours; term paper. Prerequisite: course 1, 2, or 3 recommended. Examination of the different aspects of the civil justice system in the United States and Global Society including the litigation, jury, civil rights, and international laws relating to trade, the environment, and human rights. Offered irregularly.

170. Population (4)
Lecture—3 hours; discussion—1 hour; term paper; project. Prerequisite: course 1, 2, or 3 recommended. Analysis of the causes, dynamics, and regulation of social and economic variations among kinds of social groupings with particular reference to nonviolent methods of waging and regulating conflict. Offered irregularly. GE credit: SocSci | SS.

171. Sociology of Violence and Inequality (4)
Lecture/discussion—4 hours. Prerequisite: course 1, 2, or 3 recommended. Analysis of social inequality and the organization of the practice of violence. Definitions of violence and issues affecting the social capacity for violence. Analysis and comparison of different forms, causes and consequences of violence by race, class, gender relations and social organization. Offered irregularly. GE credit: SocSci | VL, SS.

172. Ideology of Class, Race and Gender (4)
Lecture—4 hours. Prerequisite: course 1, 2, or 3 recommended. Analysis of popular belief systems and social institutions and their role in socialization. Use of media and social structures to socialization. History of media and their role in socialization. GE credit: SocSci | SS.

173. Sociology Through Literature (4)
Lecture—3 hours; discussion—1 hour; term paper; project. Prerequisite: course 1, 2, or 3 recommended. Introduction to and analysis of literature as sociological data. Reading of numerous works on American and other societies by authors such as Steinbeck, Lewis, Dreiser, Schorer, Dowell, etc. Offered irregularly. GE credit: SocSci | QL, SS.

174. American Jewish Identities and Communities (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1, 2, or 3 recommended. Sociological perspectives on Jewish identity and community in the diaspora. Diversity within the Jewish community, Americanization, women, new immigrants, post-Holocaust Jewish identity, and LGBT Jews. Offered irregularly. GE credit: SocSci | SS.

175. Mass Communication (4)
Lecture—3 hours; term paper. Prerequisite: course 1, 2, or 3 recommended. Contemporary mass communication and its role in society. Examination of the relationship between media and social structures. History of media—state relations. Media as reflector and shaper of values. Emphasis on current European and Marxist and pluralist theories rather than on content analysis. Offered irregularly. GE credit: SocSci | SS.

176. Sociology of Knowledge, Science, and Scientific Knowledge (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1, 2, or 3 recommended. Sociological, cultural, and historical perspectives on the relationship between knowledge and power. Shifting authority and power relations, labor markets, control systems, stratification, and corporate structures, and how these factors shape work in diverse or organizational and employment setting. GE credit: SocSci | SS.

180A. Complex Organizations (4)
Lecture—3 hours; discussion—1 hour; term paper; project. Prerequisite: course 1, 2, or 3 recommended. Development of a sociological approach to organizations theory. Designed to introduce sociological concepts, address the alternative psycholological and economic models, and involve students in the practice of organizational analysis. GE credit: SocSci | SS.

180B. Complex Organizations (4)
Lecture—3 hours; discussion—1 hour; term paper; project. Prerequisite: course 1, 2, or 3 recommended. Consent of instructor. Builds on concepts and skills developed in course 180A. Deals with the issues of organizational decision making, design, and survival. Emphasis on relations between organization and the effects of those relations in both the public and private sectors. Offered irregularly. GE credit: SocSci | SS.

181. Social Change Organizations (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1, 2, or 3 recommended. Analysis of organizations with social change and improvement goals and programs, emphasizing voluntary associations and grassroots citizen groups. Topics to be treated include formation, decision making and leadership, strategies and tactics, factionalism and coalitions, effectiveness. Offered irregularly. GE credit: SocSci, Wrt | SS.

182. Utopian Communal Movements and Movements (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1, 2, or 3 recommended. Introduction to and analysis of literature as sociological data. Reading of numerous works on American and other societies by authors such as Steinbeck, Lewis, Dreiser, Schorer, Dowell, etc. Offered irregularly. GE credit: SocSci | QL, SS.

183. Comparative Organizational (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 1, 2 or 3 recommended; course 180A recommended. Examination of the economic, cultural, and political organization of major industrial
184. Social Policy (4)  Lecture—3 hours; term paper or discussion—1 hour; project. Prerequisite: course 1, 2, or 3 recommended. Examination of social policies that affect the well-being of individuals, families, and groups, including such topics as old-age pensions, health insurance, and aid to the poor. Students may not take both courses 185 and 185Y for credit. GE credit: SocSci | SS, WE.

185Y. Social Policy (Hybrid Version) (4)  Web virtual lecture—1.5 hours; lecture—1.5 hours; term paper or discussion—1 hour. Prerequisite: course 1, 2, or 3 recommended. Examination of social policies that affect the well-being of individuals, families and groups, including such topics as old-age pensions, health insurance, and aid to the poor. Students may not take both courses 185 and 185Y for credit. Offered irregularly. GE credit: SocSci | SS, WE.

188. Markets, Culture and Inequality in China (4)  Lecture—3 hours; term paper. Prerequisite: course 1, 2, or 3 recommended. Economic and political systems and patterns of social interaction and inequality in China. State and corporate structures and practices, market and consumer behaviors, social mobility and stratification, protest and resistance. Offered irregularly. GE credit: SocSci | SS, WC, F, W.

189. Social Science Writing (4)  Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 1, 2, or 3 recommended. Improved analytic writing and methods for reporting social science research to a wider public. Sociological analysis of the conditions of good and bad writing. GE credit: SocSci | SS.

190X. Seminar in Sociological Analysis (4)  Seminar—3 hours; term paper. Prerequisite: upper division standing; course 100 (former 165A); senior standing. Students offer an in-depth examination at an upper division level of a special topic in Sociology. Emphasis on student participation in learning. May not be repeated for credit. Offered irregularly.

191. Workshop in Contemporary Sociological Theory (4)  Lecture—2 hours; workshop—1 hour; term paper. Prerequisite: course 100 (former 165A); senior standing. Workshop in contemporary sociological theory that allows students to explore the uses of theory in empirical inquiry on problems of interest to students. Contemporary theory considered in relation to classical and modern influences, concept formation, theory construction, and explanation. Not open for credit to students who have received credit for course 165B. Offered irregularly. GE credit: SocSci | SS.

192. Internship and Research Practicum (2-6)  Internship—6-18 hours. Prerequisite: course 46A; upper division standing. Open to seniors only. Directed reading, research and writing, culminating in the completion of a senior honors thesis; or project directed by a faculty advisor. (Deferred grading only, pending completion of sequence.) Offered irregularly. GE credit: SocEng | SE.—F, F (if W, W). 2016A. Special Studies for Honors Students (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 a faculty advisor. (Deferred grading only, pending completion of sequence.) Offered irregularly. GE credit: SocEng | SE.—F, F (if W, W).

194B. Special Studies for Honors Students (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 a faculty advisor. (Deferred grading only, pending completion of sequence.) Offered irregularly. GE credit: SocEng | SE.—F, F (if W, W).
242A. Methodologies of Sociological Inquiries (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor. Not required for graduate students in the Social Sciences Division or the Humanities, Arts, and Cultural Studies Division; required for undergraduates and students from other divisions or colleges. Introduction to conceptual and case methodological approaches to sociological inquiry, theoretical and practical issues, and substantive research agendas ranging from study of large-scale social transformations to close microhistories, including research agendas being developed by students in the course. Offered irregularly.

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. Offered irregularly.

245. Developing Societies (4)
Seminar—3 hours; term paper or project. Prerequisite: graduate student status or familiarity with problems of developing societies. Analysis of social and economic problems of developing societies from the standpoint of research and modernization and underdevelopment. Nature of third world dependency and interdependence in the global political economy. Offered irregularly.

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. Offered irregularly.

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 topic for supervised research. The course will have a theme [described in advance] each time it is offered. Paper on research will be required. Offered irregularly. (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 social behavior. Will consider (1) nature and functions of law, (2) the organization and administration of law, and (3) the capacity of law to affect social behavior. Offered irregularly.

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 classical 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 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 migration, mortality, marriage, and fertility. Special emphasis on the determinants of fertility-related attitudes and behaviors on less-developed countries, and on contemporary empirical studies. Offered irregularly.

280. Organizations and Institutions (4)
Seminar—4 hours. Theory of formal organizations and bureaucracy. Methods of research in organization and institutional studies. Historical and comparative analysis of political, religious, educational, military, and economic structure. Offered irregularly.

288. Integrative Research Practicum (4)
Seminar—5 hours, extended writing; term paper. Prerequisites: courses 207A, 242A, 292A, consent of instructor. Continuing training in field, quantitative, and/or comparative-historical methods. Emphasis on students’ research projects and applications of principles related to research design, concept and theory, construction causality and interpretation, and data and measurement. Completion of research paper is required. —S. (S.) Grindstaff, Hall, Io, Shauman, Shu, Woll.

290. Seminar (4)
Seminar—3 hours; term paper. (S/U grading only.) Offered irregularly.

292A. Field Research (4)
Seminar—3 hours; fieldwork. Prerequisite: graduate standing in Sociology or consent of instructor. Introduction to the logic, methods, and practices of field research, with particular emphasis on the ethnographic tradition of participant observation. Introduction to other qualitative techniques will also be covered. Students will develop original research projects based on their own fieldwork.

293. Proseminar in Sociology (2)
Seminar—2 hours. Prerequisite: first-year Sociology graduate students required. 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.) Offered irregularly.

295. Special 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. Offered irregularly.

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only.) Offered irregularly.

299. Individual Study (1-12)
(S/U grading only.) Offered irregularly.

Professional

309A. The Teaching of Sociology (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: graduate standing; required for first-time teaching assistants. Practical instruction in teaching methods for qualitative and quantitative courses. Pedagogical issues involved in critical sociological analysis. (S/U grading only.) Offered irregularly.

309B. The Teaching of Sociology (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: graduate standing. Practical instruction in devising course syllabi, lectures and assignments for Associates-Instructors and others interested in college teaching. Discussion of pedagogical methods of teaching qualitative and quantitative courses. (S/U grading only.) Offered irregularly.

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.) Offered irregularly.

Professional

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.) Offered irregularly.

Soil and Water Science

See Earth and Planetary Sciences, on page 238; Soil Science, on page 552; and Soils and Biogeochimstry (A Graduate Group), on page 553.

Soil Science

See Earth and Planetary Sciences, on page 238; Soil Science, on page 552; and Soils and Biogeochimstry (A Graduate Group), on page 553.
92. Soil Science Internship (1-12)
Internship—3-36 hours. Prerequisite: lower division standing and consent of instructor. Work experience off campus. Internship supervised by a member of the faculty. (P/NP grading only.)—F, W, S, (F, W, S)

Upper Division

100. Principles of Soil Science (5)
Lecture—3 hours; laboratory—3 hours; term paper. Prerequisite: Chemistry 2A-2B, Physics 1A-1B, 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. GE credit: SciEng | QL, SE, SL, VL—F (F) Scow, Southard

102. Environmental Soil Chemistry (3)
Lecture—3 hours. Prerequisite: course 100 or the equivalent; general chemistry. Soil chemistry processes related to the fate and transport of contaminants in soil. Soil minerals, natural organic matter, surface charge, soil solution chemistry, redox reactions in soil, and sorption of inorganic and organic contaminants. GE credit: SciEng | QL, SE, SL—W, W

105. Field Studies of Soils in California Ecosystems (5)
Prerequisite: courses 100 and 120, or equivalent recommended. Class size limited to a minimum of 10 and a maximum of 24 students. 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. GE credit: SciEng | QL, SE, SL, VL—W, S

107. Soil Physics (5)
Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 100, Environmental and Resource Sciences 100, Mathematics 16A, or the equivalent. Physical properties of soil. Principles of water, gas, heat, and solute movement in soil with selected examples related to soil and water management. Influence of soil properties on transport processes. GE credit: SciEng | QL, SE, VL—W, S

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 horticultural, forest soils; management of fertilizers, cover crops, compost, sewage sludge and manures for crop production and to prevent loss to the environment is emphasized. GE credit: SciEng | QL, SE, VL—W, S

111. Soil Microbiology (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 1C and Biological Sciences 1C. Major groups of microorganisms in soil, their interrelationships, and their responses to environmental variables. Role of microorganisms in cycling of nutrients. Plant-microbe relationships. Transformations of organic and inorganic pollutants. GE credit: SciEng | QL, SE, VL—W, S

118. Soils in Land Use and the Environment (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or consent of instructor. Soils are considered as elements in land use planning and environmental quality. Topics include: soil survey reports, remote sensing, land capability classification, soil erosion/conservation, waste disposal on soils and soil reclamation. One one-day field trip. GE credit: SciEng | SE, SL, S—S (S) O’Geen

120. Soil Genesis, Morphology, and Classification (5)
Lecture—4 hours; laboratory—2 hours (includes five one-day weekly field trips). Prerequisite: course 100, Geology 50 recommended. Recognition and description of soils; chemical, physical and biological processes of soil formation. Interactions of soils with diverse ecosystems. Introduction to soil classification. Practical use of soil taxonomy. Practical experience describing soil properties in the field. GE credit: SciEng | QL, SE, SL—W, S (S) Southard

192. Soil Science Internship (1-12)
Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Work experience off and on campus. Internship supervised by a member of the faculty. (P/NP grading only.)—F, W, S, (F, W, S)

194. Directed Group Study (1-5)
(P/NP grading only.)—F, W, S (F, W, S)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)—F, W, S, (F, W, S)

Graduate

202. Topics in Advanced Soil Chemistry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: undergraduate course in soil chemistry, water chemistry or consent of the instructor. Restricted to 18 students. Reviews of current research in soil chemistry. Topics include double layer theory, clay mineral and oxide surface chemistry; adsorption on soil surfaces; speciation and modeling of solution ions; solubility and mineral stability diagrams. May be repeated one time for credit if topic differs.—W (W) Parikh

205. Field Studies of Soils in California Ecosystems (5)
Fieldwork—50 hours; discussion—15 hours; lecture—5 hours. Prerequisite: courses 100 and 120 or equivalent recommended. Class size limited to 24 students. Field-based soil studies in California ecosystems. Description and classification of soils; relationships among soils, vegetation, geology, and climate; physical, chemical, and biological processes; their role in land use. Similar to course 105; requires additional work for graduate credit. May be repeated one time for credit if geographic locale changes. Offered irregularly.—S (S) Amundson, Dahlgren, O’Geen, Southard

208. Soil-Plant Interrelationships (3)
Lecture—3 hours. Prerequisite: course 100, Plant Biology 1118 or consent of instructor. Plant needs, occurrence and functions of water and mineral nutrients in soils, root systems and their growth in soils; mass flow and diffusion mechanisms in nutrient acquisition; models relating nutrient uptake to soil and plant characteristics, nutrient assimilation and crop quality. Offered in alternate years.—W (W)

211. Advanced Soil Biology (3)
Lecture—3 hours. Prerequisite: Chemistry BA-BB, course 111, Biological Sciences 102, 103 or an equivalent course recommended. Microbial metabolism of organic chemicals in soils, both natural and xenobiotic. Decomposition of organic matter. Kinetics of microbial processes in soil. Offered in alternate years.—F (F)

219. Ecosystem Biogeochemistry (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 inter- and intra-system interactions between the atmosphere, biosphere, lithosphere and hydrosphere. Laboratory section uses biogeochemical simulation models to examine case studies. (Same course as Ecology 219.)—S (S) Hulton

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 one time for credit. Offered in alternate years.—W (W) Southard

222. Global Carbon Cycle (3)
Lecture—3 hours. Prerequisite: Chemistry BA-BB, Mathematics 16A, 16B, course 100 or the equivalent. Global carbon cycles from Phanerzoic epoch to modern times. Examination of long and short-term carbon cycles. Transfer of carbon among ocean, land and life with emphasis on humic substance formation, methods of characterization, reactions with organics and soil carbon stabilization. Offered in alternate years.—W (W) Horwath

290. Special Topics in Soil Science (1-4)
Seminar—1-4 hours. Prerequisite: graduate standing. Seminars and critical review of problems, issues, and research in soil science. May be repeated for credit. (S/U grading only.)—F, W, S, (F, W, S)

298. Group Study (1-5)
Prerequisite: consent of instructor. May be repeated for credit when topic differs. (S/U grading only.)—F, W, S, (F, W, S)

299. Research (1-12)
(S/U grading only.)—F, W, S, (F, W, S)

Professional

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—F, W, S, (F, W, S)

Soils and Biogeochemistry (A Graduate Group)

A. Toby O’Geen, Ph.D., Chairperson of the Group

Group Office. 1152 Plant & Environmental Sciences Building 530-752-1669; http://soils.ucdavis.edu/; http://www.ucdavis.edu/graduate_slag.htm

Faculty

Patrick Brown, Ph.D., Professor (Plant Sciences)
William Casey, Ph.D., Professor (Chemistry)
Randy Dahlgren, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Helen Dahlke, Ph.D., Assistant Professor
Valerie Eviner, Ph.D., Assistant Professor
Graham Fogg, Ph.D., Professor
Mark Grismer, Ph.D., Professor
Rebecca Renee Hernandez, Ph.D., Assistant Professor
Peter Hermes, Ph.D., Professor
Jan Hopmans, Ph.D., Professor
William Horwath, Ph.D., Professor
Ben Houlton, Ph.D., Associate Professor
Louise Jackson, Ph.D., Professor
Sanjay Parikh, Ph.D., Associate Professor
Eliska Rejmanova, Ph.D., Professor
(Environmental Science and Policy)
Jorge Rodrigues, Ph.D., Professor
Kate Scow, Ph.D., Professor
David Smart, Ph.D., Professor
(Verticulture and Enology)
Randal Southard, Ph.D., Professor
Keri Steenwerth, Ph.D., Adjunct Assistant Professor
(Verticulture and Enology)
Susan Ustin, Ph.D., Professor
Chris van Kessel, Ph.D., Professor (Plant Sciences)

Emeriti Faculty

Caroline Bledsoe, Ph.D., Professor Emeritus
André Läuchli, Ph.D., Professor Emeritus
Roland Meyer, Ph.D., Cooperative Extension Specialist Emeritus
G. Stuart Pettygrove, Ph.D., Soils Specialist Emeritus
Wendy Silk, Ph.D., Professor Emeritus
Michael Singer, Ph.D., Professor Emeritus
Spanish and Portuguese

**Affiliated Faculty**

Victor Claassen, Ph.D., Associate Researcher
Stephan Gratton, Ph.D., Water Relations Specialist
Daniel Geissler, Ph.D., Cooperative Extension Specialist
Elise Gornish, Ph.D., Cooperative Extension Specialist
Stephan Gratton, Ph.D., Water Relations Specialist
Peter Green, Professor, Research Engineer
(Civil & Environmental Engineering)

**Graduate Study, The Soils and Biogeochemistry**

Graduate Group offers programs of study and research leading to the M.S. and Ph.D. degrees. The focus of Soils and Biogeochemistry is on the physical, chemical, and biological processes occurring in soils of different landforms and ecosystems. The goal is to understand the complex processes of mass and energy flow that control agricultural and natural ecosystem functions, productivity, and sustainability. Investigations assess impacts and implications of natural processes and anthropogenic effects, such as climate change, soil and ecosystem behavior and development. Examples include: fate and emission of greenhouse gases; soil carbon sequestration; fate and transport of native and applied chemicals; soil microbial ecology; nutrient uptake and management; nutrient cycling in managed and wildland ecosystems; pesticide and trace element adsorption on surfaces; mineral weathering; organic agriculture; bioavailability of toxins; soil erosion; conservation; ecosystem productivity and sustainability; and the study of soil evolution on the landscape. These studies are carried out within a framework of integrating applied chemical, physical, mathematical, and biological sciences.

**Faculty**

Emilio Bejel, Ph.D., Professor
Leopoldo Bernucci, Ph.D., Professor
Travis Bradford, Ph.D., Professor
Cecilia Colombi, Ph.D., Professor
Cristina Gonzalez, Ph.D., Professor
Robert Irwin, Ph.D., Professor
Michael Lazara, Ph.D., Associate Professor
Adrienne Martin, Ph.D., Professor
Cristina Martinez-Carazo, Associate Professor
Robert Newton, Ph.D., Associate Professor
Ana Pellello, Ph.D., Associate Professor
Claudia Sanchez Gutierrez, Ph.D., Assistant Professor
John Stater, Ph.D., Associate Professor

**Emeriti Faculty**

Marta E. Allsint, Ph.D., Professor Emerita
Linda Eggan, Ph.D., Professor Emerita
NORMA LÓPEZ-BURTON, M.A., Continuing Lecturer Emerita
ZUMAIDA GERTEL, PH.D., Professor Emerita

**Student Learning Outcomes.** Educational Objectives:

- Linguistics. Demonstrate knowledge of the Spanish speaking world’s linguistic diversity through the comprehension of Spanish in a variety of situations, discussion in the Spanish language, and interdisciplinary study of the linguistic and cultural manifestations produced in the Spanish-speaking world. Students will be able to communicate effectively in Spanish in a variety of situations, and will be able to analyze, interpret, and apply core concepts and the practice of literary and cultural criticism to the four areas of study represented in the department’s curriculum. Spanish literature, Spanish language and culture, Latin American literature and culture, and Latinos and cultural traditions 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 interests and needs. 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 Spain and Spanish America, and to careers not only in teaching, but also in other professions such as library science, law, medicine, and government service, business, or international relations.

**A.B. Major Requirements:**

||
|UNITS| Spanish 130, 131N, 134A or 142 | 4 |
|Spanish 150N, 151, 157, 159 or 159S | 4 |
|English 111, 117, 174, or 176 | 4 |

Six elective courses to be chosen in consultation with the student’s major adviser.

**Minor Program Requirements:**

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<th>Units</th>
<th>Spanish courses</th>
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<tr>
<td>23-24</td>
<td>Spanish 100, 100S, 141, 141S, 170, or 170S</td>
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<td>4</td>
<td>Spanish 111N, 115, or 116</td>
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<td>3-4</td>
<td>Spanish 130, 131N, 134A, or 142</td>
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<td>Spanish 150N, 151, 157, 159S</td>
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<td>4</td>
<td>Spanish 117, 174, or 176</td>
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One upper division elective in Spanish.

Consult 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 194H distributed over 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 (125 units), have attained a cumulative GPA of 3.50 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 stu-
111. The Structure of Portuguese: Sounds and Words (3)
Lecture/discussion—3 hours. Prerequisite: consent of instructor. Linguistic description of sound patterns of Portuguese and how those sounds can be used to form larger units, such as morphemes and words. Theoretical and practical comparisons with English and with other Romance languages. GE credit: SS.

130. Survey of Luso-Brazilian Literature: 1500-1800 (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 22 or 23; 100. Overview of the Luso-Brazilian literature, covering three major literary periods: Renaissance, Baroque, and Enlightenment. Attention to the concept of imitation and nativism. GE credit: AH, WC. —W. (W.)

132. Portuguese Literature: Medieval and Renaissance (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Overview of the literary Academies played in the so called "culture of manuscripts." GE credit: AH, WC, WE. —F. (F.) Bernucci, Newcomb

134. Luis de Camões (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 22 or 23; 100. Study of the poetry by João Cabral de Melo Neto and the novels of major literary writers of the Luso-Brazilian world. GE credit: AH, WC, WE. —W. (W.)

135. 19th C Masters in Brazilian Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3, 31 or 31G. Narrative and poetic texts of the 19th and 20th centuries in Brazil. In-depth and comparative study of Romantic and (Neo) Naturalist movements as a forum for discussion about literary tradition and modernity in Latin America. GE credit: AH, WC. —F. (F.) Elzire, Bernucci, Newcomb

199. Special Study for Advanced Undergraduates (1-5)
Independent study with professor for advanced undergraduate students, or honor thesis students. P/NP grading only. GE credit: AH, WC. —F. (F.) —W. (W.)

Lower Division
1. Elementary Portuguese (5)
Lecture/discussion—5 hours; laboratory—1 hour. Introduction to Portuguese grammar and development of all basic language skills in a cultural context with special emphasis on communication. GE credit: WC. —W. (W.)

2. Elementary Portuguese (5)
Lecture/discussion—5 hours; laboratory—1 hour. Prerequisite: course 1. Continuation of course 1 in the areas of grammar and development of all basic language skills in cultural context with special emphasis on communication. GE credit: WC. —W. (W.)

3. Elementary Portuguese (5)
Lecture/discussion—5 hours; laboratory—1 hour. Prerequisite: course 2. Continuation of course 2 in the areas of grammar and development of all basic language skills in cultural context with special emphasis on communication. GE credit: WC. —W. (W.)

4. Elementary Portuguese Conversation (2)
Discussion—3 hours. Prerequisite: course 3. Not open to native speakers or upper division students. Designed to develop oral communication skills.

Emphasis on increasing vocabulary, improving listening comprehension, pronunciation, accuracy and grammar control, practice of everyday situations. GE credit: WC, WE, WS, SS.

100. Principles of Luso-Brazilian Literature and Criticism (4)
Lecture—3 hours; term paper. Prerequisite: course 22 or 23 or consent of instructor. Principles of literary criticism applied to the study of fiction, poetry, and essays of major literary writers of the Luso-Brazilian world. GE credit: AH, WC, WE. —F. (F.) Bernucci, Newcomb

101. Entrepreneurial Linguistics (4)
Lecture—3 hours; intensive 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. Class activities include composition, journals, letters, individual and group projects. GE credit: WC, WE. —S. (S.)

160. Special Topics in Luso-Brazilian Literature and Culture (4)
Lecture—3 hours; term paper. Prerequisite: course 3 or Spanish 24, 24S, 245, 24S. Special Topics in Luso-Brazilian Literature and Culture. May be repeated one time for credit. GE credit: AH, WC, WE. —F. (F.) Bernucci, Newcomb

200. The Quarter Abroad
Lecture/discussion—3 hours, term paper. Prerequisite: course 100 or consent of instructor. Colonial Brazilian literature survey. Readings include 16th-18th centuries manuscripts and books of cultural importance in a society dominated by censorship and with no printing presses. Study of the role literary Academies played in the so called "culture of manuscripts." GE credit: AH, WC, WE. —F. (F.) Elzire, Bernucci, Newcomb

201. Luso-Brazilian Literature and Culture (4)
Lecture/discussion—3 hours, term paper. Prerequisite: course 100 or consent of instructor. Overview of modern Brazilian literature from early 20th C. to the poetry by João Cabral de Melo Neto and the Conceptists (1960s), including European avant-garde movements and literary and cultural manifestos leading to a revolutionary body of literature. GE credit: AH, WC, WE. —F. (F.) Elzire, Bernucci, Newcomb

300. Luso-Brazilian Literature: Renaissance, Baroque, and Enlightenment (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 100 or consent of instructor. Colonial Brazilian Literature and Culture. May be repeated one time for credit on a P/NP grading basis only. Students who have successfully completed Spanish 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. GE credit: AH, WC. —F. (F.) —W. (W.)

311. Intermediate Portuguese for Spanish Speakers (4)
Lecture/discussion—3 hours; laboratory—1 hour. Development of linguistic and learning skills required for Spanish-speaking students in upper-division courses in Portuguese.

98. Directed Group Study (1-5)
Prerequisite: consent of instructor and Department Chairperson. Directed group study primarily for lower division students. —F. (F.) —W. (W.)

Upper Division
100. Principles of Luso-Brazilian Literature and Criticism (4)
Lecture—3 hours; term paper. Prerequisite: course 22 or 23 or consent of instructor. Principles of literary criticism applied to the study of fiction, poetry, and essays of major literary writers of the Luso-Brazilian world. GE credit: AH, WC, WE. —F. (F.) Bernucci, Newcomb

161. Luso-Brazilian Literature and Culture (4)
Lecture—3 hours; term paper. Prerequisite: course 100 or consent of instructor. May be repeated one time for credit. GE credit: AH, WC, WE. —F. (F.) Elzire, Bernucci, Newcomb

162. Introduction to Brazilian Literature (4)
Lecture/discussion—3 hours, term paper. Prerequisite: course 3, 31 or 31G. Narrative and poetic texts of the 19th and 20th centuries in Brazil. In-depth and comparative study of Romantic and (Neo) Naturalist movements as a forum for discussion about literary tradition and modernity in Latin America. GE credit: AH, WC, WE. —F. (F.) Elzire, Bernucci, Newcomb

163. 20th C Masters in Brazilian Literature (4)
Lecture/discussion—3 hours, term paper. Prerequisite: course 100 or consent of instructor. Overview of modern Brazilian literature from early 20th C. to the poetry by João Cabral de Melo Neto and the Conceptists (1960s), including European avant-garde movements and literary and cultural manifestos leading to a revolutionary body of literature. GE credit: AH, WC, WE. —F. (F.) Elzire, Bernucci, Newcomb

199. Special Study for Advanced Undergraduates (1-5)
Independent study with professor for advanced undergraduate students, or honors thesis students. P/NP grading only. GE credit: AH, WC. —F. (F.) —W. (W.)

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 transfer 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
1. Elementary Spanish (5)
Lecture/discussion—5 hours. Introduction to Spanish grammar and development of all language skills in a cultural context with special emphasis on communication. GE credit: WC. —W. (W.)
21. Intermediate Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour.
Prerequisite: course 3 or 3S. Review and develop the grammar, vocabulary and composition acquired in the first year through exercises and reading of modern texts. Prerequisite for advanced level coursework in the areas of grammar and basic language skills. GE credit: OL, WC.

21S. Intermediate Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour.
Prerequisite: course 3, 3S, 3V or 3Y. Review and develop the grammar, vocabulary and composition acquired in the first year through exercises and reading of modern texts. GE credit: WC—F, W, S, Su.

21V. Intermediate Spanish (5)
Web Virtual Lecture—3 hours; web electronic discussion—2 hours. Prerequisite: course 1 or 1S; or the equivalent. Continuation of course 1, 1S, or previous high school experience in the areas of grammar and basic language skills. Online format combining synchronous chatting with technologically based materials where learning takes place both in and out of the classroom. GE credit: WC—F, W, S, Su.

22. Intermediate Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour.
Prerequisite: course 2, 2S, 2V or 2Y. Completion of grammar sequence and continuing practice of all language skills using cultural texts. GE credit: WC—F, W, S, Su.

22S. Intermediate Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour.
Prerequisite: course 21 or 21S or 21V or 21Y. Continuation of course 21 and 21S. Focus on more difficult grammatical forms, reading in a Spanish speaking country. Not open for credit to students who have completed equivalent course 22, 22S, 22V or 22Y. GE credit: WC—F, W, S, Su. (F, W, S, S, Su.)

22V. Intermediate Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour.
Prerequisite: course 021 or 021S or 021V or 021Y. Continuation of course 21 and 21S. Focus on more difficult grammatical forms, reading in a Spanish speaking country. Not open for credit to students who have completed equivalent course 22, 22S, 22V or 22Y. GE credit: WC—F, W, S, Su.

23. Spanish Composition I (4)
Lecture—3 hours; extensive writing. Prerequisite: course 22, 22S, 22V or 22Y. 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. Not open for credit to students who have completed equivalent course 23. GE credit: ArtHum|AH, WC, WE—F, W, S, Su.

23S. Spanish Composition I (4)
Lecture—3 hours; extensive writing. Prerequisite: course 22, 22S, 22V or 22Y. 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. Not open for credit to students who have completed equivalent course 23S. GE credit: ArtHum|AH, WC, WE—F, W, S, Su.

24. Spanish Composition II (4)
Lecture—3 hours; extensive writing. Prerequisite: course 23 or 23S. Development of advanced level writing skills, with 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 equivalent course 24. GE credit: ArtHum|AH, WC, WE—F, W, S, Su.

28. Intermediate Spanish Conversation (2)
Lecture—3 hours. Prerequisite: course 22. Continuation of course 8. Designed to develop oral communication skills at a more advanced level. Practice in more complex situations. (Former course 9.)

31. Intermediate Spanish for Native Speakers I (5)
Lecture/discussion—3 hours; tutorial—1 hour; extensive writing. Prerequisite: course 3 or the equivalent or permission of instructor. First course in a three-semester 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. GE credit: ArtHum|AH, WC, WE—F, F.

32. Intermediate Spanish for Native Speakers II (5)
Lecture/discussion—3 hours; tutorial—1 hour; extensive writing. Prerequisite: course 31; consent of instructor. Continuation of Spanish 31, intensive review of grammar and composition. Development of all language skills through reading, writing, and oral presentation and discussion of modern texts. GE credit: ArtHum|AH, OL, WC, WE—F, F.
cussed. Designed for students whose native language is Spanish. GE credit: ArtHum | AH, OL, WC, WE.—F, W, S.

33. Intermediate Spanish for Native Speakers III (S) Lecture/discussion—3 hours; tutorial—1 hour; extensive writing. Prerequisite: course 24 or 33, or consent of instructor. Development of writing skills, with emphasis on experimenting with various writing styles: analytical, argumentative, 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. GE credit: ArtHum | AH, OL, WC, WE.—S. (S.)

98. Directed Group Study (1-5) Prerequisite: consent of instructor and Department Chairperson. Primarily for lower division students. (P/NP grading only)—F, W, S. (F, W, S.)

99. Special Study for Undergraduates (1-5) Prerequisite: consent of instructor. (P/NP grading only)—F, W, S. (F, W, S.)

Upper Division

100. Principles of Hispanic Literature and Criticism (4) Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 24 or 24S or 33. 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. GE credit: ArtHum | AH, OL, WC, WE.—F, W, S. (F, W, S.)

100S. Principles of Hispanic Literature and Criticism (4) Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 24 or 33. 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. GE credit: ArtHum | AH, OL, WC, WE.—S.

110. Advanced Spanish Composition (4) Lecture—3 hours; frequent writing assignments. Prerequisite: course 24 or 33. 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.) GE credit: WE.

111N. The Structure of Spanish: Sounds and Words (3) Lecture—3 hours. Prerequisite: course 24 or 33, or consent of instructor; Linguistics 1 recommended. Linguistic description of the sound patterns of Spanish and how those sounds can be used to form larger words. Can be used to form larger units, such as morphemes and words. Theoretical and practical comparisons with English and with other Romance languages. (Former course 132.) GE credit: SocSci | SS.—F, W, S. (F, W, S.) Bradley

112N. The Structure of Spanish: Words and Phrases (3) Lecture—3 hours. Prerequisite: course 111N or consent of instructor. A study of Spanish word and phrase structure, how those structures can be used to form larger units, such as morphemes and words. Theoretical and practical comparisons with English and with other Romance languages. (Former course 132.) GE credit: SocSci | SS.—F, W, S. (F, W, S.) Bradley

113. Spanish Pronunciation (4) Lecture—3 hours; term paper. Prerequisite: course 24 or 33, or consent of instructor; Linguistics 1 recommended. The sound structure of modern Spanish; theoretical analysis of selected problems in pronunciation. Strongly recommended for prospective teachers of Spanish. GE credit: SocSci | SS.—F, W, S. (F, W, S.) Bradley

114N. Contrastive Analysis of English and Spanish (4) Lecture—3 hours; extensive writing. Prerequisite: course 24 or 33, or consent of instructor; course 111N and course 112N recommended. Contrastive analysis of English and Spanish, error analysis, introduction to structuralist and transformational linguistics. Individual and group conferences. (Former course 137.) GE credit: SocSci | SS.—Colombi

115. History of the Spanish Language (4) Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 24 or 33, or consent of instructor; Linguistics 1 recommended. The Spanish language from its roots in spoken Latin to modernity. Emphasis on the close relationship between historico-geographical events and language change, and the role that literature plays in language standardization. Not open for credit to students who have completed course 115S. GE credit: ArtHum or SocSci | AH or SS.—Blake

115S. History of the Spanish Language (4) Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 24 or 33, or consent of instructor; Linguistics 1 recommended. The Spanish language from its roots in spoken Latin to modernity. Emphasis on the close relationship between historico-geographical events and language change, and the role that literature plays in language standardization. Not open for credit to students who have completed course 115S. GE credit: ArtHum or SocSci | AH or SS.—Blake

116. Applied Spanish Linguistics (4) Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 24 or 33, or consent of instructor; Linguistics 1 recommended. Exploration of the major theoretical and practical issues concerning learning Spanish as a second language. For students interested in teaching Spanish as a career. Not open to students who have taken course 116S. GE credit: SocSci | SS.—Blake, Colombi, Sánchez Gutiérrez

116S. Applied Spanish Linguistics (4) Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 24 or 33, or consent of instructor; Linguistics 1 recommended. Exploration of the major theoretical and practical issues concerning learning Spanish as a second language. For students interested in teaching Spanish as a career. Not open to students who have taken course 116S. GE credit: SocSci | SS.—F, W, S. (F, W, S.) Colombi

117. Teaching Spanish as a Native Tongue in the U.S.: Praxis and Theory (4) Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 24 or 33, or consent of instructor; Linguistics 1 recommended. Exploration of the major theoretical and practical issues concerning learning Spanish as a second language. For students interested in teaching Spanish as a career. Offered in a Spanish-speaking country, in Spain, under the supervision of UC Davis faculty/lecturer. Not open to students who have completed course 116. GE credit: SocSci | SS.—E., Colombi

118. Spanish Literature (4) Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 24 or 33, or consent of instructor; Linguistics 1 recommended. Study of the major works of Spanish literature. Emphasis on the close relationship between historico-geographical events and language change, and the role that literature plays in language standardization. Not open for credit to students who have completed course 115S. GE credit: ArtHum or SocSci | AH or SS.—Blake

119. Adorning the Human (2) Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 24 or 33, or consent of instructor; Linguistics 1 recommended. The Spanish language from its roots in spoken Latin to modernity. Emphasis on the close relationship between historico-geographical events and language change, and the role that literature plays in language standardization. Not open for credit to students who have completed course 115S. GE credit: ArtHum or SocSci | AH or SS.—Blake

120. Golden Age Literature of Spain (4) Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170, 170S. Admission to the study of the principal events, literary movements, and prominent figures of the 16th and 17th century Spain. GE credit: ArtHum | AH, OL, VL, WE.—Martin, Slater

133N. Golden Age Literature of Spain (4) Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170, 170S. Admission to the study of the principal events, literary movements, and prominent figures of the 16th and 17th century Spain. GE credit: ArtHum | AH, OL, VL, WE.—Martin, Slater

134A. Don Quijote I (4) Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170, 170S. 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. GE credit: ArtHum | AH, OL, WE.—Martin

134B. Don Quijote II (4) Lecture—3 hours; term paper. Prerequisite: course 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. GE credit: ArtHum | AH, OL, WE.—Martin

135N. Spanish Romanticism (4) Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170, 170S. Romanticism as a philosophical and 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. (Former course 114.) GE credit: ArtHum | AH, WC.

136N. The Spanish Novel of the 19th Century (4) Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170, 170S. Literary realist in Spain, focusing on Leopoldo Alas [Clarín], Emilia Pardo Bazán and Benito Pérez Galdós unique characteristics of Spanish realism and its historical roots in Cervantes and the picaresque. GE credit: ArtHum | AH, WE.

137N. Twentieth-Century Spanish Fiction (4) Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170, 170S. Study of the main literary trends and authors of the modern Spanish
ish novel and short story. Selected works by Unamuno, Valle-Inclán, Sender, Cela, Matute, Ayala and others. GE credit: ArtHum | AH, WC, WE.

138N. Modern and Contemporary Spanish Poetry (4)
Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Study of the main literary movements and authors of modern and contemporary Spanish poetry. Selected works by Machado, Juan Ramón Jiménez, García Lorca, Guiliti, Alexandre, Hernández Hierro and others. (Former course 129C.) Offered alternate years. GE credit: ArtHum | AH, OL, WE.

139. Modern Spanish Theater (4)
Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Study of the main dramatic cycles in the history of modern Spanish theater. Selected works by Valle Inclán, García Lorca, Milhura, Buero Vallejo, Arrabal and others. Offered in alternate years. GE credit: ArtHum, Div | AH, WC.

140N. Modern Spanish Essay (4)
Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Ortega, Unamuno and the modern Spanish essay. Their concept of Spain and their relations with other movements and thinkers. GE credit: ArtHum | AH, WC, WE.

141. Introduction to Spanish Culture (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 24, 24S, or 33. Introduction to history, geography and culture of Spain. Art, history of ideas, and everyday cultural manifestations. Introduction to critical reading and textual analysis. Offered in a Spanish speaking country under the supervision of UC Davis faculty. Not open for credit to students who have completed course 141S. GE credit: ArtHum, Div | AH, VL, WC.—González, Martínez-Carazo

141S. Introduction to Spanish Culture (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 24, 24S, or 33. Introduction to history, geography and culture of Spain. Art, history of ideas, and everyday culture manifestations. Introduction to critical reading and textual analysis. Offered in a Spanish speaking country under the supervision of UC Davis faculty. Not open for credit to students who have completed course 141S. GE credit: ArtHum, Div | AH, VL, WC.—González, Martínez-Carazo

142. Special Topics in Spanish Cultural and Literary Studies (4)
Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Special topics in the study of Spanish literature and culture. May be repeated twice for credit. GE credit: ArtHum | AH, OL, WE.—González, Martín, Martínez-Carazo, Slater

143. Spanish Art (4)
Lecture—2 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, High, Low, and Modern Art and Contemporary art. GE credit: ArtHum | AH, VL, WC.—S. Su, J. Su, J. Su—Martínez-Carazo

144. Topics in Spanish Cultural Studies (4)
Lecture—3 hours; project. Prerequisite: course 24, 24S, or 33. Study of different historical tendencies in Spanish culture(s) from the Romans to the present. Sources studied may include literature, film, art, journalism, and performance. Approaches to material may involve analysis of aesthetics, politics, identity, and globalization. May be repeated one time for credit. GE credit: ArtHum | AH, WC.—González, Martínez-Carazo

147. Anglos, Latinos and the Spanish Black Legacy: Theoretical and Educational Implications of Anti-Hispanic Prejudice (4)
Lecture—3 hours; field work; term paper. Examination of Anti-Hispanic prejudice in the United States focusing on the “Black Legend,” a 16th Century anti-Spanish myth. Emphasis on the doctrine of “Manifest Destiny.” Exploration of the legend’s presence in contemporary American society through interviews and analysis of school textbooks. (Same course as Education 147.) GE credit: ArtHum | AH, WC, WE.

Lecture—3 hours; film viewing—3 hours. Prerequisite: course 24 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 | AH, VL, WC.—Martínez-Carazo

148S. Cinema in the Spanish-Speaking World in Translation (4)
Lecture—3 hours; film viewing—3 hours. Prerequisite: course 24 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, Spanish, under the supervision of UC Davis faculty. Not open for credit to students who have completed course 148. GE credit: ArtHum, Div | AH, VL, WC.—F. S. (F. S.)

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 and the major in Spanish. GE credit: ArtHum, Div, Wrt | AH, VL, WC.—Newcomb

150N. Survey of Latin American Literature to 1900 (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Latin American literature from preconquest texts and the chronicles of the Conquest to romanticism and modernism. Reading selections include fiction, poetry, drama and essays. GE credit: ArtHum | AH, WC.—Bernucci

151. Survey of Latin American Literature 1900 to Present (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Latin American literature from 1900 to the present. Reading selections include fiction, poetry, drama, essays, testimonio, etc. GE credit: ArtHum | AH, WC.—Bejel, Irwin, Lazzara, Peluffo

151N. Survey of Spanish American Literature 1900 to Present (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Latin American literature from the 19th century to the present. Emphasis on the contemporary period. GE credit: ArtHum | AH, WC.—Su

153. Latin American Short Story (4)
Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. The evolution of the Latin American short story from the 19th century to the present. Emphasis on the contemporary period. GE credit: ArtHum | AH, WC.—Bejel, Irwin, Lazzara, Peluffo

154. Latin American Novel (4)
Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Evolution of the Latin American novel from the 19th century to the present. Emphasis on the narrative of the Revolution and significant contemporary works. GE credit: ArtHum | AH, WC.

156. Latin American Literature of the Turn of the 20th Century (4)
Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. 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 writers of the era. GE credit: ArtHum | AH, WC.—Peluffo

157. Great Works of Latin American Literature/Culture (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Study of major works of Latin American literature/culture and their cultural and literary milieu. May include novels, poetry, film, etc. Works may be analyzed in terms of style, culture, critical significance, political importance, and/or commercial success. GE credit: ArtHum | AH, WC.—Bejel, Bernucci, Irwin, Lazzara, Peluffo

158. Latin American Poetry: From Vanguardism to Surrealism and Beyond (4)
Lecture—3 hours; term paper. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Study of vanguardism, surrealism, and more recent movements of Latin American poetry. An in-depth analysis of the works of such major poets as Neruda, Vallejo, and Paz. GE credit: ArtHum | AH, WC.—Bejel, Bernucci, Irwin, Lazzara, Peluffo

159. Special Topics in Latin American Literature and Culture (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: any one of the following: course 100, 100S, 141, 141S, 170 or 170S. Special topics in the study of Latin American literature and culture. May be repeated one time for credit when topic or subject differs; students may take any SPA 159 course two times total in combination. GE credit: ArtHum | AH, WC.—F. (F.)

159Y. Special Topics in Latin American Literature and Culture (4)
Web virtual lecture—3 hours; lecture/discussion—1 hour. Prerequisite: course 100, 100S, 141, 141S, 170 or 170S. Special topics in the study of Latin American literature and culture. Hybrid format combining classroom instruction with technologically based materials. May be repeated one time for credit when topic or subject differs; students may take Spanish 159 course two times total in combination. GE credit: ArtHum | AH, WC.—F, W, S, Su, F. W. S. Su—Bejel, Bernucci, Egan, Irwin, Peluffo, Lazzara

160. 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 the study of Latin American literature by women in Latin America. Discussions in English of works by Matto de Turner, Avellaneda, Stürmer, Ocampo, Agustini, Mistral, Castellanos, and others. GE credit: ArtHum, Div, Wrt | AH, WC.— Peluffo

170. Introduction to Latin American Culture (4)
Lecture—3 hours; term paper. Prerequisite: course 24, 24S or 33. Introduction to history, geography and culture of Latin America. Multiple genres of cultural production and representation, with a focus on cultural diversity and regional difference. Emphasis to critical reading and textual analysis. Not
170S. Introduction to Latin American Culture (4)
Lecture—3 hours; project: Prerequisite: course 24, 24S or 33. Introduction to history, geography and culture of Latin 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 to students who have completed course 170. GE credit: ArtHum, Div | AH, VL, WC, WE — F (F)

Colombi

171. 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 motena, musica andina) as well as its implications in other musical genres. Taught in Spanish. Not open to students who have taken courses 171S or Music 127. (Same course as Music 127) May be repeated one time for credit when content differs. GE credit: ArtHum | AH, WE — Irwin, Ortiz

171S. Music from Latin America (4)
Lecture—3 hours; term paper or discussion—1 hour or term paper. Prerequisite: consent of instructor. Examination of music from Latin America. Characteristic music (i.e. tango, bossa nova, salsa, musica motena, musica andina) 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. GE credit: ArtHum | AH, VL — Irwin

172. Mexican Culture (4)
Lecture—3 hours; term paper or discussion—1 hour or term paper. Prerequisite: course 24, 24S or 33. Study of Mexican culture through a diversity of cultural expression, including elite, popular and mass media culture. Focus on national icons and archetypes, multiculturalism, transnationalism. May be repeated once for credit. GE credit: ArtHum, Div | AH, VL, WE — Irwin

173. Cinema and Latin American Culture (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: course 24, 24S or 33. Understanding Latin American cultures through cinema. History and critical analysis of Latin American film. Focus on a national cinematic tradition. Comparative experiences in different parts of Latin America and/or a particular era. Conducted entirely in Spanish. May be repeated one time for credit. GE credit: ArtHum, Div | AH, VL, WC — Irwin

174. Chicano Culture (4)
Lecture—3 hours; term paper/discussion—1 hour or term paper. Prerequisite: course 24 or 24S or 33. An interdisciplinary survey course. Topics include literature, art, folklore, oral tradition, music, politics, as well as everyday cultural manifestations. Conducted in Spanish. [Former course 124.] GE credit: ArtHum, Div | ACGH, AH, DD

175. Topics in Spanish American Cultural Studies (4)
Lecture—3 hours; project—1 hour. Prerequisite: course 24, 24S or 33. Specific historical tendencies and geographic and cultural contexts (e.g. from pre-colonial times to present). Studies of literature, film, art, journalism and performance. Focus on issues of aesthetics, politics, identity, and globalization. May be repeated once for credit if content differs. GE credit: ArtHum, Div | AH, VL, WC, WE — Bejel, Irwin, Peluffo, Lazzara

176. 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 | ACGH, AH, DD — Alarcon

177. California and Latin America (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 24, 24S or 33. Interdisciplinary survey on the shared history between California and Latin America (1500s-present). Latin American representations of California and Californian representations of Latin America, as well as borderlands texts, with a special focus on Mexican-American perspectives. Conducted in Spanish. GE credit: ACGH, DD — Irwin

178A. Spanish for the Professions (4)
Lecture—3 hours; term paper or discussion—1 hour. Prerequisite: course 24, 24S or 33. For students with an advanced level of Spanish interested in the use of Spanish in the healthcare, legal and law enforcement and multi-business professions. Field trips documenting the use of Spanish in the public context. GE credit: ArtHum or SocSci | AH or SS, DD, OL, WE — Colombi

Lecture—3 hours; term paper or discussion—1 hour. Interaction between the interpretations of scientific ideas, philosophical issues, and politics concerning the human body in the Spanish-speaking world through different historical periods. Not open to students who have taken equivalent course 179Y. GE credit: ArtHum or SciEng or SocSci | AH or SE or SS — F, W, S; Bejel, Slater

179Y. Science and Politics of the Human Body in the Spanish-Speaking World (4)
Web virtual lecture—2 hours; discussion—2 hours. Interaction between the interpretations of scientific ideas, philosophical issues, and politics concerning the human body in the Spanish-speaking world through different historical periods. Not open to students who have taken equivalent course 179Y. GE credit: ArtHum or SciEng or SocSci | AH or SE or SS — F, W, S; Bejel, Slater

180. Senior Seminar in Spanish Linguistics (4)
Seminar—3 hours; term paper. Prerequisite: senior standing; a major in Spanish or consent of instructor. Limited enrollment. Group study of a special topic drawn from Spanish linguistics. May be repeated one time for credit. GE credit: ArtHum or SocSci | AH or SS, OL, WE — Blake, Bradley, Colombi

181. 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. Limited enrollment. 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. GE credit: ArtHum | AH, OL, WE — Gonzalez, Martin, Martinez-Carazo, Slater

182. 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. Limited enrollment. 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. GE credit: ArtHum | AH, OL, WE, WC — Bejel, Irwin, Lazzara, Peluffo

1921. Internship in Spanish (1-12)
Independent study—3-36 hours. Prerequisite: course 23 junior standing; major in Spanish, Chicano Studies, or a related field; consent of instructor. Internships in fields where Spanish language skills can be used and perfected (teaching, counseling, translation, interpreting). May be repeated up to 8 units for credit. Units will not count toward the Spanish major. [P/NP grading only.—F, W, S; W, S, S]

194H. Special Study for Honors Students (1-5)
Independent study—3-35 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.] GE credit: AH, WC, WE — F, W, S; F, W, S, S

197T. Tutoring in Spanish (1-4)
Tutorial—1-4 hours. Prerequisite: upper division standing and permission of the chair. Tutoring in undergraduate courses in college in small voluntary discussion groups affiliated with departmental courses. May be repeated for credit for a total of 6 units. [P/NP grading only.—F, W, S, F, W, S]

197TC. 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 of a departmental faculty member. May be repeated for credit for a total of 6 units. [P/NP grading only.—F, W, S, F, W, S]

198. Directed Group Study (1-5)
Prerequisite: consent of instructor and Department Chairperson. [P/NP grading only.] GE credit: AH, WC, WE — F, W, S, F, W, S

199. Special Study for Advanced Undergraduates (1-5)
May be repeated for up to 6 units of credit [P/NP grading only.] GE credit: AH, WC, WE — F, W, S, F, W, S

Graduate

201. 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. — Bejel

202. Literary Theory II (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Major contemporary critical theories in Hispanic literature and culture. Archival research, textual analysis, discourse analysis, statistics for linguistics, etc.; introduction to scholarly writing (MLA style) and scholarly publishing. [S/U grading only.—Bejel, Bernucci, Blake, Carazo, Colombi, Irwin, Martin, Martinez-Lazzara, Newcomb, Peluffo

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. — Bradley

206. Spanish Syntax (4)
Seminar—3 hours; term paper. Prerequisite: Linguistics 140 and 165. 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 classification. — Blake

207. History of the Spanish Language (4)
Seminar—3 hours; term paper. Prerequisite: Latin 1. [Former course 220A] — 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. — Blake
211. Hispanic Dialectology (4) Seminar—3 hours; term paper. Prerequisite: course 220 or consent of instructor. Descriptive and historical study of distinctive features of various Spanish dialects. (Former course 221.)

212. Applied Linguistics (4) Seminar—3 hours; term paper. Prerequisite: graduate standing and courses 215 and 216 recommended. Focus on linguistic aspects of teaching Spanish. Designed for graduate students who have an interest in second-language learning and teaching. —Blake, Colombi

215. Special Topics in Hispanic Linguistics (4) Seminar—3 hours; term paper. Prerequisite: consent of instructor; courses 205 and 206 recommended. Specialized topics in Hispanic linguistics (e.g., pragmatics, accent, syntax, semantics, dialects), may be repeated for credit when topic differs. —Blake, Bradley, Colombi, Sánchez Quesada

220. Catalan Language and Culture (4) Lecture/discussion—3 hours; laboratory—1 hour. Prerequisite: good command of Spanish, Portuguese, French or Italian and graduate level of study in any of these languages, consent of instructor. Open to graduate students, consent of instructor. Prerequisite: good command of Catalan. (Students with notions of Catalan, may be admitted with consent of instructor designed for graduate students. Foundation for the acquisition of Catalan oral, reading and writing skills. Emphasis on projects for students of Spanish (Iberians or Hispanic, with the capacity to interpret premeditated written language. Emphasis on weekly review of grammar and all language skills. —Martín

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 narrative and essay. May be repeated two times for credit when topic differs. —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 two times for credit when topic differs. —Martín

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 distinctive features of Peninsular and American Spanish dialects. (Former course 221.)

225. Spanish Literature of the Early Renaissance (4) Seminar—3 hours; term paper. Spanish Literature 1450-1550, with emphasis on La Celestina. (Former course 229.) —Martin

226. 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 currents of Renaissance and Baroque Spanish poetry through its language structures, styles ("Culteranismo-Conceptismo"), rhetorical devices, myths, and themes (love, death, time). —Martin

227. Spanish Literature of the Renaissance and Golden Age: Drama (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Exploration of major 16th and 17th century literary and cultural developments through the study of selected dramas. —Martin

228. Spanish Literature of the Renaissance and Golden Age: Prose (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. The origins and development of the Spanish novel during the Renaissance and the Golden Age. —Martín, Slater

256. Spanish Literature of the Renaissance and Baroque Periods (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. The origins and development of the Spanish novel during the Renaissance and Baroque periods. —Martín

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. —Slater

260. Modern Spanish Literature (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Topics of Spanish literature, from 1700-1920. —Martín

261. Contemporary Spanish Literature: Poetry (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Contemporary Spanish poetry focusing on the avant-garde, existentialism, social realism, and postmodern trends. May be repeated two times for credit when topic differs and with consent of instructor. —Martínez-Cazura

262. Contemporary Spanish Literature: Narrative (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of the 20th-century novel and short story with emphasis on the avant-garde, existentialism, social realism, and postmodernism. May be repeated two times for credit when topic differs and with consent of instructor. —Martínez-Cazura

263. Contemporary Spanish Literature: Drama (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Spanish theatrical production of the last 70 years. —Martínez-Cazura

264. Contemporary Spanish Literature: Essay (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Spanish theatrical production of the last 70 years. —Martínez-Cazura

265. Women Writers of Spain (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Selected texts of women writers. Emphasis on innovative language and structure. (Former course 229.)

266. Women Writers of Latin America (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Recent developments in Latin American narrative. Emphasis on innovative language and structure. (Former course 229.) —Lazzara

270. Latin 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 Latin America in the first half of the 20th century. (Former course 241A.) —Bernucci

271. Latin American Short Story (4) Seminar—3 hours; term paper. Works by major writers with emphasis on 20th-century authors such as Quirago, Borges, García Márquez, Cortázar, and Kuffo. (Former course 243.) —Bernucci

272. Latin American Women Writers (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Critical study of the evolution of Mexican narrative. Emphasis on the narrative of the Revolution and significant contemporary works. —Bernucci

273. Critical Approaches to Latin American Literature: Poetry and Drama (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Development of Latin American literary periods and currents in poetry and drama, from early Colonial times to the present. May be repeated two times for credit when topic differs. —Bejel, Bernucci, Egan

274. Studies of a Major Writer, Period, or Genre in Latin American Literature (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of a major Latin American writer and his/her intellectual and literary milieu or study of a special topic, period, or genre. May be repeated for credit. —Bejel, Bernucci, Irwin, Lazzara, Peluffo

275. Colonial Literature (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. An examination of pre-Hispanic and Colonial narrative, poetry and theatre. Emphasis on historical, anthropological, and ethno-historical approaches to Colonial discourse. —Bejel

276. Twentieth-Century Latin American Drama (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Major Latin American dramatists from Florencio Sánchez to the present. (Former course 240.)

277. Latin 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 Latin America in the first half of the 20th century. (Former course 241A.) —Bernucci

278. New Trends in Latin American Fiction (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Recent developments in Latin American narrative. Emphasis on innovative language and structure. (Former course 241B.) —Lazzara

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 works. —Bernucci

280. Latin American Short Story (4) Seminar—3 hours; term paper. Works by major writers with emphasis on 20th-century authors such as Quirago, Borges, García Márquez, Cortázar, and Kuffo. (Former course 243.) —Bernucci

281. Latin American Women Writers (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Critical study of the evolution of Mexican narrative. Emphasis on the narrative of the Revolution and significant contemporary works. —Bernucci

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). (Former course 245.)

283. New Directions in Latin American Poetry (4) Seminar—3 hours; term paper. New trends in Latin American poetry. Offered in alternate years. —(S.) Egan

284. The Latin American Essay (4) Seminar—3 hours; term paper. Major Latin American essayists from Sarmento to contemporary essayists.

285. Multicultural Approaches to Cuban Literature and Culture (4) Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Study of major trends in Cuban literature. Emphasis on historical, geographic, social, cultural contexts (including music and film). Course taught in English with some readings in Spanish. —Bejel
291. Foreign Language Learning in the Classroom (4)
Seminar—3 hours plus project. Overview of approaches to teaching 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.)—Blake, Bradley, Columbia.

298. Group Study (1-5)
Prerequisite: graduate standing and consent of instructor. May be repeated for credit. (S/U grading only)—F, W, S. (F, W, S.)

299. Research (1-12)
(S/U grading only)—F, W, S. (F, W, S.)

Professional
300. The Teaching of Spanish (3)
Lecture—3 hours. Prerequisite: senior or graduate standing; a major or minor in Spanish.

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.

396. Teaching Assistant Practicum (1-6)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only)—F, W, S. (F, W, S.)

Statistics
[College of Letters and Science]
Thomas Lee, Ph.D., Chairperson of the Department Department Office, 4118 Mathematical Sciences Building 335-752-2361; http://www.stat.ucdavis.edu

Faculty
Ethan Andere, Ph.D., Associate Professor
Alfred Aube, Ph.D., Associate Professor
Prabir Burman, Ph.D., Professor
Hao Chen, Ph.D., Assistant Professor
Christian Drake, Ph.D., Professor
Cho-Jui Hsieh, Ph.D., Assistant Professor
Fushing Hsieh, Ph.D., Professor
Jiming Jiang, Ph.D., Professor
Thomas Lee, Ph.D., Professor
Miles Lopez, Ph.D., Assistant Professor
Xiaodong Liu, Ph.D., Assistant Professor
Hong-Georg Muller, M.D., Ph.D., Professor
Debashis Paul, Ph.D., Associate Professor
Jie Peng, Ph.D., Professor
Wolfgang Polonik, Ph.D., Professor
James Sharpnack, Ph.D., Assistant Professor
Duncan Temple Lang, Ph.D., Professor
Jane-Ling Wang, Ph.D., Professor

Emeriti Faculty
Rudolph Beran, Ph.D., Professor Emeritus
P.K. Bhattacharya, Ph.D., Professor Emeritus
Yue-Pok Ed) Mack, Ph.D., Professor Emeritus
George G. Roussas, Ph.D., Professor Emeritus
Francisco J. Samaniego, Ph.D., Professor Emeritus
Robert H. Shumway, Ph.D., Professor Emeritus
Avin D. Wiggins, Ph.D., Professor Emeritus

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. The B.S. degree program has three options:

1. General Option, Applied Statistics Option, and Computational Statistics Option. Both the A.B. and the B.S. programs require the completion of a comprehensive course work and underscore the strong interdependence of statistical theory and the applications of statistics.

2. B.S. in Statistics-General Option emphasizes statistical theory and is especially recommended as preparation for graduate study in statistics.

3. B.S. in Statistics-Applied Statistics Option emphasizes statistical applications. This major is recommended for students who do not plan to pursue graduate studies in statistics and those who are interested in the combining the statistics study with a second major or minor program in the social and life sciences.

B.S. in Statistics-Computational Statistics Option emphasizes statistical applications. This major is recommended for students who do not plan to pursue graduate studies in statistics and those who are interested in the combining the statistics study with a second major or minor program in the social sciences or who wish to pursue a Ph.D. degree.

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. Employment opportunities include careers in data and policy analysis in government, financial management, control, insurance and health care industry, actuarial work, engineering, public health, biological and pharmaceutical research, law, and education. Some students have entered advanced studies in statistics, economics, psychology, medicine and other professional school programs.

A.B. Major Requirements: UNITS
Preparatory Subject Matter ......................................19-23
Mathematics 16A, 16B, 16C, or 17A, 17B, 17C; or 21A, 21B, 21C.........................9-12
Mathematics 22A..................................................3
Computer Science Engineering 30 or Computer Science Engineering 40 (or the equivalent).........................4
Statistics 10 .........................................................4

Depth Subject Matter .........................................45-48
Statistics 106, 108, 138 or the equivalent........................................12
Statistics 130A, 130B..............................................8
Statistics 137 or 141 ..............................................4
Three courses from: Statistics 104, 135, 137, 141, 142, 144, 145........................................12
Related elective courses...........................................9-12
Three upper division courses approved by major adviser; they should follow a coherent sequence in a single discipline in the social sciences where statistical methods and models are applied and should cover the quantitatively oriented disciplines

Total Units for the Major ........................................................................64-71

B.S. Major Requirements: General Statistics Track UNITS
Preparatory Subject Matter .....................................30-32
Mathematics 21A, 21B, 21C, 21D..........................16
Mathematics 22A....................................................3
Mathematics 25 ......................................................3
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
Related elective courses...........................................4
One upper division course approved by major adviser; it should be in mathematics, computer science or in quantitative aspects of a substantive discipline.

Total Units for the Major ........................................................................81-84

Applied Statistics Track
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 prerequisites to upper division courses in a chosen discipline to which statistics is applied........................................7-8
Any one introductory statistics course except Statistics 10.................6

Depth Subject Matter ........................................51-56
Statistics 130A, 130B..............................................8
Three courses selected from Statistics 104, 135, 137, 142, 144, 145........................................12
Five upper division elective courses outside of Statistics.................................15-20
Electives are chosen with and must be approved by the major adviser. 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 Track
Preparatory Subject Matter ...................................30-31
Mathematics 21A, 21B, 21C, 21D.........................16
Mathematics 22A....................................................3
Computer Science Engineering 30 and 40........................................8
Any one introductory statistics course except Statistics 10.................6

Depth Subject Matter ........................................52
Statistics 106, 108, 141........................................12
Statistics 131A, 131B..............................................8
Two courses from: Statistics 104, 135, 137, 141, 142, 144, 145........................................8
Programming, Data Management & Data Technologies: Computer Science Engineering 130 or 145; and 165........................................8
Two courses on Scientific Computational Algorithm and Visualization from: Computer Science Engineering 122A, 129, 140A, 158, 163........................................8

Total Units for the Major ........................................................................82-83

Major Adviser. A. Aue

Students are encouraged to meet with an adviser to plan a program as early as possible. Sometime before or during the first quarter of the junior year, students planning to major in Statistics should consult with a faculty adviser to plan the remainder of their undergraduate program.

Minor Program Requirements:
The Department offers a minor program in Statistics that consists of five upper division level courses focusing on the fundamentals of mathematical statistics.
13. Elementary Statistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: two years of high school algebra or Mathematics D. Descriptive statistics, basic probability concepts; binomial, normal, Student’s t, and chi-square distributions. Hypothesis testing and confidence intervals for one and two proportions and regression. Not open for credit to students who have completed course 135 or higher. GE credit: SciEng | QL, SE.—F, W, S, Su. (F, W, S, Su.)

13Y. Elementary Statistics (4)
Lecture—1.5 hours; web-based lecture—5 hours. Prerequisite: two years of high school algebra or Mathematics D. Descriptive statistics; basic probability concepts; binomial, normal, Student’s t, and chi-square distributions. Hypothesis testing and confidence intervals for one and two means and proportions. Regression. Not open for credit to students who have completed course 13, or higher. GE credit: SciEng | QL, SE.—F, W, S, Su. (F, W, S, Su.)

32. Introductory Statistical Analysis Through Computers (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: Mathematics 16B or 17C or 21B; ability to program in a high-level programming language. Probability concepts: Events and sample spaces; random variables; mass, density and distribution functions; parametric families; parameter estimation and confidence intervals; Central Limit Theorem. Recommended as alternative to course 13 for students with a background in calculus and programming. Only two units of credit allowed to students who have taken course 12 or 102; not open for credit to students who have taken course 102. GE credit: SciEng | QL, SE.—W, S. (W, S)

90X. Seminar (1-2)
Seminar—1-2 hours. Prerequisite: high school algebra and consent of instructor. Examination of a special 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.)

100. Applied Statistics for Biological Sciences (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: Mathematics 16B or 17C or 21B. Descriptive statistics, probability, sampling distributions, estimation, hypothesis testing, ANOVA; regression; implementation of statistical methods using computer package. Only two units credit allowed to students who have taken courses 13, 32, or 102; minimum 2.500 grade point average required for students who have taken course 102. GE credit: SciEng | QL, SE.—F, W, S, Su. (F, W, S, Su.)

101. Advanced Applied Statistics for the Biological Sciences (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 100. Basic experimental designs, two-factor ANOVA without interactions, repeated measures ANOVA, ANCOVA, random effects vs. fixed effects, multiple regression, basic model building, resampling methods, multiple comparisons, multivariate methods, generalized linear models, Monte Carlo simulations. GE credit: SciEng | QL, SE.—F, W, S, Su. (F, W, S, Su.)

104. Applied Statistical Methods: Nonparametric Statistics (4)

108. Applied Statistical Methods: Regression Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 13, 32, or 100. Simple linear regression, variable selection techniques, stepwise regression, analysis of covariance, influence measures, competing models. GE credit: SciEng | QL, SE.—F, W, S, Su. (F, W, S, Su.)

130A. Mathematical Statistics: Brief Course (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16B or 17C or 21B. Basic probability, densities and distributions, mean, variance, covariance, Chebyshev’s inequality, some special distributions, sampling distributions, central limit theorem and law of large numbers, point estimation, some methods of estimation, interval estimation, confidence intervals for certain quantities, computing sample sizes. Only two units of credit allowed to students who have taken course 131A. GE credit: SciEng | QL, SE.—F. (F)

130B. Mathematical Statistics: Brief Course (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 130A or 131A or Mathematics 135A. Transformed random variables, large sample properties of estimates. Basic ideas of hypothesis testing, likelihood ratio tests, goodness-of-fit tests. General linear model, least squares estimates, Gauss-Markov theorem. Analysis of variance, F-test. Regression and correlation, multiple regression. Selected topics. GE credit: SciEng | QL, SE.—F, W, S, Su.

131A. Introduction to Probability Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21B, 21C and 22A. Fundamental concepts 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 135A. GE credit: SciEng | QL, SE.—F, S. (F, S, S)

131C. Introduction to Mathematical Statistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 131A or consent of the instructor. Sampling, methods of estimation, sampling distributions, confidence intervals, testing hypotheses, linear regression, analysis of variance, elements of large sample theory and nonparametric inference. GE credit: SciEng | QL, SE.—F, W. (W)

135. Multivariate Data Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 130B or 131B; and Mathematics 22A or 67. Multivariate normal distribution; Mahalanobis distance; sampling distributions of the mean vector and
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
<th>Hours</th>
<th>Prerequisites</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>231A</td>
<td>Mathematical Statistics I (4)</td>
<td>3</td>
<td>Lecture—3 hours; discussion—1 hour; Prerequisite: courses 131A, 25 and Mathematics 125A or equivalent</td>
<td>First part of three-quarter sequence on mathematical statistics. Emphasizes foundational topics. Topics include basic concepts in asymptotic theory, decision theory, and an overview of methods of point estimation.</td>
<td>F, W, S.</td>
</tr>
<tr>
<td>231B</td>
<td>Mathematical Statistics II (4)</td>
<td>3</td>
<td>Lecture—3 hours; discussion—1 hour; Prerequisite: course 231A, 231B. Second part of three-quarter sequence on mathematical statistics.</td>
<td>Emphasizes hypothesis testing (including multiple testing) as well as theory for linear models.</td>
<td>W (W)</td>
</tr>
<tr>
<td>231C</td>
<td>Mathematical Statistics III (4)</td>
<td>3</td>
<td>Lecture—3 hours; discussion—1 hour; Prerequisite: course 231A, 231B. Third part of three-quarter sequence on mathematical statistics.</td>
<td>Emphasizes large sample theory and their applications. Topics include statistical fundamentals, smoothing methods and optimization techniques relevant for statistics.</td>
<td>S (S)</td>
</tr>
<tr>
<td>232C</td>
<td>Applied Statistics III (4)</td>
<td>3</td>
<td>Lecture—3 hours; laboratory—1 hour; Prerequisite: courses 106, 108, 131C, 131B, 131C, 232A and Mathematics 167.</td>
<td>Multivariate analysis; multivariate distributions, multivariate linear models, data analytic methods including principal component, factor, discriminant, canonical correlation, and causal analysis.</td>
<td>W (W)</td>
</tr>
<tr>
<td>233</td>
<td>Design of Experiments (3)</td>
<td>3</td>
<td>Lecture—3 hours; Prerequisite: course 131C.</td>
<td>Topics from balanced and partially balanced incomplete block designs, fractional factorial designs, and response surfaces.</td>
<td>Elected in alternate years.</td>
</tr>
<tr>
<td>235A</td>
<td>Probability Theory (4)</td>
<td>3</td>
<td>Lecture—3 hours; term paper or discussion—1 hour; Prerequisite: Mathematics 125B and 135A or course 131A or consent of instructor.</td>
<td>Measure-theoretic foundations, abstract integration, independence, laws of large numbers, characteristic functions, central limit theorems. Weak convergence in metric spaces, Brownian motion, invariant principle. Conditional expectation. Topics selected from martingales, Markov chains, ergodic theory.</td>
<td>Same course as Mathematics 235A.</td>
</tr>
<tr>
<td>235B</td>
<td>Probability Theory (4)</td>
<td>3</td>
<td>Lecture—3 hours; term paper or discussion—1 hour; Prerequisite: Mathematics 235A/course 235A or consent of instructor.</td>
<td>Measure-theoretic foundations, abstract integration, independence, laws of large numbers, characteristic functions, central limit theorems. Weak convergence in metric spaces, Brownian motion, invariant principle. Conditional expectation. Topics selected from martingales, Markov chains, ergodic theory.</td>
<td>Same course as Mathematics 235B.</td>
</tr>
<tr>
<td>235C</td>
<td>Probability Theory (4)</td>
<td>3</td>
<td>Lecture—3 hours; term paper or discussion—1 hour; Prerequisite: Mathematics 235A/course Mathematics 235B or consent of instructor.</td>
<td>Measure-theoretic foundations, abstract integration, independence, laws of large numbers, characteristic functions, central limit theorems. Weak convergence in metric spaces, Brownian motion, invariant principle. Conditional expectation. Topics selected from martingales, Markov chains, ergodic theory.</td>
<td>Same course as Mathematics 235A.</td>
</tr>
<tr>
<td>237A</td>
<td>Time Series Analysis (4)</td>
<td>3</td>
<td>Lecture—3 hours; term paper.</td>
<td>Prerequisite: course 131B or the equivalent. 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, regression, ARIMA models, state-space models, Kalman filtering.</td>
<td>Offered in alternate years.</td>
</tr>
<tr>
<td>237B</td>
<td>Time Series Analysis (4)</td>
<td>3</td>
<td>Lecture—3 hours; term paper.</td>
<td>Prerequisite: course 131B or the equivalent. 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, regression, ARIMA models, state-space models, Kalman filtering.</td>
<td>Offered in alternate years.</td>
</tr>
<tr>
<td>238</td>
<td>Theory of Multivariate Analysis (4)</td>
<td>3</td>
<td>Lecture—3 hours; term paper.</td>
<td>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, multivariate regression and analysis of variance, application to data.</td>
<td>Offered in alternate years.</td>
</tr>
<tr>
<td>240A</td>
<td>Nonparametric Inference (4)</td>
<td>3</td>
<td>Lecture—3 hours; term paper.</td>
<td>Prerequisite: course 231C. courses 235A, 235B-235C recommended. Comprehensive treatment of nonparametric statistical inference, including the most basic materials from classical nonparametrics, robustness, nonparametric estimation of a distribution function from incomplete data, curve estimation, and theory of resampling methodology.</td>
<td>Offered in alternate years.</td>
</tr>
<tr>
<td>240B</td>
<td>Nonparametric Inference (4)</td>
<td>3</td>
<td>Lecture—3 hours; term paper.</td>
<td>Prerequisite: course 231C. courses 235A, 235B-235C recommended. Comprehensive treatment of nonparametric statistical inference, including the most basic materials from classical nonparametrics, robustness, nonparametric estimation of a distribution function from incomplete data, curve estimation, and theory of resampling methodology.</td>
<td>Offered in alternate years.</td>
</tr>
<tr>
<td>241</td>
<td>Asymptotic Theory of Statistics (4)</td>
<td>3</td>
<td>Lecture—3 hours; term paper.</td>
<td>Prerequisite: course 231C. courses 235A, 235B-235C recommended. Comprehensive treatment of nonparametric statistical inference, including the most basic materials from classical nonparametrics, robustness, nonparametric estimation of a distribution function from incomplete data, curve estimation, and theory of resampling methodology.</td>
<td>Offered in alternate years.</td>
</tr>
<tr>
<td>242</td>
<td>Introduction to Statistical Programming (4)</td>
<td>3</td>
<td>Lecture—3 hours; laboratory—1 hour; Prerequisite: courses 130A and 130B or equivalent.</td>
<td>Essentials of statistical computing using a general-purpose statistical language. Topics include algorithms; design; debugging and efficiency; object-oriented concepts; model specification; statistical visualization; data and text processing; databases; computer systems and platforms; comparison of scientific programming languages.</td>
<td>Offered in alternate years.</td>
</tr>
<tr>
<td>243</td>
<td>Computational Statistics (4)</td>
<td>3</td>
<td>Lecture—3 hours; laboratory—1 hour; Prerequisite: courses 130A and 130B or equivalent, and Mathematics 167 or Mathematics 67 or equivalent.</td>
<td>Numerical analysis; computer generation; computer experiments and resampling techniques [bootstrap, cross validation]; numerical optimization; matrix decompositions and linear algebra computations; algorithms for chain monte carlo, expectation-maximization; algorithm design and efficiency.</td>
<td>Offered in alternate years.</td>
</tr>
<tr>
<td>250</td>
<td>Topics in Applied and Computational Statistics (4)</td>
<td>3</td>
<td>Lecture—3 hours; lecture/discussion—1 hour.</td>
<td>Prerequisite: course 131A; course 232A recommended, not required. Resampling, nonparametric and semiparametric methods, incomplete data analysis, diagnostics, multivariate and time series analysis, applied Bayesian methods, sequential analysis and quality control, categorical data analysis, spatial and image analysis, computational biology, functional data analysis, model-based data, learning theory. May be repeated for credit with consent of graduate adviser. Offered irregularly.</td>
<td>F, W, S.</td>
</tr>
<tr>
<td>251</td>
<td>Topics in Statistical Methods and Models (4)</td>
<td>3</td>
<td>Lecture—3 hours; discussion—1 hour.</td>
<td>Prerequisite: course 231B or equivalent. Topics may include Bayesian analysis, nonparametric and semiparametric regression, sequential analysis, bootstrapping, and statistical methods in high dimensions, reliability, spatial processes, inference for stochastic process, stochastic methods in finance, empirical processes, change-point problems, asymptotics for parametric, nonparametric and semiparametric models, nonlinear time series, robustness. May be repeated if topics differ; only with consent of the graduate adviser. Offered irregularly.</td>
<td>F, W, S.</td>
</tr>
<tr>
<td>252</td>
<td>Advanced Topics in Biostatistics (4)</td>
<td>3</td>
<td>Lecture—3 hours; discussion/laboratory—1 hour.</td>
<td>Prerequisite: course/Biostatistics 222 and course/ Biostatistics 223. Biostatistical methods and models selected from the following: genomics, bioinformatics and genomics; longitudinal/functional data; clinical trials and experimental design; analysis of environmental data; dose-response, nutrition and toxicology; survival data analysis; computational 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 Biostatistics 252.)</td>
<td>Offered in alternate years.</td>
</tr>
<tr>
<td>260</td>
<td>Statistical Practice and Data Analysis (3)</td>
<td>3</td>
<td>Lecture/discussion—3 hours.</td>
<td>Prerequisite: working knowledge of advanced statistical software and completion of at least one of course 207 or 232B or the equivalent.</td>
<td>Open to students enrolled in the graduate program in Statistics or Biostatistics, as the class also serves to provide professional service to clients and collaborators who work with the students. Principles and practice of interdisciplinary collaboration in statistics, statistical consulting, ethical aspects, and basics of data analysis and study design.</td>
</tr>
</tbody>
</table>
Statistics (A Graduate Program)

Thomas (C. M.) Lee, Ph.D., Chairperson of the Program
Jie Peng, Ph.D., Vice Chairperson for Graduate Affairs

Program Office. 4118 Mathematical Sciences Building 530-752-5194; http://www.stat.ucdavis.edu

Faculty
Ethan Andere, Ph.D., Associate Professor (Statistics) Alexander Aue, Ph.D., Associate Professor (Statistics) Lauren Beckett, Ph.D., Professor (Public Health Sciences) Paul Baines, Ph.D., Assistant Professor (Statistics) Prabir Burman, Ph.D., Professor (Economics) Colin Cameron, Ph.D., Professor (Economics) Hao Chen, Ph.D., Assistant Professor (Statistics) Christiana Drake, Ph.D., Professor (Statistics) Chao-Jui Hsieh, Ph.D., Assistant Professor (Statistics) Fushing Hsieh, Ph.D., Professor (Statistics) Jiming Jiang, Ph.D., Professor (Statistics) Oscar Jorda, Ph.D., Professor (Economics) Thomas Lee, Ph.D., Professor (Statistics) Xiaodong Li, Ph.D., Assistant Professor (Statistics) Miles Lopes, Ph.D., Assistant Professor (Statistics) Hans-Georg Muller, M.D., Ph.D., Professor (Statistics) Debashis Paul, Ph.D., Associate Professor (Statistics) Jie Peng, Ph.D., Professor (Statistics) Wolfgang Polonik, Ph.D., Professor (Statistics) David R. Xue, Ph.D., Professor (Statistics) (Public Health Sciences) Naoki Saito, Ph.D., Professor (Mathematics) James Shaprock, Ph.D., Assistant Professor (Statistics) Duncan Temple Lang, Ph.D., Professor (Statistics) Chih-Ling Tsai, Ph.D., Professor (Graduate School of Management) Jane-Ling Wang, Ph.D., Professor (Statistics)

Emeriti Faculty
Rudolph Beran, Ph.D., Professor Emeritus P.K. Bhattacharya, Ph.D., Professor Emeritus Thomas B. Faver, Ph.D., Professor (Population Health and Reproduction) George G. Roussas, Ph.D., Professor Emeritus Yue-Pok (Ed) Mack, Ph.D., Professor Emeritus Francisco J. Samaniego, Ph.D., Professor Emeritus Robert H. Shumway, Ph.D., Professor Emeritus Alain D. Wiggins, Ph.D., Professor Emeritus

Affiliated Faculty
Rahman Azari, Ph.D., Lecturer (Statistics)
Graduate Study, The Graduate Program in Statistics offers programs 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 methodology. Computer program 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 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, Preparation for the graduate program requires a year's of college, a course in linear algebra, facility with a programming language and upper division coursework in mathematics and/or statistics. 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, Debashis Paul (Statistics)

Study of Religion (A Graduate Group)

Flagg Miller, Ph.D., Chairperson of the Group
Program Office. 216 Sproul Hall 530-752-5799; Fax 530-752-8630 http://religiongradgroup.ucdavis.edu/

Faculty
Emily Albu, Ph.D., Professor (Classics) David Biale, Ph.D., Professor (History) Catherine Chin, Ph.D., Professor (Religious Studies) Allison Cordert, Ph.D., Professor (Religious Studies) Mark R. Elmore, Ph.D., Professor (Religious Studies) Elizabeth Freeman, Ph.D., Professor (English) Cody Gilmore, Ph.D., Professor (Philosophy) John R. Hall, Ph.D., Professor Emeritus (Sociology) Mark Halperin, Ph.D., Professor (Anthropology) A. Katie Harris, Ph.D., Professor (History) Milman F. Harrison, Ph.D., Lecturer (African American & African Studies) Ines Hernandez-Avila, Ph.D., Professor (Native American Studies) Naomi Janowitz, Ph.D., Professor (Religious Studies) Suad Joseph, Ph.D., Professor (Anthropology and Women & Gender Studies) Flagg Miller, Ph.D., Professor (Religious Studies) Eva Mroczek, Ph.D., Professor (Religious Studies) Jessie Ann Owens, Ph.D., Professor (Music) Meaghan O'Keefe, Ph.D., Professor (Religious Studies) Lynn Roller, Ph.D., Professor (Art History) Seth Sanders, Ph.D., Professor (Religious Studies) Jocelyn Shohat, Ph.D., Professor (Comparative Literature) John Smolenski, Ph.D., Professor (History) Henry Spiller, Ph.D., Professor (Music) Smriti Sinha, Ph.D., Professor (Anthropology) Daniel Stolzenberg, Ph.D., Professor (History) Mairaj Syed, Ph.D., Professor (Religious Studies) Jan Szal, Ph.D., Professor (Philosophy) Buki Tezcan, Ph.D., Professor (History & Religious Studies) Archana Venkateshan, Ph.D., Professor (Comparative Literature & Religious Studies) Haghani Watanenag, Ph.D., Professor (Art History) Keith Watanenag, Ph.D., Professor (Religious Studies) Diane Wolf, Ph.D., Professor (Sociology) Michael Zier, Ph.D., Professor (English)
210C. Special Topics in Mediterranean Religious Cultures (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative, interpretive study of the treatment of specific topics in Mediterranean religious cultures. May be repeated for credit when topics differ. Offered irregularly.

230A. Thematic Topics—Body and Praxis (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative, interpretive study of the treatment of religion through specific topics and themes relating to the body and praxis. May be repeated for credit when topics differ. Offered irregularly.

230B. Thematic Topics—Language, Rhetoric, and Performance (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative, interpretive study of the treatment of religion through specific topics and themes relating to language, rhetoric, and performance. May be repeated for credit when topics differ. Offered irregularly.

230C. Thematic Topics—Modernity, Science, and Secularism (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative, interpretive study of the treatment of religion through specific topics and themes relating to modernity, science, and secularism. May be repeated for credit when topics differ. Offered irregularly.

230D. Thematic Topics—Theory and Method (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative, interpretive study of the treatment of religion through specific topics and themes relating to theory and method. May be repeated for credit when topics differ. Offered irregularly.

230E. Thematic Topics—Values, Ethics, and Human Rights (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative, interpretive study of the treatment of religion through specific topics and themes relating to values, ethics, and human rights. May be repeated for credit when topics differ. Offered irregularly.

230F. Thematic Topics—Visual Culture, Media, and Technology (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing or consent of instructor. Comparative, interpretive study of the treatment of religion through specific topics and themes relating to visual culture, media, and technology. May be repeated for credit when topics differ. Offered irregularly.

231B. Theories of Language (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Restricted to graduate students. Focuses on historical theories of language that precede and accompany post-structuralist theory. Intended to introduce graduate students to the context of modern theory formation. May cover structuralism, poststructuralism, and postcoloniaization. Offered irregularly. — F, W, S (F, W, S.) O'Keefe

231E. History, Theory and Criticism of Human Rights (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Restricted to graduate students. Restricted to graduate students. Introduces the advanced study of Human Rights and the theoretical and practical elaboration of the international Human Rights system. Seminar will engage with criticism of Human Rights and develop research and teaching within disciplinary and interdisciplinary frameworks. (Same course as Human Rights 200A.) Offered in alternate years. — W, Y (W, W) Madonna

298. Group Study (1-5)
Prerequisite: graduate standing or consent of instructor. May be repeated for credit. (S/U grading only). — F, W, S. (F, W, S.)

299. Research (1-12)
Prerequisite: graduate standing or consent of instructor. (S/U grading only). — F, W, S. (F, W, S.)

299D. Dissertation Writing (1-12)
Prerequisite: advanced to candidacy for the Ph.D. program; consent of instructor. May be repeated for credit. (S/U grading only). — F, W, S. (F, W, S.)

Surgery
See Surgery (SUR), on page 545; and Surgical and Radiological Sciences (SRS), on page 585.

Surgical and Radiological Sciences
See Veterinary Medicine, School of, on page 585.

Sustainable Agriculture and Food Systems

(For the College of Agriculture and Environmental Sciences)
Sustainable Agriculture and Food Systems is an interdisciplinary major hosted by the Department of Human Ecology.

Ryan Galt, Ph.D., Major Adviser
Program Office, 143 Robbins Hall; 530-752-3915; http://asi.ucdavis.edu

Richard Sexton, Ph.D.
(Agricultural & Resource Economics)

Anita Oberbauer, Ph.D. (Animal Science)
Michael Parrella, Ph.D.
(Entomology and Nematology)

Susan Handy, Ph.D.
(Environmental Science & Policy)

Patty Eubanks Owens, M.L.A.
(Human Ecology)

David Campbell, Ph.D. (Human Ecology)
Randal Southard, Ph.D.
(Land, Air & Water Resources)

David Rizzo, Ph.D. (Plant Pathology)
Chris van Kessel, Ph.D. (Plant Sciences)

The Major Program
The Sustainable Agriculture and Food Systems (SA&FS) major serves students interested in improving the sustainability of agriculture and food systems. This major is designed to develop students' competencies in analyzing environmental, social, and economic challenges and opportunities associated with agricultural and food systems sustainability. The program emphasizes an experiential learning approach to sustainability education, allowing students to choose between three tracks within the major. Students in the Agriculture and Ecology track focus on crop and animal production systems, ecology, and practices that mitigate negative impacts while producing environmental and social benefits. Students in the Food and Society track focus on issues related to the social, cultural, political, and community development aspects of agriculture and food systems. Students in the Economics and Policy track focus on issues related to agricultural and resource economics, policy, and management.

The program provides students with practical experiences through courses with on-and-off campus fieldwork and through internship placements at sites related to students' interests and focus of study.

Internships and Career Alternatives
Sustainable Agriculture and Food Systems students are required to complete an internship in the field before graduation. Internships have been arranged with local, county, and state agricultural agencies, production farms and commercial processors and retailers, domestic and international non-governmental organizations, and rural and urban community development programs. Graduates are prepared to pursue a broad range of careers related to agricultural production and food system management, rural and urban community services, education and development, and agricultural and environmental sciences, as well as careers in social, environmental, and economic policy and analysis. Positions may be in private industry, government and public service agencies and in the non-profit sector, nationally and internationally. The major also prepares students for graduate study in a wide range of fields related to agriculture and food systems.

B.S. Major Requirements:

UNITS

English Composition Requirement..................4-8
See College requirement, must include Communications 1.

Core Courses........................................24-26
Plant Sciences 15 .................................4
Community and Regional Development 20 4
Plant Sciences 150 ...............................4
Agricultural and Resource Economics 121 4
Plant Sciences 190 ...............................2-4
Environmental Science and Policy 191A, 191B 6

Internship Requirement..........................12
Students must complete at least 12 units of internship, eight of which must be completed off campus.

Applied Production................................6-9
Select 1 course from: Animal Science 49A, Animal Science 411, 412 2-3
Select 1 course from: Agricultural and Biological Systems Technology 49, 52, 101, 142 2-3

Track I: Agriculture and Ecology
Focuses on crop and animal production systems, ecology, and practices that mitigate negative impacts while producing environmental and social benefits.

Track I Adviser, W. Horvath, Ph.D.

Preparatory Subject Matter..........................60-61
Mathematics 16A, 16B ..............................6
Plant Sciences 120 or Statistics 100 4
Chemistry 2A, 2B .................................10
Physics 1A, 1B ...............................10
Biological Sciences 2A, 2B ........................10
Plant Sciences 2 ...............................4
Animal Sciences 1 or 2 ...........................4
Food Science 1 .................................4
Economics 1A .....................................4
Community and Regional Development 1 4
Select one course from: Philosophy 14, 15, 24 4
Select one course from: Anthropology 2 4
Political Science 4, Sociology 1, Sociology 3 4-5

Depth Subject Matter..............................34-38
Agricultural and Resource Economics 120 or 142 4
Environmental Science and Policy 161 or 169 3-4
Soil Science 100 or Soil Science 109 4-5
Select one course from: Animal Science 129, Environmental Horticulture 160 or, Environmental Science and Policy 100, Evolution and Ecology 101, Plant Sciences 105, 142, Wildllife, Fish, and Conservation Biology 154

Select one course from: Agricultural and Resource Economics 112, 150, 157
Select 11-12 units from: Agricultural and Resource Economics 120, 130, 147, 176, Environmental Science and Policy 160, 161, 169, 172, 179, 183, 294
Select 12 units from: Anthropology 101, 102, Community and Regional Development 142, 152, Sociology 139, 144, 145A, 145B, 150
Additional units in consultation with an adviser

Total units for the major: 140-163

**Major Adviser.** R. Galt (Human Ecology), Warwick Horwath (Land, Air & Water Resources).

**Advising Center** for the major is located in 1303 Harr Hall, Department of Human Ecology 330-752-2424.

**Courses in Sustainable Agriculture and Food Systems (SAF)**

**Lower Division 90X. SAF&S Portfolio (1-4)**

Workshop—3-12 hours. Prerequisite: consent of instructor. Restricted to Sustainable Agriculture and Food Systems majors with lower-division standing or consent of instructor. SAF&S Portfolios are designed to complement interdisciplinary, academic coursework by supporting student development of each of the SAF&S Student Outcomes: Systems Thinking, Experimentation & Inquiry, Understanding Values, Interpersonal Communication, Strategic Management, Civic Engagement and Personal Development. May be repeated for credit. Offered irregularly. (P/NP grading only)–F, W, S, Su. (F, W, S, Su.)

**92. Internship (1-12)**

Internship—3-36 hours. Prerequisite: consent of instructor. Restricted to Sustainable Agriculture and Food Systems majors or with consent of instructor. Lower-division internship for students enrolled in the Sustainable Agriculture and Food Systems program of study. Enrollment for non-majors by consent of instructor. May be repeated up to 12 units for credit with consent of instructor. (P/NP grading only)–F, W, S, Su. (F, W, S, Su.)

**98. Directed Group Study (1-5)**

Prerequisite: consent of instructor. Restricted to Sustainable Agriculture and Food Systems major or with consent of instructor. Group study on focused topics in Sustainable Agriculture and Food Systems. Varies according to instructor. Course plan is adapted to student need and interest in conjunction with the expertise of the instructor. Offered irregularly. (P/NP grading only)–F, W, S, Su. (F, W, S, Su.)

**99. Special Study for Undergraduates (1-5)**

Independent study—3-15 hours. Prerequisite: consent of instructor. Under faculty supervision, advanced students pursue a special or individualized course of study related to Sustainable Agriculture and Food Systems. May be repeated for credit. (P/NP grading only)–F, W, S, Su. (F, W, S, Su.)

**Upper Division 192. Internship (1-12)**

Internship—3-36 hours. Prerequisite: upper-division standing; consent of instructor. Restricted to Sustainable Agriculture and Food Systems majors or non-majors by consent of instructor. Upper-division internship for students enrolled in the Sustainable Agriculture and Food Systems program of study. May be repeated up to 12 units for credit. (P/NP grading only)–F, W, S, Su. (F, W, S, Su.)

**Sustainable Environmental Design**

(College of Agriculture and Environmental Sciences)

(Graduate Program in Human Ecology)

Steven E. Greco, Ph.D., Chairperson, Landscape Architecture and Environmental Design Program

Program Office: 131 Hunt Hall, 530-752-3907; http://humanecology.ucdavis.edu/lda/academic_programs/sed

**Faculty**

Elizabeth Boults, MLA Continuing Lecturer
David de la Pena, Ph.D., Assistant Professor
Steven E. Greco, Ph.D., Professor
Eric Larsen, Ph.D., Associate Research Scientist
Jeoff Loux, Ph.D., Associate Adjunct Professor
Brett Milligan, M.L.A., Assistant Professor
N. Claire Napawan, M.L.A., Assistant Professor
Lorence Oki, Ph.D., Associate Specialist in Cooperative Extension
Patsy Eubanks Owens, M.L.A., Professor
Michael Rios, Ph.D., Assistant Professor
Sheryl-Ann Simpson, M.L.A., Assistant Professor
Stephen Wheeler, Ph.D., Professor

**The Major Program**

The Sustainable Environmental Design major is intended to build student understanding and skills related to creation of sustainable communities and landscapes. Coursework emphasizes urban and environmental design, sustainable development theory and practice, green building, local government planning and decision-making, community dynamics and organizations, and written, graphic, and oral presentation of sustainability strategies.

**The Program**

The Sustainable Environmental Design major is particularly suited for students who are interested in the...
physical form and design of communities and related public and private processes. It is focused on the physical, environmental, and cultural aspects of communities and the process of designing, planning for, and regulating the built landscape and the place-making considerations involved in creating sustainable communities.

Career Alternatives
Graduates who choose to pursue work in government, community organizations, education, or the private sector. They will also be well-positioned to pursue graduate education in city and regional planning, landscape architecture, architecture, public policy, public administration, law, real estate, and related fields.

B.S. Major Requirements:

Preparatory Subject Matter

UNITS

English Writing/Oral Communication.................6
Biological Sciences 2A, 2B................................10
One course each in Statistics, Economics, Political Science, Physical Sciences, and Sociology.................................20
Landscape Architecture 1, 2, 3, 21, 30, 50, 70........................................26

Depth Subject Matter

21

Landscape Architecture 140, 141, 142...14
Environemental Science and Policy 171.....4
Landscape Architecture 190 (three quarters))........................................3
Restricted Electives......................................20-25
Select 20 units of upper division courses chosen from courses related to community sustainability. 20
Internship: Recommended..................................5

Total units for the major.................105-110

Major Adviser, Stephen Wheeler
Advising Center. See Shorla Cheney, 135 Hunt Hall, 530-754-8628, schenery@ucdavis.edu.

Technocultural Studies

See Cinema and Digital Media, on page 208.

Textile Arts and Costume Design

See Design, on page 234.

Textile Science

See Fiber and Polymer Science, on page 340.

Textiles (A Graduate Group)

Ning Pan, Ph.D., Chairperson of the Group

Group Office, 129 Everson Hall
530-752-8035; nerabaud@ucdavis.edu
http://textiles.ucdavis.edu

Faculty

Susan Avilia, M.F.A. Professor (Design)
Collin A. Carter, Ph.D., Distinguished Professor (Agricultural and Resource Economics)
James Chaffin, Ph.D., Professor (Agricultural & Resource Economics)
Hidergarde Heymann, Ph.D., Distinguished Professor (Textile and Clothing)
You-Lo Hsieh, Ph.D., Distinguished Professor (Textiles and Clothing)
Susan B. Kaiser, Ph.D., Professor (Textiles and Clothing)
Helen Koo, Assistant Professor (Design)
Ning Pan, Ph.D., Professor (Textiles and Clothing, Biological & Agricultural Engineering)
Tingrui Pan, Ph.D., Associate Professor (Biomedical Engineering)
Diana Strazdee, Associate Professor (Art History)
Gang Sun, Ph.D., Professor (Textiles and Clothing)
Susan Verba, M.F.A., Associate Professor (Design Program)

Emeriti Faculty

Stephen Jett, Ph.D., Professor Emeritus (Textiles and Clothing, Geography)
Joel T. Johnson, Professor (Psychology)
Gyongy Laky, M.A., Professor Emeritus (Textiles and Clothing)
Margaret H. Rucker, Ph.D., Professor Emeritus (Textiles and Clothing)
Howard G. Schutz, Ph.D., Professor Emeritus (Consumer Science)
James F. Shackelford, Ph.D., Professor Emeritus (Chemical Engineering and Materials Science)
Charles F. Shoemaker, Ph.D., Professor Emeritus (Food Science and Technology)
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 science aspects 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 Advisers. Y.L. Hsieh, N. Pan

Textiles and Clothing

(College of Agricultural and Environmental Sciences)
You-Lo Hsieh, Ph.D., Chairperson of the Division
Division Office, 129 Everson Hall
530-752-8650; http://textiles.ucdavis.edu

Faculty

You-Lo Hsieh, Ph.D., Professor
Susan B. Kaiser, Ph.D., Professor (Women and Gender Studies)
Ning Pan, Ph.D., Professor
Gang Sun, Ph.D., Professor

Emeriti Faculty

Stephen C. Jett, Ph.D., Professor Emeritus
Gyongy Laky, M.A., Professor Emeritus
Mary Ann Morris, Ph.D., Professor Emeritus
Margaret H. Rucker, Ph.D., Professor Emeritus
S. Haig Zeronian, Ph.D., D.Sc., Professor Emeritus

The Major Program

The textiles and clothing major emphasizes the connections among (a) the physical characteristics of textile products, (b) human perceptions of and behavior toward these products, and (c) global economic trends affecting the textile/apparel marketplace. An integrative knowledge base links textile products with people and processes, to focus on the production, distribution, and consumption of textiles and apparel; see also Fiber and Polymer Science, on page 340.

The Program. The textiles and clothing major offers two options: textile science and marketing/economics. The Textile Science option provides students with a broad knowledge base in both the social and physical sciences. This base includes production, end-use applications and care of textiles and apparel, physical and chemical properties of textiles, and social-psychological and economic aspects of textiles and clothing. The Marketing/Economics option emphasizes social science and business course work, while allowing students with an awareness of the physical nature of textile products.

Internships and Career Alternatives. Textiles and clothing majors can pursue internships and careers in apparel production and merchandising, retail management, international marketing, textile testing and conservation, and textiles journalism. The majority of textiles and clothing graduates accept entry-level management and technical positions within the textile and apparel industry or in related fields; e.g., merchandising and marketing, production, research and development, technical service and design. Students may also pursue graduate studies in textiles, business, and other areas depending on their specific selection of restricted elective course work.

B.S. Major Requirements:

Preparatory Subject Matter

UNITS

Plant Sciences 21 or Computer Science Engineering 15 or 30........................................3-4
Economics 1A-1B......................................8
Anthropology 2, Science and Society 1, Art History 1A, 1B, 1C, or 1D..........................4
Physics 1A or 10.....................................4
Psychology 1........................................4
Sociology 2........................................4
Statistics 13........................................4
Textiles and Clothing 6, 78, 91, 121, 122, 124, 128, 129, 130..........................................12

Select one of the following two options:

Marketing/Economics option

Additional Preparatory Subject Matter for the option...............................................18-19
Management 11A-11B................................8
Chemistry 10 or 2A................................4-5
Mathematics 16A-16B..............................6

Depth Subject Matter..................................36-57

Agricultural and Resource Economics 100A-100B, 106, 136........................................11
Statistics 103..........................................4
Psychology 151 or Consumer Science 100.................................................................3-4
Fiber and Polymer Science 110, Textiles and Clothing 107, 162, 162L, 163, 163L, 164, 165, 171, 173, 174........................................33

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, 136, 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, 143, Textiles and Clothing 180A, 180B, 230, 293, with consent of instructor, and a maximum of five units in either Textiles and Clothing 192 or 199.

Textile Science option

Additional Preparatory Subject Matter for the option...............................................19
Chemistry 2A, 2B, 8A, 8B.........................................16
Mathematics 16A..................................3

Depth Subject Matter..................................51-52

Agricultural and Resource Economics 112, 113...............................................8
Design 143........................................4
Psychology 151 or Consumer Science 100................................................. 3
Fiber and Polymer Science 100, 161, 161L, 161T, 162, 162L, 163,
163L, 164, 165, 171, 173, 174............. 36

Restricted Electives................................ 16

Courses selected from the following:
Agricultural and Resource Economics 18,
141, 142, 155, 171A, 171B, Plant Sciences 120,
Chemistry 2C, 128A, 128B, 128C,
Communication 42, 130, 136, 140,
Community and Regional Development 162,
Consumer Science 120, Design 77, 107,
170B, 170C. Economics 100, 101, 121A,
121B, 134, Fiber and Polymer Science 110,
Foreign Language units may be used to satisfy
any or all of the required 16 units,
Management 11A, 11B, Mathematics 168,
16C, Psychology 151, Sociology 25, 123,
124, 140, 148, 159, 175, Statistics 106,
108, Textiles and Clothing 180A, 180B,
230, 293, with consent of instructor, and
a maximum of five units in either Textiles and
Clothing 192 or 199.

Total Units for the Major............. 128-132

Major Adviser. S. Kaiser

Advising Center for the major is located in 1204
RMII south 530.752.3250 or 1298 Everson Hall
530.754.8368.

Minor Program Requirements:
The Division of Textiles and Clothing offers a minor
program for non-majors interested in satisfying sec-
condary career objectives. For acceptance into the program see the staff advisor in 1298 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 107, 162-162L, 163-163L, 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 340.

Lower Division

6. Introduction to Textiles (4)

Lecture—3 hours; laboratory—3 hours. Introduction to
the structure and properties of textiles. Consumer use
and aesthetic properties are emphasized. GE credit:
SciEng | SE, SL, VL — F. (F) Sun

7. Style and Cultural Studies (4)

Lecture/discussion—3 hours; discussion/labora-
tory—1 hour. The multiple and overlapping influ-
ences of gender, sexuality, ethnicity, and class on
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 through history will be interpreted. GE credit:
ArtHum or SciSch, Div, Wrt | AH or SS, VL, WE, WE — W. (W) Kaiser

8. The Textile and Apparel Industries (4)

Lecture—4 hours. Textile and apparel industries
including fashion, marketing, production, distribution,
and consumption of textile goods. GE credit: SciSch,
Div | SS

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

107. Social and Psychological Aspects of
Clothing (4)

Lecture—3 hours; discussion—1 hour. Prerequisite:
Sociology 2. Social and cognitive factors influencing
behavior and perception of personal appearance
in everyday life. Concepts and methods appro-
priate to the study of meaning of clothes in social and

162. Textile Fabrics (3)

Lecture—3 hours. Prerequisite: course 6. Properties
of fabrics as related to serviceability, comfort, and
appearance. GE credit: SciEng | SE, VL — W. (W) Pan

162L. Textile Fabrics Laboratory (1)

Laboratory—3 hours. Prerequisite: course 162 (may
be taken concurrently). Laboratory methods and pro-
cedures employed in studying properties of textile
fabrics as related to serviceability, comfort, and
appearance. GE credit: SciEng | QL, SE, VL — W. (W) Pan

163. Textile Coloration and Finishing (3)

Lecture—3 hours. Prerequisite: course 6, Fiber and
Polymer Science 110, or Chemistry 88. Basic prin-
ciples of textile dyeing, printing, and finishing; color
theory; structure, properties, and application of dyes
and finishes; factors affecting application and fast-
ness; maintenance of dyed and finished textiles. GE
credit: SciEng | SE, VL — S. (S) Sun

163L. Textile Coloration and Finishing Laboratory (1)

Laboratory—3 hours. Prerequisite: course 163 (may
be taken concurrently). Laboratory methods and pro-
cedures employed in studying properties 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 result-
tant textile. GE credit: SciEng | QL, SE, VL — S. (S) Sun

164. Principles of Apparel Production (3)

Lecture—3 hours. Prerequisite: course 6 or 8. Over-
view of characteristics, technology, processes, and
research in apparel manufacturing industries includ-
ing study of government statistics, material utiliza-
tion and fabrication, mechanization, management, and
production engineering. GE credit: SciSch | OL, SS, VL

165. Textile Processes (3)

Lecture/discussion—3 hours. Prerequisite: course 6.
Physical processes involved in the production of tex-
tiles from the individual fiber to the finished fabric.
Includes spinning, texturing, yarn formation, weav-
ing preparation, weaving and knitting, tufting and
fabric finishing. GE credit: SciEng | SE

171. Clothing Materials Science (4)

Lecture—3 hours; laboratory/discussion—3 hours.
Prerequisite: course 6, 8, and senior standing. The
properties, characterization, and performance eval-
uation of clothing materials and structures for spe-
cific functional requirements. Principles and methods
related to wetting and transport properties, fabric
hand and aesthetic properties, clothing comfort, and
material and assembly technology. GE credit: SciEng | SE

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
philosophy, marketing, and production. GE credit:
SciSch | SS, WE — W. (W) Hsiang

174. Introduction to World Trade in Textiles and
Clothing (4)

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

180A-180B. Introduction to Research in
Textiles (2-2)

Laboratory—6 hours. Prerequisite: senior standing
with textile-related major, and consent of instructor.
Senior thesis on independent problems. Research
begun in course 180A will be continued and com-
pleted in course 180B. (Deferred grading only,
pending completion of sequence.) GE credit:

192. Internship in Textiles and Clothing (1-12)

Laboratory—3-36 hours. Prerequisite: consent of
instructor. Work-experience off campus in a tex-
tiles or clothing-related area. Supervision by a member
of the Textiles and Clothing faculty. (P/NP grading
only)

197T. Tutoring in Textiles and Clothing (1-5)

Discussion/labatory—3-15 hours. Prerequisite:
upper division textiles-related major and consent of
instructor. Tutoring of students in Textiles and Cloth-
ing courses. Assistance with discussion groups and
laboratory sections under supervision of instructor.
May be repeated for credit if tutoring another textiles
course. (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

230. Behavioral Science Concepts in
Textiles (3)

Lecture—3 hours. Prerequisite: course 107, upper
division or graduate course in statistics (e.g., Agri-
cultural Management and Rangeland Resources
120) and one in a behavioral science (e.g., Psychol-
y 145). Examination of theories and research con-
cerning relationships between clothing and human
behavior with emphasis on research techniques,
including methods of measuring clothing variables.
Offered in alternate years. —Kaiser

290. Seminar (1)

Seminar—1 hour. Critical review of selected topics
of current interest in textiles. (S/U grading only) — F.
(W, F) W

290C. Research Conference (1)

Discussion—1 hour. Prerequisite: graduate standing;
consent of instructor. Individual faculty members
meet with their graduate students. Critical presenta-
tions of original research are made by graduate stu-
dents. Research activities are planned. Discussions
are led by major professors for their research
projects. (S/U grading only) — F, S, W. (F, W, S)

293. Recent Advances in Textiles (3)

Lecture—3 hours. Prerequisite: two upper division
courses in Textiles and Clothing or consent of instruc-
tor. Critical reading and evaluation on selected top-
ics of current interest in textiles. Multidisciplinary
aspects of the topics selected will be stressed. May
be repeated for credit. —(W)

298. Group Study (1-5)

(S/U grading only)

299. Research (1-12)

(S/U grading only)

Professional

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: graduate standing. May be repeated
for credit. (S/U grading only) — F, W, S (F, W, S)

Textiles and Clothing 569
Theatre and Dance

Theatre and Dance

(College of Letters and Science)

David Greneke, Chairperson of the Department

Department Office, 101 Art Building 350-752-0888; Fax 350-752-8818

http://arts.ucdavis.edu/theatre-dance

Faculty

Lawrence Bogad, Ph.D., Associate Professor

David Greneke, Professor

Lynette Hunter, Ph.D., Distinguished Professor

John Iacovelli, M.F.A., Professor

Peter Lichtenfel, Professor

Maggie Morgan, M.F.A., Professor

Jon D. Rossini, Ph.D., Associate Professor

Emeriti Faculty

Bobbie J. Bolden, M.A., Senior Lecturer Emerita

Harry C. Johnson, M.A., Professor Emeritus

William E. Kleb, D.F.A., Professor Emeritus

Emeriti Faculty

http://arts.ucdavis.edu/theatre-dance

Department Office.

A.B. Major Requirements:

theatre (Lab A), as well as in the Mondavi Center's

staged in our proscenium (Main), thrust (Wyatt),

M.F.A and Ph.D. students. These productions are

workshops and performance projects developed by

Davis; projects generated through the Institute for

directors and choreographers in three Granada Art-

tion. Students build significant skills in specific areas

of distinguished scholars in history, theory and criti-

university and non-majors, can audition for department pro-

and distinguished distinguished in three times a year. The faculty includes a group

Artist-in-Residence program, which brings a major

Art-in-Residence and faculty three times a year, as well as the Granada-

William E. Kleb, D.F.A., Professor Emeritus

F. J. Bolden, M.A., Senior Lecturer Emerita

Jon D. Rossini, Ph.D., Associate Professor

Lynette Hunter, Ph.D., Distinguished Professor

David Grenke, Professor

Lawrence Bogad, Ph.D., Associate Professor

Faculty

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Theatre and Dance

Transfer students should see the major adviser for an evaluation of your previous experience.

Guest Artists. The Granada Visiting Artists Pro-

gram brings distinguished professionals and artists to the campus each year, to be in residence for a quarter. These working professional artists interact closely with students in the classroom and rehearsal halls and provide them excellent pre-professional experi-

ences of theater practice.

Graduate Study. The Department of Theatre and

Dance offers programs of study and research lead-

ing to the M.F.A. in Theatre and Dance (the interdis-

iplinary study of acting; choreography; design; direct-

choir, and dance and performance research) and con-

tributing to the Graduate Group Ph.D. in Perfor-

mance Studies. Detailed information may be ob-

ained by contacting the Graduate Program Administra-

ators: for the M.F.A. in Theatre and Dance 350-752-8710 and for the Graduate Group in Per-

formance Studies 350-754-6973.

Courses in Dramatic Art (DRA)

Lower Division

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." No open to students who have completed course 1. GE credit: ArtHum, Div, Wtr (AH, DD, VL, WE).—S. Bogad

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 stu-

dents who have completed course 1. Offered irre-

geographically. GE credit: ArtHum, Div, Wtr.

2. Acting: The Basics: History and Practice (4)

Lecture—3 hours; discussion—1 hour. Introduction to

the historical evolution of the actor—from ancient

Greece & Asia to the Hollywood icon & postdramatic

performer—and the practical foundations of acting

for stage and screen. Options for various academic

opportunities within lecture course structure. GE credit: AH, OL, VL.

5. Understanding Performance: Appreciation of Modern Theatre, Dance, Film and Performance Art for the Humanities and Sciences

(4)

Lecture/discussion—3 hours; laboratory/discus-

sion—1 hour. Relevance of theatre and performance
to modern culture, science and society. Approaches to
theatre/dance/media/performance art, inte-

grated into Mondavi Centre for the Artists and

Theatre and Dance Department programs. (Same course as Science and Society 41.) GE credit: ArtHum, Div (AH, DD, OL, VL, WE, WE).

10. Introduction to Acting (4)

Laboratory/discussion—4 hours. Fundamentals of

movement, speech, theatre games, and improvisa-

tion. Selected reading and viewing of theatre pro-

ductions. Intended for students not specializing in

Dramatic Art. GE credit: OL, VL.

11. Introduction to Presentation Skills (2)

Laboratory—4 hours. Class size limited to 20 stu-

dents. Development of clear oral and physical

communication skills that build confidence, presenta-

tional style and clarity for students whose command

of English is at a basic level.

14. Introduction to Contemporary Dance (4)

Lecture—3 hours; laboratory—3 hours. Introduction to

basic issues and methods in contemporary dance. Focus on preparing the student for dancing and


}}
dance-making through basic techniques of improvisation and composition. Consideration of dance as a cultural practice. GE credit: VL.

20. Introduction to Dramatic Art (4) Lecture—3 hours; discussion—1 hour. Understanding and appreciation of both the distinctive and collaborative contributions of playwrights, 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 | AH, VI, WC, WE

21A. Fundamentals of Acting (4) Lecture—2 hours; laboratory—4 hours. Prerequisite: course 20. Open to students planning to major in Theatre and Dance. Physical and psychological resources of the actor. Experience in individual and group contact and communication, theatre games, advanced improvisation, sound and movement dynamics. Viewing of theatre productions. GE credit: VI, VL—Leavy, Merlin


25. Technical Aspects of Dramatic Production (4) Lecture—3 hours. Technical principles of dramatic production emphasizing the three areas of scenic, costume, and lighting. Subjects covered include basic tools, materials and equipment, production practices; and the interdisciplinary and collaborative nature of dramatic production.

26. Performing Arts Production Management (3) Lecture—3 hours. Theoretical study of performing arts administration and backstage operations from audition through production. Techniques of scheduling, production management, stage management, theatrical mechanics, backtrack protocols, scenic construction, properties, lighting, basic shop tools, costume shop use and construction, basic makeup, sound equipment, graphics and robotics for theatre. GE credit: ArtHum | AH, VI

30. Theatre Laboratory (1-5) Prerequisite: consent of instructor. Projects in acting, production, scene design, costume, lighting, directing, and playwriting. Participation in departmental productions. May be repeated for credit up to 11 units. — F, W, S. (F, W, S.)

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 one time for credit. For Dance majors, further repeats negotiated with faculty adviser in Dance. GE credit: VL.

41A. Beginning Jazz Dance (2) Laboratory/discussion—4 hours. Prerequisite: consent of instructor. Fundamentals of jazz dance; includes warm-ups, dance techniques and combinations. Basic anatomy, dance terminology and general overview of jazz dance history. May be repeated one time for credit with consent of instructor.

41B. Intermediate Jazz Dance (2) Laboratory/discussion—4 hours. Prerequisite: course 41A or consent of instructor. Warm-ups, 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 one time for credit with consent of instructor.

42A. Beginning Ballet (2) Laboratory/discussion—4 hours. 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 for credit with consent of instructor. GE credit: AH, VL

42B. Intermediate Ballet (2) Laboratory/discussion—4 hours. Prerequisite: courses 42A or consent of instructor. Barre and center work at the intermediate level. Development of refinement of technique through proper alignment, rhythmic, and qualitative understanding. Anatomy, ballet terminology, and dance history. May be repeated one time for credit with consent of instructor. GE credit: AH, VL

43A. Contact Improvisation Dance (2) Lecture/labatory—4 hours. Fundamentals of contact improvisation and its applications to all forms of dance, performance, sport, physical safety and health. Solving problems, communication, alignment, basic lifting and weight-sharing, intuition, developing relaxed readiness and personal expression. May be repeated twice times for credit. Offered irregularly. GE credit: AH, VL

43B. Intermediate Contact Improvisation (2) Lecture/labatory—4 hours. Prerequisite: course 43A or consent of instructor. 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 contact. May be repeated times for credit. GE credit: AH, VL

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 rhythm and timing, skipping, quick shifts of weight and mastering dance combinations. Discussions on Hip Hop dance history, styles and terminology. May be repeated for credit. GE credit: ArtHum | AH

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 mastering both vocabulary and rhythmic, percussive technique. Complex dance combinations, advanced across the floor sequences. May be repeated one time for credit.

55. Contemporary Local, National and Global Theatre, Dance and Performance (4) Lecture/discussion—4 hours. Introduction a range of contemporary theatre, dance and performance in local, national and international settings. Training in critical analysis and appreciation of these forms. Emphasis varies based on instructor. GE credit: ArtHum | AH, DD, DL, VL.

56A. History of Theatre and Dance I: Myth, Magic and Madness (4) Lecture/discussion—4 hours. Exploration of aesthetic movements in various disciplines of theatre and dance from the origins to 1550. Examination of Greek, Roman, Sanskrit, Khakhali, Chinese, Japanese, Mesopotamian, European and Indigenous theatre and dance including oral, ritual and shamanic performance. Offered once a year. GE credit: ArtHum | AH, VL, WC.

56B. History of Theatre and Dance II: Romance, Revenge and Rebellion (4) Lecture/discussion—4 hours. Exploration of aesthetic movements in various disciplines of theatre and dance from 1550 to 1850. Examination of genres related to romance, revenge and rebellion using European, North and South American, and Asian examples. Offered once a year. GE credit: ArtHum | AH, VL, WC.


92. Internship in Dramatic Art (1-12) Prerequisite: consent of instructor and department chairperson. Restricted to lower division students with less than 84 units completed. Internship outside the Department of Theatre. GE credit: Practical skills. May be repeated up to 12 units for credit. (P/NP grading only)

98. Directed Group Study (1-5) Primarily for lower division students. (P/NP grading only)

Upper Division

110. Advanced Presentation Skills (2) Lecture/labatory—4 hours. Class size limited to 20 students. Development of clear oral and physical communication skills that build confidence, presentsational style and clarity for students whose command of English is at a competent to fluent level. GE credit: OL


114. Theatre on Film (4) Lecture/discussion—3 hours, film viewing—2 hours; term paper. Prerequisite: consent of instructor. Study of six/eight plays on film, using mixed casts and raising issues of diversity. Focus: sociohistorical context for production and reception, interpretation and analysis of topics (gender, ethnicity, age, politics, philosophy), and filming, screenwriting, design, and acting/directing for film. GE credit: ArtHum or Social, Div, Wrt, AH or SS, VI.

115. Advanced Study of Major Film Makers (4) Lecture/discussion—3 hours; film viewing—2 hours. Analysis of the contribution of some outstanding film creators. Study of diverse creative theories on the cinema and their application to selected films. May be repeated for credit when different film creator studied, or studied with a different methodological approach. GE credit: VL.

116. Design on Screen (4) Lecture/discussion—3 hours, film viewing—3 hours. Analysis of the contribution of outstanding designers for cinema, television and filmed entertainment. Study of diverse aesthetic theories of production design and art direction, costume design, or cinema

Fall 2011 and on Revised General Education (GE): AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; ACGH—American Cultures; DD—Diverse Domains; OL—Oral Skills; SL—Quantitative; SL—Scientific; VL—Visual; WC—World Cultures; WE—Writing Experience

Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; ScIng—Science and Engineering; SocSci—Social Sciences; Div—Diverse Domains; Wrt—Writing Experience

Quarter Offered: F—Fall, W—Winter, S—Spring, Su—Summer; 2017-2018 offering in parentheses

Theatre and Dance 571
torography. Introductory principles and practice, history. May be repeated twice for credit when topic differs. Pre-requisites: Classical Cinema and Techno-cultural Studies 116) Offered irregularly. GE credit: ArtHum| AH, VL.—lacovelli, Morgan

120. Intermediate Acting/Gateway: The Actor’s Toolkit (4)
Lecture/lab—6 hours. Prerequisite: course 21A or consent of instructor. Limited enrollment. Implementation of acting tools drawn predominantly from Stanislavsky’s ‘system’. Gateway into the Advanced Acting courses. GE credit: OL, VL.—Leavy, Merlin

121A. Advanced Acting: Scene Study and Script Analysis (4)
Lecture/lab—6 hours. Prerequisite: course 120 and consent of instructor. Limited enrollment. In-depth study, analysis and performance of texts from different eras, genres and styles. Implementation of tools to undertake independent preparation of character creation. May be repeated up to eight units for credit. Since acting requires repetition to habituate the body and imagination to new practices, this course may be taken twice. New scripts and scenes must be undertaken in the repetition. Offered in alternate years. GE credit: OL, VL

121B. Advanced Acting: Rehearsal Processes and Practices (4)
Lecture/lab—6 hours. Prerequisite: course 120 and consent of instructor. Limited enrollment. Development of rehearsal process and etiquette, using a variety of scenes from different eras and genres. May be repeated up to eight units for credit. The course has facilitated the enabling of visiting artists in residence to undertake the instruction, as well as faculty. Therefore, this course may be taken twice, as students will be exposed to different professional practitioners’ working processes. New studies, scripts and scenes must be undertaken in the repetition. Offered irregularly. GE credit: OL, VL

121C. Advanced Acting: Character and Style (4)
Lecture/lab—6 hours. Prerequisite: course 120 and consent of instructor. Limited enrollment. Study of psycho-physical techniques to create characters with an emphasis on non-realistic styles. May be repeated up to eight units for credit. Since acting requires repetition to habituate the body and imagination to new practices, this course may be taken twice. New scripts and scenes must be undertaken in the repetition. Offered irregularly in alternate years. GE credit: ArtHum| OL, VL

122A. Advanced Acting: Devising and Collaboration (4)
Lecture/lab—6 hours. Prerequisite: course 120 and consent of instructor. Limited enrollment. Study and practice of various devising techniques, to collaborate on and produce a series of short etudes and dramatic scenes/sharp plays. May be repeated up to eight units for credit. Since acting requires repetition to habituate the body and imagination to new practices, this course may be taken twice. New scripts and scenes must be undertaken in the repetition. Offered in alternate years. GE credit: ArtHum| OL, VL.—Lichtenfels

122B. Advanced Acting: Shakespeare and His Contemporaries (4)
Lecture/lab—6 hours. Prerequisite: course 120 and consent of instructor. Limited enrollment. Study and performance of classical texts (monologues and dialogues), with a focus on Shakespeare and the Elizabethan world view. May be repeated up to eight units for credit. Since acting requires repetition to habituate the body and imagination to new practices, this course may be taken twice. New monologues and scenes must be undertaken in the repetition. Offered in alternate years. GE credit: OL, VL.—Lichtenfels

122C. Advanced Acting: Special Topics in Acting (4)
Lecture/lab—6 hours. Prerequisite: course 120 and consent of instructor. Restricted to Theatre and Dance majors. Intensive study and practical exploration of a specialized area; for example, World Theatre, Social Theatre, Physical Theatre, Musical Theatre, the Ancient Greeks, etc. At least eight units for credit. Offered irregularly. GE credit: AH, OL, VL

124A. Principles of Theatrical Design: Scenery (4)
Lecture/discussion—4 hours. Prerequisite: course 24 or consent of instructor. Pass One restricted to Theatre and Dance majors. Scenic design processes, working drawings, sketching techniques, scale models, methods and materials of scenery construction. GE credit: ArtHum| AH, VL—lacovelli

124B. Principles of Theatrical Design: Lighting (4)
Lecture/discussion—4 hours. Prerequisite: course 24 or consent of instructor. Pass One restricted to Theatre and Dance majors. Analysis of plays in terms of scenic design, elements of design, execution of designs for modern and period plays. GE credit: ArtHum| AH, VL—lacovelli

135. Voice in Performance (2)
Performance instruction—4 hours. Prerequisite: course 21B or consent of instructor. Progression of exercises to free, develop and strengthen the voice, as a human and then as an actor’s instrument with emphasis on how the voice works, to freeing the channel for sound, to interpersonal communication. May be repeated twice for credit.

140A. Dance Composition (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 40A or 41A or 42A or consent of instructor. Introduction to the craft of choreography. Compose phrases and present movement studies based on the elements of choreography: motivation, space, time, force/energy. GE credit: VL—Grenke

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 alternative forms and genre. May be repeated twice for credit.

140C. Dance Composition (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: courses 140A, 140B. Continuation of study of choreography focusing on separate groups. The relation between dance and allied media: music, sets, costumes and lighting. Students conceptualize a choreographic issue and explore it through creation of short dance studies. —Grenke

141. Introduction to the Fundamentals of Movement (4)
Lecture/discussion—4 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 various body mind specialists including Laban, Feldenkrais, Bartenieff and Sweigard as well as the eastern discipline of Yoga. GE credit: VL—Grenke

142. History of Modern Dance (4)
Lecture/discussion—4 hours. Modern Dance tradition, focusing on its theorizations of individual and social identity. Students will write and choreograph analyses of principle dances in this tradition. Offered in alternate years. GE credit: ArtHum| AH, VL, WE—Grenke

143. Dance and Movement Studio (1-4)
Laboratory/discussion—2-8 hours. Prerequisite: consent of instructor. Special studies in dance and movement such as African, Balinese, Baroque, Chinese, European, and stage combat. Offered as needed for stage productions. May be repeated up to eight units for credit. GE credit: ArtHum| AH, VL—lacovelli

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 or SocSci, DW| AH, SS—Hunter

144A. Introduction to Traditional Chinese Embodied Culture (4)
Laboratory/discussion—4 hours. Traditional Chinese Wushu practices, explored through practical work in dance laboratory conditions. Integration of
144B. Traditional Chinese Physical Culture (4)
Lecture/discussion—4 hours. Prerequisite: course 144A. Traditional Chinese Wushu practices, explored through work in dance laboratory conditions. Integration of practice with conceptual analysis; critical phases around values and ethical action. May be repeated two times for credit when content or instructor varies and if student progression is required. GE credit: ArtHum or SocSci, Div | AH or SS, DD, VL, WC. — Hunter

144C. Daoist Philosophy in Traditional Chinese Movement Culture (4)
Lecture/discussion—4 hours. Prerequisite: course 144B. Daoist practices of movement and their relation to daoist philosophy, explored through work in dance laboratory conditions. Integration of practice with conceptual analysis, and critical phases around values and ethical action. May be repeated two times for credit when content or instructor varies and if student progression is required. GE credit: ArtHum | AH, DD, VL, WC. — Hunter

145. Directed Choreography Projects (4)
Lecture/laboratory—6 hours. Prerequisite: courses 140A, 140B, 140C or consent of instructor. Conceptualization, creation, casting, rehearsing, and completing presentation of complete dances, with students integrating elements of stagecraft and directing the on-stage rehearsals. — Grenke

146A. Professional Track Modern Dance I (4)
Lecture/laboratory—6 hours. Prerequisite: course 146A; 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. GE credit: VL. — Grenke

146B. Professional Track Modern Dance II (4)
Lecture/laboratory—6 hours. Prerequisite: courses 40B and 146A; consent of instructor. Continuation of course 146A. Body and space relationships in solos, duets and group work; stylistic variations of Graham technique, works of Paul Taylor. May be repeated one time for credit. GE credit: VL. — Grenke

146C. Professional Track Modern Dance III (4)
Lecture/laboratory—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, muscle. May be repeated one time for credit. Offered irregularly. GE credit: VL. — 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 | ACGH, AH, DD, VL, WE.

151. Australian Performance and Culture (4)

154. Asian Theatre and Drama: Contexts and Issues (4)
Lecture/discussion—4 hours. Selected Asian plays and performance forms in their cultural and artistic contexts; myth, ritual and the theatre; performance training, visual contents of the text; political, philosophical, intercultural performance-the fusion of Asian and Western traditions. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, WC, WE.

155. Representing Race in Performance (4)
Lecture—4 hours. Representation and performance of “race” in Asian culture featuring different subheadings such as “Asian-Americans On Stage,” “Asian-Americans in Performance,” or “Asian-Americans on Stage.” May be repeated one time for credit when topic differs. GE credit: ArtHum, Div, Wrt | AH, DD, VL, WC. — Rossi

155A. African American Dance and Culture in the United States, Brazil and the Caribbean (4)
Lecture/discussion—4 hours. Comparative study of the African American dance forms in the U.S.A., Brazil, Haiti, Cuba, Jamaica, Barbados, and Trinidad. Examination of ritual, folk, and popular dance forms and the socio/historical factors that have influenced these formal dance courses in African American and African Studies. Offered in alternate years. GE credit: ArtHum | AH, VL, WC.

155B. Ancient and Contemporary Greek Theatre and Dance (6)
Discussion/laboratory—10 hours; performance instruction—10 hours; seminar—13 hours. Origins of early theatres and the first actors, playwrights and dancers and their powerful influence on western performance. Fought up to the present day. Offered in Greece. GE credit: ArtHum | AH.

156AN. Performance Analysis (4)
Lecture—3 hours; discussion—1 hour. Performance on the stage, in the street, in everyday life, ritual, and in politics. Satire, irony, creative protest and performance as political statement, the state, and performance as tactical intervention. GE credit: ArtHum, Div, Wrt | AH, DD, WE. — Bogad

156B. Theatre in History and Place: Local, National and Global Conditions for Production (4)
Lecture—3 hours; discussion—1 hour. Exploration of local, national and global issues in theatre production, with special attention to historical changes in social and political conditions. GE credit: ArtHum, Div, Wrt | AH, WE, WC. — Hunter

156C. Modern Aesthetic Movements in Performance (4)
Lecture/laboratory—3 hours; discussion—1 hour. Prerequisites: permission of instructor. Important movements in performance, especially theatre and dance, from realism to the present. Primary emphasis on Western traditions through others may be studied. GE credit: ArtHum, Div, Wrt | AH, WE, WC. — Hunter

156D. Theatre History through Shakespeare (4)
Lecture—4 hours; extensive writing. Shakespeare’s plays, theatre history, and theatre today. European contexts from 1590-2004 and international theatrical theatre from 20th century. Stagecraft, different media (print, stage, film), social/political environments, design, and cultural change (gender, sexuality and ethnic). May be repeated one time for credit. ArtHum, Div, Wrt | AH, OL, WC, WE.

158. Performance Studies Undergraduate Seminar (4)
Seminar—4 hours. Prerequisite: course 155AN recommended; 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 relation to the subject of inquiry. May be repeated for credit. Offered irregularly. GE credit: Wrt. — Bogad

159. Contemporary Experimental Performance, Theatre and Drama (4)
Lecture/discussion—4 hours; extensive writing. Evaluation and examination of the “New Theatre,” its experimental and innovative nature since the 1960s. Dance, film, stage, performance art and public acts of a performative nature. May be repeated three times for credit when topic differs. GE credit: AH, DD, VL, WC, WE.

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 1960s. Dance, film, stage, performance art and public acts of a performative nature. May be repeated for credit if instructor or content varies. Offered irregularly. GE credit: ArtHum | AH, WE. — Su

160A. Principles of Playwriting (4)
Lecture/discussion—4 hours. Prerequisite: two courses in Theatre and Dance or related courses in other departments; consent of instructor. Analysis of dramatic structure; preparation of scenarios; the composition of plays. GE credit: WE. — Rossi

160B. Principles of Playwriting (4)
Lecture—4 hours. Prerequisite: course 160A; consent of instructor. Analysis of dramatic structure; preparation of scenarios; the composition of plays. GE credit: WE. — Rossi

170. Media Theatre (4)
Lecture—1 hour; rehearsal—2 hours; performance instruction—1 hour. Prerequisite: consent of instructor. New media and application of in theatre devising and performance. Emphasis on collaborative process in relationship to integration of emerging technologies and formation of theatrical works. Development of collaborative performance through lecture, demonstration, improvisation and experimentation. May be repeated one time for credit. GE credit: ArtHum | AH, VL.

174. Acting for Camera (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: consent of instructor. Analysis and practice of acting skills required for camera work and digital media. May be repeated eight times for credit when content or instructor differs. (Same course as Cinema & Technocultural Studies 174.)

175. Small Scale Film Production (4)
Lecture/laboratory—6 hours. Prerequisite: consent of instructor. Lecture and intensive workshop teaching small-scale film production. Assignments as n/directors, director of photography, actor, writer, lighting designer, sound designer and other critical positions are used to produce and submit a short film to a film festival. (Same course as Technocultural Studies 175.) May be repeated two times for credit.

180. Theatre Laboratory (1-5)
Prerequisite: consent of instructor. Projects in acting, production, scene design, costuming, lighting, directing, and playwriting. Participation in departmental productions. May be repeated for credit. — F, W, S. (J, W. S.)

180A. Theatre Laboratory: Performance (1-5)
Rehearsal—12 hours. Prerequisite: consent of instructor. Limited enrollment. Rehearsal and performance of a production directed or choreographed by visiting Granada Artists-in-Residence and/or faculty, and/or the UG Edge Festival. May be repeated for credit. Since each production involves different scripts, directions, challenges of rehearsal practices and performance processes, it is possible for students to appear in a variety of productions in the course of their education. Admission by audition.

180B. Theatre Laboratory: Design (1-4)
Prerequisite: consent of instructor. Design-related participation in theatre design and production processes involves research, creation and implementation of design concept in collaboration with the director and other members of the production team. May be repeated for credit. Because each technical piece is conceived and produced afresh with new source material, scripts, and production style the challenges and assignments for the designers will be new each and every time they design a show. GE credit: ArtHum | AH, VL.

180C. Theatre Laboratory: Management, Directing, other Production Team (1-5)
Prerequisite: consent of instructor. Participation in theatre and dance productions management, direction, choreography, dramaturgy, writing or other
195. Senior Capstone Experience (2)
Project; lecture/discussion—1 hour. Open to Theatre and Dance Majors who have completed 135 more units. Consent of instructor. Examination, reflection and synthesis on development. Discussion of professional development and translatable skills. Individual project and development of portfolio. (P/NP grading only.) GE credit: ArtHum | AH, VL.

196. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

197. Tutoring in Dramatic Art (1-5)
Tutoring—1-5 hours. Prerequisite: upper division or consent of department chairperson. Leading of small volunteer groups with members of the department. May be repeated for credit.

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. Group study focusing primarily on one discipline: scenic, costume or lighting design. May be repeated up to five times for credit.

199. Special Study for Advanced Undergraduates (1-5)
Prerequisite: consent of instructor. (P/NP grading only.)

Graduate
200. Methods and Materials in Theatre Research (4)
Seminar—3 hours; term paper. Essential research tools in theatre and related fields; bibliographies, primary sources; methods of evaluating and presenting evidence; dealing with research areas in the field.

211. Advanced Voice and Speech (3)
Lecture/discussion—2 hours; laboratory—2 hours. Prerequisite: consent of instructor. Open only to Dramatic Arts Students and Ph.D. students with an emphasis in Performance Studies. Review of a progression of exercises to free, develop and strengthen the voice, first as a human instrument, and then as an actor’s instrument using various texts such as Shakespeare, Ibsen and contemporary plays. Required for the M.F.A. degree in Acting. May be repeated up to five times for credit.

212. Advanced Stage Movement (3)
Laboratory—8 hours. Prerequisite: consent of instructor. Group study focusing primarily on one discipline: scenic, costume or lighting design. May be repeated six times for credit.

228. Seminar in Directing Theory: Non-Realism (4)
Seminar—2 hours; laboratory—2 hours; rehearsal—4 hours. Prerequisite: consent of instructor. Projects in selecting scenes selected from plays from ancient Greece to the present. May be repeated two times for credit.

230. Advanced Problems in Choreography and Performance (2)
Lab/drama/concert—2 hours. Prerequisite: consent of instructor. Explores contemporary issues of choreography and performance in depth and how those issues pertain to performance work. Focus will include contemporary thought on representation, legibility, new forms, and cultural attitudes. May be repeated six times for credit.

244. Critical Approaches to Traditional Systems of Body Movement (4)
Discussion/laboratory—2 hours/project; term paper. Prerequisite: consent of instructor. 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. Offered irregularly.

250. Modern Theatre (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor. The theatre of Europe and America, 1860-1940, with emphasis on the relationship of the dramas of the period to the physical circumstances under which they were produced.

251. Scoring and Scripting in Performance (4)
Lecture—2 hours; laboratory—2 hours. Prerequisite: consent of instructor. Process of weaving together various performance elements brought into play by the artists in their respective fields. The script is the thread from which the artists “scores” will layer and transform the “script” into performance for specific time, place, spectators. Offered in alternate years.
252. Performance: Concepts of Space, Place, and Time (4)
Lecture—2 hours; laboratory—2 hours. Prerequisite: consent of instructor. Innovative theories of creating performance spaces, establishing a sense of place, and communicating the concept of time explored through collaboration. Required reading includes traditional principles, site-specific spaces and consideration of various tempi from music and movement. Offered in alternate years.

253. Approaches to Collaboration (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: consent of instructor. Exploration of different approaches to collaboration among artists in different media and their influence on the creative process.

254. Performing Identities/Personae (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: consent of instructor. Historical and contemporary theories of constructing stage identities. Discussion and project collaborations based on theories. Questions of identity related to ethnicity, gender, and social and cultural contexts. Offered in alternate years. — S. (S)

255. Composition in the Arts (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: consent of instructor. Examine manner in which specific movements utilized by actors, directors, 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 one time for credit.

256. Visual Language for Performance (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: graduate standing. Restricted to graduate students. Explores a different school of thought with regard to the visual elements of performance. Focus on design style and story for different media and genres, storytelling through visual elements of performance. Offered in alternate years. — Morgen

257. Interdisciplinary Seminar in Theatre, Dance and Performance (1)
Seminar—1.5 hours; project—1.5 hours. Prerequisite: consent of instructor. Restricted to students enrolled in the MFA in Drama; students taking the PhD in Performance Studies or the DE in Studies in Performance and Practice may apply to enroll. Interdisciplinary seminar for first and second year MFA students in Dramatic Art. Topics range from current practice in dance, theatre, film and performance, to leading edge developments by outstanding practitioners in the field. May be repeated for credit.

259. Topics in Contemporary Theatre and Performance (4)
Seminar—3 hours; term paper. Prerequisite: consent of instructor. 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 Theatre," "Race and Gender in Performance." May be repeated for credit.— F, W, S.

260. Topics in Contemporary Theatre and Performance (4)
Seminar—3 hours; term paper; project. Prerequisite: admission to any graduate program in the University; consent of instructor. Preference to students enrolled in the Designated Emphasis in Studies in Performance and Practice. Instruction is offered a variety of disciplinary approaches and methodologies in Performance and Practice, with a focus on cross-disciplinary learning and research. Usually offered each quarter. May be repeated for credit when content differs. Offered irregularly.

265A. Performance Studies: Modes of Production (4)
Seminar—3 hours; term paper; project. Prerequisite: consent of instructor. 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. May be repeated three times for credit when topic differs. 

265B. Performance Studies: Signification and the Body (4)
Seminar—3 hours; term paper; project. Prerequisite: consent of instructor. Introduces students to analysis of the body in Western drawing on theoretical models from several fields. May be repeated three times for credit when topic differs. Offered in alternate years.

265C. Performance Studies: Performance and Society (4)
Seminar—3 hours; term paper; project. Prerequisite: consent of instructor. Introduces students to the role of performance (broadly defined), in everyday life, sociopolitical action, identity, social movements, the media, and the state. May be repeated three times for credit when topic differs. Offered in alternate years. — W. S. (W, S)

265D. Performance Studies: Theory, History, Criticism (4)
Seminar—3 hours; term paper; project. Prerequisite: consent of instructor. Introduction to the theory, history and criticism, informing performance studies. May be repeated three times for credit when topic differs. Offered in alternate years.

280. Theatre Laboratory (1-12)
Prerequisite: consent of instructor. Advanced practice in acting, designing, directing, playwriting, and technical theatre may be repeated for credit.

298. Group Study (1-5)
Prerequisite: consent of instructor.

299. Individual Study (1-12)
Prerequisite: consent of instructor. (S/U grading only)

299D. Dissertation Research (1-12)
Prerequisite: consent of instructor. (S/U grading only)

Transportation Technology and Policy
(A Graduate Group)

Susan Handy, Ph.D., Chairperson of the Group
Group Office. 1605 Tilia, Suite 100 530-752-0247; http://www.its.ucdavis.edu

Faculty
Gwen Arnold, Ph.D., Assistant Professor (Environmental Science and Policy)
Francis Assadian, Ph.D., Professor (Mechanical and Aerospace Engineering)
David Bunch, Ph.D., Professor (Graduate School of Management)
Paul Erickson, Ph.D., Associate Professor (Mechanical and Aerospace Engineering)
Yueye Fan, Ph.D., Associate Professor (Civil and Environmental Engineering)
Y. Hossein Farzin, Ph.D., Professor (Agricultural and Resource Economics)
Susan Homma, Ph.D., Professor (Environmental Science and Policy)
John T. Harvey, Ph.D., Professor (Civil and Environmental Engineering)
Miguel Jaller, Ph.D., Assistant Professor (Civil and Environmental Engineering)
Bryan Jenkins, Ph.D., Professor (Biological and Agricultural Engineering)
Alissa Kendall, Ph.D., Associate Professor (Civil and Environmental Engineering)
Cynthia Lin Lowell, Ph.D., Associate Professor (Agricultural and Resources Economics)
Frank Loge, Ph.D., Professor (Civil and Environmental Engineering)
Mark Lubell, Ph.D., Professor (Environmental Science and Policy)
Erich Muehrlegger, Assistant Professor (Economics)
Debbie A. Niemeyer, Ph.D., Professor (Civil and Environmental Engineering)
Jan Ogdén, Ph.D., Professor (Environmental Science and Policy)
David Rapoos, Ph.D., Assistant Professor (Economics)
Simon Sadler, Ph.D., Professor (Design)
Daniel Sperling, Ph.D., Professor (Civil and Environmental Engineering, Environmental Science and Policy)
Stephen M. Wheeler, Ph.D., Associate Professor (Landscape Architecture)
Michael Zhang, Ph.D., Professor (Civil and Environmental Engineering)

Emeriti Faculty
Thomas Cahill, Ph.D., Professor Emeritus (Atmospheric Science and Physics)
Dan Chang, Ph.D., Professor Emeritus (Civil and Environmental Engineering)
Harry Dwyer, Ph.D., Professor Emeritus (Mechanical and Aerospace Engineering)
Mark Francis, M.L.A., Professor (Landscape Architecture)
Andrew A. Frank, Ph.D., Professor Emeritus (Mechanical and Aerospace Engineering)
Robert Johnston, Ph.D., Professor Emeritus (Environmental Science and Policy)
Patricia L. Mokhtarian, Ph.D., Professor Emeritus (Civil and Environmental Engineering)

Affiliated Faculty
Rahman Aaziri, Ph.D., Lecturer (Statistics)
Andrew F. Burke, Ph.D., Research Engineer (Institute of Transportation Studies)
Steven S. Cliff, Ph.D., Research Engineer (Institute of Transportation Studies)
Kenneth S. Kurani, Ph.D., Research Engineer (Institute of Transportation Studies)
Andrew A. Frank, Ph.D., Professor Emeritus (Mechanical and Aerospace Engineering)
Gian-Claudia Sciara, Ph.D., Assistant Professional Researcher (Institute of Transportation Studies)
Gyi Tal, Ph.D., Assistant Professional Researcher (Institute of Transportation Studies)
Thomas Tarttertine, Ph.D., Research Anthropologist (Institute of Transportation Studies)
Christopher Yang, Ph.D., Research Scientist (Institute of Transportation Studies)
Sonia Yeh, Ph.D., Research Scientist (Institute of Transportation Studies)

Graduate Study. The Graduate Group in Transportation Technology and Policy offers the M.S. (Plan I-thesis; Plan II-exam), M.E., and Ph.D. degrees in two areas of specialization: Transportation Technology and 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 vehicle propulsion and 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.

Fall 2011 and on Revised General Education (GE) Art/Arts and Humanities; SCI=Science and Engineering; SOC=Social Sciences; OLS=Other Skills; OLS=Quantitative; SL=Scientific; VL=Visual; WC=World Culture; WE=Writing Experience
Pre-Fall 2011 General Education (GE): ArtHum=Arts and Humanities; SCI=Science and Engineering; SOC=Social Sciences; Div=Diverse; Wrt=Writing Experience Quarter Offered: F=Fall; W=Winter; S=Spring; Su=Summer; 2015-2016 offering in parentheses
Preparation. Applicants will normally be expected to have completed two courses in calculus, one course in economics, and one course each in calculus level statistics and microeconomics. Additionally, students entering the transportation track will need to either 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 I 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 Advisers. Yue-Yue Fan and Alissa Kendall

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 one in the area of Research Design from the following: Transportation Planning, Survey Methods (MTF 200); Research Methods in Environmental Policy (ESP 278), Survey and Questionnaire Research Methods (PSY 207), Design and Analysis of Engineering Experiments (EBS 265), Experimental Design and Analysis (PLS 205), Engineering Experimentation and Uncertainty Analysis (MAE 207), and Statistical Methods for Research (STA 205).

Skill areas core courses: M.S. and Ph.D. students take one in the area of Research Design from the following: Transportation Survey Methods (MTF 200), Research Methods in Environmental Policy (ESP 278), Survey and Questionnaire Research Methods (PSY 207), Design and Analysis of Engineering Experiments (EBS 265), Experimental Design and Analysis (PLS 205), Engineering Experimentation and Uncertainty Analysis (MAE 207), and Statistical Methods for Research (STA 205).

M.S. students take one and Ph.D. students take two in the area of Transportation Models and Quantitative Methods from the following: Applied Linear Programming (ARE 252), Optimization Techniques with Economic Applications (ARE 255), Dynamic Optimization Techniques with Economic Applications (ARE 254), Applied Econometrics (ARE 256), Probabilistic Design and Optimization (ECI 249), Dynamic Programming and Multistage Decision Processes (ECI 253), Discrete Choice Analysis of Travel Demand (ECI 254), Urban Traffic Management and Control (ECI 256), Transportation-Air Quality: Theory and Practice (ECI 269), Quantitative Geography (GEO 200CN), Numerical Optimization (MAT 258A), Variational Analysis (MAT 258B), Applied Statistical Methods: Regression Analysis (STA 108), Applied Statistical Methods: Analysis of Variance (STA 104), Analysis of Categorical Data (STA 138), Design and Analysis of Engineering Experiments (EBS 265), Multivariate Systems and Modeling (PLS 206), or Psychometric Data (PSC 204A, B, C, or D).

Integration and Breadth core courses: M.S. and Ph.D. students take ITS Seminars (ITT 281), Transportation Orientation Seminar (ITT 282), and Research (ITT 299).

Planning and Policy Courses. Approved courses in this area include the following; additional courses may be added upon approval by the Chairperson.


Technology Courses. Approved courses in this area include the following; additional courses may be added upon approval by the Chairperson:

Applied Biological Systems Technology 180, 181N, 182D
Atmospheric Science 116, 270
Applied Science Engineering 170, 2200, 220B
Biological Systems Engineering 216
Civil and Environmental Engineering 143, 149, 161, 162, 179, 242, 244, 250, 253, 256, 257, 269, 282
Computer Science Engineering 168
Environmental and Resource Sciences 131, 136
Electrical and Computer Engineering 207
Mechanical Engineering 134, 151, 163, 188, 216, 217, 218, 226, 234, 236, 258, 269

Other Courses. Approved courses in this area include the following; additional courses may be added upon approval by the Chairperson:

Agricultural and Resource Economics 106, 155, 252, 253, 254, 255, 256
Anthropology 138
Biological Systems Engineering 265
Civil and Environmental Engineering 153, 249, 254
Community and Regional Development 151, 153
Engineering, Biological Sciences 265
Environmental Policy 278 Graduate School of Management 249
Mathematics 108, 227, 258A, 258E
Mechanical and Aeronautical Engineering 207
Nutrition 492A
Plant Sciences 205, 206
Psychology 204A, 204B, 204C, 204D, 205A, 205B, 205C
Sociology 298
Transportation Technology and Policy 200

Courses in Transportation Technology and Policy (TTP)
Graduate

200. Transportation Survey Methods (4) Lecture—4 hours. Prerequisite: Statistics 13; Civil and Environmental Engineering 251 recommended. Description of types of surveys commonly used in transportation demand modeling, including travel and activity diaries, attitudinal, panel, computer, and stated-response surveys. Discussion of sampling, experimental design, and survey design issues. Analysis methods, including factor, discriminant and cluster analysis. Not open for credit to students who have taken Civil and Environmental Engineering 255. (Same course as Geography 281.)—W. (W.)

210. Fundamentals of Transportation Technology (4) Lecture—2 hours; discussion—2 hours. Prerequisite: consent of instructor; Mathematics 21A, 21B, 22A; graduate or junior/senior undergraduate as a technical elective. Limited enrollment. Fundamentals of Transportation Technology is a course designed to prepare students in the basics of thermodynamics, fluid mechanics and heat transfer as they relate to transportation. Not open for credit to students who have completed course 289. (Former course 289.)—F. (F.)

220. Transportation Planning and Policy (4) Lecture/discussion—4 hours. Limited enrollment. Transportation planning process at the regional level, including the role of federal policy in shaping regional transportation planning, tools and techniques used in regional transportation planning, issues facing regional transportation agencies, and potential solutions and strategies. Students having taken this course previously as course 289 cannot repeat it for credit, having taken other course 289 offerings does not preclude taking this course for credit. (Same course as Geography 236.) Offered in alternate years. S. Handy

281. ITS Transportation Seminar Series (1) Seminar—1.5 hours. Transportation seminars by guest speakers, on varied topics. May be repeated for credit. (S/U grading only.)—F. W. S. (F. W. S.) Handy, Sterling

282. Transportation Orientation Seminar (1) Seminar—1 hour. Ten weeks of seminars, introducing various topics in transportation research and education, focusing on topics of particular interest at UC Davis. May be repeated for credit. (S/U grading only.)—F. (F.) Handy

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.)—S. (S.) Sterling

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. F. W. S. (F. W. S.)

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.)—F. W. S. (F. W. S.)

290C. Graduate Research Group Conference (1) Discussion—1 hour. Prerequisite: consent of instructor. Research problems, progress, and techniques in transportation. May be repeated for credit. (S/U grading only.)—F. W. S. (F. W. S.)
292. Internship in Transportation Technology and Policy (1-5)
Prerequisite: second-year standing; approval of project and period of internship. Supervised work experience in transportation studies. May be repeated for credit if topics differ. (S/U grading only.) F, W, S.

298. Group Study (1-5)
Discussion—1-1.5 hours. Prerequisite: consent of instructor. (S/U grading only.)

299. Research (1-12)
Discussion—1-1.2 hours. Prerequisite: consent of instructor. (S/U grading only.)

Professional

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: graduate standing. May be repeated for credit. (S/U grading only.)—F, W, S (F, W, S).

UC Davis Study Abroad

Aliki Dragona, Ph.D., Fadi Fathallah, Ph.D., Faculty Directors
UC Davis Study Abroad
International Center, Suite 1120
530-297-4633; Fax 530-297-4695; studyabroad@ucdavis.edu; http://studyabroad.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 pursue their academic interests in a global context, to learn a language, to gain practical field work, internship or lab experience, to prepare for a job in the global economy and to add distinction to an application for graduate or professional school.

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

UC Davis Study Abroad is home to UC Davis Quarter Abroad, UC Davis Summer Abroad, UC Davis Internships Abroad, UC Davis Seminars Abroad and the University of California Education Abroad Program (UCEAP). UC Davis Study Abroad also provides advising for students interested in non-UC “independent” programs and administers the Non-UC Study Abroad Abroad program. Finally, UC Davis Study Abroad advises and provides student services for international UCEAP Reciprocity students.

UCEAP 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 lead their own study abroad while experiencing the culture firsthand. Some programs include the possibility of internships or field research. In most cases, students attend courses taught by the faculty of the host institution.

UCEAP 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 lead their own study abroad while experiencing the culture firsthand. Some programs include the possibility of internships or 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 to students during their program. Full UC credit is granted for courses satisfactorily completed, and courses are recorded on official UC transcripts. With careful planning, most UCEAP students make normal progress toward their UC degrees, even those students who study abroad for a full year. With approval of major or college advisors, students may earn credit towards their major, minor and general education requirements.

Graduation Requirements. If 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 university, college, and major/minor requirements for their degree.

Although units and grade points earned while studying abroad through UCEAP are incorporated into the University transcript and GPA, departments and majors retain the right to determine which UCEAP 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 will not be required to immediately upon completion of their UCEAP program 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,
- or
- Students who have completed all of their degree requirements following completion of their UCEAP program may satisfy the University residence requirement by completing at least 35 units, including at least 12 units after returning from UCEAP, 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 UCEAP planning process for information on the university residence requirement.

Students may satisfy GE requirements while on UCEAP, but should consult with the Education Abroad Center UC Davis Study Abroad and their college Dean’s office prior to departure for information on the certification process.

Students may participate in UCEAP provided that (1) they will not exceed 225 units prior to their departure and (2) all degree requirements have been fulfilled either before they leave campus or during their time on UCEAP study abroad program. Participants may only return to campus from UCEAP 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 will not be recorded on the student’s UC Davis transcript until after return to campus from abroad.

UC Davis Study Abroad

Aliki Dragona, Ph.D., Faculty Director
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530-297-4633; Fax 530-297-4695; studyabroad@ucdavis.edu; http://studyabroad.ucdavis.edu/

UC Davis Study Abroad offers a number of faculty-led programs abroad, including UC Davis Quarter Abroad, UC Davis Summer Abroad, UC Davis Internship Abroad, UC Davis Seminars Abroad. These programs enable students to study abroad in small program cohorts taught by UC Davis faculty in over 30 countries around the world. Programs are specifically tailored to UC Davis discipline and provide unique opportunities for study, internships, field or lab work, research, and language learning in intimate and engaging environments.

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 two-week seminars to 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, museums, tours, and theatre visits. Many also include field work, internship, or service learning experiences. Financial aid and scholarships apply. Students may participate in UC Davis faculty-led programs 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 course.

In preparation for UC Davis Quarter Abroad, UC Davis Summer Abroad, and/or UC Davis Seminars Abroad, students are urged to take Education Abroad Program (EAP) 90X or 190X.

UC Davis Quarter Abroad

Aliki Dragona, Ph.D., Faculty Director
International Center, Suite 1120
530-297-4633; Fax 530-297-4695; quarterabroad@ucdavis.edu; http://quarterabroad.ucdavis.edu/

Academic Focus. Students can earn 12-28 UC Davis quarter units through 3-6 courses taught abroad. Academic focus varies by program and may include subject area courses, language learning, lab work, internship/field work, and/or practical training experience. Programs range in length from 10 to 16 weeks. UC Davis faculty leaders teach one or more of the courses, while other courses may be taught or co-taught by adjunct faculty of the host country, under supervision by UC Davis faculty. Students may be able to apply earned units towards their major, minor, language, or general education requirements.

UC Davis Summer Abroad

Aliki Dragona, Ph.D., Faculty Director
International Center, Suite 1120
530-757-8308; Fax 530-297-7142; summer-abroad@ucdavis.edu; http://summer-abroad.ucdavis.edu/

Academic Focus. Students earn 8 UC Davis quarter units through two courses taught abroad. All courses are taught by UC Davis faculty, sometimes with select supplemental lectures provided by local partners.

Fall 2011 and on Revised General Education (GE) ACH—Arts and Humanities; ES—Science and Engineering; SS—Social Sciences; ACGH—American Cultures; DD—Domestic Diversity; OL—Other; Quantitative; SL—Social Sciences; VL—Visual; WC—World Cultures; WE—Writing Experience
UC Davis Internships Abroad
Aliki Dragona, Ph.D., Faculty Director
International Center, Suite 1120
530-297-4695, Fax 530-297-4695;
http://studyabroad.ucdavis.edu/

Academic Focus. Students earn 0 or more UC Davis units for internship hours and supplemental instruction. Internship programs are structured around thematic areas of study such as Global Health, Engineering, Business and Communication. Placements are a collaboration between international organizations, UC Davis Study Abroad and the UC Davis Internship and Career Center to ensure the internships meet requirements for credit and relevance to the student area. In addition to internship hours worked, students will take an online course taught by UC Davis faculty that places their internship in a broader social and cultural context. Planned group activities and field trips enhance the formal internship work. Students may be able to apply earned UC Davis units toward their major, minor, or general education requirements. Most placements are in English-speaking environments; some programs require language proficiency.

UC Davis Seminars Abroad
Aliki Dragona, Ph.D., Faculty Director
International Center, Suite 1120
530-297-4653, Fax 530-297-4695;
http://studyabroad.ucdavis.edu/

Academic Focus. Students earn 2-6 UC Davis quarter units through one or more courses taught abroad. These short courses are taught by UC Davis faculty and may be offered as stand-alone programs abroad, or as an instructional component to a course taught during a regular term on campus. A heavy focus on field trips, onsite projects and group activities enhance classroom instruction. Students may be able to apply earned UC Davis units toward their major, minor, or general education requirements. Programs are typically offered in September, June, or during the winter break.

Courses in Education Abroad Program (EAP)

Upper Division

180. Education Abroad: Special Topics (1-12)
Lecture/discussion—3-12 hours; laboratory/discussion—3-12 hours. Prerequisite: open to lower division students attending UC Davis study abroad and international 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)—F, S. (F, S.)

UC Washington Center (UCDC)

Campus Program Office. The Grove (Surge III), Room 1350;
http://washingtonprogram.ucdavis.edu

Residential Program Location. 1608 Rhode Island Avenue, NW, Washington, D.C. 20036

The University of California hosts a system-wide academic and residential program for undergraduate students attending the UC campuses. Housed within the UC Washington Center (UCDC), an 11-story, state of the art facility, convenient to public transportation and located in downtown D.C., the program provides undergraduates an opportunity to enrich their education while in residence for one quarter in the nation’s capital. The program’s principal activities include enrollment in credit-bearing courses, participation in academic internships, and opportunities to explore the many educational, cultural and historical activities in the Washington area.

Program of Study
UCDC is open to undergraduates from all majors who will have upper-division standing by the start of the quarter in which they plan to participate — although not required. A GPA of at least 3.0 is recommended for admission although not required. Applicants are also evaluated based on overall relevant employment, internship, and volunteer experiences, written statement, and letter(s) of recommendation (only one is required).

Academic Year Component (11 weeks). Students earn academic credit and continue to be registered as full-time UC Davis students during the quarter in which they participate.

Internship (Mandatory). Students work from 3-4 days per week as interns in think-tanks, museums, Congress, federal agencies, interest groups, trade associations, research institutions, media corporations, or other organizations related to the interests and objectives of individual students.

Research Seminar (Mandatory). Each student writes a research paper in consultation with Washington Program faculty and graduate fellows. To complete the assignment, students take advantage of the many unique research resources in Washington, D.C.

Elective Seminar Course (Optional). Each student may optionally enroll in one elective upper division seminar course taught at UCDC. These courses vary each quarter from among offerings that typically include international relations, history, political science, public policy and other social studies, the arts and humanities, and science policy. In addition to regular instruction, seminars often include guest speakers, observations of congressional committees and federal agencies, and other relevant Washington experiences.

Courses are taught by UCDC faculty appointed by the various UC campuses, or visiting faculty from the Washington area.

Financial aid eligibility and awards as determined by the home campus is maintained while enrolled in the program, and the aid package can be adjusted to reflect the additional costs of the program.

Summer Component (10 weeks). UCDC also offers a 10-week Summer Program with a credit or non-credit option. The credit option allows students to enroll in courses in addition to working at an internship. Students pay the summer sessions rate per credit hour plus an application fee. The non-credit option (internship only) has no enrollment fee. Both options allow students to participate in many educational, cultural, historical and social activities.

University Graduation Requirements

• All prospective applicants should carefully plan their course programs in order to satisfy university, college, and major/minor requirements for their degree.

• Although units and grade points earned at UCDC are incorporated into the University transcript and GPA calculation, departments and the UCDC must retain the right to determine which UCDC courses will be accepted in satisfaction of major and minor requirements.

• All degree candidates must meet the University residence requirement. Students should consult with their college Dean’s office early during the UCDC planning process for information on the university residence requirement, particularly students who intend to study abroad or participate in UCDC during their senior year.

Recognizing the special value of UCDC, the faculty has approved four exceptions to the usual residence requirement for students participating in the Washington Program:

• Students planning to graduate immediately upon completion of participation in UCDC may satisfy the University residence requirement by completing at least 35 of their final 45 units on the Davis campus immediately preceding entry into UCDC.

• Students who have not finished all of their degree requirements following the completion of their participation in the UCDC program may satisfy the University residence requirement by completing at least 35 units, including at least 12 units after returning from UCDC, on the Davis campus within the final 90 units earned toward the degree.

Students who will not meet the residency requirements outlined may petition their Dean’s office requesting an exception to policy.

• Students may satisfy GE requirements while at UCDC but should consult with their college Dean’s office prior to departure for information on the certification process.

• Students with a large number of units may participate in the UCDC program 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 at UCDC. Participants may only return to campus from UCDC to complete any outstanding degree requirements provided that they can do so within the 225 unit restriction.

Courses in UC Washington Center (WAS)

Optional elective courses listed at http://www.ucdavis.edu/academic/courses.

Upper Division

175. Health Policy and Health Politics (4)
Seminar—3 hours; extensive writing or discussion—1 hour. Restricted to students attending UC Washington Center program. Following the model of a Congressional subcommittee, students study four salient health policy issues for study, research, and development of model policies to address them. (Same course as Public Health Sciences 175W.) GE credit: SocSci, Writ (A-Grade) or Social Sciences, Writ (A-Grade) or Social Sciences, Writ (A-Grade) or Social Sciences, Writ (A-Grade) or Social Sciences, Writ (A-Grade) or Social Sciences.
University Honors Program

David Furlow, Ph.D., Director
Eddy Ruiz, Ph.D., Associate Director

Program Office, 1350 The Grove (formerly Surge 3) 530-752-3225, http://honors.ucdavis.edu/

Faculty
Includes members from various departments across colleges.

The Program of Study
The honors course of study is designed to enhance the undergraduate experience of highly motivated students in all academic pathways. The University Honors Program (UHP) is an interdisciplinary, campus-wide honors program for top students interested in enhancing their education through special courses, close contact with faculty, and dynamic interaction with academic peers.

General Education Honors courses, seminars, and special study opportunities constitute the course offerings of the University Honors Program. First-year and second-year students in the UHP take six General Education honors courses during their first and second year. Upper division and transfer students complete a variety of research projects and service learning opportunities. All students who successfully complete the program receive transcript notation.

UHP courses and seminars are designed to foster critical thinking and analytic improvement, improve oral, written and technical communication skills, enhance research skills, and provide experience with group dynamics and collaborative exploration of problems. Course enrollment is generally limited to 25 students.

Updated program information is available at the UHP website. A complete list of these courses, with course registration numbers, is made available to admitted students through the UHP office.

Only University Honors Program students may register for the courses in University Honors Program (HNR).

Courses in Davis Honors Challenge (HNR)

Lower Division

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—3-36 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. Open to students in the Davis Honors Challenge. Collaborative, multidisciplinary exploration of complex contemporary problems. Focus on critical thinking and analytical interpretation, on oral and written communication, and on the use of electronic media in gathering information. May be repeated for credit. GE credit: Wrt|WE.—F, W, S, Su. (F, W, S, Su.)

98. Directed Group Study (1-5)
Discussion—1-5 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. GE credit: Wrt|WE.—F, W, S, Su. (F, W, S, Su.)

99. Special Study for Undergraduates (1-5)
Independent study—1-5 hours. Prerequisite: student in the Davis Honors Challenge. (P/NP grading only.)

Upper Division

190X. Honors Contract (1)
Independent study or discussion—3 hours. Prerequisite: open only to students in the Davis Honors Challenge. In-depth examination of material in an upper division course or research 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—3-36 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. Seminar (1)
Seminar—3 hours. Prerequisite: consent of instructor. Open only to students in the Davis Honors Challenge. May be repeated for credit. GE credit: Wrt|WE.—F, W, S. (F, W, S.)

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)

Courses in Integrated Studies (IST)

Lower Division

8. Colloquium (1)
Discussion—1 hour. Lectures, films, and readings on the intersection between the arts and sciences. May be repeated for credit. (P/NP grading only).—F, (F)

8A. Special Topics in Natural Science and Mathematics (4)

8B. Special Topics in Humanities (4)
Lecture—3 hours; discussion—1 hour. Limited enrollment. Group study of a special topic in social sciences. Course varies with topic offered. May be repeated for credit. GE credit: ArtHum, Wrt|AH—F, W, S, F, W, S.

8C. Special Topics in the Social Sciences (4)

9. Seminar (1)
Lecture—1 hour. Preparation of a research report. Normally taken with course 8. May be repeated for credit. (P/NP grading only)—F, W, S, F, W, S.

90. Seminar (1)
Seminar—1 hour. Prerequisite: course 9; consent of instructor; completion of 45 units with a minimum GPA of 3.250. Limited to sophomores who participated in the Integrated Studies Honors Program during their freshman year and transfer students by consent of instructor. Interrelation between the arts and sciences, focusing on a special topic. (P/NP grading only)—F, (F)

94. Seminar (1)
Seminar—1 hour. Prerequisite: course 9, consent of instructor and completion of 45 units with a minimum GPA of 3.500. Restricted 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. (P/NP grading only)

Upper Division

190. Topics in Integrated Studies (1)
Seminar—1 hour. Prerequisite: course 9. Discussion of the integration of the arts and sciences, focusing on a special topic. May be repeated three times for credit when topic differs. (P/NP grading only)

194HA. Special Study for Honors Students (4)
Independent study—3 hours; seminar—1 hour. Prerequisite: consent of instructor and completion of 90 units with a minimum GPA of 3.500. A program of research culminating in the writing of a junior honors thesis under the direction of a faculty adviser. May be repeated one time for credit. (Deferred grading only, pending completion of sequence).—F, (F)

194HB. Special Study for Honors Students (4)
Independent study—3 hours; seminar—1 hour. Prerequisite: course 9, consent of instructor and completion of 90 units with a minimum GPA of 3.500. A program of research culminating in the writing of a junior honors thesis under the direction of a faculty adviser. May be repeated one time for credit. (Deferred grading only, pending completion of sequence).—W, (W)

197T. Tutoring in Integrated Studies (1-4)
Tutorial—1 hour. Prerequisite: consent of Director of Integrated Studies Honors Program. Open to students in the Integrated Studies Program only. Tutoring in Integrated Studies courses, usually in small discussion groups. Weekly discussions with the instructor on the subject matter of the course being
University Writing Program

[College of Letters & Science]
Carl Whithaus, Ph.D., Program Director

Program Office, 109 Voorhis Hall
530-752-6283; http://writing.ucdavis.edu

Committee in Charge
Rebekka Andersen, Ph.D. (University Writing Program)
Elizabeth Constanble, Ph.D. (Gender, Sexuality, and Women’s Studies)
Pamela Demory, Ph.D. (University Writing Program)
Daniel Melzer, Ph.D. (University Writing Program)
Dana R. Ferris, Ph.D. (University Writing Program)
Sarah Perrault, Ph.D. (University Writing Program)
Daniel Potter, Ph.D. (Plant Sciences)
Angie Louie, Ph.D. (Biomedical Engineering)
Christopher J. Thaiss, Ph.D. (University Writing Program)

Carl W. Whithaus, Ph.D. (University Writing Program)

Faculty
Rebekka Andersen, Ph.D., Assistant Professor
Dana R. Ferris, Ph.D., Professor
Sarah Perrault, Ph.D., Assistant Professor
Christopher J. Thaiss, Ph.D., Professor
Carl W. Whithaus, Ph.D., Professor

Affiliated Faculty
Sasha Abramsky, M.S., Lecturer
Cynthia J. Bates, M.A., Lecturer
Amy Clarke, Ph.D., Lecturer
Marlene B. Clark, Ph.D., Lecturer

Academic Federation Excellence in Teaching Award
Pamela Demory, Ph.D., Lecturer
Alili Dragona, Ph.D., Lecturer

Academic Federation Excellence in Teaching Award
Laurie Glover, Ph.D., Lecturer
Scott R. Herrng, Ph.D., Lecturer

Academic Federation Excellence in Teaching Award
Brad J. Henderson, Ph.D., Lecturer
Andy Jones, Ph.D., Lecturer
Jeff Magnin, M.A., Lecturer
David Maisel, M.F.A., Lecturer
Sean McDonnell, Ph.D., Lecturer
Heather Milton, Ph.D., Lecturer
Stephen Magagnini, B.A., Lecturer
Pamela J. Major, Ph.D., Lecturer
James McClory, Ph.D., Lecturer
Don Meisenhimer, Ph.D., Lecturer
John Samels, Ph.D., Lecturer
Wrye Sententia, Ph.D., Lecturer
Victor Squillieri, Ph.D., Lecturer

Academic Federation Excellence in Teaching Award
Karma Waltonen, Ph.D., Lecturer

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 writing in the professions. The Professional Writing Program trains advanced undergraduates and places them as interns in K-12 classrooms to improve writing instruction.

Minor Program Requirements:

<table>
<thead>
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<th>UNITS</th>
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<tbody>
<tr>
<td>Professional Writing .............................. 20</td>
</tr>
</tbody>
</table>

One course from each of the following four groups:

- **Group A**: English 100NF, University Writing Program 101, 102A, 102B, 102C, 102D, 102E, 102F, 102G, 102H, 102I, 102K, 102L, 102M
- **Group B**: University Writing Program 104A, 104B, 104C, 104D, 104E, 104F, 104G, 104H, 104I, 104J, 104K, 104L, 104M
- **Group C**: Anthropology 110, 120, Classics 110, Communication 101, 105, 152, Design 145, 149, English 1011, 103, 103Q, English Language/Linguistics
- **Group D**: University Writing Program 100, 112A, 120, 121

Additional units to achieve a total of 20 upper division units are required.

1. Expository Writing (4)
   - Lecture/discussion—2 hours. Prerequisite: completion of Entry-Level Writing Requirement. Composition, the essay, paragraph structure, diction, and related topics. Frequent writing assignments. GE credit: ArtHum 111, Wrt|AH, WE, WE—F, W, S, Su. (F, W, S, Su.)

2. Writing and Visual Rhetoric (4)
   - Lecture/discussion—2 hours. Prerequisite: completion of Entry-Level Writing Requirement. Composition, the essay, paragraph structure, diction, and related topics. Frequent writing assignments. GE credit: ArtHum 111, Wrt|AH, WE, WE—F, W, S, Su. (F, W, S, Su.)

3. Advanced Academic Reading and Writing for Multilingual Students (4)
   - Lecture/discussion—4 hours. Prerequisite: course 21 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 and arguments, and writing with form and clarity. GE credit: ArtHum, Wrt|AH, WE, WE—F, W, S, Su.

4. Introduction to Academic Reading and Writing for Multilingual Students (4)
   - Lecture/discussion—4 hours. Prerequisite: course 21 or English 3 or the equivalent. Reading and writing para- graphs and short multi-paragraph texts for academic purposes. Suitable for students whose primary home language was not English. GE credit: ArtHum, Wrt|AH, WE, WE—F, W, S, Su.

5. Intermediate Academic Reading and Writing for Multilingual Students (4)
   - Lecture/discussion—4 hours. Prerequisite: course 21 or English 3 or the equivalent. Reading and writing multi-paragraph texts for academic purposes. Suitable for students whose primary home language was not English. GE credit: ArtHum, Wrt|AH, WE, WE—F, W, S, Su.

6. Writing Experience (4)
   - Lecture/discussion—4 hours. Prerequisite: course 21 or equivalent. GE credit: ArtHum, Wrt|AH, WE, WE—F, W, S, Su.

7. Writing Experience (4)
   - Lecture/discussion—4 hours. Prerequisite: course 21 or equivalent. GE credit: ArtHum, Wrt|AH, WE, WE—F, W, S, Su.

8. Persuasive Writing for Multilingual Students (4)
   - Lecture/discussion—4 hours. Prerequisite: course 21 or equivalent. GE credit: ArtHum, Wrt|AH, WE, WE—F, W, S, Su.

9. Internship in Writing (1-12)
   - Internship—3-36 hours. Prerequisite: course 21 or English 3 in internships in fields where students can practice their skills. May be repeated for credit for a total of 12 units. (P/NF grading only.)
98. Directed Group Study (1-5)
Prerequisite: course 1 or English 3 or the equivalent; consent of instructor. May be repeated for credit. (P/N grade only.) GE credit: AH, WE.

99. Special Study for Undergraduates (1-5)
Prerequisite: course 1 or English 3 or the equivalent; consent of instructor. (P/N grading only.) GE credit: AH, WE.

Upper Division

100. Genre Theory and Professional Writing (4)
Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 1 or the equivalent; course 10. Introduction to discipline of professional writing. Examination of writing as a social practice, using genre theory as a conceptual framework. Analysis of how genres function rhetorically in specific contexts and how social systems both shape and are shaped by genres. GE credit: AH, WE. —W (Wk)

101. Advanced Composition (4)
Lecture—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. GE credit: ArtHum, Wrt|AH, WE. —F, W, S. Sc; F, W, S, Sc.

102A. Writing in the Disciplines: Special Topics (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors or to students concurrently enrolled in an upper division course in a specific academic discipline or interdiscipli- nary field. Advanced instruction in writing that discipline and practice in effective styles of communication. May be repeated one time for credit if taken in conjunction with a different subject-matter course. GE credit: ArtHum, Wrt|AH, WE. —F, W, S; F, W, S.

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: ArtHum, Wrt|AH, WE. —F, W, S; F, W, S.

102C. Writing in the Disciplines: History (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors in history or to students concurrently enrolled in an upper division course for the history major. Advanced instruction in writing in history. GE credit: ArtHum, Wrt|AH, WE. —W (Wk)

102D. Writing in the Disciplines: International Relations (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors in international relations or to students concurrently enrolled in an upper division international relations or compar- ison science course for the major. Advanced instruction in writing in international rela- tions. GE credit: ArtHum, Wrt|AH, WE. —W (Wk)

102E. Writing in the Disciplines: Engineering (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to upper division stu- dents in the College of Engineering and to students enrolling in an upper division engineering or compu- ter science course for the major. Advanced instruc- tion in writing in engineering. GE credit: ArtHum, Wrt|AH, WE. —F, W, S; F, W, S.

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 and upper division standing. Open to majors in food sci- ence and technology and to students concurrently enrolled in an upper division course in food science and technology. GE credit: ArtHum, Wrt|AH, WE. —S. (S)

102G. Writing in the Disciplines: Environmental Writing (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to students with upper division coursework with an environmental focus. Advancing writing practice in effective styles of communication in the fields of environmental policy, history, or art. GE credit: ArtHum, Wrt|AH, WE. —S. (S)

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 and upper division standing. Open to majors and minors or to students concurrently enrolled in an upper divi- sion course in Human Development or Psychology. Advanced instruction in writing and practice in effective styles of communication in Human Development and Psychology. GE credit: ArtHum, Wrt|AH, WE. —S. (S)

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. Open to majors and minors in ethnic studies, or to students with upper division coursework focusing on race and ethnicity. Advanced instruction in cross-disciplinary writing about race and ethnicity in effective styles of communication. GE credit: ArtHum, Wrt|AH, WE. —F. (F)

102J. Writing in the Disciplines: Fine Arts (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors or to students concurrently enrolled in an upper divi- sion course for the major history. GE credit: ArtHum, Wrt|AH, WE. —W (Wk)

104A. Writing in the Professions: Business (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors and minors in business, administration, or management. GE credit: ArtHum, Wrt|AH, WE. —F, W, S; F, W, S.

104B. Writing in the Professions: Law (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Advanced principles of critical thinking, argumentation, and style, with special emphasis on their application to legal communication. GE credit: ArtHum, Wrt|AH, WE. —F, W, S; F, W, S.

104C. Writing in the Professions: Journalism (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Open to majors and minors in journalism, or to students planning careers in law, busi- ness, administration, or management. GE credit: ArtHum, Wrt|AH, WE. —F, W, S; F, W, S.

104D. Writing in the Professions: Elementary and Secondary Education (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Advanced expository writing in the elementary or secondary school classroom. GE credit: ArtHum, Wrt|AH, WE. —F, W, S; F, W, S.

104E. Writing in the Professions: Health (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1 or English 3 or the equivalent and upper division standing. Advanced expository writ- ing common in the health professions, emphasizing effective communication in such settings and with different audiences. Topics relate to health, disability, and disease. Suitable for students planning careers in professions such as medicine, dentistry, physical therapy, optometry. GE credit: ArtHum, Wrt|AH, WE. —F, W, S; F, W, S.

104F. Writing in the Professions: Health (4)
Lecture/discussion—1.5 hours; web electronic dis- cussion—1.5 hours; extensive writing. Prerequisite: course 1 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

University Writing Program
to students who have taken course 104A prior to Fall

teachers, and non-specialists. Not open for credit

to varied audiences for var-

Communicating effectively about technology and

profits, politics. GE credit: ArtHum|AH, WE.

Lecture/discussion—3 hours; extensive writing. Pre-

require: satisfaction of the upper-division writing require-

ment. Restricted to upper-division students

who have a strong interest in journalism. Counts toward

the writing minor. Instruction in the elements and

practices of science journalism. Offered in alternate

years. GE credit: ArtHum, Wrt|AH, WE. —W.

112A. Introduction to Professional Editing

Lecture/discussion—3 hours; extensive writing. Pre-

require: satisfaction of the upper-division writing require-

ment. Restricted to upper-division students who have satis-

fied the upper-division writing require-

ment; counts toward the writing minor, Group C:

Theory, History, and Design. Introduction to general ed-

ting practices and principles, with an emphasis on

professional editing in organizational contexts,

including academia and the workplace. Extensive

practice in copy, comprehensive, and collaborative

effort. Offered irregularly. GE credit: ArtHum, Wrt|AH, Vl, WE.

120. Rhetorical Approaches to Scientific

and Technological Issues (4)

Lecture/discussion—3 hours; extensive writing.

Restricted to upper-division standing. Application of

rhetorical theories to scientific issues. Topics include:

Rhetorical dimensions of knowledgeable-

ing; scientific voice; rhetorical figures in science;

incommensurability and demarcation; epistemol-

ogy, definition, and classification; science wars;

models of scientific literacy and accommodation,

and impacts of risk communication. Offered in alternate

years. GE credit: ArtHum or ScEng|AH or SE, WE. —W.

121. History of Scientific Writing

Lecture/discussion—3 hours; extensive writing. Pre-

require: upper-division standing. History of scien-

tific writing from the 17th century to the present;

origins and evolution of scientific genres; role of scien-

tific writing in producing scientific knowledge; dis-

cussive differences between disciplines; emergence

of English as a global language of science. Offered

in alternate years. GE credit: ArtHum or ScEng|AH

or SE, SL, WE. —W. Whithaus

190. Capstone Portfolio Seminar

Lecture/discussion—3 hours; extensive writing. Pre-

require: course 100. Open to majors who have com-

pleted 135 units. Capstone course for majors.

Synthesis and application of rhetorical concepts

learned in the major; analysis of professional
digital and print portfolio for graduate school and

career applications. GE credit: WC. —S. (S.)

192. Internship in Writing (1-12)

Internship—36 hours. Prerequisite: upper divi-

sion or English 3 or the equivalent; consent of in-

structor. Internships in fields where students can practice their

skills. May be repeated up to 12 units for credit. (P/NP grading only.) GE credit: AH.

197T. 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 affili-

ated with a writing course. May be repeated up to 10 units for credit. (P/NP grading only.) GE credit: AH.

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.) GE credit: AH.

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.) GE credit: AH, WE.

199. Special Study for Advanced

Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.) GE credit: AH, WE.

Graduate

220. Rhetorical Approaches to Genre

Study (4)

Lecture/discussion—3 hours; extensive writing. Pre-

require: graduate standing or consent of instructor.

Using genre theory and methods of analysis to

understand and prepare to research on different

types of writing in varying academic and profes-
sional contexts. Emphasis on problems in organiza-
tional, professional, and/or interdisciplinary

communication. Offered in alternate years. —F, W. (F, W) Andersen, Ferris, Perrault, Thaiss, Whithaus

250. Writing Assessment

Lecture/discussion—3 hours; extensive writing. Pre-

require: graduate standing or consent of instructor.

Examine key testing and research on the history of

writing assessment; and relationships among

writing tests and methods of teaching writ-

ing; the impacts of Information and Communication

Technology (ICT), and how educational policies both

drive and respond to writing assessments. Offered in alternate years. —(W) Whithaus

253. Writing Program Administration

Lecture/discussion—3 hours; extensive writing. The-

ories, models, and procedures of writing programs,

primarily in higher education. Developmental, first-

year, and advanced writing programs, writing cen-
ters, writing across-the-curriculum programs, writing

minors and majors, and graduate programs in rhet-

oric and composition. Offered in alternate years. —Ferris, Thaiss, Whithaus

270. Theory and Research in Response to

Student Writing (4)

Discussion—3 hours; extensive writing; extensive writ-

ing or discussion; project. Restricted to graduate

standing. Intensive focus on the critical topic of

response or feedback to student writers. Coverage of

philosophy, theory, and empirical research on

teacher written feedback, teacher-student writing

conferences, peer response, and error correction.

Offered in alternate years. —W. (W) Ferris

270. Literacy and Technology (4)

Lecture/discussion—3 hours; extensive writing. Pre-

require: graduate standing or consent of instructor.

Examines how the physical qualities of texts offer dif-

ferent affordances during production and reception;

grounds these discussions in the development of liter-

ary practices and writing technologism from ancient
to contemporary; creates frameworks for research

into literacy, teaching, and textual technologies.

Offered in alternate years. —(W) Andersen, Whithaus

271. Second Language Writing (4)

Seminar—3 hours; extensive writing; project. Prereq-

site: graduate standing. Restricted to graduate stud-

ts. Traces the history of second language writ-

ing theory and research on second language writers in

a variety of academic and professional contexts.

Emphasis on writer characteristics, texts, and con-
texts. Offered irregularly. F. S. (F, S) Ferris

280. Journal Editing Workshop: Writing on

the Edge (2)

Seminar—2 hours. Reading and critiquing manu-

script submissions. Discussing relevant work in the

field of writing studies. Applying writing programs of profes-
sional editing. Developmental editing, copy-editing,

and hypertexts of accepted manuscripts. Soliciting

articles and communicating with contributors. Stu-
dents encouraged to enroll both semesters. May

be repeated for credit. (S/U grading only.) —F, W, (F, W) Masiel

298. Directed Group Study (1-5)

Prerequisite: graduate standing; consent of instruc-
tor. (S/U grading only.)

299. Individual Study (1-12)

Prerequisite: consent of instructor; graduate stand-

ding. (S/U grading only.)
Department of Anatomy, Physiology & Cell Biology. Internships are supervised by a member of the faculty. Offered irregularly. (P/NP grading only.)—F, W, S. (F, W, S.)

Upper Division

100. Comparative Vertebrate Organogeny (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 differentiation is programmed into tissue and organs to perform diverse physiological functions. (Same course as Neurobiology, Physiology, and Behavior 123.)—F, W. (F, W)

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)—F, W, S. (F, W, S.)

199. Special Study for Advanced Undergraduates (1-5)
 Prerequisite: consent of instructor. (P/NP grading only)—F, W, S. (F, W, S.)

Graduate

286. Basics of Microscopy and Cellular Imaging (2)
 Lecture—1 hour; laboratory—2 hours. Prerequisite: graduate standing; consent of instructor. Class size limited to 20 students. Practical applications of basic microscopy 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. Offered in alternate years.—S. Van Winkle

290. Seminar (1)
 Seminar—1 hour. Discussion and critical evaluation of advanced topics and current trends in research. (P/NP grading only.)—F, W, S. (F, W, S.) VanWinkle

291. Topics in Biology of Respiratory System (1)
 Seminar—1 hour. Prerequisite: graduate standing; consent of instructor. Topics concerning structure and function of respiratory system. Possible topics include: lung growth, pulmonary reaction to toxins, pulmonary inflammation, lung metabolism, biology of lung cells, tracheobronchial epithelium, nasal cavity structure and function. May be repeated for credit. (S/U grading only)—F, W, S. (F, W, S.) Pinkerton, W.

298. Group Study (1-5)
 Laboratory—6-15 hours. Prerequisite: consent of instructor. —F, W, S. (F, W, S.) Genetos, Meyers

299. Research (1-12)
 Laboratory—6-36 hours. Prerequisite: consent of instructor. (S/U grading only)—F, W, S. (F, W, S.)

304. Medicine and Epidemiology (VME) Upper Division

158. Infectious Disease in Ecology and Conservation (3)
 Lecture—2 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. Multidisciplinary approach combines perspectives of ecology and veterinary medicine. (S/U grading only.)—W. (W) Foley

198. Directed Group Study (1-5)
 Prerequisite: consent of instructor. (P/NP grading only.)—W. (W)

199. Special Study for Advanced Undergraduates (1-5)
 (P/NP grading only.)—F, W, S. (F, W, S.)

Graduate

201. Emerging Issues at the Interface of Ecosystem, Animal and Human Health (3)
 Lecture—1 hour; discussion—2 hours. Prerequisite: Active student status in MPVM, Master of Public Health programs or graduate groups in Epidemiology, Ecology, Public Health, Comparative Pathology, or consent of instructor. Restricted to 20 students. Principles of one health with emphasis on the relationships and interdependence of environmental, animal and human health. Exploration of critical data gaps needed to achieve sustainability in ecosystems and disease prevention.—F. (F) Johnson

217. Evaluation and Use of Diagnostic Tests (2)
 Lecture—14 sessions; laboratory—6 sessions; discussion—3 sessions. Prerequisite: Preventive Veterinary Medicine 205 or Epidemiology 205; consent of instructor. Class size limited to 30 students. Clinical and epidemiologic properties and application of diagnostic tests for disease, with emphasis on selecting tests; validating, evaluating, and interpreting new tests individually and in aggregate; determining cutoff values; and developing testing strategies. Offered in alternate years.—(S) Hill

225. Retroviral Pathogenesis Seminar/Journal Club (1)
 Discussion—2 hours. Prerequisite: course 158 (must be taken concurrently). Presentation, analysis and discussion of primary literature 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. (S/U grading only.)—W. (W) Foley

298. Group Study (1-5)
 Prerequisite: student in School of Veterinary Medicine consent of instructor. Group study in selected areas of the clinical sciences. (S/U grading only)—F, W, S. (F, W, S.) Martinez

299. Research (1-12)
 (S/U grading only)—F, W, S. (F, W, S.)

Molecular Biosciences (VMB)

Lower Division

92. Internship (1-12)
 Internship—3-36 hours. Prerequisite: lower division standing; 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.)—F, W, S. (F, W, S.)

101Y. Principles of Pharmacology and Toxicology (3)
 Laboratory/discussion—1.5 hours; web virtual lecture—1.5 hours; web electronic discussion—0.5 hour; autotutorial—5 hours. Prerequisite: upper division standing in a science major; Chemistry through organic chemistry and general biology, or consent from instructor; good standing with university; computing capability using MS Word, Excel, and PowerPoint; menu driven software programs, SmartSite, computer, or ready access to a computer, with

Urban Planning

See Environmental Science and Policy, on page 328.

Urology

See Medicine, School of, on page 428.

Vegetable Crops

See Plant Sciences, on page 516.

Veterinary Medicine, School of

Michel D. Laimore, D.V.M., Ph.D., Dean of the School
Patricia A. Conrad, D.V.M., Ph.D., Associate Dean—Global Programs
Jan E. Iwiku, B.V.Sc., Ph.D., Associate Dean—Academic Programs
Sean D. Owens, D.V.M., Associate Dean—Admissions and Student Programs
John R. Pascoe, B.V.Sc., Ph.D., Executive Associate Dean
Isaac N. Pessaah, Ph.D., Associate Dean—Research and Graduate Education Programs
Jane Sykes, B.V.Sc., Ph.D., Interim Associate Dean—Clinical Programs and Director—Veterinary Medical Teaching Hospital
School Office. 530.752.1360; http://www.vetmed.ucdavis.edu/

Departmental Courses

Anatomy, Physiology and Cell Biology (APC)

Lower Division

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. Offered irregularly. (P/NP grading only.)—F, W, S. (F, W, S.)
201. Integrative Pathobiology Core I (5)
Lecture—3 hours; discussion—2 hours. Overview of molecular biology techniques, tissue structure and function, cell membrane pathology and cellular mechanisms of disease including cellular responses and adaptations to stress, cell cycle, cell death, cell biomechanics, vascular disturbances, and mechanisms of neoplasia and tumorigenesis. (W.) (W.)

202. Integrative Pathobiology Core II (4)
Lecture—2 hours; discussion—2 hours. The second required core course in the graduate group with topics in inflammamtion, host-pathogen interaction, regenerative medicine, and conservation and ecosystem health. —S. (J.) Foley

203. Experimental Design and Data Analysis in Pathobiology (2)
Lecture—1 hour, lecture/laboratory—2 hours. Follows two required core courses in courses 201 and 202, for Ph.D. and M.S. students. Goal is to bridge gap between statistics and real-world pathobiology to increase students' skills and independence in experimental design and data analysis. —F. (F.)

214. Vector-borne Infectious Diseases: Changing Patterns (2)
Lecture/discussion—2 hours. Prerequisite: graduate student standing (Ph.D. or M.S.). Restricted to 10 students. Vector-borne infectious diseases and how they relate to changing patterns associated with climatic changes, trade and population movement. Prerequisite: consent of instructor. (S/U grading only).—F. (F.) Coffey, Lanzaro

215. Topics in Virus Research (1)
Discussion—1 hour. Prerequisite: graduate student standing (Ph.D. or M.S.). Restricted to 10 students. Discussion-based seminar covering graduate student virology research, clinical and basic laboratory procedures in clinical virology. May be repeated for credit. (S/U grading only).—F. (F.) Murphy

270. Advanced Immunology (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: Introductory course in immunology. Restricted to graduate student status in the Comparative Pathology Graduate Group: all other students require consent of instructor. Current concepts of immunology with an emphasis on interactions between the host, the environment and the pathogen. These interactions will include those that are protective and successful for the host as well as those that are deleterious. —W. (W.) Stott

290. Seminar (1)
Seminar—1 hour. Prerequisite: graduate level standing. Topics in pathobiology, microbiology or immunology. May be repeated for credit. (S/U grading only).—F. W. S., Su. (F. W. S.)

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).—F. W. S., Su. (F. W. S.)

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).—F. (F.) Brynt

298. Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only).—F. W. S., Su. (F. W. S.)

299. Reading (1-5)
Prerequisite: graduate standing and consent of instructor. (S/U grading only).—F. W. S., Su. (F. W. S.)
Population Health and Reproduction (PHR)

Lower Division

219. 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 agricultural production. (P/NP grading only)—F, W, S. (F, W, S.)

Upper Division

106. Human-Animal Interactions: Benefits and Issues (2)
Lecture—18 sessions; fieldwork—1 session. Prerequisite: upper division standing or consent of instructor. The interrelationships 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.—W. (W.)

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 preparatory medicine. May be repeated for credit. (P/NP grading only)—F, W, S. (F, W, S.)

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. (P/NP grading only)—F, W, S. (F, W, S.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)—F, W, S. (F, W, S.)

Graduate

202. Sampling in Health-Related Research (3)
Lecture—3 hours. Prerequisite: Preventive Veterinary Medicine 403 or the equivalent; consent of instructor. Basic coverage of simple 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.—W. (W.)

203. Multivariate Biostatistics (3)
Lecture—3 hours. Prerequisite: Preventive Veterinary Medicine 402 or 404, or the equivalent; consent of instructor. Multivariate procedures covered are principal component analysis, factor analysis, two- and k-group multivariate analysis, discriminant analysis and repeated measures analysis, cluster analysis, and canonical analysis. Emphasis is on application of procedures. Offered in alternate years.—W.

210. Epidemiological Approaches to Waterborne Zoonotic Pathogens (1)
Lecture—1 hour. Waterborne zoonotic diseases remain a significant cause of human illness. Review key waterborne pathogens, their biology, fate and transport in aquatic systems; on-farm management practices for reducing microbial contamination of California’s fresh and marine aquatic resources from livestock production systems. (S/U grading only)—F, W, S. (F, W, S.)

212. Epidemiology of the Zoonoses (4)
Lecture—1 hour. Waterborne zoonotic diseases remain a significant cause of human illness. Review key waterborne pathogens, their biology, fate and transport in aquatic systems; on-farm management practices for reducing microbial contamination of California’s fresh and marine aquatic resources from livestock production systems. (S/U grading only)—F, W, S. (F, W, S.)

241. Advanced Topics in Canine Genetics and Genomics (2)
Discussion—2 hours. Prerequisite: Genetics 201A, 201C (or equivalents, with consent of instructor). Limited enrollment. In-depth study of topics in canine genomics and genetics. Topics will vary annually, but can 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. Offered every 2 years.—S. Bannasch

Lecture—2 hours; discussion—0.5 hours; laboratory—0.5 hours. Prerequisite: undergraduate genetics and ecology/corporation/business courses recommended. Class size limited to 20 students; graduate students, 2nd or 3rd year veterinary students; advanced undergraduate students with consent of instructor. Introduction to the field of applied ecological genetics to include applications in conservation-ecology, population genetics, population biology, wildlife health and disease ecology. (Same course as Ecology 242.)—F (F.) Ernest

243. Advanced Topics in Conservation Genetics (2)
Discussion—18 sessions; lecture—2 sessions. Prerequisite: graduate level genetics and ecology or consent of instructor. Restricted to 16 students. In-depth study of topics related to the application of genetic tools to wildlife conservation. Topics will vary annually, but may include use of non-invasive methods of genetic assessment and monitoring wildlife populations. Students will lead discussions on assigned readings. May be repeated for credit when topic differs. Offered every 2 years.—F (F.) Sacks

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 Master of Public Health 266.)—S. (S.) Kass

277. Mathematical Models in Epidemiology (3)
Lecture/discussion—2 hours; laboratory—2 hours. Prerequisite: Preventive Veterinary Medicine 403 and Medicine & Epidemiology 405; consent of instructor; although not required, students are encouraged to refresh their knowledge of high school calculus and differential equations. Class size limited to 20 students. Theory of epidemics and mathematical modeling concepts for infectious diseases to include discrete and continuous time models, their use to explore disease dynamics and investigate control strategies for human and veterinary infectious diseases. (Same course as Epidemiology 277.)—S. (S.) Ayl

290. Seminar (1)
Seminar—1 hour. Presentation and discussion of advanced and current topics in population health and reproduction. (S/U grading only)—F, W, S. (F, W, S.)

298. Group Study (1-5)
Prerequisite: consent of instructor.—F, W, S. Su. (F, W, S., Su.)

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only)—F, W, S. Su. (F, W, S., Su.)

Viticulture and Enology

Upper Division

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only)—F, W, S. Su. (F, W, S., Su.)

Graduate

298. Group Study (1-5)
Prerequisite: consent of instructor. (S/U grading only)—F, W, S. Su. (F, W, S., Su.)

299. Research (1-12)
Prerequisite: consent of instructor. (S/U grading only)—F, W, S. Su. (F, W, S., Su.)

Viticulture and Enology

Fall 2011 and on Revised General Education (GE): AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; D——Preparatory Requirements.

Pre-Fall 2011 General Education (GE): ArtHum—Arts and Humanities; SciEng—Science and Engineering; SocSci—Social Sciences; DivD—Diverse; Wrt—Writing Experience
Viticulture and Enology

3,000 for similar courses taken at community college for these and all other preparatory courses. In addition, students’ overall UC GPA must be 2.50 or higher. All courses must be taken for a letter grade.

UNITS

Biological Sciences 1A or 2A .......................... 4-5
Chemistry 2A, 2B, 2C, 8A .......................... 17
Mathematics 1A, 1B, 1C .......................... 3
Physics 1A, 1B or 7A .......................... 4-6

Recommendations. 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 any of these will delay entry into required upper division courses and may thus delay graduation. Some courses may be available at UC Davis during Summer Session:

Chemistry 8B ........................................ 0
Mathematics 168 .................................... 3
Biological Sciences 1C or Plant Sciences 2 .......................... 4-5
Biological Sciences 2 .......................... 3

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 must choose 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:

Preparatory Subject Matter .......................... 44-51

Biological Sciences 1A or 2A and 1C or Plant Sciences 2 .......................... 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

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 must choose particular emphasis on viticulture, enology or economics. Credit may also be earned for foreign language study and internships. Additionally they may work in related fields such as pest management, nursery production and analytical services.

B.S. Major Requirements:

Preparatory Subject Matter .......................... 44-51

Biological Sciences 1A or 2A and 1C or Plant Sciences 2 .......................... 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 .......................... 48-54

Biological Sciences 102, 103 or 105 ......... 3
Microbiology 102, 102L or 101 ......... 5
Plant Sciences 120 or Statistics 106 ......... 4
Courses taught in English will not count as restricted electives by prior arrangement. May be increased to 12 units in exceptional circumstances.

Total Units for the Major: 120-133

Major Adviser. L. Bisson, A. Walker

Related Major Programs.

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 152, Engineering (Chemical Engineering, on page 277), Ecology (A Graduate Group), on page 251, Food Science (A Graduate Group), on page 341, Integrative Genetics and Genomics (A Graduate Group), on page 381, Horticulture and Agronomy (A Graduate Group), on page 370, Microbiology (A Graduate Group), on page 459, Plant Biology (A Graduate Group), on page 513, Plant Pathology, on page 514, Soils and Biogeochemistry (A Graduate Group), on page 553, and Viticulture and Enology (A Graduate Group), on page 588.

Courses in Viticulture and Enology (VEN)

Lower Division

2. Introduction to Viticulture (2)

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. GE credit. SF—F, W, S.

3. Introduction to Wine Making (3)

Lecture—3 hours. Overview of the history of wine, viticulture, fermentation, winery operations, the physiology of wine consumption, wines produced in California and other major wine-producing regions and the sensory evaluation of wine. GE credit: SF, SS—W. (W.)

90X. Lower Division Seminar (2)

Seminar—1 hour; term paper (required)/discussion. Prerequisite: Reading and consent of instructor. Introduction to current issues surrounding wine and health as they relate to diet, nutrition, and toxicology. May not be repeated for credit. GE credit: WE—F, W, S.

99. Special Study for Undergraduates (1-5)

(P/NP grading only.)

Upper Division

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. GE credit: SF—F, W, S.

101B. Viticultural Practices (3)

Lecture—1.5 hours; discussion/laboratory—3.5 hours. Prerequisite: course 2. Theories, principles, and practices of pruning and grapevine propagation. Plant materials and the viticulturist’s role in pest control and weed identification, wood diseases, and frost protection. One field trip required. GE credit: SF—W. (W.)

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. GE credit: SciEng|SF—S. (S.)

110. Grapevine Growth and Physiology (3)

Lecture—3 hours. Prerequisite: course 2. Botanical aspects including morphology and domestication will precede lectures covering flower development and energy budget concepts. Impact of physiological variables such as photosynthesis translocation, mineral nutrition, and water relations on fruit ripening and composition will be covered. GE credit: SciEng|SF—W. (W.)
**Viticulture and Enology**

Wine Microbiology (2)

Lecture—2 hours. Prerequisite: courses 123 and 124, Microbiology 102 and 102L, or Food Science and Technology 102 and 102L; courses 123 and 126 recommended. Nature, development, physiology, biochemistry, and control of yeasts and bacteria involved in the making, aging, and spoilage of wine. GE credit: SciEng | SE, WE. —W (W.) Runnebaum

128N. Wine Microbiology Laboratory (2)

Laboratory—6 hours. Prerequisite: course 123, 124, and 126 (may be taken concurrently). Microbiology 102L or Food Science and Technology 104A and 104L; course 125 and 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. GE credit: SciEng | SE, WE, VL, WE. —W (W.) Bisson

128L. Wine Microbiology Laboratory (2)

Laboratory—6 hours. Prerequisite: course 123, 124, and 126 (may be taken concurrently). Microbiology 102L or Food Science and Technology 104A and 104L; course 125 and 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. GE credit: SciEng | SE, WE, VL, WE. —W (W.) Bisson

will become familiar with basic principles of flavor chemistry, analysis, and formation in fresh and processed foods. Students will critically evaluate flavor chemistry literature. (Same course as Food Science and Technology 213). —S. (J.) Eble, Heymann

215. Sensometrics (3)

Lecture—3 hours. Prerequisite: Food Science and Technology 117 or the equivalent, course 125 and 125L or Food Science and Technology 107A or 107B. Experimental design and statistical analysis, including multivariate analysis and instrumental data in enology and food-related studies. —F. (F.) Heymann

216. Sustainable Vineyard Development (4)

Lecture/discussion—3 hours; fieldwork—3 hours; term paper. Prerequisite: course 101A, 101B, 101C, and one of courses 115 and 118 or consent of instructor; course 110, Soil Science 100, Atmospheric Science 135, Agricultural and Resource Economics 140 recommended. Application of plant, meteorological, soil, water, GIS, and economic sciences to sustainable vineyard development. Preparation of a comprehensive study to determine the viticultural and economic feasibility of a given site for raisin, table, or wine grape production. —F. (F.) Smart

217. Field and GIS Evaluation of Soils (3)

Lecture/lab—3 hours; fieldwork—3 hours. Prerequisite: Plant Sciences 120, 205 or 206; Soil Science 100, 105, or 107; course 101C. Applied Biotechnology 180 recommended; consent of instructor. Principles and practices used to evaluate agricultural soils in the field, including soil pits, soil cores, electrical conductivity meters, ground penetrating radar, geomorphology and surface terrain analysis. Use of geographic information sciences, soil databases, digital elevation models and geostatistics. Offered in alternate years. —W (W.) Smart

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 to the natural products found in wine. Chemicals with a sensory impact will be emphasized, including flavonoids and other phenolics, terpenes and norisoprenoids, pyrazines, oxides, volatiles and other wine constituents. —F. (F.) Waterhouse

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 required. Biological Sciences 100, 103 or 107 or Biological Sciences 105; Chemistry 107B or Chemistry 115 recommended. Open to upper division students in Viticulture & Enology, Food Science and Technology; students in Food Science, Ag & Environmental Chemistry and Viticulture & Enology graduate groups. 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. —S. (J.) Eble

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 participating faculty. Critical analysis of the technical content of published material. —S. (S.)

225. Advanced Sensory Analysis of Wines (3)

Lecture/discussion—2 hours, laboratory—4 hours. Prerequisite: courses 122 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, focusing on basic sensory science methods. Data will be analyzed by analyses of
Viticulture and Enology (A Graduate Group)

Andrew L. Waterhouse, Ph.D., Chairperson of the Group
Group Office. 1204 RMI South 530-752-1852, Fax 530-752-0332; http://vengg.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. Block, Ph.D., Professor (Viticulture and Enology, Chemical Engineering)
Rogier B. Boulton, Ph.D., Professor (Viticulture and Enology, Chemical Engineering)
Dario Cantí, Ph.D., Associate Professor (Viticulture and Enology)
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)
Maria Marco, Ph.D., Associate Professor (Food Science and Technology)
Mark A. Matthews, Ph.D., Professor (Viticulture and Enology)
David A. Mills, Ph.D., Professor (Viticulture and Enology, Food Science and Technology)
Kenneth A. Shackel, Ph.D., Professor (Plant Sciences)
David R. Smart, Ph.D., Professor (Viticulture and Enology)
Li Tian, Ph.D., Associate Professor (Plant Sciences)
M. Andrew Walker, Ph.D., Professor (Viticulture and Enology)
Andrew L. Wolpert, 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, Guldaler, Ph.D., Specialist in Cooperative Extension (Plant Pathology)
Andrew J. McElrone, Ph.D., Assistant Adjunct Professor (Viticulture and Enology)
Jean-Jacques Lambert, Ph.D., Assistant Research Soil Scientist (Viticulture & Enology)
Anita Oberholster, Ph.D., Assistant Specialist in Cooperative Extension (Viticulture and Enology)
Kerri L. Stein, 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. Applications must be submitted online by January 15.

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, microbiology, and economics.

Specific requirements are outlined in detail and may be obtained by visiting http://vengg.ucdavis.edu.

Graduate Advisers. L.F. Bisson, D. Cantí

War–Peace Studies

[College of Letters and Science]
The interdisciplinary minor in War–Peace Studies examines the causes and dynamics of intra- 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 (IGCC).

The minor is sponsored by the International Relations Program.

Minor Program Requirements:

UNITS

19-20

Water Science

See Hydrologic Sciences (A Graduate Group), on page 376; Hydrology, on page 378; and Soil and Water Science, on page 552.

Wildlife, Fish, and Conservation Biology

[College of Agricultural and Environmental Sciences]
John M. Eadie, Ph.D., Chairperson of the Department

Department Office. 1086 Academic Surge 530-752-9796; http://wfcb.ucdavis.edu

Faculty
Louis W. Botsford, Ph.D., Professor
Tim Caro, Ph.D., Professor
John M. Eadie, Ph.D., Professor
Nann A. Fangue, Ph.D., Associate Professor
Douglas A. Kelt, Ph.D., Professor
Brian D. Todd, Ph.D., Associate Professor
Kirby H. Van Vuren, Ph.D., Professor

Emeriti Faculty
Daniel W. Anderson, Ph.D., Professor Emeritus
Joseph J. Cech, Jr., Ph.D., Professor Emeritus
Christopher M. Dewees, Ph.D., Specialist in Cooperative Extension Emeritus
Deborah L. Elliot-Fuk, Ph.D., Senior Lecturer Emerita
Don C. Erman, Ph.D., Professor Emeritus
Nancy A. Erman, M.S., Specialist Emeritus
E. Lee Fitzhugh, Ph.D., Specialist in Cooperative Extension Emeritus
Walter E. Howard, Ph.D., Professor Emeritus
Rex E. Marsh, A.B., Specialist Emeritus
The Major Program

The Wildlife, Fish, and Conservation Biology major deals with the relationships between the requirements 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 sciences, with specialization in one of four areas. The major is designed primarily for students interested in becoming professionals in the diverse fields of wildlife, fish, and conservation biology, including veterinary and wildlife health sciences. The breadth of course requirements, when combined with electives, also make this an excellent preparatory major for secondary school teaching. Certification by professional societies such as The Wildlife Society, American Fisheries Society, or the Ecological Society of America, or preparation for graduate study may also be achieved by careful planning of electives with a faculty adviser.

Career Alternatives

The major prepares students to excel in the dynamic fields of environmental and conservation biology, emphasizing vertebrate animals—both native and invasive—in their natural environments, as well as resolution of conflicts between humans and wild animals. Positions now held by graduates of this major include wildlife biologist, fisheries biologist, wildlife damage management, and resource biologists and managers with local, state, and federal agencies, biologists or consultants with private industries such as environmental consulting firms, commercial fishing businesses, electrical utilities, sporting clubs or businesses, and aquaculture operations, as well as veterinarians, medical physicians, and professors/researchers who teach and/or conduct research in academic institutions.

B.S. Major Requirements:

<table>
<thead>
<tr>
<th>Written/Oral Expression</th>
<th>7-8</th>
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<tbody>
<tr>
<td>University Writing Program 1, 2, 3</td>
<td>4</td>
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<tr>
<td>Communication 1, 3 or Dramatic Art 10</td>
<td>3-4</td>
</tr>
<tr>
<td>Completing University Writing Program 1 and Communication 1 will simultaneously satisfy the College requirements.</td>
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Preparatory Subject Matter: 50-51

| Biological Sciences 2A, 2B, 2C | 15 |
| Chemistry 2A, 2B, 2C, 2D | 16 |
| Mathematics 1A, 1B | 16 |
| Physics 1A, 1B | 16 |
| Statistics 100, 101, 102 | 120 |
| Wildlife, Fish, and Conservation Biology 10, 11, or 50 | 4 |

Depth Subject Matter: 45-50

Students graduating with this major are required to attain at least a C average (2.000) in all courses taken at the university in depth area of specialization subject matter.

| Environmental Science and Policy 100 or Evolution and Ecology 101 | 4 |
| Evolution and Ecology 101 | 4 |
| Biological Sciences 101-104 | 4 |

Wildlife, Fish, and Conservation Biology 121 or 130 | 4 |

Neurobiology, Physiology and Behavior 102 or Wildlife, Fish, and Conservation Biology 141 | 3-4 |

Wildlife, Fish, and Conservation Biology 122 | 4 |

Wildlife, Fish, and Conservation Biology 154 | 4 |

Choose three lecture courses and two (laboratory) courses from: Wildlife, Fish, and Conservation Biology 110, (111), 111, (111L), 120, (120L), or 134, (134L). |

| 14-15 |

Wildlife, Fish, and Conservation Biology 100, or 101, or 102 & 102L. |

| 4-7 |

Strongly recommended, but not required, Statistics 104, 106, or 108. |

| 4 |

Strongly recommended, but not required, Landscape Architecture 150. |

| 3 |

Strongly recommended, but not required, Anatomy, Physiology and Cell Biology 100. |

| 4 |

Restricted Electives: 12-24

Choose one from the four Areas of Specialization shown below. No course can be used simultaneously to satisfy the Depth Subject Matter and the Area of Specialization.

Areas of Specialization

1. Wildlife and Conservation Biology:

   Complete Wildlife, Fish, and Conservation Biology 151.
   - Choose one course from: Wildlife, Fish, and Conservation Biology 110, 111, 120, 134, 136, 141, 144, 152, 155 & 155L, 156, 157 or 160.
   - Note: Students interested in certification as a Wildlife Biologist from The Wildlife Society should consider additional courses in plant sciences.

2. Fish Biology:

   Complete Wildlife, Fish, and Conservation Biology 120 & 120L.
   - Choose one course from: Entomology 116, Evolution and Ecology 112 or 114.
   - Choose three courses including at least one course from each of the following two groups:
     (a) Aquatic Systems
     (b) Water Policy/Law
        - Choose one course from: Hydrology 150, Environmental Science and Policy 161, 162, 166N or 169.

3. Wildlife Health:

   Complete Wildlife, Fish, and Conservation Biology 151.
   - Complete either Biological Sciences 102 and 103 or Animal Biology 102 and 103.
   - Choose one course from: Wildlife, Fish, and Conservation Biology 110, 111, 120, 134, 136, 141, 144, 152, 155 & 155L or 160.
   - Choose one course from: Animal Science 103, 104, 170, Anatomy, Physiology, and Cell Biology 100, Microbiology 101, 104 Molecular and Cell Biology 150, Neurobiology, Physiology, and Behavior 101, 140, or Veterinary Medicine and Epidemiology 150.

   Note: That this AOS recommends additional preparatory courses; prerequisites for admission to Veterinary Medicine vary among schools and students should confirm the specific requirements of the school(s) to which they wish to apply.

Additional Preparatory (recommended, not required): Chemistry 2C, 118A, 118B, 118C, Physics 7A, 7B, 7C.

(4) Individualized: Students may, with prior approval of their adviser and the curriculum committee, design their own individualized specialization within the major. The specialization will consist of at least four upper division courses with a common theme.

Total Units for the Degree: 114-133

Major Adviser: N.A. Fangue

Minor Program Requirements:

The minor in Wildlife, Fish, and Conservation Biology is designed for students interested in basic training and understanding of the ecology and conservation of wild terrestrial and aquatic vertebrates, emphasizing birds, mammals, amphibians, reptiles, and fish, but with relevance and application to all life forms.

Minor Adviser: N.A. Fangue

Graduate Study: Faculty in Wildlife, Fish, and Conservation Biology are active members of several graduate programs, including the Ecology, Population Biology, Genetics, Animal Behavior, and Avian Science graduate groups. Students interested in graduate studies should see Graduate Studies, on page 121.

Courses in Wildlife, Fish, and Conservation Biology (WFC)

Lower Division

10. Wildlife Ecology and Conservation (4)

Lecture—3 hours; discussion—1 hour. Introduction to the ecology and conservation of vertebrates. Complexity and severity of world problems in conserving biological diversity. GE credit: SciEng, Div Wrt|SE, SL, WE, SL; F, S, F, S, F; S, Fangue, Kelt

11. Introduction to Conservation Biology (3)

Lecture—3 hours. Introduction to conservation biology and controversies surrounding loss of species and habitats for students with no background in biological sciences. Offered in alternate years. GE credit: SciEng, Wrt|SE, SL, WE.

50. Natural History of California's Wild Vertebrates (3)

Lecture—2 hours; discussion—1 hour. Examination of the natural history of California’s wild vertebrates (fish, amphibians, reptiles, and mammals), including their biogeography, systemsatics, ecology and conservation status. GE credit: SciEng, Wrt|SE, SL, WE, WE, W; W, (W)

51. Introduction to Conservation Biology (3)

Lecture—3 hours. Introduction to conservation biology including both biological and social issues related to the loss of species and habitats. Intended for students with no background in biological sciences. GE credit: SciEng, Wrt|SE, SL, SL, S, (S) Caro
92. Internship (1-6)
Internship—3–18 hours. Prerequisite: lower division standing and consent of instructor. Work experience offered on and off campus in all subject areas offered by the department. Internships supervised by a member of the faculty. (P/NP grading only.)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. Special study for undergraduates. (P/NP grading only)—F, W, S (F, W, S)

Upper Division

100. Field Methods in Wildlife, Fish, and Conservation Biology (4)
Lecture—2 hours; laboratory—3 hours; fieldwork—3 hours. Prerequisite: Biological Sciences 2A-2C, Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course (can be taken concurrently) and consent of instructor. Introduction to field methods for monitoring and studying wild vertebrates, with emphasis on field methods for monitoring and studying wild vertebrates. Prerequisite: course 111 or 111L (can be taken concurrently) and consent of instructor. Limited enrollment. Field research in 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. Offered in alternate years. GE credit: SciEng [SE—S.], Eadie, Kelt, Van Vuren

101L. Field Research in Wildlife Ecology: Laboratory (4)
Lecture/discussion—2 hours—2 hours; field work—1-5 hours. Prerequisite: course 101 (may be taken concurrently) and consent of instructor. Limited enrollment. Field research in 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. Offered in alternate years.—F, Eadie, Kelt, Todd, Van Vuren

102. Field Studies in Fish Biology (1)
Fieldwork—15 hours; laboratory—12 hours; discussion/lab—3 hours. Prerequisite: course 102 (may be taken concurrently) and consent of instructor. Field investigations of fish biology are emphasized in this course. Independent research projects on ecology, behavior, physiology or population biology of fishes. Offered irregularly.—S (S)

102L. Field Studies in Fish Biology: Laboratory (6)
Fieldwork—15 hours; laboratory—12 hours; discussion/lab—3 hours. Prerequisite: course 102 (may be taken concurrently) and consent of instructor. Field investigations of fish biology are emphasized in this course. Independent research projects on ecology, behavior, physiology or population biology of fishes. Offered irregularly.—S (S)

110. Biology and Conservation of Wild Mammals (3)
Lecture—3 hours. Prerequisite: Biological Sciences 2A-2C, Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course, can be taken concurrently. Origins, evolution, diversification, and geographical and ecological distributions of mammals, physiological, reproductive, and behavioral adaptations of mammals to their environment.—S (S) Kelt

110L. Laboratory in Biology and Conservation of Wild Mammals (3)
Laboratory—3 hours. Prerequisite: course 110 (can be concurrent) and consent of instructor. Limited enrollment. Laboratory exercises in the morphology, systematics, species identification, anatomy, and adaptations of wild mammals to different habitats.—S (S) Kelt

111. Biology and Conservation of Wild Birds (3)
Lecture—3 hours. Prerequisite: Biological Sciences 2A-2C, upper division ecology course recommended. Physiology, population dynamics, behavior and physiological ecology of wild birds. Emphasis on adaptations to environments, species interactions, management, and conservation. GE credit: SciEng [SE—F] Eadie

111L. Laboratory in Biology and Conservation of Wild Birds (3)
Laboratory—6 hours; laboratory—3 hours. Prerequisite: course 111 or 111L (can be taken concurrently) and consent of instructor. Limited enrollment. Laboratory exercises in bird species identification, anatomy, molts, age and sex, specialized adaptations, behavior, research, with emphasis on methods and techniques. Several weekend field trips, after class bird walks, and independent bird study are required.—F (F) Eadie

120. Biology and Conservation of Fishes (3)

120L. Laboratory in Biology and Conservation of Fishes (2)
Laboratory—3 hours. Prerequisite: course 120 (can be concurrent) and consent of instructor. Limited enrollment. Morphology, taxonomy, conservation, and identification of marine and freshwater fishes with emphasis on California species.—S (F)

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. Offered irregularly. GE credit: SciEng [WRT, SE, W]

122. Population Dynamics and Ecological Genetics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 16A-16B; Statistics 13 or the equivalent; 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, capture-mortality, etc.), mathematical models of populations (e.g., Leslie matrix, logistic, dynamic pool, stock-renewal models).—W (F). Botsford

130. Physiological Ecology of Wildlife (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course. Principles of physiological ecology, emphasizing vertebrates. Ecological, evolutionary, and behavioral perspectives on physiological mechanisms used by animals to adapt to their environment, including consideration of climate-change and other threats to biodiversity. Tropical, temperate, and polar ecosystems are highlighted. GE credit: SciEng [SE—W] (W, W) Fangue

134. Herpetology (3)
Lecture—2 hours; term paper. Prerequisite: Biological Sciences 2A, 2B, 2C, Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent upper division course recommended. Evolution and ecology of distribution, migration, reproduction, and behavior of amphibians and reptiles. Emphasis on adaptations to environments, species interactions, management, and conservation. Offered in alternate years.—W. Todd

134L. Herpetology Laboratory (3)
Laboratory—6 hours. Prerequisite: Biological Sciences 2A, 2B, 2C, Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent upper division course recommended; course 134 concurrently; consent of instructor. Diagnostic characteristics and functional anatomy of amphibians and reptiles, emphasizing ecological, biogeographic, and phylogenetic patterns. Field experience with common species of reptiles and amphibians in the Davis area. Offered in alternate years.—W. Todd

136. Ecology of Waterfowl and Game Birds (4)
Lecture—3 hours; laboratory—3 hours; fieldwork—1 hour. Prerequisite: course 111L or the equivalent, or consent of instructor. Detailed examination of distribution, behavior, population dynamics, and management of waterfowl and upland game birds. Offered in alternate years.—Eadie

141. Behavioral Ecology (4)
Lecture—3 hours; film viewing—1 hour. Prerequisite: Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course. 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.—F (F) Eadie

144. Marine Conservation Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course in introductory ecology. Class size limited to 30 students. Key differences between marine and terrestrial ecosystems, major stressors of marine environments (e.g., fisheries, pollution, bioinvasions, climate change and habitat destruction) and their consequences. Laws and agencies responsible for addressing problems, and the policies used. Offered in alternate years.—F (F) Eadie

150. Urban Wildlife Ecology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 2A, 2B, 2C, or the equivalent. Introduction to the behavioral ecology, population and community ecology of wild vertebrates in urban environments. Effects of urbanization on disease, fitness, and dynamics of animal populations. Conservation and conflict management efforts in urban settings. Offered in alternate years.—W.

151. Wildlife Ecology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A, 2B, 2C or equivalent. Ecology of wild vertebrates, including habitat selection, spatial organization, demography, population dynamics, competition, predation, herbivory, energetics, and community dynamics, set in the context of human-caused degradation of environments in North America.—F (F) Van Vuren

152. Ecology of Human–Wildlife Conflicts (3)
Lecture—3 hours. Prerequisite: Biological Sciences 2A, 2B, 2C, or the equivalent. Ecological approaches to managing wildlife that come into conflict with agriculture, public health, or the conservation of biodiversity. Offered in alternate years.—W. 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 ecotoxicology, examples/case histories, philosophical/mangement consideration. Offered irregularly. GE credit: SciEng [WRT, SE, W]

154. Conservation Biology (4)
Lecture—3 hours; term paper. Prerequisite: Evolution and Ecology 101 or Environmental Science and Policy 100 or the equivalent. Introduction to conservation biology and background to the biological issues and controversies surrounding loss of species and habitats. Review of species’ recovery plan. GE credit: SciEng [SE, W]—F (F) Todd

155. Habitat Conservation and Restoration (3)
Lecture—3 hours. Prerequisite: Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent 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, Writ|SE, VL, WE.

155L. Habitat Conservation and Restoration Laboratory (2)
Fieldwork—3 hours; laboratory—3 hours. Prerequisite: Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course 155 (may be taken concurrently). Analysis of the characteristics of wildlife and fish habitats, application of restoration methods, and evaluation of conservation and restoration projects in the field. Students will also participate during the term in a restoration project. — W (W)

156. Plant Geography (4)
Lecture—3 hours; laboratory—3 hours; term paper. Field trips will be substituted for some in-lab activities. Prerequisite: Environmental Science and Policy 100 or Evolution and Ecology 101; Plant Biology 102 or 108 strongly recommended. Survey of the geographical distribution of vegetation and plant communities, with consideration of the environmental and historical factors that determine these patterns. Conservation and management approaches. Analytical field and lab techniques introduced. Offered irregularly. GE credit: SciEng, Writ|SE, VL, WE.

157. Coastal Ecosystems (4)
Lecture—3 hours; laboratory—3 hours; fieldwork—3 hours. Prerequisite: Environmental Studies 100 or Evolution and Ecology 101; course work in organismal biology, physical geography, and geology recommended. Overview of coastal ecosystems, physical and biological elements and processes, and coastal zones, including sandy, rocky and muddy shorelines, estuaries, dunes and coastal watersheds. Discussion of the role of historical factors and conservation, restoration, and management approaches. Offered irregularly. GE credit: SciEng | SE, VL, WE.

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 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 irregularly.

160. Animal Coloration (3)
Lecture/discussion—3 hours. Prerequisite: Biological Sciences 2A, 2B, 2C. Evolutionary and ecological significance of coloration in mammals, birds, reptiles, amphibians, fish, cephalopods, crustaceans, spiders, insects, and at least two courses in physiology; consent of instructor. Influences of concepts of animal behavior (functional, evolutionary, developmental, mechanistic, and methodological issues) on conservation biology theory and practice. Offered in alternate years. (S—J.) Caro

230. Advanced Physiological Ecology of Wildlife (4)
Lecture—3 hours; discussion—1 hour. Advanced principles of physiological ecology. Ecological, evolutionary and behavioral perspectives on physiological mechanisms used by animals to adapt to their environment in the context of climate change and other threats to biodiversity. Primary literature will form the basis of discussion. — W (W) Fangue

223. Conservation Biology and Animal Behavior (3)
Lecture—1.5 hours; discussion—1.5 hours. Prerequisite: Ecology 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 in alternate years. (S—J.) Caro

262. 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 simple 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. (Same course as Ecology 262.) Offered irregularly.— W (W) Botsford

292. Physiology of Fishes Seminar (1)
Seminar—1 hour. Prerequisite: upper division standing in the biological sciences. Reports and discussions of recent advances related to wildlife and fisheries biology. May be repeated for credit up to 3 times. (P/NP grading only.)—F, W, S (F, W, S.)

191. Museum Science (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: upper division standing and consent of instructor. Principles and techniques required to preserve and present biological specimens for research, teaching collections, and museums. (P/NP grading only.) Offered in alternate years. — W (W) Englis

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.)—F, W, S, Su. (F, W, S, Su.)

195. Field and Laboratory Research (3)
Laboratory—6 hours; discussion—1 hour. Prerequisite: course 190L, 191L, or 120; 121 or 130; Evolution and Ecology 101 or 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. GE credit: SciEng | SE, VL, W; S (F, W, S.)

1977. Tutoring in Wildlife and Fisheries (1-5)
Offered in alternate years. (S/U grading only.)— F (F.)

198. Directed Group Study (1-5)
Offered in alternate years. (S/U grading only.)—F, W, S (F, W, S.)

199. Special Study for Advanced Undergraduates (1-5)
(P/NP grading only.)—F, W, S (F, W, S.)

Graduate

223. Conservation Biology and Animal Behavior (3)
Lecture—1.5 hours; discussion—1.5 hours. Prerequisite: Evolution 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 in alternate years. (S—J.)(Same course as Animal Behavior 294.) Offered in alternate years. — W (W) Caro

230. Advanced Physiological Ecology of Wildlife (4)
Lecture—3 hours; discussion—1 hour. Advanced principles of physiological ecology. Ecological, evolutionary and behavioral perspectives on physiological mechanisms used by animals to adapt to their environment in the context of climate change and other threats to biodiversity. Primary literature will form the basis of discussion. — W (W) Fangue

223. Conservation Biology and Animal Behavior (3)
Lecture—1.5 hours; discussion—1.5 hours. Prerequisite: Evolution 208 or Animal Behavior 221; consent of instructor. Influences of concepts of animal behavior (functional, evolutionary, developmental, mechanistic, and methodological issues) on conservation biology theory and practice. Offered in alternate years. (S—J) Caro

262. 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 simple 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. (Same course as Ecology 262.) Offered irregularly.— W (W) Botsford

292. Seminar (1-3)
Seminar—1 hour. 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.)—F, W, S (F, W, S.)

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.)—F, W, S (F, W, S.)

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.)— S (S.)

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 two times for credit. Offered irregularly. (S/U grading only.)— F (F.)

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 two times for credit. (Same course as Animal Behavior 294.) Offered in alternate years. — W (W) Caro

295. Seminar in Wildlife Ecotoxicology (3)
Seminar—2 hours; term paper. Prerequisite: graduate standing in biology. Presentation and analysis of assigned and researched 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 irregularly. (S/U grading only.)

297. Supervised Teaching in Wildlife and Fisheries Biology (1-3)
Tutorial—3-9 hours. Prerequisite: meet qualifications for teaching assistant; graduate standing; 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.)—F, W, S (F, W, S.)

298. Group Study (1-5)
F, W, S (F, W, S.)

299. Research (1-12)
(S/U grading only.)—F, W, S (F, W, S.) 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. Contact the Department in 1086 Academic Surge Building or telephone 530-752-9796.

Wine Production

Food Science and Technology, on page 341; Microbiology and Molecular Genetics, on page 457; Viticulture and Enology, on page 585.

Women and Gender Studies

See Gender, Sexuality and Women's Studies, on page 349.

Zoology

See Evolution and Ecology, on page 336.