NOTICE: This General Catalog Supplement is not a contract nor an offer to enter into a contract. While every effort is made to ensure the accuracy of the information provided in this General Catalog Supplement, it must be understood that all courses, course descriptions, designations of instructors, curricular and degree requirements and other academic information described herein are subject to change or elimination at any time without notice or published amendment to this General Catalog Supplement. In addition, The University of California reserves the right to make changes at any time, without prior notice, to other programs, policies, procedures and information, which are described in this catalog only as a convenience to its readers. Fees and all other charges are subject to change at any time without notice. Students should consult the appropriate academic or administrative department, school, college, graduate division or other service provider for currently accurate information on any matters described in this General Catalog Supplement; contact information is available at http://www.ucdavis.edu.
• International Commercial Law (A Graduate Group)
• Managerial Economics
• Management, Graduate School of
• Music
• Political Science
• Sociology
• Statistics
• Viticulture and Enology

General Catalog Update, Version 1.3;
6/12/2017
• Anthropology
• Geographic Studies
• Middle East/South Asia Studies
• Native American Studies
• Natural Sciences
• Physics
• Political Science
• Psychology
• Theatre and Dance
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The 2016-2018 UC Davis General Catalog Supplement contains updated information regarding requirements and courses for the 2016-2018 academic years. Use this document in conjunction with the 2016-2018 UC Davis General Catalog. If a department is not listed in this document, there are no changes to that department's programs.

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Introduction

The 2016-2018 General Catalog Course Supplement and Policies & Requirements Addendum addresses important changes to the UC Davis 2016-2018 General Catalog. Changes are contained in two sections; the Course Supplement and Policies & Requirements Addendum.

Course Supplement

Changes, cancellations, or the addition of new courses, are contained in the Course Supplement, below.

Policies and Requirements Addendum

Revised or the addition of new undergraduate/graduate/professional degree programs and requirements, and revised or the addition of new General Catalog policies or procedures are contained in the Policies & Requirements Addendum.

Course Supplement

African American and African Studies

New and changed courses in African American and African (AAS)

Lower Division

12. Introduction to African Studies (4)

Lecture—3 hours; discussion—1 hour. Introduction to African Studies which will focus on the various disciplinary perspectives through which African society and culture are generally studied. A survey of methods, resources and conceptual tools for the study of Africa. GE credit: ArtHum, Div, Wrt|AH, SS, WC, WE.—W. (W.) Adebanwi, Adejumobi

(change in existing course—eff. fall 17)

Upper Division

107B. African Descent Communities and Culture in North America (4)


(change in existing course—eff. winter 17)

Agricultural and Resource Economics

New and changed courses in Agricultural and Resource Economics (ARE)

Upper Division

100A. Intermediate Microeconomics: Theory of Production and Consumption (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A C- or better, Economics 1B C- or better; Mathematics 16A C- or better, Mathematics 16B C- or better, Mathematics 16C C- or better or Mathe-matics 17A C- or better, Mathematics 17B C- or better or Mathematics 21A C- or better, Mathematics 218 C- or better. Pass One open to Managerial Economics (AMGE), Animal Science and Management (AANM), and Textiles and Clothing (ATXC) Majors

100B. Intermediate Microeconomics: Imperfect Competition, Markets and Welfare Economics (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A C- or better. Pass One open to Managerial Economics Majors (AMGE) and Agricultural and Resource Economics (GARE) Graduate Majors. Price determination, and employment of resources under pure competition. Not open for credit to students who have completed Economics 100. GE credit: SocSci|QL, SS.—F, W, S, Su. (F, W, S, Su.)

(change in existing course—eff. spring 17)

106. Econometric Theory and Applications (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A C- or better; Statistics 103 C- or better. Pass One open to Managerial Economics Majors (AMGE) and Agricultural and Resource Economics (GARE) Graduate Majors. Statistical methods for analyzing data to solve problems in managerial economics. Topics include the linear regression model, methods to resolve data problems, and the economic interpretation of results. Not open for credit to students who have enrolled in or completed Economics 140. GE credit: SocSci|QL, SS.—F, W, S, Su. (F, W, S, Su.)

(change in existing course—eff. spring 17)

112. Fundamentals of Organization Management (4)


(change in existing course—eff. fall 17)

121. Economics of Agricultural Sustainability (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A; Mathematics 12; or equivalent of Mathematics 12. Pass One open to Majors in the College of Agricultural and Environmental Sciences and Graduate Majors. Application of economic concepts to agro-environmental issues relevant to agricultural sustainability. Topics include market efficiency, production externalities, government policy, agricultural trade, product differentiation, all linked to sustainability issues. Case studies include biotechs, genetically modified foods and geographically differentiated products. GE credit: SocSci|SS.

(change in existing course—eff. spring 17)

136. Managerial Marketing (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 100B; course 106. Pass One open to Managerial Economics (AMGE), Animal Science and Management (AANM) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Application of economic theory and econometrics to the study of marketing and consumer research. Emphasis on industry structure, history, regulatory aspects, integrated brand promotion, market segmentation, optimal product mix, message placement. GE credit: SocSci|SS.—F, W, S, Su. (F, W, S, Su.)

(change in existing course—eff. fall 17)

143. Investments (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor. Pass One open to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Survey of investment institutions, sources of investment information, and portfolio theory. Analysis of the stock, bond and real estate markets from the perspective of the investor. GE credit: SocSci|SS.—W, Su. (W, Su.)

(change in existing course—eff. winter 17)

144. Real Estate Economics (3)

Lecture—3 hours. Prerequisite: course 100A. Pass One open to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. 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.)

(change in existing course—eff. winter 17)
American Studies

New and changed courses in American Studies (AMS)

Upper Division

101D. Special Topics: American National Character (4)
(canceled course—eff. spring 17)

120. American Folklore and Folklife (4)
(canceled course—eff. winter 17)

160. Undergraduate Seminar in American Studies (4)
Seminar—3 hours, term paper. Pass One restricted to American Studies majors; 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 for credit up to one time when content differs. —W. S. (W.)

Animal Behavior (A Graduate Group)

New and changed courses in Animal Behavior (ANB)

Graduate

203. Advanced Animal Welfare (3)
(new course—eff. spring 17)

Animal Biology (A Graduate Group)

New and changed courses in Animal Biology (ABG)

Graduate

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 for alternate years. —S. (S.) Tucker
(new course—eff. spring 16)

Animal Genetics

New and changed courses in Animal Genetics (ANG)

Upper Division

111. Molecular Biology Laboratory Techniques (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 2C; Biological Sciences 101; Biological Sciences 102 or Animal Biology 102; Biological Sciences 103 or Animal Biology 103. Introduction to the concepts and techniques used in molecular biology; the role of this technology in both basic and applied animal research, and participation in laboratories using some of the most common techniques in molecular biology. GE credit: SciEng | SE, SL, VI, WE, _WF_ F. (F.) Kuehn, Murray

Animal Science

New and changed courses in Animal Science (ANS)

Upper Division

129. Environmental Stewardship in Animal Production Systems (3)
Lecture—3 hours. Prerequisite: course 2, Biological Sciences 2A, 2B, 2C; Chemistry 8A and 8B or 118A and 118B. Management principles of environmental stewardship for grazing lands, animal feeding, and aquaculture operations; existing regulations, sample analyses, interpretation and utilization of data, evaluation of alternative practices, and policy development. Offered in alternate years. GE credit: SciEng | SE, SL, VI, WE, _WF_ F. (F.) Meyer

205. Advanced Nutritional Energics (3)
Discussion/laboratory—1 hour; lecture—2 hours. Prerequisite: Animal Biology 102, Animal Biology 103, Neurobiology, Physiology, and Behavior 101; or the equivalent courses. Class size limited to 30 students. History of nutritional energetics. Evaluation of energy transformations associated with food utilization. Energy expenditures at cellular, tissue, and animal levels as affected by diet and physiological state. Current and future feeding systems. —S. (S.) Sainz
(new course—eff. spring 17)

211. Advances in Animal Biotechnology and Genetics (3)
Lecture/discussion—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 121; Biological Sciences 101; or consent of instructor. Introduction to advanced techniques used for assisted reproductive technologies in mammals and birds, genetic engineering, gene editing, stem cell biology. Offered in alternate years. —S. (S.) Murray, Ross
(new course—eff. spring 17)
136. Techniques and Practices of Fish Culture (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: general biology and chemistry; course 2. Restricted to upper division standing. Daily care and maintenance of fish in residential aquariums, 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: SciEng, WR, SL, VL, WE.—F, W, S; [F, W, S] (change in existing course—eff. winter 17)

Upper Division

125A. Structuralism and Symbolism (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Survey of anthropological approaches to understanding the logic of structuralism and symbolism in cultural analysis. Focus on how structural and symbolic interpretations relate to cultural and linguistic universals and to the philosophical basis of relativism in the social sciences. Former course 125 offered in alternate years. GE credit: SocSci, DIV, SS, WW, WC. GE credit: SocSci, Div | SS, WE, WE. (change in existing course—eff. winter 17)

132. Anthropology of Ocean Worlds (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Exploration of various oceanic cultures and their engagement with the sea. Piracy, smuggling, exchange, maritime legal regimes, offshore policing, media infrastructures, and ocean ecologies. GE credit: SS, WC, WE.—Kahn (change in existing course—eff. winter 17)

135. Media Anthropology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing. Examining human practices through their inscription in old and new media; evaluating the emergent fields of "cyber" and "digital" anthropology; and problematizing terms and concepts routinely deployed in studies of media worlds—platform or social media, hologram, algorithm, remediation, curation, animation. GE credit: AH or SS, VL, WC.—S. (S.) Elhai (change in existing course—eff. winter 17)

144. Contemporary Societies and Cultures of Latin America (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 2 recommended. Introduction to contemporary social structure of Latin America. Origins, maintenance and changes in inequality: economic responses to poverty, sociocultural responses to discrimination, and political responses to powerlessness. GE credit: SocSci, Div, WR | SS, WC, WE.—de la Cadena (change in existing course—eff. winter 17)

147. Dairy Processing and Marketing (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Animal Biology 102, Biological Sciences 201, or consent of instructor. Restricted to upper division standing. Daily care and maintenance of dairy animals and their milking, processing, packaging, and marketing in areas such as genetics, endocrinology, histology and physiological function. GE credit: SciEng | SL, VL, WE.—S. (F) Todgham (change in existing course—eff. spring 16)

148. Biological and Environmental Systems Technology
New and changed courses in Biological and Environmental Systems Technology (ABT)

Upper Division

181N. Concepts and Methods in Geographic Information Systems (4)
Lecture/laboratory—8 hours. Prerequisite: course 150; Landscape Architecture 150, or consent of instructor. Data representation and analysis in geographic information systems (GIS). Creation of spatial data sets from analog and digital sources such as aerial photography and maps; data structures, data management, database design, georeferencing, georectification, surface models, analysis, and spatial data visualization. Offered in alternate years. GE credit: SciEng | SE, SL, VL.—W. Hijmans (change in existing course—eff. winter 18)

Arabic

New and changed courses in Arabic (ARB)

Lower Division

21. Intermediate Arabic 21 (4)
Lecture/discussion—4 hours. Prerequisite: course 3, or consent of instructor. Cardiovascular and/or aural comprehension 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 collateral dialect. GE credit: ArtHum | AH, OL, WC.—F (F) Hassouna (change in existing course—eff. spring 17)

21A. Accelerated Intensive Intermediate Arabic (15)
Lecture/discussion—15 hours. Prerequisite: course 3 or with consent of instructor. Special 12-week accelerated, intensive summer session course that combines the work of courses 21, 22, and 23. Modern Standard Arabic through development of all language skills in a cultural context with emphasis on communicative proficiency. Not open for credit to students who have completed course 21, 22 or 23. Offered irregularly. GE credit: ArtHum | AH, WC.—Su. (Su.) (new course—eff. summer 17)
Art History

New and changed courses in Art History (AHI)

Upper Division

122. Sex and Space (4)
Lecture/discussion—4 hours. Relationship between space and sexuality. Sexual explorations in art and architecture, gender identity formation via images and space. Diverse intersections of sexuality and art history. GE credit: AH, DD, VL, WE.—F (Grigor)
(new course—fall 16)

148. Theory and Criticism: Painting & Sculpture (4)
Lecture—3 hours; term paper. Prerequisite: Art Studio 5 or 7 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
(change in existing course—fall 17)

163D. Art from China 1900 to the Present (4)
Lecture/discussion—4 hours. Forms of modern and avant-garde expression from China’s industrialization to the 21st century. Interactions of art and politics, individuals and state, art for the free market versus art for the state, expressions of modernity; China on the world stage. Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WE, —Burnett
(change in existing course—spring 17)

175. Architecture and Urbanism in Mediterranean Antiquity (4)
Lecture—3 hours; extensive writing. 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, Wrt | AH, VL, WE.—Roller
(change in existing course—fall 17)

187. Contemporary Architecture (4)
Lecture—3 hours; term paper. Introduction to world architecture and urban design since circa 1966. Relation of influential styles, buildings, and architects to postmodern developments in socio-economic, cultural, technological and environmental change. Offered in alternate years. GE credit: ArtHum, Div, Wrt | AH, VL, WE.
(change in existing course—spring 17)

Art Studio

New and changed courses in Art Studio (ART)

Lower Division

10. Fine Art Appreciation (4)
Lecture—3 hours; discussion—1 hour. Survey of contemporary art since 1970. Topics explore contemporary thought within the visual arts using the forms and strategies of painting, sculpture, installation, performance, photography, and video in collabora-

tive, ephemeral and multimedia approaches. Intended for Art and non-Art majors. GE credit: ArtHum | AH, VL.
(change in existing course—fall 17)

Upper Division

103C. Intermediate Drawing: 3 Dimensions (4)
Studio—12 hours. Prerequisite: courses 2. Pass One restricted to Art Studio Major. Intermediate study of drawing composition using three dimensional media. Offered in alternate years. GE credit: ArtHum | AH, VL.—Pardee
(new course—fall 17)

143. Advanced Ceramic Sculpture: Studio Projects (4)
Studio—12 hours. Prerequisite: course 8; course 142A or course 142B or course 142C. Pass One restricted to Art Studio majors. Experimentation with all techniques learned in prerequisite ceramics classes. Course will include class projects in consultation with faculty. May be repeated for credit up to two times; consent of instructor required for students taking the course a third time. GE credit: ArtHum | AH, VL.—Rosen
(change in existing course—spring 17)

Professional

401. Museum Training: Curatorial Principles (4)
Seminar—3 hours; papers. Approved for graduate degree credit. Study of private and public collections. Museum personalites. Appraisal of works of art; ethics of appraisal. Auction and sales; methods and catalogues. Registration. Technical problems of the museum. Connoisseurship. Collaborative reading. Visits to museums. Offered in alternate years. (change in existing course—fall 17)

Asian American Studies

New and changed courses in Asian American Studies (ASA)

Lower Division

A Contemporary Issues of Asian Americans (4)
Lecture—3 hours; discussion—1 hour. Introduction to Asian American Studies through the critical analysis of the impact of race, ethnicity, imperialism, militarism, and immigration since 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, WE, —F, W, S.
(change in existing course—spring 17)

Upper Division

189I. Topics in Asian American Studies: Politics and Social Movements (4)
Lecture—4 hours. Intensive treatment of a topic in Asian American Studies: politics and social movements. May be repeated for credit. Offered irregularly. GE credit: ArtHum or SocSci | ACGH, AH or SS, DD, VL, WE.
(change in existing course—spring 17)

198F. Student Facilitated Course (1-4)
Students facilitated [taught] course intended for upper division students. Offered irregularly (P/NF grading only)
(change in existing course—fall 17)
Astronomy

New and changed courses in Astronomy (AST)

Lower Division

2.5. Introduction to Modern Astronomy and Astrophysics (4)
Lecture—3 hours; discussion—2.5 hours. Prerequisite: good facility in high school physics and mathematics (algebra and trigonometry). Description and interpretation of astronomical phenomena using the laws of modern physics and observations by modern astronomical instruments. Gravity, relativity, electromagnetic radiation, atomic and nuclear processes in relation to the structure and evolution of stars, galaxies, and the universe. Not open to students who have received credit for course 2, 10G, or 1OL. GE credit: SciEng | QL, SE, VL, --F (F. ) Fassnacht, Lubin

(change in existing course—eff. winter 17)

Biological Sciences

New and changed courses in Biological Sciences (BIS)

Lower Division

Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Introduction to basic principles of ecology and evolutionary biology, focusing on the fundamental mechanisms that generate and maintain biological diversity over times ranging from molecules and genes to global processes and patterns. Not open for credit for student who have completed Biological Sciences 1B with a grade of C- or better. GE credit: SciEng | QL, SE, SL, VL, --F, W, S, Su. (F, W, S, Su.)

(change in existing course—eff. fall 17)

Upper Division

132. Introduction to Dynamic Models in Modern Biology (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: Mathematics 16C, Statistics 13, one lower division course in biology, or the equivalents. Dynamic modeling in the biological sciences, including matrix models, difference equations, differential equations, and complex dynamics. Examples include classic models in ecology, cell biology, physiology, and neurosciences. Emphasis on understanding models, assumptions, and implications for modern biology. GE credit: SciEng, Wrt1 | QL, SE, SL, VL, WE.

(change in existing course—eff. spring 17)

Biophotonics

New and changed courses in Biophotonics (BPT)

Graduate

201. Current Topics in Biophotonics and Bioimaging Research (1)
Lecture/discussion—1 hour. Prerequisite: consent of instructor. Designed to help graduate students develop and maintain familiarity with the current and past literature in the field of Biophotonics and Bioimaging research and related areas. May be repeated for credit when topics differ. May be repeated for credit up to four times when subject differs. --F, W, S. (F, W, S.)

(new course—eff. fall 17)

Upper Division

198. Directed Group Study (1-5)
Prerequisite: consent of instructor. Restricted to upper division students. (P/NP grading only.)

(change in existing course—eff. winter 17)

Upper Division

271. Optical Methods in Biophysics (4)
Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: Biological Sciences 102; Applied Sciences 108B; Chemistry 110A; or equivalents. 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.

(change in existing course—eff. spring 17)

Biotechnology

New and changed courses in Biotechnology (BIT)

Lower Division

91. Undergraduate Seminars in Biotechnology (1)
Seminar—1 hour. Undergraduate oriented seminar series focused on biotechnology research and product development. Speakers from campus and the private sectors discuss ongoing research, product development and biotechnology careers. [P/NP grading only]—W. (W.)

(new course—eff. winter 17)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Directed group study. May be repeated for credit. GE credit: SE, --F, W, S, Su. (F, W, S, Su.)

(new course—eff. fall 16)

Upper Division

150. Applied Bioinformatics (4)
Lecture—2 hours; laboratory/discussion—2 hours. Prerequisite: Biological Sciences 101; Computer Science Engineering 10 or Computer Science Engineering 15 or Plant Science 21; Plant Science 120; or Statistics 13 or Statistics 100; or consent of instructor. 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, VL, --Run.

(change in existing course—eff. winter 17)
422. Big Data (2)
Lecture—2 hours. Introduction to business applica-
tions involving storage, streaming, and network-
data. Emphasis on scalable technologies for process-
ing and analyzing big data for diverse applica-
tions. —F. (F)
(new course—eff. fall 17)

423. Data Design and Representation (2)
Lecture—2 hours. Students learn computational rea-
soning about data representations by mapping con-
ceptual data models to relational structures and
analyzing database architectures and design tradeoffs. —F. (F)
(new course—eff. fall 17)

431. Data Visualization (2)
Lecture—2 hours. Extract insights using visualization
tools in R, Python, Manyeyes, HTML/CSS, etc. Stan-
dard (histograms, boxplots, and dashboards) and
specialized (3D, animation, word clouds) formats are covered. —F. (F)
(new course—eff. fall 17)

441. Statistical Exploration and Reasoning (2)
Lecture—2 hours. Introduction to statistical reasoning
and inference extraction from large data-sets. Stu-
dents learn to obtain preliminary insights and form
initial hypotheses through exploratory data analysis
(EDA). —F. (F)
(new course—eff. fall 17)

442. Advanced Statistics (3)
Lecture—3 hours. Continue exploring statistical rea-
soning using maximum likelihood estimation, Bayes-
ian models, nonparametric models, Monte Carlo
Markov Chain, time series, model specification,
model selection, and dimension reduction. —F. (F)
(new course—eff. fall 17)

443. Analytic Decision Making (3)
Lecture—3 hours. Students explore contemporary
and emerging domains for high-yield applications of
analytics. Topics: social network analytics, search
analytics, health care analytics, internet of things,
supply chain/analytics operations, and marketing
analytics. —F. (F)
(new course—eff. winter 17)

451. Practicum Initiation (2)
Lecture—2 hours. Students form teams, scope their
project in light of team capability and business
opportunity, create a preliminary structure and solu-
tion approach for the core problem, and assess data
quality and project risks. —F. (F)
(new course—eff. fall 17)

452. Practicum Elaboration (2)
Lecture—2 hours. Building on problems chosen in
course 451, teams refine the business opportunity
draw insights from exploratory data analysis. —F. (F)
(new course—eff. fall 17)

462. Practicum Elaboration (2)
Lecture—2 hours. Students learn computational rea-
soning about data representations by mapping con-
ceptual data models to relational structures and
analyzing database architectures and design tradeoffs. —F. (F)
(new course—eff. fall 17)

463. Practicum Analysis (2)
Lecture—2 hours. Implement selected analytic
approaches through iteratively refining assumptions
and analysis, synchronizing client requirements with
model results, and creating minimum viable proto-
types. Offered irregularly. —F. (F)
(new course—eff. fall 17)

464. Practicum Implementation (4)
Lecture—2 hours; discussion/labatory—4 hours.
Prerequisite: Biological Sciences 106. Limited enroll-
ment. Course complements Gross Anatomy by
extending the study of structure to the microscopic
level. Shows how cells are assembled into tissues,
and tissues into organs, with an emphasis on demon-
strating how microscopic structure explains function.
GE credit: SE. —W. (W.) Beck, Witt, Simo
(new course—eff. winter 17)

Cell Biology and Human Anatomy

New and changed courses in Cell Biology and Human Anatomy (CHA)

Upper Division

102. Human Microscopic Anatomy; Structure and Function of Human Tissues and Organ Systems (4.5)
Lecture—3 hours; discussion/labatory—4 hours.
Prerequisite: Biological Sciences 106. Limited enroll-
ment. Course complements Gross Anatomy by
extending the study of structure to the microscopic
level. Shows how cells are assembled into tissues,
and tissues into organs, with an emphasis on demon-
strating how microscopic structure explains function.
GE credit: SE. —W. (W.) Beck, FitzGerald, Simo
(new course—eff. winter 17)

Graduate

202. Microscopic Anatomy for Researchers (3)
Lecture—2 hours; discussion/labatory—3 hours.
Open to graduate students in the biomedical sci-
cences (no consent required); advanced undergradu-
ates seeking research careers in the biomedical
sciences (consent of instructor required). The grow-
ing importance of the use of gene knock-out studies
and imaging technology requires significant under-
standing of basic anatomy. Designed to familiarize
students in diverse fields with anatomical, cellular
and tissue organization of typical animal models. —
W. (W.) Beck
(change in existing course—eff. spring 17)

Professional

493. Clinically-Oriented Anatomy Special Study Module (6)
(canceled course—eff. fall 17)

Chemistry

New and changed courses in Chemistry (CHE)

Lower Division

2A. General Chemistry (5)
Lecture—3 hours; laboratory/discussion—4 hours.
Prerequisite: high school chemistry and physics, and
concurrent enrollment in mathematics at or above
the level of Mathematics 12 strongly recommended; any
one of the following: (A) SAI 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
118A. Organic Chemistry for Health and Life Sciences (4)  
Lecture—3 hours; laboratory/discussion—1.5 hours. Prerequisite: course 2C or better or course 2CH C- or better. The 118A, 118B, 118C series is for students planning professional school studies in health and life sciences. Rigorous, in-depth presentation of basic principles with emphasis on stereochemistry and spectroscopy and preparations and reactions of nonaromatic hydrocarbons, haloalkanes, alcohols and ethers. Only 2 units credit for students who have completed course 8A. Not open for credit to students who have completed course 118C. GE credit: SciEng [SE, SL, F, W, F/W] (change in existing course—eff. spring 17)

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 hydrocarbons, aromatic compounds, aldehydes and ketones. —W. S. [W, S] (change in existing course—eff. spring 17)

118C. Organic Chemistry for Health and Life Sciences (4)  
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 118B or courses 128B and 129A. Open to students who have completed course 128A and permission of instructor. Continuation of course 128B course sequence only if they have completed prior organic laboratory work (at least course Chemistry 129A). Continuation of course 118B, with emphasis on the preparation, reactions and identification of carboxylic acids and their derivatives, alkyl and acyl amines, vicarabonyl compounds, and various classes of naturally occurring, biologically important compounds. —F, S. [F/W] (new course—eff. fall 17)

122B. Organic Chemistry (3)  
Lecture—3 hours. Prerequisite: course 122A or consent of instructor. Continuation of course 122A with emphasis on the chemistry of alcohols, ethers, their sulfur analogs, and carbonyl compounds. Introduction to the application of spectroscopic methods to organic chemistry. Introduction to synthesis of moderately complex organic molecules. Full credit to students who have completed 8B or 118A; not open for credit to students who have completed course 118B. GE credit: SciEng [SE, F, S, S] (change in existing course—eff. winter 17)

129A. Organic Chemistry Laboratory (2)  
Lecture—1 hour; laboratory—2 hours. Prerequisite: C or better in course 2C or 2CH; course 129A (may be taken concurrently). Introduction to laboratory techniques of organic chemistry. Emphasis on methods used for separation and purification of organics. Full credit to students who completed course 8B; not open for credit to students who have completed course 118B. GE credit: SciEng [SE, F, W] (change in existing course—eff. winter 17)

129B. Organic Chemistry Laboratory (2)  
Lecture—6 hours. Prerequisite: courses 129A; CHE 128B (can be concurrent). Continuation of course 129A. Emphasis on methods used for synthesis and isolation of organic compounds. Not open for credit to students who have completed course 118C. Not open for credit to students who have completed course 118C. GE credit: SciEng [SE, S, F, S] (change in existing course—eff. winter 17)

130B. Pharmaceutical Chemistry (3)  
Lecture—2 hours; lecture/laboratory—1 hour. Prerequisite: course 130A (can be concurrent). Continuation of course 130A with emphasis on case studies of various drugs and the use of computational methods in drug design. —S. [S] (change in existing course—eff. spring 17)

135. Advanced Bio-organic Chemistry Laboratory (3)  
Lecture—1 hour; laboratory—6 hours. Prerequisite: course 130B (can be concurrent); 130B (can be concurrent). 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. [S] (change in existing course—eff. spring 17)

New and changed courses in Chicana/o Studies

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 and Latinas in the U.S. and their diverse countries of origin. GE credit: ArtHum or SocSci, Div, Wrt1 [ACGH, AH or SS, DD, WE]. (new course—eff. fall 17)

Graduate

241. Community Based Health Research (4)  
Lecture/discussion—3 hours; term paper. Provides knowledge and skills to plan and implement public health projects that highlight the intersection of social determinants of health within a community empowerment framework. —S. [S] Deeb-Sossa, Flores (new course—eff. fall 17)
Chinese

New and changed courses in Chinese (CHN)

Upper Division

107. Traditional Chinese Fiction (in English) (4)
Lecture—3 hours; discussion—1 hour. A comparative approach to Chinese and Japanese poetry, examining poetic practice in the two cultures; includes a general outline of the two traditions, plus study of poetic forms, techniques, and distinct treatments of universal themes: love, nature, war, etc. Offered in alternate years. (Same course as Japanese 108.) GE credit: ArtHum, Div, Wrt | AH, WC. —Yeh (change in existing course—eff. fall 17)

108. Poetry of China and Japan (in English) (4)
Lecture—3 hours; discussion—1 hour. An examination 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 relations between literature, author, society, and culture. GE credit: ArtHum, Div, Wrt | AH, WC. —Yeh (change in existing course—eff. fall 17)

110. Great Writers of China: Texts and Context (in English) (4)
Lecture—3 hours; discussion—1 hour. Examination 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 relations between literature, author, society, and culture. GE credit: ArtHum, Div, Wrt | AH, WC. —Yeh (change in existing course—eff. fall 17)

111. Modern Chinese: Reading and Discussion (12)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 6 C- or better or course 3BL C- or better or course 4A C- or better; or placement exam or consent of instructor. Building on Chinese 6/3BL, further development of communicative skills in Modern Standard Mandarin-speaking environments. GE credit: ArtHum | AH, OW, WC. —Yeh, He (change in existing course—eff. spring 17)

Graduate

297. Directed Independent Study (4)
Term paper; independent study—8 hours; conference—1 hour. Prerequisite: consent of instructor. Restricted to graduate students. Directed independent study on a topic culminating in a term paper. Independent studies may only be arranged with consent of the instructor and when graduate seminars are unavailable. May be repeated for credit up to five times. —F, W, S. —Chen, Chu, Halperin, He, Yeh (new course—eff. winter 17)

Classics

New and changed courses in Classics (CLA)

Lower Division

10Y. Greek, Roman, and Near Eastern Mythology—Hybrid (3)
Lecture—2 hours; web virtual lecture—1 hour. Examination of major myths of Greece, Rome, and the Near East; their place in the religion, literature, and art of the societies that produced them; their subsequent development, influence and interpretation. GE credit: ArtHum | AH, VL, WC. —F, W, S. —Brelini, Rundin, Seal, Uhrig (new course—eff. winter 16)

40. Life and Economy in the Ancient Mediterranean World (4)
Lecture/discussion—3 hours; term paper. Characterization of ancient Mediterranean economies, with emphasis on Greece and Rome. Utilization of archaeological, art historical, and literary evidence. Craft production, labor specialization, trade networks, ancient technology, urban growth, agricultural productivity, coinage systems, and household economies. Offered in alternate years. GE credit: AH, VL, WC, WE. —Stem (new course—eff. fall 16)

Upper Division

103. Love and Beauty in the Ancient World (4)
Lecture/discussion—3 hours; extensive writing—3 hours. Philosophical and literary traditions connect love, beauty, and goodness in ancient thought. Moral and ethical implications, ideologies of sexuality and gender; transmission into the medieval and modern world. Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WC, WE. —F, W, S. —Chin (new course—eff. fall 17)

111. Forms of Knowledge in the Ancient World (4)
Extensive writing—3 hours; lecture/discussion—3 hours. History of knowledge preservation and transfer in the ancient Mediterranean. Oral tradition, technology, innovations, forms of writing, libraries, ancient scholarship, cultural exchange and influence. Offered in alternate years. GE credit: ArtHum, Wrt | AH, VL, WC, WE. —F, W, S. —Uhlig, Webster (new course—eff. fall 17)

170. Cultural Interactions in the Ancient Mediterranean World (4)
Lecture—3 hours; term paper. Exploration of the role of colonial encounters in the spread of ideas throughout the ancient Mediterranean from an archaeological and artistic perspective. Emphasis on material and literary expressions of culture, trade routes, and theories pertaining to culture contact. Offered in alternate years. GE credit: AH, VL, WC, WE. —Stem (new course—eff. fall 16)

175. Architecture and Urbanism in Mediterranean Antiquity (4)
Lecture—3 hours; extensive writing. Architecture and urban development in the ancient Near East, Greece, and Rome. Special emphasis on the social structure of the ancient city as expressed in its architecture, and on the interaction between local traditions and the impact of Greco-Roman urbanism. (Same course as Art History 175.) GE credit: ArtHum, Div, Wrt | AH, VL, WC, WE. —F, W, S. —Raller (change in existing course—eff. spring 17)

Cinema & Digital Media

New and changed courses in Cinema & Digital Media (CDM)

Upper Division

105. Feminist Media Production (6)
Lecture/discussion—3 hours; laboratory—3 hours; fieldwork—6 hours. Prerequisite: Cinema & Technocultural Studies 20 or equivalent; one course in Women and Gender Studies, or consent of instructor. Media production as a mode of cultural criticism, furthering feminist and social justice goals. Fundamentals of camera, editing and distribution via a social engagement model. Study and hands-on response to key historic and contemporary feminist and social justice media discourses. (Same course as Women’s Studies 163.) Offered in alternate years. GE credit: ArtHum, SocSci, Div | AH, SS, ACGH, DD, VL, W. —Wright (new course—eff. fall 17)

124E. Costume Design for Film (4)
Lecture/discussion—4 hours. Prerequisite: Dramatic Art 24; or consent of instructor. Pass One restricted to Theatre and Dance majors. Theory and practice of the art and business of costume design. Script analysis, costume research, developing design concepts, budgeting, and current production practices and methods. Execution of designs for period and contemporary films. Viewing of current films. (Same course as Dramatic Art 124E.) GE credit: ArtHum | AH, OL, VL. —W. —Morgan (new course in existing course—eff. spring 17)

163. Art & Cinema: Between the White Cube and the Black Box (4)
Lecture—3 hours; film viewing—3 hours. Current debates between cinema studies and contemporary art. Issues covered include, experimental modes of filming, montaging, installing, screening, and displaying images between the White Cube (gallery/museum) and the Black Box (cinema). Offered in alternate years. GE credit: ArtHum, SocSci, Div | AH, OL, VL, WE. —W. (Di) Montezemolo (new course—eff. winter 17)

Cinema & Technocultural Studies

New and changed courses in Cinema & Technocultural Studies (CTS)

Upper Division

146B. Modern South Asia Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: upper-division standing or consent of instructor. South Asian cinema of last 100 years in the context of cultural, social, and political changes. South Asian history, Independence, Partition, urban life, class, migration, postcolonial identity, diaspora, gender, sexuality, religion, sport, performance, etc. (Same course as Middle East/South Asia Studies 1318 and Anthropology 147) Offered in alternate years. GE credit: SocSci | AH, SS, VL, WC, WE. (new course—eff. winter 17)
Clinical Research

New and changed courses in Clinical Research (CLH)

Graduate

205. Introduction to Medical Statistics (4) (cancelled course—eff. winter 17)

214A. Biodesign I (2)
Lecture—2 hours. Prerequisite: consent of instructor. Prior approval by instructor required; student must commit to taking both courses; Biodesign I and Biodesign II. Focusses on the principles of needs identification and invention of biomedical technologies. Two part course provides a basic understanding of the elements of the innovation process and how to translate these principles into biomedical device design. F.—F. (F.) Tran (new course—eff. fall 17)

214B. Biodesign II (2)
Lecture—2 hours. Prerequisite: course 214A; consent of instructor. Prior approval by instructor required; student must commit to taking both courses; Biodesign I and Biodesign II. Focusses on the implementation of biomedical technologies and translational process. Two part course provides a basic understanding of the elements of the innovation process and how to translate these principles into biomedical device design. W.—W. (W.) Tran (new course—eff. winter 17)

244. Introduction to Medical Statistics (4)
Lecture—4 hours. Introduction to statistical methods and software in clinical, laboratory and population medicine. Graphical and tabular presentation of data, probability, binomial, Poisson, normal, t-, F- and Chi-square distributions, elementary nonparametric methods, simple linear regression and correlation, life tables. Only one unit of credit for students who have completed Statistics 100 or Preventive Veterinary Medicine 402. (Same course as Public Health Sciences 244.) F.—F. (F.) Beckett (new course—eff. winter 17)

Communication

New and changed courses in Communication (CMN)

Lower Division

1. Introduction to Public Speaking (4)
Lecture—2 hours; discussion—2 hours. Practice in the preparation and delivery of speeches based on principles and strategies of informing and persuading audiences drawn from the social sciences and humanities. GE credit: Wrl/A, OI, SS, W.—F., W, S, Su. (F., W, S, Su.) Shub (change in existing course—eff. winter 17)

10V. Introduction to Communication (4)
Web virtual lecture—3 hours; web electronic discussion—1 hour. Basic principles of communication and communication processes; models of communication; foundations of empirical research in communication; contexts of communication and communication research, including interpersonal, intercultural, news, entertainment, mediated, and others. Not open for credit to students who have taken course 10Y. GE credit: SS.—F., W, S, Su. (F., W, S, Su.) Ruiz, Taylor (new course—eff. fall 16)

10Y. Introduction to Communication (4)
Web virtual lecture—3 hours; discussion—1 hour. Basic principles of communication and communication processes; models of communication; foundations of empirical research in communication; contexts of communication and communication research including interpersonal, intercultural, news, entertainment, mediated, and others. Not open for credit to students who have taken course 10Y. GE credit: SocSci SS.—F., W, S, Su. (F., W, S, Su.) Ruiz, Taylor (change in existing course—eff. winter 17)

Upper Division

102. Empirical Methods in Communication (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 13; or equivalent of Statistics 013. Social scientific research methods employed in Communication. Topics include research design, measurement, sampling, questionnaire construction, survey research, experimental design, content analysis and qualitative field methods. GE credit: SocSci SS.—F., W, S. (F., W, S.) Bell, Palomares, Yegiyan (change in existing course—eff. fall 17)

110. Communication Networks (4)
Lecture/discussion—3 hours; discussion/laboratory—1 hour. Theoretical approaches to communication networks, practical applications of network studies, and network analysis tools. Friendship, political discussion, social support, organizational social media, and disease transmission networks are examined. Impact of emerging technologies on network creation, maintenance, and expansion. GE credit: SocSci SS.—F. (F.) Barnett, Shen (change in existing course—eff. fall 17)

114. Communication and Cognition (4)
Lecture/discussion—4 hours. Pass One open to Communication majors only. Relationship between communication and cognition in interpersonal and mediated contexts. Discussion comprehension and production, impact of language attitudes on social judgments, the effects of information processing on decision making. Not open for credit to students who have completed course 138. GE credit: SocSci SS, WE, S—S. (S.) Yegiyan (change in existing course—eff. winter 18)

124. Family Communication (4)

132. Social Media for Public Relations (4)
Lecture/discussion—4 hours. Prerequisite: course 131. Uses of social media technologies in contemporary public relations practice. Social and behavioral theories of social media processes and effects. Strategies and tools for authoring content that builds relationships and creates conversations with key publics. GE credit: SS.—Fhett (new course—eff. fall 16)

140. Introduction to Mass Communication (4)

142. Newsmaking (4)
Lecture/discussion—4 hours. Prerequisite: course 140; course 102. Pass One open to Communication majors only. The making of news. How journalists construct news and how consumers and newsmakers use it. Effects of news, technology’s challenges to journalism, and the relationship of news to other institutions. GE credit: SocSci SS, WE, S.—W. (W., S.) Cho, Theobald (change in existing course—eff. spring 17)

144. Media Entertainment (4)
Lecture/discussion—3 hours; term paper. Pass One 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 respective features and emotional/social-psychological effects of genres such as comedy, mystery, thriller, sports, music, horror, and erotica. GE credit: SocSci SS, WE, S.—S. (S.) Taylor (change in existing course—eff. spring 17)

145. Political Communication (4)
Lecture/discussion—3 hours; extensive writing—3 hours. Prerequisite: course 140; course 102; or a research methods course equivalent to course 102. Pass One open to Communication majors only. Relationships among the mass media, citizens, and politics, production of political news, campaign strategies, and citizens’ attitudes and behaviors.
Frameworks for mediated politics, the news, and elite discourse. Lecture—2 hours; web virtual lecture—2 hours; discussion—2 hours. Non-technical survey of modern communication methods, Web scraping, artificial intelligence, visualizing social networks, and computer simulations. Hands-on use of diverse software applications. Professors from all ten UC campuses contribute. GE credit: QL, SS—F, S. (F, S.) Hiltiberb
(new course—eff. winter 17)

161. Health Communication (4)
Lecture/discussion—3 hours; extensive writing—3 hours. Health communication theories and research. Health literacy, social support and coping, doctor-patient interaction, health communication campaigns, media influences on health, and applications of new technologies in health promotion. GE credit: SocSci SS, OL, WC.—F, W, S. (F, W, S.) Theobald
(change in existing course—eff. spring 17)

150V. Computational Social Science (4)
(new course—eff. winter 17)

192. Internship in Communication (1-12)
Internship—3-36 hours. Prerequisite: communication majors who have completed 20 units of division communication courses; consent of instructor. Open to Communication majors only. Supervised work experience requiring the application of communication principles and strategies. Assignments involve the evaluation of communication practices in a professional setting. Relevant experiences include public relations, advertising, sales, human resources, health promotion, public relations, journalism, and broadcasting. May be repeated up to 12 units of credit. (P/NP grading only.)—F, W, S, Su.—F, W, S, Su.
(change in existing course—eff. fall 17)

233. Persuasive Technologies for Health (4)
Lecture/discussion—3 hours; term paper. Theorizing, designing, and evaluating technology-based health communication interventions. Uses of social media, mobile communication apps, wearable devices, computer-generated tailored messages, educational games, and computational approaches in health promotion and healthcare delivery. Same course as Public Health Sciences 233. Offered in alternate years. —S. (S.) Zhang
(change in existing course—eff. fall 17)

235. Health Communication Campaigns (4)
Lecture/discussion—3 hours; term paper. Prerequisite: consent of instructor; restricted to graduate students. Principles of health communication campaign planning, implementation and evaluation. Strategies for changing health behaviors, shaping policy, and improving healthcare organizations’ relations with stakeholders. Same course as Public Health Sciences 235. Offered in alternate years. —W. Hether
(new course—eff. fall 17)

251. Digital Technology and Social Change (4)
Seminar—9 hours; term paper. Conceptual, theoretical, and international consideration of how digital communication technologies transform social organization and development. Topics include social media, big data, political revolutions, e-democracy, digital divide, e-education, e-health, entrepreneur- ship, public health, education, digital inequalities, and privatization. Theorizing and writing under the supervision of a faculty member. Offered in alternate years. —S. (S.) Peña
(change in existing course—eff. winter 18)

251Y. Digital Technology and Social Change (4)
Web virtual lecture—2 hours; discussion—2 hours. Discussion and research on how digital technologies transform our lives through social media, mobility, big data, global connectivity, and artificial intelligence; changing business, health, democracy, globalization, families, dating, and education. Not open to students who have taken course 251Y. Offered in alternate years. —S. (S.) Hiltiberb
(change in existing course—eff. spring 17)

251Y. Digital Technology and Social Change (4)
Web virtual lecture—2 hours; discussion—2 hours. Discussion and research on how digital technologies transform our lives through social media, mobility, big data, global connectivity, and artificial intelligence; changing business, health, democracy, globalization, families, dating, and education. Not open to students who have taken course 251Y. Offered in alternate years. —S. (S.) Hiltiberb
(change in existing course—eff. fall 17)

253. Children, Adolescents, and the Media (4)
Lecture/discussion—3 hours; term paper. Theory and research on the connections between media, politics, and citizens in the digital age. Critical framework for understanding the nature of mediated politics by assessing inter-relationships between production of news, political elites’ campaign strategies, and behaviors of citizens. Offered in alternate years. —S. (S.) Cingel
(change in existing course—eff. winter 17)

299R. Thesis/Dissertation Research and Writing (1-12)
Independent study—3-36 hours. Prerequisite: consent of instructor; graduate standing in Communication. Students in the Department of Communication graduate programs conduct dissertation research and writing under the supervision of a faculty member. May be repeated for credit up to twenty one times. Across campus, students use the course 299 numbers to reach the 12-unit requirement for full time student status. In saying that students may repeat this “course” 21 times, we state that students would complete their doctoral programs within seven years (five is the norm). The value 21 was based on the calculation 3 quarters * 7 years. (S/U grading only.)
(change in existing course—eff. winter 17)

Community and Regional Development

New and changed courses in Community and Regional Development (CRD)

Upper Division
151. Community Field Research: Theory and Analysis (4)
(change in existing course—eff. fall 17)

Graduate
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 organiza- tions and philanthropic foundations. —S. (S.)
(change in existing course—eff. spring 17)
Comparative Literature

New and changed courses in Comparative Literature (COM)

Upper Division

100. World Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: completion of entry level writing requirement, upper division standing, or consent of instructor. Comparative, cross-cultural study of a topic, theme, or movement in world cinema beyond the boundary of a single national tradition. Topics may include "postsocialist cinemas in East Europe and Asia," "cinema and globalization," and "popular Asian cinemas." May be repeated for credit up to three times the topic differs. GE credit: ArtHum, Div, WRt| AH, VL, WC, WE, —Lu
(change in existing course—eff. spring 17)

110. Hong Kong Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: consent of instructor. Hong Kong cinema, its history, industry, styles, genres, directors, and stars. Special attention to its postcolonial, postmodern, transitional, colonial, and postcommunist environment. GE credit: ArtHum, Div, WRt| AH, VL, WC, WE, —Lu
(change in existing course—eff. spring 17)

128. Design Ethnography (4)
Lecture/laboratory—12 hours. Prerequisite: course 1; or consent of instructor. Pass One restricted to Design majors. Practical introduction to design ethnography through project-based work. Tools and methods, observation, interviews, fieldnotes, and synthesis of qualitative data. Exploration of participatory design. Examination of the ethical questions. GE credit: ArtHum, — S. (S.) Maiorana
(new course—eff. spring 17)

128. BioDesign Theory and Practice (4)
Lecture/discussion—3 hours; term paper. Pass One restricted to Design and Art History majors. Recent biological theories and their influence upon design theory and practice; includes bio-based materials in contemporary design. GE credit: VL—Cagdoll
(change in existing course—eff. winter 17)

144. History of Interior Architecture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor. Priority given to Design majors. Thematic survey of interior architecture. Emphasis on dwellings in their cultural settings and development of modern interior design theories. Interiors considered in relation to buildings' exteriors, sites, and uses. Offered in alternate years. GE credit: ArtHum | AH, WE—Housesfield
(change in existing course—eff. fall 17)

155A. Pattern, Form and Surface (4)
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1; course 115; course 14 or course 21; course 15; course 16; course 31 or course 113; or consent of instructor. Priority given to Design majors. Experimental approaches to form-making through an examination of pattern, form, and surface in historical and contemporary contexts. Explorations of alternative design processes, materials, and technologies that open up new possibilities for content creation and invention in design practice. GE credit: VL—W. (W.) Verba
(change in existing course—eff. fall 17)

156. Graphitecture: Architecture in the Age of New Media (4)
Studio—6 hours. Prerequisite: course 1, 14, 15, 16. Priority to Design majors. Thematic survey of interior architecture. Emphasis on dwellings in their cultural settings and development of modern interior design theories. Interiors considered in relation to buildings' exteriors, sites, and uses. Offered in alternate years. GE credit: ArtHum | AH, WE—S. (S.) Snyder
(new course—eff. fall 16)

160. Textile Surface Design: Patterns and Resists (4)
Studio—12 hours. Prerequisite: course 1; course 14 or course 21; course 15; or consent of instructor. Pass One restricted to Design majors. Use of traditional and contemporary processes to create images and patterns on fabric using a variety of dyes, including direct applications, bound and mechanical resists, and surface additives. GE credit: ArtHum | AH, VL—F. (F.) Avila
(change in existing course—eff. fall 17)

161. Textile Surface Design: Screen and Digital Printing (4)
Studio—12 hours. Prerequisite: course 1; course 14 or course 21; course 15; or consent of instructor. Pass One restricted to Design majors. Design of textiles and screen printing on fabrics; soft-product development; integration of hand-produced and digitally generated imagery on cloth. GE credit: ArtHum | AH, VL—S. (S.) Avila
(change in existing course—eff. winter 17)
Graduate

225. Studio Practice in Design (4)

Studio—12 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 for credit up to two times. — W. [W]

(change in existing course—eff. fall 17)

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. (S/U grading only.)—F, W, S, F, S. [J] Maiarana

(change in existing course—eff. winter 17)

Dramatic Art

New and changed courses in Dramatic Art (DRA)

Lower Division

41A. Fundamentals of Acting (4)

Lecture—2 hours; laboratory—4 hours. 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. Advanced improvisation, sound and movement dynamics. Viewing of theatre productions. GE credit: OL, VL.—Leavy, Merlin

(change in existing course—eff. fall 16)

40A. Beginning Modern Dance (2)

Laboratory/discussion—4 hours. 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 for credit up to two times. Non-dance majors can only repeat the course once. Dance majors may apply to the dance faculty adviser for permission to repeat more times. Dance is a repetitive practice that involves constant reiteration and demands this for improvement and better understanding of the somatic and proprioceptive skills. GE credit: AH, VL.

(change in existing course—eff. spring 17)

40B. Intermediate Modern Dance (2)

Laboratory/discussion—4 hours. Prerequisite: course 40A or consent of instructor. Modern dance techniques. 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 consultation. May be repeated one time for credit. GE credit: AH, VL.

(change in existing course—eff. fall 16)

41A. Beginning Jazz Dance (2)

Laboratory/discussion—4 hours. 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 for credit up to one time. —change in existing course—eff. spring 17

Upper Division

124E. Costume Design for Film (4)

Lecture/discussion—4 hours. Prerequisite: course 24; or consent of instructor. Pass One restricted to Theatre and Dance majors. Theory and practice of the art and business of film costume design. Script analysis, costume research, developing design concepts, budgeting, and current production practices and methods. Execution of designs for period and contemporary films. Viewing of current films. (Same course as Cinema and Ethnoscopical Studies 124E.) GE credit: ArtHum | AH, OL, VL.—Morgan

(change in existing course—eff. spring 17)

166A. Professional Track Modern Dance I (4)

Lecture/laboratory—6 hours. Prerequisite: 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

(change in existing course—eff. fall 16)

166B. Professional Track Modern Dance II (4)

Lecture/laboratory—6 hours. Prerequisite: courses 146A; consent of instructor. 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

(change in existing course—eff. fall 16)

166C. Professional Track Modern Dance III (4)

Lecture/laboratory—6 hours. Prerequisite: course 146A; course 146B; consent of instructor. Continuation of course 146B. Time as a theatrical device, sustaining movement and non-movement, phrasing, musicality. May be repeated one time for credit. Offered irregularly. GE credit: VL.—Grenke

(change in existing course—eff. winter 17)

156C. Modern Aesthetic Movements in Performance (4)

Laboratory/discussion—3 hours; discussion—1 hour. Important movements in performance, especially theatre and dance, from realism to the present. Primary emphasis on Western traditions though others may be studied. GE credit: ArtHum, Div, Wrt|AH, WE.

(change in existing course—eff. spring 17)

170. Media Theatre (4)

Lecture—1 hour; rehearsal—2 hours; performance instruction—1 hour. New media and application of in theatre devising and performance. Emphasis on collaborative process in the integration of emerging technologies and formation of new theatrical works. Development of collaborative performance through lecture, demonstration, improvisation and experimentation. May be repeated one time for credit. GE credit: ArtHum | AH, VL.

(change in existing course—eff. spring 17)

Graduate

257. Visual Language for Performance (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: consent of instructor. Restricted to graduate students. Exploration of different approaches and methods to the visual elements of performance. Focus on design and style for different media and genres, storytelling through visual elements of performance. Offered in alternate years.—Morgan

(change in existing course—eff. winter 17)

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 Dramatic Art; 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 Theatre and Dance. Topics range from current practice in dance, theatre, film and per-
204. Population and Community Ecology (4) (canceled course—eff. fall 16)

211. Advanced Topics in Cultural Ecology (4) (canceled course—eff. spring 17)

212A. Environmental Policy Process (4) Lecture—3 hours; discussion—1 hour. Prerequisite: First course in Ecology (e.g., Environmental Science and Policy 100); Statistics 102, Mathematics 16A, 16B or consent of instructor. This course will cover the political process and application of ecological policy. [change in existing course—eff. winter 17]

213. Population, Environment, and Social Structure (4) (canceled course—eff. fall 16)

215. Social Ecological Systems (3) Lecture/discussion—3 hours. Prerequisite: completion of core courses for specific graduate programs, for example courses 200A/B. Overview of social-ecological systems that links environmental policy and decision-making to ecological processes. [change in existing course—eff. fall 17]

115BY. Economic Development (4) Lecture—1.5 hours; web virtual lecture—1.5 hours; term paper. Prerequisite: course 130 or 1A. Major macroeconomic issues of developing countries. Issues include problems in generating capital, conduct of monetary and fiscal policies, foreign aid and investment. Important issues of policy concerning international borrowing and external debt of developing countries. GE credit: SS. (new course—eff. fall 16)

125. Energy Economics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or Agricultural and Resource Economics 100A, Agricultural and Resource Economics 100B; course 102 or course 140 or Agricultural and Resource Economics 106 or Statistics 108; or consent of Instructor. The health care market, emphasizing the role and use of economics. Individual demand, provision of services by doctors and hospitals, health insurance, managed care and competition, the role of government access to health care. — W. (W.) Cameron (change in existing course—eff. winter 18)

140. Econometrics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or (Resource Economics 100A, Resource Economics 100B); course 101; Statistics 13, Mathematics 16A or Mathematics 17A or Mathematics 17B or Mathematics 21A; Mathematics 16B or Mathematics 178 or Mathematics 21B. Problems of observation, estimation and hypothesis testing in economics through the study of the theory and application of linear regression models. The study of empirical investigations of empirical research and exercises in applied econometrics. Only 2 units of credit allowed to students who have completed two of the following courses: Economics 102, Agricultural and Resource Economics 106 or Statistics 108; not open for credit to students who have completed Agricultural and Resource Economics 106. (change in existing course—eff. spring 17)

Graduate

233. Poverty and Public Policy (4) Lecture/discussion—4 hours. Interdisciplinary course covering qualitative and quantitative U.S. based poverty research. Topics include measurement, statistics, theories and evidence on the causes and consequences of poverty, and the history and efficacy of major anti-poverty programs. (new course—eff. fall 16)

235D. Macroeconomics (4) Lecture—3 hours; discussion—1 hour. Selected topics in Macroeconomics. May be repeated for credit. Offered irregularly. (new course—eff. winter 17)

240A. Econometric Methods (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 239 or consent of instructor. Least squares, instrumental variables, and maximum likelihood estimation and inference for single equation linear regression model; linear restrictions; heteroskedastic-
Education

New and changed courses in Education (EDU)

Upper Division

122. Children, Learning and Material Culture (4)
Lecture/discussion—3 hours; extensive writing or discussion—1 hour; fieldwork. How material artifacts shape what and how children learn in school, at home, and in the community. Artifacts examine include books, computers, household appliances, toys and games, entertainment media, collectibles, sports equipment, clothing, folk arts and crafts, and neighborhood space. GE credit: SocSci. Div: Wrt 111, SS; VL, WE.—F, W, S. (F, S) Vander Gheynst, White (change in existing course—eff. summer 17)

130. Issues in Higher Education (4)
Discussion—3 hours; field work—3 hours. Analysis of current issues in higher education and of some practical implications of varying philosophical approaches to the role of the university. GE credit: SocSci. Div: SS, WE.—S. (S) Cuellar, Gonzalez (change in existing course—eff. summer 17)

180A. Computers in Education (1)
Lecture/discussion—1 hour; laboratory—2 hours; project—3 hours. Prerequisite: acceptance in Teacher Credential Program. 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) (change in existing course—eff. fall 13)

180B. Computers in Education (1)
Lecture/discussion—1 hour; laboratory—2 hours; project—3 hours. Prerequisite: acceptance in Teacher Credential Program. 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) (change in existing course—eff. fall 13)

180C. Computers in Education (1)
Lecture/discussion—1 hour; laboratory—2 hours; project—3 hours. Prerequisite: 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) (change in existing course—eff. fall 13)

Education Abroad Program

New and changed courses in Education Abroad Program (EAP)

Upper Division

192. Internship in Education Abroad (1-12)
Internship—36 hours. Prerequisite: participation in a study abroad program. Internship with Education Abroad Program, potentially either at university or abroad. May be repeated for up to 12 units of credit. (P/NP grading only.)—F, W, S, Su. (F, W, S, Su) (change in existing course—eff. winter 17)

Energy Systems

(A Graduate Group)

New and changed courses in Energy Systems (EGG)

299. Research (1-12)
Prerequisite: consent of instructor. Research. May be repeated for credit. (S/U grading only.)—new course (change in existing course—fall 17)

Engineering

New and changed courses in Engineering (ENG)

Lower Division

3. Introduction to Engineering Design (4)
Lecture—2 hours; studio—2 hours; project—4 hours. Prerequisite: Must have satisfied the Entry Level Writing Requirement (ELWR). Pass One restricted to lower division College of Engineering students; Pass Two restricted to lower division students. Introduction to the engineering design process that incorporates the development of oral and written communication skills integral to the design process. Conducted in workshop format with hands-on engagement in the design process. GE credit: SciEng SE, SS, OL.—F, W, S, Su, (F, S, W, S) Vander Gheynst (change in existing course—eff. winter 17)

17. Circuits I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 22A; Mathematics 22B can be taken concurrently; Physics 9C or 9HD C- or better recommended for each course. Basic electric circuit analysis techniques, including electrical quantities and elements, resistive circuits, transient and steady-state responses of RLC circuits, sinusoidal excitation and phasors, and complex frequency and network functions. GE credit: SciEng SE, OL, SS.—F, S. (F, S) (change in existing course—fall 17)

35. Statics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 9A C- or better; Mathematics 21D C- or better [can be concurrent]. Force systems and equilibrium conditions with emphasis on engineering problems. GE credit: SciEng SE.—F, W, S, S. (F, W, S, S) (change in existing course—fall 17)

102. Dynamics (4)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 35 C- or better; Mathematics 22C C- or better. Open to College of Engineering students only. Fundamentals of thermodynamics: heat energy and work, properties of pure substances, First and Second Law for closed and open systems, reversibility, entropy, thermodynamic temperature scales. Applications of thermodynamics to engineering systems. GE credit: SciEng SE, OL, SS.—F, W, S, S. (F, W, S, S) Cheng, Eke, Hess, Joshi (change in existing course—fall 17)

111. Electric Machinery Fundamentals (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 22B C- or better; Physics 9B C- or better. Open to College of Engineering students only. Fundamentals of thermodynamics: heat energy and work, properties of pure substances, First and Second Law for closed and open systems, reversibility, entropy, thermodynamic temperature scales. Selection of electric power equipment components based on their construction features and performance characteristics. Offered in alternate years. GE credit: SciEng SE, OL, SS, VL.—Dulwiche (change in existing course—fall 17)

122. Introduction to Mechanical Vibrations (4)
Lecture—4 hours. Prerequisite: Engineering 102 C- or better; Engineering 6 C- or better or Engineering 5 C- or better or Computer Science Engineering 30 C- or better; ability to program in MATLAB. Free and forced vibrations in lumped parameter systems with and without damping; vibrations in coupled systems; electromechanical analogs; use of energy conservation principles. GE credit: SciEng SE.—F. (F) (change in existing course—fall 17)
Engineering: Aerospace Science and Engineering

New and changed courses in Aerospace Science and Engineering (EAE)

Lower Division

10. From the Wright Brothers to Drones and Quadcopters (2B) 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. GE credit: SciEng or SocSci SE or SS. —So. (Su.)

(change in existing course—eff. fall 16)

Upper Division

127. Applied Aircraft Aerodynamics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 106 C- or better. Principles, governing equations, and predictive theories for aircraft aerodynamics. Lift and drag of 2D airfoils, 3D wings, and high-lift devices. GE credit: SciEng SE, WE. —F. (W.) Davis

(change in existing course—eff. fall 16)


(change in existing course—eff. fall 17)

130A. Aircraft Performance and Design (4) Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 127 C- or better; course 129 C- or better (can be concurrent). Major aircraft design experience with multiple realistic constraints including aerodynamics, performance analysis, weight estimation, stability and control, and appropriate engineering standards. GE credit: SciEng SE. —W. (W.) van Dam

(change in existing course—eff. fall 17)

130B. Aircraft Performance and Design (4) Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 120A C- or better. Restricted to upper division standing. Major aircraft design experience including detailed design, cost analysis, analysis of aircraft structure, propulsion system, aerodynamics, aircraft handling qualities, manufacturing, or meeting relevant engineering standards. GE credit: SciEng OL, SE. —S. (S.) van Dam

(change in existing course—eff. fall 17)

135. Aerospace Structures (4) Lecture—4 hours. Prerequisite: Engineering 104 C- or better; course 126 or course 127 recommended. Analysis and design methods used in aerospace structures. Shear flow in open, closed and multicell beam cross-sections, buckling of flat and curved sheets, tension field beams, local buckling. GE credit: SciEng QIL, QL. SE. —W. (W.) La Saponaara

(change in existing course—eff. fall 17)


(change in existing course—eff. fall 17)

Engineering: Applied Science—Davis

New and changed courses in Engineering: Applied Science—Davis (EAD)

Graduate

285D. Physics and Technology of Microwave Vacuum Electron Beam Devices IV (4) (cancelled course—eff. fall 16)

Engineering: Biological Systems

New and changed courses in Engineering: Biological Systems (EBS)

Graduate


(change in existing course—eff. fall 17)

268. Polysaccharides Surface Interactions (3) Lecture—3 hours. Prerequisite: graduate students in science or engineering. Study of fundamental surface science theories as applied to physical and chemical interactions of carbohydrates and polysaccharides. [Same course as Engineering: Chemical 268.] Offered in alternate years. —F. (F.) Jeoh

(change in existing course—eff. winter 17)

Engineering: Biomedical

New and changed courses in Biomedical Engineering (BIM)

Upper Division

102. Cellular Dynamics (4) Lecture/discussion—4 hours. Prerequisite: Biological Sciences 2A; Chemistry 8B or Chemistry 118B. Open to College of Engineering students only. Fundamental cell biology for bioengineers. Emphasis on physical concepts underlying cellular processes including protein trafficking, cell motility, cell division and cell adhesion. Current topics including cell biology of cancer and stem cells will be discussed. Only two units of credit for students who have completed Biological Sciences 104. GE credit: SciEng QIL, QL, SE, VL. —F. (F.) Yamada

(change in existing course—eff. spring 17)

110A. Biomedical Engineering Senior Design Experience (3) Lecture/discussion—1 hour; project—6 hours. Prerequisite: course 110L (can be concurrent); course 111 (can be concurrent). Restricted to senior Biomedical Engineering majors (or by consent of instructor). 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. Continues in course 110B. (Deferred grading only, pending completion of sequence.) GE credit: SciEng SE, OL, VL. —W. (W.) Passerini

(change in existing course—eff. spring 17)

110L. Biomedical Engineering Senior Design Lab (2) Laboratory—3 hours; laboratory/discussion—2 hours. Prerequisite: course 110; course 108; course 109. Restricted to Biomedical Engineering majors. Manufacturing processes, safety, computer-aided design, numerical simulation, computer-aided design to fabrication of biomedical devices. Application of engineering principles & design theory to build a functional prototype to solve a biomedical problem. Continues in 110LAB. (Deferred grading only, pending completion of sequence.) GE credit: SE. —F. (F.) Facciotti

(change in existing course—eff. fall 17)

126. Tissue Mechanics (3) Lecture—2 hours; laboratory—3 hours. Prerequisite: Exercise Biology 103 or Engineering 45. Structural and mechanical properties of biological tissues, including bone, cartilage, ligaments, tendons, nerves, and skeletal muscle. Offered irregularly. GE credit: SE.

(change in existing course—eff. fall 17)

140L. Protein Engineering Laboratory (2) Discussion—1 hour; lecture—3 hours. Prerequisite: course 140 (can be concurrent); concurrent enrollment in course 140 required. Optional hands-on laboratory for BIM 140. Students use the engineering design process to design, build, and test a solution to a practical problem in the field of protein engineering. Problems change each offering. Offered in alternate years. GE credit: SE. —S. Facciotti

(new course—eff. spring 17)

143L. Synthetic Biology Laboratory (2) Discussion—1 hour; lecture—3 hours. Prerequisite: course 143 (can be concurrent); concurrent enrollment in course 143 required. Optional hands-on laboratory for BIM 143. Students solve a practical problem in the field of synthetic biology by designing, building, and testing an appropriate solution or product. Problems change each offering. Offered in alternate years. GE credit: SE. —S. (S.) Facciotti

(new course—eff. spring 17)

144. Fundamentals of Biophotonics and Bioimaging (4) Lecture/discussion—4 hours. Prerequisite: Mathematics 228; Physics 9B; or consent of instructor; course 108 or equivalent helpful; Biology or Physiology course recommended. Biophotonics and bioimaging, emphasizing quantitative description of light propagation & light tissue interactions. Key technologies and illustrative applications in basic research, clinical diagnostics and therapy. GE credit: SE. —W. (W.) Srinivasan

(new course—eff. spring 17)

161A. Biomolecular Engineering (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A; Chemistry 8B or Chemistry 118B. 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 | SE — S. | Lewis—F. (F.)

167. Biomedical Fluid Mechanics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 116 C- or better. Introduction to the mathematical analysis of biological systems and processes. Emphasis on the qualitative and quantitative description of fluid flow, including the application of classical and modern fluid mechanics theories. Not open for credit to students who have completed a similar course.

170. Aspects of Medical Device Design and Manufacturing (2)
Lecture—2 hours. Prerequisite: consent of instructor. Open to upper division Biomedical Engineering majors only. Survey of medical device design & impact on manufacturing operations. Introduction to medical device design process & product lifecycle. Principles of Design for Manufacturability, Design for Lean Manufacturing, and quality management systems. GE credit: SciEng | SE — W. | Chigazola—F. (F.)

171. Clinical Applications for Biomedical Device Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 116 C- or better or Neurobiology, Physiology, and Behavior 101 C- or better. Introduction to clinical applications for biomedical devices with emphasis on the pathophysiology of common diseases. It relates the basic bioengineering principles, in vitro diagnostics, needs assessment, and regulatory considerations. GE credit: SE — F. (F.) Tan—new course—fall 17

Graduate

201. Scientific Communication for Biomedical Engineers (1)
Lecture/discussion—1 hour. Prerequisite: consent of instructor. Course is designed to improve the written and oral communication skills of first-year graduate students through writing fellowship proposals, analyzing data, and critically reviewing research papers, product development and biotechnology careers. S/U grading only. —F. (F.) Leach—new course—fall 16

214. Continuum Biomechanics (4)
Lecture—4 hours. Prerequisite: course 141; Engineering 102 or equivalent. Continuum mechanics relevant to bioengineering. Concepts in tensor calculus, kinematics, stress and strain, and constitutive theories of continua. Selected topics in bone, articular cartilage, blood/circulation, and cell biomechanics will illustrate the derivation of appropriate continuum mechanics theories. —W. (W.) Althsous—change in existing course—fall 17

215. Biomedical Fluid Mechanics and Transport Phenomena (4)
(cancelled course—fall 16)

221. Drug Delivery Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 108; Physics 108, or an equivalent undergraduate optics course. Quantum mechanics of photons and their interactions with matter. Emphasis on applications of quantum mechanics to biotechnology and biophysics.

241. Drug Delivery Systems (4)
Lecture—4 hours. Prerequisite: course 284 or equivalent; graduate standing in biomedical engineering. Introduction to the design, engineering, and control of biological systems for biotechnological applications and biological studies. Offered in alternate years. —F. (F.) Tan—new course—fall 16

253. Statistical Methods in Genomics (4)
Lecture—4 hours. Statistical approaches to problems in computational molecular biology and genomics; formulation of questions via probabilistic modeling, statistical inference methods for parameter estimation, and interpretation of results to address biologically relevant questions; application to high-impact problems in functional genomics and molecular biology. —F. (F.) Avaran—new course—winter 17

257. Advanced Biophotonics and Bioimaging (4)
Lecture—4 hours. Prerequisite: course 108; Physics 108, or an equivalent graduate optics course. Quantitative studies of biophotonics and bioimaging, with emphasis on the physical and mathematical description of optics, light propagation, and light-tissue interactions. Applications and limitations of various optical imaging and sensing technologies. Illustrative applications in diagnostics, basic research, and therapy. —F. (F.) Srinivasan—new course—fall 17

262. Cell and Molecular Biophysics for Biologists (4)
Lecture—4 hours. Prerequisite: course 284 or equivalent; graduate standing. 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 of their assemblies, in particular membranes. Not open for credit to students who have completed Biomedical Engineering 162. —F. (F.) Henrickson

264. Synthetic and Systems Engineering of Cells (4)
Lecture—4 hours. Introduction to the design, engineering, and control of biological systems for biotechnological applications and biological studies. Offered in alternate years. —F. (F.) Tan—new course—fall 17

283. Advanced Design of Experiments for Biomedical Engineers (4)
Lecture—4 hours. Open to graduate students only. Provides biomedical engineering graduate students with the tools to properly design experiments, collect and analyze data, and extract, communicate, and act on information generated. Not open for credit to students who have taken Biological Systems Engineering 265. —S. (S.) Lewis—new course—spring 17

288. Living Matter: Physical Biology of the Cell (3)
Lecture—3 hours. Open to any student possessing a general background in physics, chemistry, and biology. Introduction to the origin, maintenance, and regulation of the dynamic architecture of the cell, including cellular modes of organization, energy dissipation, and the coupling of local structure and transport processes. —F. (F.) Avaran—new course—fall 17

290X. Honors Discussion Section (1)
Discussion—1 hour. Open only to students in the Chemical Engineering or Biomedical Engineering Honors Programs. Examination of special topics covered in selected lower-division courses through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations.

2016-2018 General Catalog Course Supplement and Policies and Requirements Addendum

Fall 2011 and on Revised General Education (GE): AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; AGCH—American Cultures; DD—Domestic Diversity; 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—Domestic Diversity; Wrt—Writing Experience

Quarter Offered: F—Fall; W—Winter; SE—Spring; F, W, S. (F, S.) is indicated parenthetically.

Courses & Programs are subject to change without notice.
credit allowed if topic differs. May be repeated for credit. Offered irregularly. GE credit: SciEng. — W, S. (W, S.)
(new course—eff. fall 17)

Upper Division

140. Mathematical Methods in Biochemical and Chemical Engineering (4)
Lecture/discussion—3 hours; laboratory—1 hour. Prerequisite: Mathematics 228; course 60 or Engineering 6; or equivalents of course 60 or Engineering 6. Mathematical methods for solving problems in chemical and biochemical engineering, with emphasis on transport phenomena. Fourier series and separations 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 159. GE credit: SciEng. — F. (F.)
(change in existing course—eff. spring 17)

145A. Chemical Engineering Thermodynamics Laboratory (3)
Laboratory—2 hours; discussion—2 hours; extensive writing. Prerequisite: course 152A; course 152B [can be concurrent]. Open to majors in Chemical Engineering, Chemical Engineering/Materials Science, & Biochemical Engineering. Laboratory experiments in chemical engineering thermodynamics. GE credit: SciEng | SE, WE, — W (W).
(change in existing course—eff. winter 17)

145B. Chemical Engineering Transport Lab (3)
Laboratory—2 hours; discussion—2 hours; extensive writing. Prerequisite: courses 141; course 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, — S. (S.)
(change in existing course—eff. spring 17)

152A. Chemical Engineering Thermodynamics (3)
Lecture—3 hours. Prerequisite: course 60 or Engineering 6; or equivalents. 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. (F.)
(change in existing course—eff. spring 17)

155. Chemical Engineering Kinetics and Reactor Design Laboratory (4)
Laboratory—4 hours; discussion—1 hour; term paper. Prerequisite: course 145B; course 148A; course 148B [can be concurrent]; course 157 [can be concurrent]; upper division English composition requirement [can be concurrent]. Open to majors in Chemical Engineering, Chemical Engineering/Materials Science, & 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 | SE, OL, VL, WE, — W, S. (W, S.)
(change in existing course—eff. spring 17)

190X. Honors Discussion Section (1)
Discussion—1 hour. Open only to students in the Chemical Engineering or Biochemical Engineering Honors Programs. Examination of special topics covered in selected upper division courses through additional readings, discussions, collaborative work, or special activities which may include projects, laboratory experience or computer simulations. May be repeated for credit. Offered in alternate years. — F, W, S. (F, W, S.)
(change in existing course—eff. fall 17)

Graduate

261. Molecular Modelling of Soft and Biological Matter (4)
Lecture/discussion—4 hours. Prerequisite: Materials Science and Engineering 247 or Chemical Engineering 252; or equivalent course in advanced thermodinamics/statistical mechanics. Modern molecular simulation techniques with a focus on soft matter like polymers, biologically relevant systems, and glasses. Offered irregularly.
(new course—eff. winter 17)

268. Polysaccharide Surfaces: Interaction (3)
Lecture—3 hours. Prerequisite: graduate students in science or engineering. Study of fundamental surface science theories as applied to physical and chemical interactions of carbohydrates and polysaccharides. (Same course as Engineering: Biological Systems 268.) Offered in alternate years. — F. (F.)
(Josh)
(new course—eff. winter 17)

269. Cell and Molecular Biophysics for Bioengineers (4)
Lecture—4 hours. Prerequisite: Biomedical Engineering 284 or equivalent; graduate standing; undergraduate students by consent of instructor. Introduction to fundamental mechanisms governing the structure, function, and assembly of biomacromolecules. Emphasis is on a quantitative understanding of the nano-microscale interactions between and within individual molecules, as well as of their assemblies, in particular membranes. (Same course as Biomedical Engineering 162.) — F. (F.) Heinrich
(new course—eff. winter 17)

Engineering: Chemical and Materials Science

New and changed courses in Engineering: Chemical and Materials Science (ECM)

Lower Division

1. Design of Coffee—An Introduction to Chemical Engineering (3)
(canceled course—eff. fall 16)

5. Analysis in Biochemical, Chemical and Materials Engineering (3)
(canceled course—eff. fall 16)

6. Computational Methods for Bio/Chemical/Materials Engineers (4)
(canceled course—eff. fall 16)

90X. Honors Discussion Section (1)
(canceled course—eff. fall 2017)

94H. Honors Seminar (1)
(canceled course—eff. winter 17)

Upper Division

189A. Special Topics in ECM: Fluid Mechanics (1-5)
(canceled course—eff. fall 16)

189B. Special Topics in ECM: Nonlinear Analysis and Numerical Methods (1-5)
(canceled course—eff. fall 16)

189C. Special Topics in ECM: Process Control (1-5)
(canceled course—eff. fall 16)

189D. Special Topics in ECM: Chemistry of Catalytic Processes (1-5)
(canceled course—eff. fall 16)

189E. Special Topics in ECM; Biotechnology (1-5)
(canceled course—eff. fall 16)

189F. Special Topics in ECM; Interfacial Engineering (1-5)
(canceled course—eff. fall 16)

189G. Special Topics in ECM; Thermodynamics (1-5)
(canceled course—eff. fall 16)

189H. Special Topics in ECM; Membrane Separations (1-5)
(canceled course—eff. fall 16)

189L. Special Topics in ECM; Novel Experimental Methods (1-5)
(canceled course—eff. fall 16)

189J. Special Topics in ECM; Transport Phenomena (1-5)
(canceled course—eff. fall 16)

189K. Special Topics in ECM; Biomolecular Engineering (1-5)
(canceled course—eff. fall 16)

189M. Special Topics in ECM; Electronic Materials (1-5)
(canceled course—eff. fall 16)

189N. Special Topics in ECM; Physics and Chemistry of Materials (1-5)
(canceled course—eff. fall 16)

189O. Special Topics in ECM; Materials Processing (1-5)
(canceled course—eff. fall 16)

189P. Special Topics in ECM; Materials Science and Forensics (1-5)
(canceled course—eff. fall 16)

189Q. Special Topics in ECM; Biomaterials (1-5)
(canceled course—eff. fall 16)

189R. Special Topics in ECM; Surface Chemistry of Metal Oxides (1-5)
(canceled course—eff. fall 16)

190X. Honors Discussion Section (1)
(canceled course—eff. fall 17)

194HA. Special Study for Honors Students (2)
(canceled course—eff. fall 17)

194HB. Special Study for Honors Students (1-5)
(canceled course—eff. spring 17)

194HC. Special Study for Honors Students (1-5)
(canceled course—eff. fall 17)

Graduate

229. Computational Molecular Modeling (4)
(canceled course—eff. fall 16)

261. Molecular Modelling of Soft and Biological Matter (4)
(canceled course—eff. winter 17)

268. Process Monitoring and Data Analysis (3)
(canceled course—eff. spring 17)
281. Green Engineering: Theory and Practice (3)  
[cancelled course—eff. fall 16]

290. Chemical Engineering & Materials Science Seminar (1)  
[cancelled course—eff. fall 17]

**Engineering: Civil and Environmental**

New and changed courses in Engineering: Civil and Environmental (ECI)

**Upper Division**

100. Introduction to Fluid Mechanics for Civil and Environmental Engineers (4)  
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 35 C- or better; Mathematics 228 C- or better; Physics 98 C- or better. Pass One restricted to Civil Engineering, Environmental Engineering and Hydrology majors. Fluid flow in civil & environmental engineering, basics of design, buoyancy, hydrostatics, gravity dams, hydraulic modeling, similarity & scaling, conservation laws, flow in bends, nozzles, pipes, pumps, turbines, complimentary lab experience. Not open for credit to students who have taken Engineering 103. GE credit: SE. —F, W. (F, W) Bombardelli, Forrest, Oldroyd, Schladow, Younis  
[new course—eff. fall 17]

136. Building Design (4)  
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 130 or 131; course 135 or 132. Design of a building structure for a specific need under the multiple constraints of safety, serviceability, cost and aesthetics. GE credit: SciEng | SE. —S. (J) Bronner  
[change in existing course—eff. fall 17]

140. Environmental Analysis of Aqueous Systems (3)  
[cancelled course—eff. winter 18]

140A. Environmental Analysis of Aqueous Systems (3)  
Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 28 C- or better. Pass One restricted to Environmental Engineering majors. Introduction to "wet chemical" and instrumental techniques commonly used in the examination of water and wastewater and assessment of raw data analysis. Not open for credit to students who have taken Civil and Environmental Engineering 140 or Chemistry 100. GE credit: SE. —F. (F) Darby  
[new course—eff. fall 17]

140B. Chemical Principles for Environmental Engineers (4)  
Lecture—4 hours. Prerequisite: Chemistry 28 C- or better. Aqueous chemistry; equilibrium relationships; carbonate system; thermodynamics; kinetics & rate laws; precipitation, adsorption, & volatilization phenomenon; oxidation & reduction reactions; pH, PE and predominance diagrams; organic chemicals. Not open for credit to students who have taken Civil and Environmental Engineering 140. GE credit: SE. —F. (F) Darby  
[new course—eff. fall 17]

140L. Environmental Analysis of Aqueous Systems Laboratory (1)  
[cancelled course—eff. winter 18]

143. Green Engineering Design and Sustainability (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: upper division standing. 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, SL, WE. —W. (W) Bronner  
[change in existing course—eff. winter 17]

145. Hydraulic Structure Design (4)  
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 141 C- or better. Project-based course on the design of an integrated urban drainage system with focus on consideration of design alternatives, multiple realistic constraints, quantification of uncertainty, codes and standards, technical drawing and cost analysis. GE credit: SciEng | SE. —S. (J) Younis  
[change in existing course—eff. fall 17]

147A. Environmental Engineering Senior Design Experience I (4)  
Lecture—4 hours. Prerequisite: courses 148A, 148B, 149. Restricted to senior level standing. Cumulating design experience for environmental engineering majors. Students work in teams to address environmental engineering challenges on campus or nearby. Consideration of environmental, social and economic aspects. Guest lectures from practitioners on background information. Continues in course 147B. GE credit: SE, OL, WE. —W. (W) Bronner  
[new course—eff. winter 18]

147B. Environmental Engineering Senior Design Experience II (4)  
Lecture—4 hours. Prerequisite: courses 147A. Restricted to senior level standing. Cumulating design experience for environmental engineering majors. Students work in teams to address environmental engineering challenges on campus or nearby. Consideration of environmental, social and economic aspects. Guest lectures from practitioners on background information. Continuation of course 147A. GE credit: SE, OL, WE. —S. (J) Bronner  
[new course—eff. spring 18]

150. Air Pollution Control System Design (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: course 149 C- or better or Atmospheric Science 149 C- or better. Design and evaluation of air pollution control devices. GE credit: SciEng | SE. —W. (W) Cappa  
[change in existing course—eff. fall 17]

175. Geotechnical Earthquake Engineering (4)  
Lecture—4 hours. Prerequisite: course 171 C- or better. Tectonics, faults, site response, and probabilistic ground motion prediction equations. Cyclic loading and liquefaction of soil elements and layers. Empirical procedures and field tests for evaluation of triggering and consequences, of liquefaction. GE credit: SciEng | SE. —F. (F) Boulanger, Kutter  
[change in existing course—eff. fall 17]

Graduate

246. Pilot Plant Laboratory (4)  
[cancelled course—eff. fall 16]

254. Exploring Data from Built Environment Using R (4)  
Lecture—3 hours; laboratory—2 hours. Introduction to modern data science, specifically data acquisition, exploratory data analysis, visualization, and beginning data analysis using R. Emphasizes computational reasoning and working with tabular and non-standard data. Focus will be on data generated in the built environment. Same course as Geophy 279J. —W. (W) Nienaber  
[change in existing course—eff. fall 17]

258. Transportation Planning in Developing Countries (3)  
[cancelled course—eff. fall 16]

**Engineering:** Computer Science

New and changed courses in Engineering: Computer Science (ECS)

**Lower Division**

20. Discrete Mathematics for Computer Science (4)  
[change in existing course—eff. winter 17]

30. Programming and Problem Solving (4)  
Lecture—2 hours; discussion—1 hour. Prerequisite: Mathematics 16A (can be concurrent) or 17A (can be concurrent) or Mathematics 21A (can be concurrent); prior experience with basic programming concepts (variable, loops, conditional statements) recommended. Pass One open to Computer Science, Computer Science Engineering, Computer Engineering, Electrical Engineering, and Cognitive Science Majors only. Introduction to computers and computer programming, algorithm design, and debugging. Elements of good programming style. Programming in the C language. Use of basic UNIX tools. GE credit: SciEng | QL, SE. —F, W. (S, F, W, S) Butner, Gysel  
[change in existing course—eff. spring 17]

40. Software Development and Object-Oriented Programming (4)  
[change in existing course—eff. winter 18]

50. Computer Organization and Machine-Dependent Programming (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40 C- or better. Pass One open to Computer Science, Computer Science Engineering, Computer Engineering, and Cognitive Science Majors only. Comparative study of different hardware architectures via programming in the assembly languages of various machines. Role of software in producing an abstract machine. Introduction to I/O devices and programming. Only one unit of credit allowed for students who have taken Electrical and Computer Engineering 70. GE credit: SciEng | SE. —F, W. (S, F, W, S) Butner, Eissel  
[change in existing course—eff. winter 17]
60. Data Structures and Programming (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40 C or better. Pass One open to Computer Science, Computer Science Engineering, Computer Engineering, and Cognitive Science Majors only. Design and analysis of data structures for a variety of applications. Trees, heaps, searching, sorting, hashing, graphs. Extensive programming. GE credit: SciEng [Q], SL—F, W, F, W, S] Davis (change in existing course—eff. spring 17)

Upper Division

124. Theory and Practice of Bioinformatics (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 10 or course 30 or Engineering 6; Statistics 12 or Statistics 13 or Statistics 32 or Statistics 100 or Statistics 131A or Mathematics 135A; Biological Sciences 2A or Molecular and Cellular Biology 10 or Biomedical Engineering 10S. 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] Tagkopoulos (change in existing course—eff. spring 17)

140A. Programming Languages (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 50 or Electrical Computer Engineering 70; course 60. Pass One open to Computer Science, Computer Science Engineering, Computer Engineering, and Cognitive Science Majors only. Syntactic definition of programming languages. Introduction to programming language features including variables, data types, data abstraction, object-orientedness, scoping, parameter disciplines, exception handling. Non-imperative programming languages. Comparative study of several high-level programming languages. GE credit: SciEng [SE—F, W, S, F, W] Nitta, Olsson, Su (change in existing course—eff. winter 17)

150. Operating Systems and System Programming (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40; course 50 or Electrical and Computer Engineering 170; course 60. 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/synchronization; virtual memory, program loading and linking, file and I/O subsystems; utility programs. Study of a real operating system. GE credit: SciEng [SE—W, S, W] Levitt, Wu (change in existing course—eff. fall 17)

154A. Computer Architecture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 50 or Electrical and Computer Engineering 70. Pass One open to Computer Science and Computer Science Engineering Majors only. Introduction to digital design of devices for I/O, memory and memory management. Input/output programming, via wait loops, hardware interrupts and calls to operating system services. Hardware support for operating systems software. Only one unit of credit allowed for students who have taken Electrical and Computer Engineering 170. GE credit: SciEng [SE—F, W, F, W] Butner, Davis (change in existing course—eff. winter 17)

161. Modern Programming Tools (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: course 40; or Pass One open to Computer Science and Computer Science Engineering Majors only. Concepts and practice of collaborative software development using modern software tools. GE credit: SciEng [Q], SL—F, W, F, W, S] Davis (new course—eff. fall 17)

162. Web Programming (4)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 30 or equivalent programming experience in C and the Unix environment. Pass One open to Computer Science and Computer Science Engineering Majors only. Technical aspects of building websites, including both server-side and client-side software development. GE credit: SE, VL—Amenta (new course—eff. fall 17)

174. Computer Vision (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 60; Statistics 32 or Statistics 131A or Mathematics 135A or Electrical and Computer 161 or Computer Science Engineering 132; Mathematics 22A or Mathematics 67. Pass One open to Computer Science and Computer Science Engineering Majors only. Computer vision as 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 recognition. GE credit: SciEng [SE—S, S] Lee (change in existing course—eff. winter 18)

188. Ethics in an Age of Technology (4)

40. Introduction to Environmental Engineering (4)
Lecture—4 hours. Prerequisite: Chemistry 28. Pass One open to students in the College of Engineering. Introduces to topics in environmental engineering; discussion on influence of literary work, art, and media on the evolution of environmental engineering practice, relevant laws, and regulations; presentations of historical case studies. GE credit: AH—F, F [F] Bronner (new course—eff. winter 17)

110A. Electronic Circuits I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100; course 140A (can be concurrent). Use and modeling of nonlinear solid-state electronic devices in basic analog and digital circuits. Introduces to the design of transistor amplifiers and logic gates. GE credit: SciEng [SE, VL—F, W, S, W] (change in existing course—eff. fall 17)

150A. Introduction to Signals and Systems I (4)
Lecture—4 hours. Prerequisite: course 100; Engineering 6 (can be concurrent) or Mathematics 22AL (can be concurrent). Characterization and analysis of continuous-time linear systems. Fourier series and transforms with applications. Introduction to communication systems. Transfer functions and block diagrams. Elements of feedback systems. GE credit: SciEng [Q], SE, VL—F, W, S, W] (change in existing course—eff. fall 17)

Graduate

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. Pass One and Pass Two open to Graduate Students in Mechanical and Aerospace Engineering and Computer Science only. Develops the mathematical theory underlying growth, structure and function of networks with applications to physical, social, biological and engineered systems. Topics include network growth, resilience, epidemiology, phase transitions, software and algorithms, routing and search control, cascading failures. [Same course as Mechanical & Aeronautical Engineering 253] Offered in alternate years. (S) D’Souza (change in existing course—eff. winter 17)

Engineering: Electrical and Computer

New and changed courses in Engineering: Electrical and Computer (EEC)

Lower Division

10. Introduction to Digital and Analog Systems (4)
Lecture—2 hours; laboratory—3 hours; project. Prerequisite: Computer Science Engineering 30; Physics 9C (can be concurrent) or Physics 9HD (can be concurrent); and 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 interrogated, with a programmable microcontroller with the ability to program the electrical connections between analog and digital components. GE credit: SciEng [SE—W, W, S] (change in existing course—eff. winter 17)

40. Introduction to Environmental Engineering (4)
Lecture—4 hours. Prerequisite: Chemistry 28. Pass One open to students in the College of Engineering. Introduction to topics in environmental engineering; discussion on influence of literary work, art, and media on the evolution of environmental engineering practice, relevant laws, and regulations; presentations of historical case studies. GE credit: AH—F, F [F] Bronner (new course—eff. winter 17)

70. Computer Structure and Assembly Language (4)
(cancelled course—eff. spring 17)

Upper Division

110A. Electronic Circuits I (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100; course 140A (can be concurrent). Use and modeling of nonlinear solid-state electronic devices in basic analog and digital circuits. Introduces to the design of transistor amplifiers and logic gates. GE credit: SciEng [SE, VL—W, S, W] (change in existing course—eff. fall 17)

150A. Introduction to Signals and Systems I (4)
Lecture—4 hours. Prerequisite: course 100; Engineering 6 (can be concurrent) or Mathematics 22AL (can be concurrent). Characterization and analysis of continuous-time linear systems. Fourier series and transforms with applications. Introduction to communication systems. Transfer functions and block diagrams. Elements of feedback systems. GE credit: SciEng [Q], SE, VL—W, S, W] (change in existing course—eff. fall 17)

Courses & Programs are subject to change without notice.
163. Statistical and Digital Communication (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 160; course 161. Introduction to random process models of modulated signals and noise, and analysis of receiver performance. Analog and digital communication systems. Probability of error, matched filters. Intersymbol interference, pulse shaping and equalization. Carrier and clock synchronization. GE credit: SciEng.

181A. Digital Systems Design Project (3)
Workshop—1 hour; laboratory—6 hours. Prerequisite: course 180B; course 170. Digital-system and computer-design-engineering 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 | OL, SE, W. (W)
(change in existing course—eff. winter 18)

193A. Civil and Environmental Engineering Senior Design (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 140 C- or better, course 148A C- or better, course 148B C- or better; course 171 C- or better, course 171L C- or better; or course 132 C- or better or course 135 C- or better; or course 161 C- or better or course 163 C- or better; or course 141 C- or better or course 141L. Sign and consent of instructor. Open to seniors in Civil Engineering and Environmental Engineering only. Students must be in their final year of study. Culminating design experience for civil engineering and environmental engineering majors. Student teams work closely with faculty, city officials or consulting clients to propose, implement and validate a unique solution to a real-world problem. (Deferred grading only, pending completion of sequence.) GE credit: OL, SE, WE—W. (W), Bronner, Niemeier (new course—eff. fall 17)

193B. Civil and Environmental Engineering Senior Design (4)
Lecture—1 hour; laboratory—9 hours. Prerequisite: course 193A. Open to seniors in Civil Engineering and Environmental Engineering only. Culminating design experience for civil engineering and environmental engineering majors. Student teams work closely with faculty, city officials or consulting clients to propose, implement and validate a unique solution to a real-world problem. (Deferred grading only, pending completion of sequence.) GE credit: OL, SE, VI, WE—S. (J), Bronner, Niemeier (new course—eff. fall 17)

195A. Autonomous Vehicle Design Project (3)
Workshop—1 hour; laboratory—6 hours. Prerequisite: Computer Science and Engineering 30; course 180A; and either 110B, 157A (may be taken concurrently). 180B, or Computer Science and Engineering 60. Pass One restricted to major. Design and construct an autonomous race car. Work in groups to design, build and test speed control circuits, track sensing circuits, and a steering control loop. (Deferred grading only pending completion of sequence.) GE credit: SciEng | OL, SE—F. (F)
(change in existing course—eff. fall 16)

Engineering: Materials Science and Engineering

New and changed courses in Materials Science and Engineering (EMS)

Upper Division

Lecture—4 hours. Prerequisite: Chemistry 2A C- or better, or course 9B C- or better, Physics 98 C- or better. Description of the structure of engineering materials on the atomic scale by exploring the fundamentals of crystallography. The importance of this structure to materials’ properties. Description of experimental determination of x-ray diffraction techniques. GE credit: SciEng | OL, SE—W. (W)
(change in existing course—eff. fall 13)

147. Principles of Polymer Materials Science (5)
Lecture—3 hours. Prerequisites: Chemistry 2A; Chemistry 2B; Chemistry 8A or Chemistry 8B or Engineering 43; introductory physics. Basic principles of polymer science presented including polymer structure and synthesis; polymerization mechanisms, polymer classes, properties, and reactions; polymer morphology, rheology, and characterization; polymer processing. (Same course as Fiber and Polymer Science 100.) GE credit: SciEng | OL, SE—S. (S)
Pan (change in existing course—eff. winter 17)

Graduate

288. Living Matter: Physical Biology of the Cell (3)
Lecture—3 hours. Open to any student possessing general background in any disciplines of physical or biological sciences and engineering. Introduction to the origin, maintenance, and regulation of the dynamic architecture of the cell, including cellular modes of organization, dynamics and energy dissipation, molecular transport, motility, regulation, and adaptability. Same course as Biomedical Engineering 288 and Biophysics 288. —W. (W) Parikh (change in existing course—eff. fall 16)

290. Materials Science and Engineering Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing or consent of instructor. Selected topics of current interest in Materials Science and Engineering. The subject covered will vary from year to year and will be announced at the beginning of each quarter. May be repeated for credit. (S/U grading only.)—F, W, S. (J) Bronner (change in existing course—eff. fall 17)

Engineering: Mechanical

New and changed courses in Engineering: Mechanical (EME)

Lower Division

5. Computer Programming for Engineering Applications (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16A (can be concurrent) or Mathematics 21A (can be concurrent). Structured programming in C for solving problems in engineering.

Introduction to MATLAB and comparison study of C/C++ with MATLAB. GE credit: SciEng | SE—F. (F)
Cheng (change in existing course—eff. fall 17)

50. Manufacturing Processes (4)
Lecture—discussion—3 hours; laboratory—3 hours. Prerequisite: Engineering 4 C- or better; Physics 9A C- or better. Restricted to Mechanical Engineering and Mechanical Engineering/Materials Science Engineering majors. majors. Manufacturing methods, safety, manufacturing instructions, computer-aided manufacturing and their role in the engineering design and development process. GE credit: SciEng | SE—F, W, Su, F, W, Su, Faronuki, Linke, Sashi (change in existing course—eff. fall 17)

Upper Division

108. Measurement Systems (4)
Lecture—2 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: Engineering 100 C- or better; Engineering 102 C- or better; Engineering 104 recommended. Restricted to Mechanical Engineering, Aerospace Science & Engineering and Mechanical/ Materials Science & Engineering. Experiments to illustrate principles of mechanical systems. Signal analysis; Demonstration of basic sensors for mechanical systems; Experimental project design; Experiments involving voltage measurement; strain gauges, dynamic systems of 1st order. Three units of credit for students who have previously taken Biomedical Engineering 111, two units of credit for students who have previously taken Biological Systems Engineering 165; one unit of credit allowed for students who have completed course 107B (former version of course 108). GE credit: SciEng | SE—F, W, S, J Erickson, Kennedy, Park, Shaw (change in existing course—eff. fall 17)

109. Experimental Methods for Thermal Fluids (4)
Lecture—2 hours; laboratory—1.5 hours; discussion—1 hour; extensive writing. Prerequisite: course 106 C- or better. Restricted to Mechanical Engineering, Aerospace Science & Engineering and Mechanical/ Materials Science Engineering Majors. Experiments illustrating principles of thermal-fluid systems and related measurement devices. Statistical design of experiments and uncertainty analysis of data; thermodynamic cycles, combustion, compressible and incompressible flows. Three units of credit for students who have previously taken Chemical Engineering 155A; two units of credit for students who have previously taken Chemical Engineering 155B; three units of credit for students who have previously taken Civil and Environmental Engineering 141L; one unit of credit for students who have already completed course 107A (former version of course 109). GE credit: SciEng | SE—F, W, Su, F, W, S, J Erickson, Pan, Pan, Parikh, Pan (change in existing course—eff. fall 17)

121. Engineering Applications of Dynamics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 102 C- or better; Engineering 6 C- or better or Mechanical Engineering 3 C- or better or Computer Science Engineering 30 C- or better. Technical elective that revisits dynamic principles with emphasis on engineering applications: Equations of motion are derived and put into a format for computer solution; There is a computer laboratory where real engineering systems are simulated. GE credit: SciEng | SE—S. (S) Margolis (change in existing course—eff. fall 17)

134. Vehicle Stability (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 102 C- or better. Restricted to Mechanical Engineering, Aerospace Science and Engineering, and Mechanical Engineering/Materials Science Engineering majors. Analytical and experimental
161. Combustion and the Environment (4)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: course 106 C- or better. Introduction to combustion kinetics; premixed and diffusion flames; turbulent combustion; pollutant formation; examples of combustion devices such as internal combustion engines, gas turbines; Liquefied Petroleum Gas; alternative fuels. Offered in alternate years. GE credit: SciEng | SE — S. (J.) Karnaopp
(change in existing course—eff. fall 17)

150A. Mechanical Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45C or better or Engineering 45Y C- or better; Engineering 104 C- or better. Fundamentals of engineering mechanics applied to the design and analysis to mechanical components. Principles of design. Application of the design to mechanical components. Design projects, concentrate on real-world problems, engineering analysis, methods of failure, material selection, and cost. GE credit: SciEng | SE — F, S, Su. (F, S, Su.) Hill, Moore, Ravani, Schauf
(change in existing course—eff. fall 17)

150B. Mechanical Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150A C- or better. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Engineering, Mechanical Engineering/Materials Science and Engineering. Principles of engineering mechanics applied to the design and selection of mechanical components. Principles of engineering mechanics applied to the design and selection of mechanical components. Projects design, incorporate practical aspects of mechanical design and manufacturing. Applications include product evaluation and decision making, probabilistic design, systems reliability, and fatigue under random loading. GE credit: SciEng | SE — W. (W.) C. Davis
(change in existing course—eff. fall 17)

151. Statistical Methods in Design and Manufacturing (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150A C- or better. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Engineering, Mechanical Engineering/Materials Science and Engineering. Methods of statistical analysis with emphasis on applications in mechanical design and manufacturing. Applications include product evaluation and decision making, probabilistic design, systems reliability, and fatigue under random loading. GE credit: SciEng | SE — W. (W.) C. Davis
(change in existing course—eff. fall 17)

152. Computer-Aided Mechanism Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 102 C- or better; Mechanical Engineering 5 C- or better or Engineering 6 C- or better or Computer Science Engineering 30 C- or better. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Engineering, Mechanical Engineering/Materials Science and Engineering. Principles of computer-aided mechanism design. Computer-aided kinematic, static, and dynamic analysis and engineering design of planar mechanisms such as multiple-loop linkages and geared linkages. Introduction to kinematic synthesis of mechanisms. Offered in alternate years. GE credit: SciEng | SE — F. (F.) Cheng
(change in existing course—eff. fall 17)

154. Mechatronics (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100 C- or better; Engineering 102 C- or better; course 50 C- or better. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Engineering, Mechanical Engineering/Materials Science and Engineering. Overview of mechatronics system and control system design concepts, control software architecture, control hardware architecture, microcontroller and interface technology for mechatronics control, sensor and actuator systems, actuator drives. GE credit: SciEng | SE — S. (S.) Soshi, Yamazaki
(change in existing course—eff. fall 17)

1585A. Mechanical Engineering Systems Design Project (4)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 150A C- or better, course 165 C- or better. [can be concurrent.] Communications 1 or Communications 3 recommended; upper division composition recommended. Restricted to Senior standing in Mechanical Engineering (EMEC). Major mechanical engineering design experience; the mechanical engineering design process and its use in the design of engineering systems incorporating appropriate engineering standards and multiple realistic constraints. [Deferred grading only, pending completion of sequence.] GE credit: SciEng | SE — F. (W.) Moore, Velinsky
(change in existing course—eff. fall 17)

1585. Mechanical Engineering Systems Design Project (4)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 150A; senior standing in the Department of Mechanical and Aerospace Engineering. Major mechanical engineering design experience; the mechanical engineering design process and its use in the design of engineering systems incorporating appropriate engineering standards and multiple realistic constraints. [Deferred grading only, pending completion of sequence.] GE credit: SciEng | SE — S. (J.) Moore, Velinsky
(change in existing course—eff. fall 17)

Engineering: Mechanical and Aerospace

New and changed courses in Engineering: Mechanical and Aerospace (MAE)

Graduate

208. Measurement Methods in Fluid Mechanics and Combustion (4)
(cancelled course—eff. fall 16)

215. Biomedical Fluid Mechanics and Transport Phenomena (4)
(cancelled course—eff. fall 16)

227. Research Techniques in Biomechanics (4)
(cancelled course—eff. fall 16)

231. Musculo-Skeletal System Biomechanics (4)
(cancelled course—eff. fall 16)

236. Aerodynamics in Nature and Technology (4)
(cANCELLED course—eff. fall 16)

253. Network Theory and Applications (4)
Lecture/discussion—4 hours. Prerequisite: Mathematics 22A; Mathematics 22B; Statistics 13 or Statistics 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 network growth, resilience, epidemiology, phase transitions, software and algorithms, routing and search control, cascading failures. [Same course as Computer Science Engineering 253.] Offered in alternate years. — F. D’Souza
(change in existing course—eff. winter 17)

261. Gas Dynamics (4)
(cANCELLED course—eff. fall 16)

266. Computational Aerodynamics (4)
(cancelled course—eff. fall 16)

266. Advanced Wind-Tunnel Testing (4)
(cancelled course—eff. fall 16)
English

New and changed courses in English (ENL)

Lower Division

4. Critical Inquiry and Literature: Freshman Seminar (4)
Seminars 1 hour. Prerequisite: 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.)
(change in existing course—eff. winter 17)

Upper Division

100F. Creative Writing: Fiction (4)
Discussion—4 hours. Prerequisite: course SF or course SP; course SNF; consent of instructor. Priority given to English (Creative Writing) majors. Writing of fiction. May be repeated for credit.—F, W, S. [F, S, W, S.]
(change in existing course—eff. winter 17)

100NF. Creative Writing: Non-Fiction (4)
Discussion—4 hours. Prerequisite: course SF or course SP or course SNF; consent of instructor. Priority given to English (Creative Writing) majors. Writing of non-fiction. May be repeated for credit.—change in existing course—eff. winter 17

100P. Creative Writing: Poetry (4)
Discussion—4 hours. Prerequisite: course SF or course SP or course SNF; consent of instructor. Priority given to English (Creative Writing) majors. Writing of poetry. May be repeated for credit.—change in existing course—eff. winter 17

154. The Graphic Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1; or equivalent courses. Thematically, historically, and formally focused study of the graphic novel genre. Contents may include any regional, national, or transnational group of graphic novels. Offered irregularly. GE credit: ArtHum, Wrt | AH, VL, WE.
(new course—eff. fall 14)

157. Detective Fiction (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Historically, formally, and thematically focused study of novels and short stories in the detective fiction genre. GE credit: ArtHum, Wrt | AH, WE.
(prew course—eff. winter 17)

182. Literature of California (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1. Focus is on the diverse contributions to the rise of California literature. Reading of poetry, fiction, and essays. Emphasis on 19th and 20th century naturalists, turn of the century novelists, the Beats, and writers of the last two decades. GE credit: ArtHum, Div, Wrt | ACGH, AH, DD, WE.
(change in existing course—eff. fall 17)

Graduate

275. Proseminar in Research Practices (2)
Lecture/discussion—2 hours. Must have passed Departmental Preliminary Exam. Study of various practical and technical skills needed to perform research in literary studies. Materials to be selected by the instructor. Evaluation based on student projects that involve hands-on application of skills taught in the proseminar. May be repeated for credit.—new course—eff. winter 17

Entomology

New and changed courses in Entomology (ENT)

Upper Division

105. Insect Ecology (4)
Lecture/discussion—3 hours; term paper. Prerequisite: Biological Sciences 2B (can be concurrent); consent of instructor. Introduction to insect ecology combining fundamental concepts and questions in ecology with ideas, hypotheses and insights from insects. Integrates aspects of individual, population, community and ecosystem ecology. Offered in alternate years. GE credit: SciEng | SE, OL, SL, WE. —F. Yang
(change in existing course—eff. fall 17)

Graduate

253. Advanced Medical Entomology (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: one upper division course in entomology (other than course 153) and one course in microbiology: course 153 strongly recommended. An analysis of several arthropod-borne human diseases with emphasis on the relationships of the biology of the vector to the ecology of the disease. Discussion includes demonstration of vectors and techniques.—change in existing course—eff. fall 17

Environmental Horticulture

New and changed courses in Environmental Horticulture (ENH)

Upper Division

100. Urban Forestry (4)
Lecture—2 hours; laboratory—3 hours; term paper. Prerequisite: course 1 or Plant Sciences 2 or Biological Sciences 28. 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. (F.) Cadena, Volder
(change in existing course—eff. winter 17)

120. Management of Container Media (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: Soil Science 10 or Soil Science 100. Principles of soil science and practices related to management of container media are taught, emphasizing appropriate use of soils and amendments, irrigation, and fertilizers. Physical and chemical properties are tested and effects of management on crops are evaluated in the laboratory. GE credit: SciEng | QL, SE, WE. —F. (F.) Evans
(change in existing course—eff. winter 17)

125. Greenhouse and Nursery Crop Production (5)
Lecture—3 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: Plant Sciences 2 or Biological Sciences 2C. Principles and techniques for the production of ornamental greenhouse and nursery crops. Hands-on experience producing greenhouse crops. Optional weekend field trip. GE credit: SciEng | SE, WE. —W. (W.) Lief
(change in existing course—eff. winter 17)

133. Woody Plants in the Landscape: Growth, Ecology and Management (4)
Lecture—3 hours; laboratory—2 hours; discussion—1 hour. Prerequisite: Plant Sciences 2 or Biological Sciences 2C. Principles and practices of managing trees and shrubs in the urban landscape and other managed environments. Topics include woody plant form; growth response and adaptation; tree management in relation to soil, moisture, climate; plant problems. GE credit: SciEng | SE—W. (W.) Berry, Volder
(change in existing course—eff. winter 17)

160. Restoration Ecology (3)
Lecture—3 hours. Prerequisite: Plant Biology 117 or Evolution & Ecology 117 or Plant Biology 147; or equivalent course in ecology/plant ecology. Conceptual bases of restoration ecology; tools used by restoration ecologists to solve practical problems; scope and success of actual restoration projects. GE credit: SciEng | SE, SL, WE. —S. (S.) Talamas
(change in existing course—eff. winter 17)

Environmental Policy & Management

New and changed courses in Environmental Policy & Management (ENV)

Graduate

200A. Analysis of Environmental Management and Policy (4)
Lecture—4 hours. Prerequisite: graduate standing. Introduction to rational decision making for public policy problems. Modeling natural/human system interactions, data gathering and hypothesis testing. Predicting outcomes of policy options.—F. (F.)
(new course—eff. fall 17)

200C. Environmental Policy Process (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course in public policy (e.g., Environmental Science and Policy 160); environmental law (e.g., Environmental Science and Policy 161); course in statistics (e.g., Sociology 106 or Agricultural and Resource Economics 106). Introduction to selected topics of the policy process and applications to the field of environmental policy. Develops critical reading skills, understanding of policy theory, and an ability to apply multiple theories to the same phenomena. [Same course as Ecology 212A.]—S. (S.) Arnold
(change in existing course—eff. fall 17)

201. Environmental Law (3)
Lecture—3 hours. Roles of legislatures, agencies, and courts in creating and interpreting law; legal strategies for addressing environmental problems; major environmental laws and the relationship between federal and state/local legal authority.—F. (F.)
(new course—eff. fall 17)

202. Strategies of Environmental Administration and Management (4)
Lecture—4 hours. Bureaucracy and public management, organizational theory, analysis of environmental management by US agencies, NGOs, and business. Overview of natural resource management, analyzes the strengths and limitations of different administrative approaches.—F. (F.)
(new course—eff. fall 17)

203. Environmental Policy Clinic (4)
Laboratory—12 hours. Prerequisite: graduate standing. Teams of students examine an environmental policy problem from scientific, legal, and economic perspectives. Hands-on learning partnering with rotating clients. May be repeated for credit up to one time – once in winter and once in spring.—W. (W.), S. (S.)
(new course—eff. winter 18)
296. Environmental Policy and Management Practicum (2-6)
Internship—6-18 hours. Prerequisite: consent of instructor. Practicum experience integrating coursework into an applied professional setting. May be repeated for credit. (S/U grading only)—F, W, S, Su. (F, W, S, Su.)
(new course—eff. fall 17)

296. Environmental Policy and Management Practicum (2-6)
Internship—6-18 hours. Prerequisite: consent of instructor. Practicum experience integrating coursework into an applied professional setting. May be repeated for credit. (S/U grading only)—F, W, S, Su. (F, W, S, Su.)
(new course—eff. winter 18)

297. Professional Development Seminar (1)
Seminar—3 hours. Prerequisite: graduate standing. Weekly seminar inviting policy and management professionals to come and discuss their challenges and achievements. May be repeated for credit up to six units. (S/U grading only)—F, W, S, F, W, S, Su. (F, W, S, Su.)
(new course—eff. winter 18)

Environmental Science and Policy
New and changed courses in Environmental Science and Policy (ESP)
Upper Division
151. Limnology (4)
Lecture—3 hours; discussion—1 hour; special project. Prerequisite: Biological Sciences 2A; Biological Sciences 2B; Biological Sciences 2C and course 100 or Evolution and Ecology 101 recommended. Biology and productivity of inland waters with emphasis on the physical and chemical environment. Offered irregularly. GE credit: SciEng | SE
(change in existing course—eff. spring 17)

165. Climate Policy (3)
Lecture—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. (S.) Springborn
(change in existing course—eff. fall 17)

165N. Climate Policy (3)
(canceled course—eff. fall 17)

166. 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 species. Offered in alternate years. GE credit: SocSci | SS.—W. (W.) Sanchirico
(new course—eff. fall 17)

166N. Ocean and Coastal Policy (3)
(canceled course—eff. winter 17)

168A. Methods of Environmental Policy Evaluation (5)
Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: Statistics 13; course 1; Economics 1A; Economics 100 recommended. 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.—F.
(change in existing course—eff. spring 17)

175. Natural Resource Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural and Resource Economics 100B or Economics 100 or the equivalent. Pass One open to Managerial Economics (AMGE) and Environmental Policy Analysis (AEPP) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. 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 Agricultural and Resource Economics 175.) GE credit: SocSci | SS.—S. (S.) Lin
(change in existing course—eff. winter 17)

Graduate
212A. Environmental Policy Process (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course in public policy (e.g., course 160); environmental law (e.g., course 161); course in statistics (e.g., Sociology 106 or Agricultural and Resource Economics 106). Introduction to selected topics of the policy process and applications to the field of environmental policy. Develops critical reading skills, understanding of policy theory, and an ability to apply multiple theories to the same phenomena. (Same course as Ecology 212A, Environmental Policy and Management 200C.)—S. (S.) Arnold
(change in existing course—eff. fall 17)

Professional
396. Teaching Assistant Training Practicum (1-4)
Prerequisite: consent of instructor. Teaching assistant training practicum. May be repeated for credit. (S/U grading only)—F, W, S, F, W, S, Su. (F, W, S, Su.)
(new course—eff. spring 17)

Epidemiology
New and changed courses in Epidemiology (EPI)
Graduate
202. Quantitative Epidemiology I: Probability (5)
Lecture—4 hours; laboratory—2 hours. Prerequisite: Mathematics 16A or Mathematics 17A or Mathematics 21A; Statistics 102; Statistics 108; or Population Health and Reproduction 402 and 403 for either of listed course; concurrent or previous enrollment in a basic epidemiology course (e.g., course 205). Foundations in probability for epidemiologists. Emphasis on properties of and relationships between distributions and application of probability concepts to epidemiology. Includes a mathematical skills laboratory to assist in solution of epidemiologic problems.
(change in existing course—eff. winter 17)

203. Quantitative Epidemiology II: Statistical Inference (4)
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: course 202 or Statistics 130A or Statistics 131A or Statistics 133; course 205; a basic course in Epidemiology (Epidemiology 205 or equivalent). Provides the mathematical statistics foundation for statistical models, methods, and data analysis.
(change in existing course—eff. winter 17)

204. Quantitative Epidemiology III: Statistical Models (4)
Lecture—3 hours; laboratory/discussion—1 hour. Prerequisite: course 203 or Statistics 130B or Statistics 131B or Statistics 133); course 205; Statistics 108 recommended; a basic course in Epidemiology (course 205 or equivalent); consent of instructor. Introduces statistical models, methods, and data analysis in the areas of generalized linear model and survival analysis methodology.
(change in existing course—eff. winter 17)

205A. Principles of Epidemiology (4)
canceled course—eff. winter 17

224. Health and Ecological Risk Analysis (4)
Lecture—2 hours; laboratory—4 hours. Methodological approach to risk analysis for human and animal related health and ecological issues. Basic principles of risk analysis, including perception, communication, assessment and management. Emphasis on the assessment of risk. —S. (S.)
(change in existing course—eff. winter 17)

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. —W. (W.) DeRiemer
(change in existing course—eff. spring 17)

232. Advanced Data Analysis with SAS (3)
Lecture—3 hours. Prerequisite: course 202; course 203; course 204; or the equivalent, or consent of instructor. Provide an overview of common advanced statistical methods as well as a treatment of how to use SAS to implement them. Learn the ideas of reproducible research and reporting of statistical analyses. —W. (W.) Ioannidis
(new course—eff. winter 17)

280. Introduction to SAS Programming (3)
Lecture—2 hours; discussion/laboratory—1 hour. Prerequisite: Introductory statistics course (e.g., Preventive Veterinary Medicine 402, Statistics 102); Conduction, convection, and radiation heat transfer. Computational modeling of heat transfer in engineering. Applications to engineering equipment with the use of digital computers. (Same course as Public Health Sciences 280.)—Qi
(new course—eff. fall 16)

Evolution and Ecology
New and changed courses in Evolution and Ecology (EVE)
Lower Division
17. Dining with Darwin: Evolutionary Insights Into Your Diet (3)
(new course—Fall. 2017-2018 offering in parentheses
Courses & Programs are subject to change without notice.

2016-2018 General Catalog Course Supplement and Policies and Requirements Addendum
Food Science and Technology

New and changed courses in Food Science and Technology (FST)

**Lower Division**

3. Introduction to Brewing and Beer (3)
   Lecture—3 hours. Basic description of brewing and associated processes, from raw materials to final product; history of brewing and brewing science; types of beer worldwide; world beer markets; basics of beer quality, including wholesomeness; role of scientist in brewing. Not open for credit to students who have taken course 3V. GE credit: SciEng | QL, SE, SL, -- | F, W, Su. (F, W, S, Su.) Bayliss, Baer (canceled course—eff. fall 17)

3V. Introduction to Brewing and Beer (3)
   Web virtual lecture—1 hour; web electronic discussion—1 hour; project—1.5 hours. Basic description of brewing and associated processes, from raw materials to final product; history of brewing and brewing science; types of beer worldwide; world beer markets; basics of beer quality, including wholesomeness; role of scientist in brewing. Not open for credit to students who have taken course 3. GE credit: SciEng | QL, SE, SL, -- | F, W, S, Su. (F, W, S, Su.) Bayliss, Baer (new course—eff. fall 17)

50. Introduction to Food Preservation (3)
   Lecture—2 hours, laboratory—2 hours. Prerequisite: Chemistry 2A; Science 13. Can be concurrent. Biological Sciences 2A can be concurrent. Restricted to Food Science Majors. Introduction to modes of fresh 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, SL, -- | F. (F.) DeMoura Bell (change in existing course—eff. winter 18)

50A. Food Chemistry Laboratory (3)
   Lecture—3 hours; discussion—1 hour. Prerequisite: course 123L (can be concurrent). Study of basic chemical and physical properties that influence the reactivity and functional properties of components in food systems. GE credit: SciEng | QL, SE, VL, WE. -- | F. (F.) Sklupsky (change in existing course—eff. spring 17)

102A. Malting and Brewing Science (4)
   Lecture—4 hours. Prerequisite: Biological Sciences 102, 103; senior standing recommended. The technology of the malting, brewing and fermentation processes is integrated with the chemistry, biochemistry and microbiology that determine industrial practices and product quality. Not open for credit to students who have taken course 102. GE credit: SciEng | QL, SE. -- | F. (F.) Bayliss (new course—eff. fall 97)

104L. Food Microbiology Laboratory (4)
   Lecture—1 hour; discussion—1 hour; laboratory—6 hours. Prerequisite: Biological Sciences 2A; Biological Sciences 102; senior standing. Determination of microbial characteristics of microorganisms involved in food spoilage, in food-borne disease, and food fermentation. Analysis of microbiological quality of foods. GE credit: SciEng | QL, SE, VL, WE. -- | S. (S.) Young (change in existing course—eff. spring 17)

107. Food Sensory Science (4)
   Lecture—3 hours; laboratory—3 hours. Prerequisite: course 117 can be concurrent; Statistics 13. Critical examination of techniques and theories of sensory measurement of food, measures of consumer perception and acceptance. An introduction to the sensory and cognitive systems associated with the perception of food. Not open for credit to students who have completed course 107A. GE credit: SciEng | QL, SE, WE. -- | F. (F.) O'Mahoney (change in existing course—eff. spring 17)

109. Principles of Quality Assurance in Food Processing (3)
   Lecture—2 hours; discussion—1 hour. Prerequisite: Statistics 13. Quality assurance measurement techniques applied to selected foods. GE credit: SciEng | QL, SE, SL, -- | F. (F.) Simmons (change in existing course—eff. spring 17)

110. Food Processing Laboratory (2)
   Laboratory—3 hours; discussion—1 hour. Prerequisite: course 110 can be concurrent; course 50. Open to Food Science majors only. Laboratory exercises to gain experience with common food processing operations at the bench and pilot plant scales. GE credit: SciEng | QL, SE, SL, VL. -- | F. (F.) Bornhorst (change in existing course—eff. spring 17)

115. Fermented Foods (4)
   Lecture—3 hours; term paper/discussion—3 hours. Prerequisite: Biological Sciences 103; Microbiology 102; or consent of instructor. Pass One restricted to upper division or graduate level Food Science and Viticulture and Enology majors. Physiology, biochemistry, and genetics of microorganisms important in food fermentations. How microorganisms are used in fermentations and how raw materials are converted into finished fermented foods and beverages. -- | S. (S.) Mills (new course—eff. spring 17)

117. Design and Analysis for Sensory Food Science (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 13. Methods of design and analysis for sensory food science. Experimental design strategies. Use of taste panels and consumer testing. Data analysis and computation including the relative merits and limitations of parametric and nonparametric approaches. Modifications for quality assurance. GE credit: SciEng | QL, SE, VL. -- | F. (F.) O'Mahoney (change in existing course—eff. spring 17)

119. Chemistry and Technology of Milk and Dairy Products (4)
   Lecture—4 hours; demonstrations and a field trip. Prerequisite: Biological Sciences 2A; Biological Sciences 102; consent of instructor. Composition, structure and properties of milk and products derived from milk. Relates chemical, microbiological, and technological principles to commercial practices in processing of milk and its products. GE credit: SciEng | QL, SE, VL. -- | S. (S.) Rosenberg (change in existing course—eff. spring 17)

123. Introduction to Enzymology (3)
   Lecture—3 hours. Prerequisite: course 123L can be concurrent. Biological Sciences 102, Biological Sciences 103. Principles of physical, chemical and catalytic properties of enzymes and their importance. Purification, characterization, and quantitative evaluation of the function of enzymes. The practical and ethical implications of the application of knowledge are stressed.
Specificty and mechanism of action illustrated by use of selected enzymes. (Former course Biochemistry and Biophysics 123.) GE credit: SciEng | OL, SE, VL. — S. (S.) G. Smith (change in existing course—eff. spring 17)

159. New Food Product Ideas (3)
Lecture—3 hours. Prerequisite: course 50; Biological Sciences 2A, Physics 7A, 7B, 7C; Chemistry 2A, 2B, 2C. Create, refine, test and present viable ideas for new food products. Activities include trend monitoring, consumer research, idea generation, concept screening, and new product concept presentations. GE credit: ArtHum or SocSci | AH or SS, OL, WE. — F. (F.) Biltekoff (change in existing course—eff. spring 17)

Graduate

201. Food Chemistry and Biochemistry (4)
Lecture—4 hours. Prerequisite: undergraduate courses in organic chemistry and biochemistry; undergraduate course in food chemistry is recommended. Restricted to Food Science graduate level standing or consent of instructor. Advanced topics in food chemistry and biochemistry, emphasizing the application of the basic principles of chemistry and biochemistry to food composition, properties, preservation and processing. Chemical structures, interactions, reaction mechanisms and experimental methods are stressed. — F. (F.) Barile (change in existing course—eff. fall 17)

202. Physical Chemistry of Foods (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Chemistry 107A; Chemistry 107B; Biological Sciences 102 recommended. Fundamental 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.) Dungan (change in existing course—eff. winter 17)

230. Food & Gut Microbiota (4)
Lecture—1.5 hours; discussion—1.5 hours; term paper. Prerequisite: Microbiology and molecular biology undergraduate coursework or consent of instructor. Upper division or graduate standing. Impact of specific food structures on the structure and function of the animal gut microbiota. How food is transformed by, and modulates, the gut microbiota to provide the host with nutrients and protection. — S. (S.) Mills (new course—eff. spring 17)

Genetics

(A Graduate Group)

New and changed courses in Genetics (A Graduate Group) (GGG)

Graduate

225. Gene and Cellular Therapies (3)
Lecture/discussion—3 hours. 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 (change in existing course—eff. winter 17)

296. Scientific Professionalism and Integrity (2)
Lecture—1 hour; seminar—3 hours. Prerequisite: graduate standing or consent of instructor. Review of basic skills required of contemporary scientists. Topics include scientific conduct, manuscript preparation, grant writing, seminar presentations, and time management. Emphasis on responsibilities of scientists to factually and thoughtfully communicate results. (P/NP grading only.) — F. (F.) Yoder (change in existing course—eff. spring 17)

Geography

(A Graduate Group)

New and changed courses in Geography (GEO)

Graduate

252. Landscape and Power (4)
(cancelled course—eff. fall 16)

270. Experimental Design and Analysis (5)
(cancelled course—eff. fall 16)

271. Applied Multivariate Modeling in Agricutural and Environmental Sciences (4)
(cancelled course—eff. fall 16)

279. Exploring Data from Built Environment Using R (4)
Lecture—3 hours; laboratory—3 hours. Introduction to modern data science, specifically data acquisition, exploratory data analysis, visualization, and beginning data analysis using R. Emphasizes computational reasoning and working with tabular and non-standard data. Focus will be on data generated in the built environment. (Same course as Civil and Environmental Engineering 254.) — W. (W.) Niedermeier (change in existing course—eff. fall 17)

Geology

New and changed courses in Geology (GEL)

Lower Division

2. Earth System Science (3)
Lecture—3 hours. Solid and fluid earth and its place in the solar system. How the solid earth interacts with the atmosphere, hydrosphere, biosphere, and extra-terrestrial environment. Only 2 units credit for students who have taken course 50; only 2 units credit for students who have taken course 1. GE credit: SciEng | SE, SL. — W. (W.) Montañez (change in existing course—eff. winter 17)

91. Geology of Campus Waterways (1)
(cancelled course—eff. fall 16)

Upper Division

110. Summer Field Geology (8)
Fieldwork. Prerequisite: course 60; course 103; course 109; course 105 recommended. Advanced application of geologic and geophysical field methods to the study of rocks. Includes development and interpretation of geologic maps and cross sections; gravity, magnetic, electrical resistivity and seismic surveys; and field analysis of plutonic and volcanic rock suites. Eight hours/day; six days/week for six weeks. GE credit: SciEng; Wrt | SE, WE, W. (W.) Osokin, Cowgill (change in existing course—eff. spring 17)

115. Earth Science, History, and People (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or course 50. Study of interplay between the Earth and its human inhabitants through history, including consideration of acute events such as earthquakes and eruptions as well as the geography of resources, topography, and water. GE credit: SciEng or SocSci, Wrt | OL, SE, WE. — S. (S.) Versub (change in existing course—eff. winter 17)

183. Teaching High School Mathematics and Science (3)
Lecture/discussion—2 hours; field work. Prerequisite: major in mathematics, science, or engineering; or consent of instructor with completion of a one-year sequence of science or calculus. 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. Field experience in high school classrooms. (Same course as Education 183.) GE credit: SocSci | OL, SS, WE. — F. (F.) Su; S. (S.) F., W. (W.) Stevenson (change in existing course—eff. fall 17)

185A. Conceptual Integrated Science for Non-Science Majors: The Physical World (2)

185B. Conceptual Integrated Science for Non-Science Majors: Earth System Science (2)
Lecture—1 hour; discussion/laboratory—3 hours. Conceptual, inquiry-based integrated science course. Topics in the Next Generation Science Standards. Elementary school level teaching practice. Earth, space and environmental science, and science inquiry. GE credit: SE, SL. — S. (S.) Pinter (new course—eff. fall 16)

186. Conceptual Integrated Science for Non-Science Majors: Earth System Science (2)
Lecture/discussion—1 hour. STEM Learning Assistant Seminar. Theoretical and practical issues of effective teaching in discussion/labs; student-centered, active, cooperative learning environments, responsive teaching, and differentiated classroom instruction. GE credit: SS. — F. (F.) W. (W.) Su; S. (S.) F., W. (W.) Stevenson (new course—eff. fall 16)

Global Disease Biology

New and changed courses in Global Disease Biology (GDB)

Lower Division

90. Introduction to Global Disease Biology (1)
Seminar—3 hours. Open to Global Disease Biology majors only. 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. (F.) W. (W.) Su; S. (S.) F., W. (W.) Rizzo (change in existing course—eff. fall 17)
Greek

New and changed courses in Greek (GRK)

Upper Division

106. Greek Hexameter Poetry (4)
Lecture/discussion—3 hours; extensive writing—3 hours. Prerequisite: course 100; or consent of instructor. Selected readings from ancient Greek hexameter poetry. Wisdom poetry, hymns, epyllia, idylls, epic, natural history and other texts from the hexameter tradition. May be repeated for credit. GE credit: Arthum, Wrt | AH, WC, WE.—F, W, S | F, W, S | Breilinski, Uhlig
(new course—eff. fall 17)

Hebrew

New and changed courses in Hebrew (HEB)

Lower Division

2. Elementary Hebrew (5)
Lecture/discussion—4 hours; laboratory—2 hours. Prerequisite: course 1; or the equivalent. Speaking, listening, comprehension, reading and writing fundamentals of modern Hebrew. GE credit: Arthum | AH, OL, WC.—W. (W.) Franco
(new course in existing course—eff. fall 17)

3. Elementary Hebrew (5)
Lecture/discussion—4 hours; laboratory—2 hours. Prerequisite: course 2; or the equivalent. Speaking, listening, comprehension, reading and writing fundamentals of modern Hebrew. GE credit: Arthum | AH, OL, WC.—S. (S.) Franco
(new course in existing course—eff. fall 17)

11. Introduction to Biblical Hebrew (3)
(new course—eff. winter 17)

12. Introduction to Biblical Hebrew (3)
(new course—eff. spring 17)

21. Intermediate Modern Hebrew I (4)
Lecture/discussion—4 hours. Prerequisite: course 3; consent of instructor. Development and refinement of grammar, composition, and language skills required for reading literary texts and conversing about contemporary topics at an advanced level. History of the Hebrew language. Not open to students who have taken course 101 or 100A. GE credit: Arthum | AH, OL, WC.—F. (F.) Franco
(new course in existing course—eff. fall 17)

22. Intermediate Modern Hebrew II (4)
Lecture/discussion—4 hours. Prerequisite: course 21; consent of instructor. Continued development and refinement of grammar, composition, and language skills required for reading literary texts and conversing about contemporary topics at an advanced level. History of the Hebrew language. Not open to students who have taken course 101 or 100B. GE credit: Arthum | AH, OL, WC.—W. (W.) Franco
(new course in existing course—eff. fall 17)

Hindi

New and changed courses in Hindi (HIN)

Lower Division

Lecture/discussion—4 hours. Prerequisite: course 3 level course for students who have completed Elementary Hindi/Urdi or the equivalent. Students will continue to practice their skills in listening, speaking, reading and writing in Hindi and Urdu. GE credit: Arthum | AH, OL, WC.—F. (F.) Chauhan
(new course in existing course—eff. fall 17)

22. Intermediate Hindi/Urdi II (4)
Lecture/discussion—4 hours. Prerequisite: course 21. 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, OL, WC.—W. (W.) Chauhan
(new course in existing course—eff. fall 17)

23. Intermediate Hindi/Urdi III (4)
Lecture/discussion—4 hours. Prerequisite: course 22. 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, OL, WC.—S. (S.) Chauhan
(new course in existing course—eff. fall 17)

98. Directed Group Study (1-5)
Prerequisite: consent of instructor. Directed group study. May be repeated for credit. (P/NP grading only)
(new course—eff. winter 17)

99. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. Special study. May be repeated for credit. (P/NP grading only)
(new course—eff. winter 17)

Professional

396. Teaching Assistant Training Practicum (1-4)
Prerequisite: consent of instructor. Restricted to graduate students. Teaching practice. May be repeated for credit up to eighteen times. (S/U grading only)—F, W, S | F, W, S | Franco
(new course—eff. winter 17)

History

New and changed courses in History (HIS)

Lower Division

2. Introduction to the History of Science and Technology (4)
Lecture—3 hours; discussion—1 hour. Introduction to topics and methods of the history of science and technology. Emphasis on understanding the role of science and technology in the modern world through a long-term historical perspective. (Same course as Science and Technology Studies 2.) GE credit: AH, SL, SS, WC, WE.
(new course—eff. fall 17)

3. Cities: A Survey of World Cultures (4)
Lecture—3 hours; lecture/discussion—1 hour. Survey of urban world cultures, focusing on up to ten cities selected by the instructor. Offered irregularly. GE credit: Arthum or SocSci, Div, Wrt | AH or SS, WC.
(change in existing course—eff. winter 17)

15. Introduction to African History (4)
(cancelled course—eff. spring 18)

15A. Africa to 1900 (4)
Lecture—3 hours; discussion—1 hour. Introduction to African history to 1900. Origins and impact of early human history, precolonial states and societies, slavery and the slave trade, religious and cultural movements, and the foundations of European colonialism. GE credit: AH, SS, WC.
(new course—eff. spring 18)

15B. Africa Today (4)
Lecture—3 hours; discussion—1 hour. Survey of major themes in colonial and postcolonial sub-Saharan African history, including colonialism, decolonization, nationalism and politics, economic history and labor, urbanization, popular culture, gender, marriage, and family life. GE credit: AH, SS, WC.
(new course—eff. fall 17)

Upper Division

107. Medicine's Histories: Human and Veterinary Medicine from the Ancient World to One Health (4)
Lecture/discussion—3 hours; project—3 hours. Global, comparative study of the related histories of human and veterinary medicine from the ancient world to today's interdisciplinary One Health. Emphasis on reintegration of human and veterinary medicine to meet the biggest health challenges today. GE credit: AH, SS
(new course—eff. spring 17)

109. Environmental Change, Disease and Public Health (4)
Lecture/discussion—3 hours; project. Analysis of environmental changes from pre-history to the present and their influence on disease distribution, virulence and public health. Focus on critical study of many human-driven environmental changes and the accelerated transformation/spread of pathogens under globalization. Not open for credit to students who have taken course 100B. (Same course as Science and Society 109.) GE credit: SciEng or SocSci, Div | SE or SS, SL, WC.—F. (F.) Davis
(new course—eff. fall 16)

109A. Global Environmental History (4)
(cancelled course—eff. winter 17)

109B. Environmental Change, Disease and Public Health (4)
(cancelled course—eff. winter 18)
right citizenship; overthrow of biracial Southern governments; segregation and disfranchisement; culture of reconciliation. GE credit: ACGH, AH. (new course—eff. spring 17)

172. American Environmental History (4) Lecture—3 hours; term paper. 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. (change in existing course—eff. winter 18)

180C. The Fight for the Right to Vote (4) Lecture—3 hours; term paper. History of the struggle for voting rights from the colonial period to the present. Emphasis on the struggle for inclusion by African Americans, women, Latinos, and other groups. GE credit: ACGH, AH or SS. (change in existing course—eff. fall 17)

187. History of US Foreign Relations in the Twentieth Century (4) Lecture—3 hours; extensive writing—3 hours. Rise of the US to superpower status during the twentieth century, from colonialism to the war on terror, including political, diplomatic, cultural, and economic activities of the US government and private American agencies beyond US borders. Offered in alternate years. GE credit: SS, WE. (new course—eff. fall 17)

193A. History of the Modern Middle East, 1750-1914 (4) Lecture—3 hours; term paper. Prerequisite: course 6 recommended. Society and state within the Middle East from 1750 to 1914 under pressure of the changing world economy and European imperialism. Themes: colonialism, Orientalism, intellectual renaissance, Islamic reform, state-formation, role of subaltern groups. Offered irregularly. GE credit: ArtHum or SocSci, Wrt | AH, SS, VL, WC, WE. (change in existing course—eff. fall 17)

195C. A History of Vietnam (4) Lecture/discussion—4 hours. Overview of Vietnamese history: early state formation in Southeast Asia; expansion/contention in the 17th and 18th centuries; war with the US; and post-war developments (with an emphasis on relations with China and the US). Offered irregularly. GE credit: AH, SS, WC, WE. (new course—eff. fall 17)

Horticulture

New and changed courses in Horticulture (HRT)

Graduate

203. Research Perspectives in Horticulture (3) Lecture—1 hour; lecture/discussion—2 hours. Prerequisite: graduate standing. Following lectures/discussions of scientific methodology, students develop research proposals aided by classroom discussions and individual interactions with instructors. Lectures and critiques of "classical papers" provide a sense of the evolution of the current concepts in perennial plant biology. —W. (W.) Melotto, Zwieniecki (change in existing course—eff. spring 17)

171B. Civil War Era (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 the Civil War in 1865. Causes of the war and its humanitarian and social consequences of reconstruction after the war. Offered in alternate years. GE credit: ArtHum or SocSci, Wrt | ACGH, AH or SS, DD, WE. (change in existing course—eff. spring 17)

171C. Reconstruction, America's Second Founding (4) Lecture—3 hours; term paper. After the U.S. Civil War, from 1865 to 1876. Emphasis on end of slavery; expansion of civil rights; voting rights, and birth

Human Development

New and changed courses in Human Development (HDE)

Upper Division

100A. Infancy and Early Childhood (4) Lecture—4 hours. Prerequisite: Psychology 1, Biological Sciences 1A, 1B, 2A, 2B, 10B, Molecular and Cellular Biology 10, or Psychology, Physiology, and Behavior 10 or 12; or Microbiology 10. Pass One restricted to Human Development majors. Biological, social, and cultural influences in the psychological growth and development of children, prenatal through age six. Two observations of preschool children required. —F, W, Su. [F, W, Su.] Hibel (change in existing course—eff. fall 17)

Human Rights

New and changed courses in Human Rights (HR)
Hydrologic Science (A Graduate Group)

New and changed courses in Hydrologic Science (HYD)

Graduate

201A. Hydrologic Sciences Core Survey (3) Lecture/discussion—2 hours; project—3 hours. Considers the primary sub-disciplines while reviewing the fundamental scientific concepts/processes of the hydrologic sciences research community, and includes a basic writing component.—(Grismer, Harter) (new course—eff. fall 17)

201B. Hydrologic Sciences Core Seminar (1) Seminar—3 hours. Exposes students to the research underway in the Hydrologic Sciences Graduate Group as well as provide them the opportunity to present and refine their research through interaction with other students in the Graduate Group. (P/NP grading only).—(Harter) (new course—eff. winter 18)

273. Introduction to Geostatistics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 130A, Statistics 130B, or the equivalent. Statistical treatment of spatial data with hydrologic emphasis. Topics: theory of random functions, variogram analysis, Kriging/co-Kriging, indicator geostatistics, and stochastic simulation of spatial variability. Geostatistical software use. Offered in alternate years.—(F. Foggi, Puente) (change in existing course—eff. fall 17)

Hydrology

New and changed courses in Hydrology (HYD)

Upper Division

143. Ecohydrology (4) Lecture/discussion—3 hours; course 10 or course 141 or Environmental Science and Policy 1 or Environmental Science and Management 120 or Environmental Science and Management 108 or Geology 50 or Soil Science 100; consent of instructor. Movement and storage of water in individual ecosystems and the integrated functioning of water and biota at the watershed scale. Offered in alternate years. GE credit: SciEng, OL, QL, SE, SL—W. (W. Pasternack) (change in existing course—eff. winter 17)

145. Water Science and Design (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: any one of the following or consent of instructor: Hydrology 141, Mathematics 16C, 17C or 21C. Introduction to watershed engineering, storm water management, design of hydraulic systems. Topics include hydrological risk analysis, flood routing, design storms, open channel flow, pipes, culverts, spillways, and detention basins. Class project and field trips will apply theory to real-life problems. Offered in alternate years. GE credit: SciEng, OL, SE, SL—W. (W. Dahlin) (new course—eff. fall 16)

Integrated Pest Management

New and changed courses in Integrated Pest Management (IPM)

Graduate

201. Concepts and Systems of Plant Protection and Pest Management (4) cancelled course—eff. winter 17

202A. Diagnosis of Plant Pest Problems and the Control of Causal Agents (4) cancelled course—eff. winter 17

202B. Diagnosis of Plant Pest Problems and the Control of Causal Agents (4) cancelled course—eff. winter 17

290. Seminar (1-2) cancelled course—eff. winter 17

298. Group Study (1-2) cancelled course—eff. winter 18

299. Research (1-12) cancelled course—eff. winter 18

International Agricultural Development

New and changed courses in International Agricultural Development (IAD)

Graduate

201. The Economics of Small Farms and Farming Systems (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Agricultural and Resource Economics 100A or Economics 100, or the equivalent. 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.) Vasti (change in existing course—eff. winter 17)

202N. Analysis and Determinants of Farming Systems (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Plant Sciences 110C or Plant Sciences 111; 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.) Bunn, Van Kessel (change in existing course—eff. winter 17)

203N. Project Planning and Evaluation (4) Discussion—1 hour; workshop—3 hours. Prerequisite: course 200N; or consent of instructor. 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.) Kessel (change in existing course—eff. winter 17)

Italian

New and changed courses in Italian (ITA)

Lower Division

8A. Italian Conversation (3) Discussion—3 hours. Prerequisite: course 3 or the equivalent. Italian conversation in peers in classroom setting. GE credit: OL, WC.—F. (F.) Heyer-Caput (change in existing course—eff. winter 17)

8AS. Italian Conversation (3) Discussion—3 hours. Prerequisite: course 3 or the equivalent. Italian conversation in local context outside United States. GE credit: OL, WC.—F. (F.) Heyer-Caput (change in existing course—eff. winter 17)

8B. Italian Conversation (3) Discussion—3 hours. Prerequisite: course 8A. Italian conversation with peers in a classroom setting. Offered irregularly. GE credit: WC. (change in existing course—eff. winter 17)

8BS. Italian Conversation (3) Discussion—3 hours. Prerequisite: course 8A. Italian conversation in local context outside United States. Offered irregularly. GE credit: OL, WC.—F. (F.) Heyer-Caput (change in existing course—eff. winter 17)

31. Beginning Italian for Spanish Speakers (5)
Lecture/discussion—5 hours. Prerequisite: Spanish 3; or two years of high school Spanish or native or heritage speaker of Spanish. Intensive introductory course on Italian language with emphasis on structural similarities between Italian and Spanish. Not open for credit to students who have completed course 1, course 2; course 1A, course 1S, course 25. GE credit: AH, OL, WC.—F. (F.) Gomez (new course—eff. spring 17)

32. Beginning Italian for Spanish Speakers (5)
Lecture/discussion—5 hours. Prerequisite: course 31 or course 31Y; or consent of instructor. Continuation of course 31. Intensive introductory course to Italian language and grammar with emphasis on oral and written communication. Highlights the structural similarities between Italian and Spanish. Not open for credit to students who have completed course 2, course 3; course 1A, course 1S, course 25, course 35. GE credit: AH, OL, WC.—S. (S.) Gomez (new course—eff. spring 17)

Upper Division

120A. Italian Literature of the Twentieth Century: The Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 9; 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/WR, AH, OL, WC. —Can- non, Heyer-Caput (change in existing course—eff. spring 17)
### Japanese

#### New and changed courses in Japanese (JPN)

**Lower Division**

- **75. Intensive Intermediate Japanese (20)**
  - Lecture/discussion—20 hours. Prerequisite: course 2 C- or better; or the equivalent language proficiency; consent of Instructor. Special intensive course that combines the work of courses 3, 4, 5, and 6. Introduction to Japanese grammar and development of all language skills in a cultural context with emphasis on communication. Taught in Japanese. GE credit: ArtHum | AH, OL, WC—S. (S.)
  - [change in existing course—eff. winter 17]

- **106. Japanese Culture Through Film (4)**
  - Lecture/discussion—3 hours; film viewing—3 hours. Aspects of Japanese culture such as love, sexuality, war, the military, the family, the position of women, growing up and older age portrayed in Japanese cinema. Lectures, discussion, and readings in English. Films with English subtitles. GE credit: ArtHum | Div, Wrt | AH, VL, WC—Chang, Gundry
  - [change in existing course—eff. spring 17]

- **110. Japanese Popular Culture (4)**
  - Film viewing—3 hours; lecture/discussion—3 hours. Japanese popular culture, from its medieval/early modern precedents to contemporary incarnations. Emphasis on major forms of popular culture that emerged in the 20th century, including comics, animation, science fiction, fantasy. Offered in alternate years. GE credit: ArtHum | Div | AH, VL, WC.
  - [change in existing course—eff. fall 17]

- **111. Modern Japanese: Reading and Discussion (4)**
  - Lecture—3 hours; discussion—1 hour. Prerequisite: course 6 C- or better; or the equivalent language proficiency. Readings in Modern Japanese short stories, newspaper articles, and essays; conversation practice based on these readings. GE credit: ArtHum | AH, OL, WC—F. (F)
  - [change in existing course—eff. spring 17]

- **114A. Spoken Japanese (2)**
  - Discussion—2 hours. Prerequisite: consent of instructor. Training in spoken Japanese for students with a basic working knowledge of the language. (P/NP grading only) GE credit: OL
  - [change in existing course—eff. spring 17]

- **116. Culture and History in Kyoto (8)**
  - Lecture/discussion—9 hours; fieldwork—9 hours. Intensive course exploring the historical and cultural riches in Kyoto and its environs. Limited to students enrolled in the corresponding Quarter Abroad program. Takes place on-site in and around Kyoto, Japan. GE credit: AH, WC—S. Sorensen
  - [new course—eff. fall 17]

- **1175. Intensive Modern Japanese: Reading and Discussion (17)**
  - Lecture/discussion—17 hours. Prerequisite: course 5 C- or better; or consent of instructor; or the equivalent language proficiency. Introduction to basic Japanese grammar and development of more advanced reading, writing, and conversation skills in a cultural context. Combination of courses 6, 111, 112, and 113 taught intensively in Japan. Not open to students who have taken courses 6, 111, 112, or 113; an exception can be made for students who have taken course 6 or its equivalent, provided that these five units are deducted from the 19 total unit load.
  - GE credit: ArtHum | AH, OL, WC.
  - [change in existing course—eff. winter 17]

**Upper Division**

- **130. Readings in Modern Japanese Literature to 1925 (4)**
  - Lecture/discussion—4 hours. Prerequisite: course 113; or equivalent language proficiency. Restricted to completion of course 113 or equivalent as determined by taking a placement exam or consent of instructor. Short stories and essays by Japanese writers of the Meiji and Taishô eras, from 1868 to 1926. Authors include Natsume Sôseki, Izumi Kyôka, Tanizaki Jun'ichirô and Akutagawa Ryûnosuke. Readings are conducted in Japanese with some emphasis on translation into English. GE credit: ArtHum | AH, WC—Sorensen
  - [change in existing course—eff. winter 17]

- **138. Readings in the Humanities: Japan Today (4)**
  - Lecture/discussion—4 hours. Prerequisite: course 113; or equivalent language proficiency. 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 center on defining Japan today in terms of 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
  - [change in existing course—eff. winter 17]

- **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 from the perspectives of phonology, syntax, discourse analysis, sociolinguistics and psycholinguistics. GE credit: ArtHum, Div, Wrt | AH, WC, WE—Kayama
  - [change in existing course—eff. winter 17]

- **155. Introduction to Japanese Folklore (4)**
  - Discussion—2 hours; lecture—2 hours. Focus on narrative genres of myth, legend, and folk tale, with additional attention paid to festivals, folk art, belief systems, and the development of folklore studies (minzokugaku) as an academic discipline. Examination of the relationship between folklore, ethnic and national identity. GE credit: AH, WC—W. (W)
  - [change in existing course—eff. fall 16]

- **160. The Culture of Japanese Food (4)**
  - Discussion—2 hours; lecture—2 hours. Study of Japanese food and the culture of eating and drinking in Japan. Attention to symbolism, historical development, aesthetics, identity and global contexts. Materials examined include critical sources as well as literary texts, art, and films. Offered irregularly. GE credit: AH, SS, WC—Foster
  - [new course—eff. fall 17]

- **162. Japan Travelogue: Ethnographic Writing on Japanese Culture and People (4)**
  - Lecture/discussion—4 hours. Focuses on ethnographic writing about Japan. Includes modern scholarly ethnographies, travel writing, blog posts, etc. Critical analysis of how the Japanese “other” is represented across time. Offered irregularly. GE credit: AH, WC, WE—Foster
  - [new course—eff. fall 17]

- **3. Sustainable Development: Theory and Practice (4)**
  - Lecture—3 hours; discussion—1 hour. Origins, theoretical perspectives, and practical applications of the concept of sustainable development across scales (site, building, neighborhood, city, region, and nation) through lectures, sketch exercises, student projects, walking tours. GE credit: SocSci, Wrt | ACHG, SS, VL, WE—S. (S.) Pass One
  - [change in existing course—eff. winter 18]

**Landscape Architecture**

#### New and changed courses in Landscape Architecture (LDA)

**Lower Division**

- **21. Landscape Representation I (4)**
  - Studio—6 hours; project—3 hours. Prerequisite: course 21; or consent of instructor. Restricted to Pre-Landscape Architecture and Sustainable Environmental Design majors. Introduction to landscape architectural representation techniques. Fundamentals of orthographic drafting, freehand drawing, photography, and basic digital representation. GE credit: ArtHum | AH, OL, VL—F. (F) Baux
  - [change in existing course—eff. fall 17]

- **23. Landscape Representation II (3)**
  - Studio—6 hours, project—2 hours. Prerequisite: course 21; or consent of instructor. Restricted to Pre-Landscape Architecture and Landscape Architecture majors only. Instruction of methods to explore and communicate landscape design intentions through digital media. GE credit: ArtHum | AH, OL, VL—F. (F)
  - [change in existing course—eff. fall 17]

- **31. Photography for Designers (4)**
  - cancelled course—eff. fall 17

- **60. Landform and Grading Studio (6)**
  - Studio—8 hours, extensive problem solving—2 hours; project—8 hours. Prerequisite course 70. Pass One restricted to Pre-Landscape Architecture and Sustainable Environmental Design majors. Introduction of landform and topography as landscape medium and utilization of grading and drainage to design meaningful and functional spaces. Intro to site analysis and site planning, with specific attention to topography. GE credit: ArtHum, SciEng | AH, OL, VL, SS—S. (S.)
  - [change in existing course—eff. fall 17]

- **70. Introduction to Spacemaking (5)**
  - Lecture—3 hours; laboratory—3 hours. Prerequisite: course 21; or consent of instructor. Restricted to Pre-Landscape Architecture and Sustainable Environmental Design majors. Introduction to basic principles of design towards the creation of space. Design methodologies and skills to define, manipulate, and represent the built environment. Workshops in 3D physical modeling for spacemaking. GE credit: ArtHum | AH, OL—W. (W)
  - [new course—eff. fall 17]

**Upper Division**

- **101. Advanced Theory in Environmental Design (3)**
  - Lecture/discussion—3 hours. Prerequisite: course 70 (can be concurrent); or consent of instructor. Open to LDA/SED majors only. Provides exploration of contemporary theories and philosophies impacting design of landscapes and the built environment. Includes exploring competing definitions of “landscape,” “nature,” and “culture.” GE credit: AH—F. (F) Napawon
  - [new course—eff. fall 17]
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**Law**

**New and changed courses in Law**

**Graduate**

**200A. U.S. Legal System Seminar (LL.M.) (2)**
- 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. (change in existing course—eff. fall 2017)

**200B. U.S. Legal Methods I (LL.M.) (3)**
- Lecture. Course is only offered to LL.M. students. Designed to provide background skills necessary to succeed in both law school and legal practice. Gain an introductory working knowledge of the US legal system which includes learning various forms of legal writing and speaking. (new course—eff. fall 2017)

**200T. U.S. Legal Methods A (LL.M.) (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. (new course—eff. fall 2017)

**200C. U.S. Legal Methods II (LL.M.) (3)**
- Lecture. Open to LL.M. students only. Designed to provide background skills necessary to succeed in both law school and legal practice. Gain an introductory working knowledge of the US legal method which includes learning various forms of legal writing and speaking. (new course—eff. fall 2017)
200CT. U.S. Legal Methods B (LL.M.) (3)  
Lecture/discussion—3 hours. Course is designed to provide basic 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.  
(change in existing course—eff. spring 17)

200D. American Legal Concepts I (LL.M.) (3)  
Lecture. Prerequisite: consent of instructor. Course is only offered to LL.M. students. Designed to provide basic skills necessary to succeed in both law school and legal practice.  
(new course—eff. fall 17)

200DT. Advanced Introduction to American Legal Concepts and Methods (LL.M.) (3)  
Lecture—3 hours. Course is only offered to LL.M. students. Building on the Introduction to American Law course, this course will provide additional instruction in American law and legal methods. Students will audit selected substantive courses and will produce a series of legal memoranda.  
(change in existing course—eff. spring 17)

200E. American Legal Concepts II (LL.M.) (3)  
Lecture. Prerequisite: consent of instructor. Course is only offered to LL.M. students. Designed to provide basic skills necessary to succeed in both law school and legal practice.  
(new course—eff. fall 17)

207. Legal Research and Writing I (2)  
Discussion/laboratory—2 hours. Fall semester course. Wydick Fellowship Program faculty is an integrated legal research and writing skills course. Basic legal research resources and strategies are introduced and practiced.  
(change in existing course—eff. fall 17)

207A. Legal Research (LL.M.) (1)  
Discussion—1 hour. Restricted to LL.M. students only. Description of the evolution and use of sources of law and secondary authority.  
(change in existing course—eff. fall 17)

208A. Legal Research and Writing II (LL.M.) (LLM) (2)  
Discussion—2 hours. Persuasive writing and oral advocacy. LL.M. students complete integrated research and writing assignments, including a complaint, a brief, a district court opinion, and a motion to dismiss in federal court, and an appellate brief with oral arguments.  
(change in existing course—eff. spring 17)

209AT. Patent Prosecution and Practice (3)  
Discussion—3 hours. Prerequisite: course 274, or consent of instructor. Examines core requirements and strategies for drafting and prosecuting a patent application before the U.S. Patent & Trademark Office. Students will interact with real inventors and US PTO examiners to gain the experience of getting a patent issued.  
(change in existing course—eff. spring 17)

209DT. Innovation Law (2)  
Seminar—2 hours. Explores range of legal issues that innovation lawyers face, from establishing a startup to high stakes technology mergers & acquisitions, to data protection and privacy, protecting intellectual property through strategic patent litigation.  
(new course—eff. spring 17)

210. Reforming the Police and Criminal Justice (2)  
Seminar—2 hours. Limited to 25 students. Focus on major current issues: policing ethnic neighborhoods; use of deadly force; modernizing the work of prosecutors and defense counsel.  
(change in existing course—eff. fall 16)

210ET. Race, Mass Incarceration and Policing (2)  
Seminar—2 hours. Key issues in the historical development and the current state of modern American criminal imprisonment, policing structures, and the criminal justice system in relation to race.  
(new course—eff. spring 17)

210FT. Restorative Justice (3)  
Seminar—3 hours. Explore both the theory and practice of restorative justice as an alternative approach to the retributive justice model of our current criminal legal system and many other institutions.  
(new course—eff. spring 17)

219. Evidence (4)  
Lecture/discussion. Covers rules regarding the admissibility of proof during civil and criminal cases, including rules governing relevancy, hearsay, the examination and impeachment of witnesses, expert opinion, and constitutional and statutory privileges.  
(change in existing course—eff. fall 17)

220A. State and Local Taxation (3)  
Discussion—3 hours. Introduction to fundamentals of state and local taxation. Beginning with historical and constitutional aspects, students analyze recent developments in state and local taxation and their impact on client representation.  
(change in existing course—eff. fall 17)

221. Trusts, Wills and Estates (3)  
Discussion—3 hours. Study of the law of decedent’s estates, wills, and trusts.  
(change in existing course—eff. fall 16)

222CT. Anti-Corruption Law in India (2)  
Seminar—2 hours. Addresses the impact of large corruption scandals on long term social trust, in light of Indian coal block and 2G spectrum allocation scandals.  
(new course—eff. spring 17)

222T. Asian Pacific Americans and Law (3)  
Discussion—3 hours. Focus on the impact of Asian Pacific Americans on U.S. law and society, examining the experiences of these communities, and the law that affects them.  
(change in existing course—eff. spring 17)

226. Disability Rights Law (3)  
Discussion—3 hours. Examines disability law and theory. Developed in response to Americans with Disabilities Act (particularly Titles I, II, and III); it applies to employment, education, public accommodations, and government services and programs.  
(change in existing course—eff. fall 17)

226ET. Mental Disability Law (3)  
Lecture/discussion—3 hours. Students will examine the civil and constitutional bases of mental disability law, as well as its history, and explore the role of mental disability in the policing and criminal trial process.  
(change in existing course—eff. spring 17)

228. Startups and Venture Capital (2)  
Lecture/discussion. Prerequisite: course 215; prerequisite will not be waived, do not register for the course unless you have completed course 215. Limited enrollment. Introduces to the various legal and business considerations involved in forming and operating an emerging growth business.  
(change in existing course—eff. fall 17)

228A. Mergers and Acquisitions Law (3)  
Discussion—3 hours. Prerequisite: course 215. Practical approach to mergers and acquisitions, with an in-depth look at the planning, negotiation, documentation and completion of mergers and acquisitions.  
(change in existing course—eff. fall 17)

235A. Community Lawyering (3)  
Lecture. Study the need for community lawyering including the structural inequalities and privileges embedded in the legal system and society. Skills necessary for community lawyering as well as sites and models for practice will be examined.  
(new course—eff. fall 17)

236CT. Securities Enforcement (3)  
Lecture—3 hours. Examines civil and criminal enforcement of securities laws by both the Securities and Exchange Commission and Justice Department. Surveys administrative rules and investigative procedures that govern the SEC and the substantive related crimes.  
(new course—eff. spring 17)

239. Mediation (3)  
Discussion/laboratory—3 hours. Restricted to 24 students. Interactive course focuses on attorney representation of clients in mediation.  
(change in existing course—eff. spring 17)

240. Reforming Campaign Finance Law and the Initiative Process (2)  
Discussion—2 hours. Limited to 25 students. The recent election exposed many campaign finance and initiative issues. Focuses on reforms as well as the current law.  
(change in existing course—eff. spring 17)

241. Voting Rights Seminar (2)  
Seminar—2 hours. Seminar investigates the right to vote as a matter of constitutional and statutory law, with emphasis on the voting rights of racial and ethnic minorities.  
(new course—eff. spring 17)

243A. Secured Transactions (2)  
Discussion—2 hours. Covers secured transactions where a lender takes an interest in the debtor’s property as “collateral,” or security, for repayment of a loan, in personal property, such as auto loans and bank loans against business inventory.  
(change in existing course—eff. fall 17)

243BT. Introduction to Bankruptcy Law (2)  
Lecture/discussion—2 hours. Bankruptcy Code and the bankruptcy process, emphasis on consumer bankruptcy in Chapter 7 and Chapter 13, but many topics, such as the automatic stay and calculation of claims, are common to consumer and business bankruptcy.  
(new course—eff. spring 17)

245. Corporate and White Collar Crime (2)  
Discussion—2 hours. Covers the law of conspiracy, corporate criminal liability, mail and wire fraud, the Hobbs Act, RICO, money laundering, obstruction of justice, and other white collar crimes and their associated defenses.  
(change in existing course—eff. fall 17)

245A. White Working Class and the Law (2)  
Seminar—2 hours. Considers the social, cultural, economic, and legal situation of low-income and/or low-education whites in contemporary U.S. society.  
(change in existing course—eff. fall 17)

247. Taxation of Partnerships and LLCs (3)  
Lecture/discussion—3 hours. Prerequisite: course 220. Study of the federal income tax treatment of partnerships and LLCs, including entities classified as partnerships.  
(change in existing course—eff. spring 17)
248CT. United Nations Human Rights Practicum (1) Seminar—2 hours. Students will engage in intensive research and writing in the field of cultural rights, the workings of the United Nations human rights system, and gain experience working with UN documents, individual cases in the field and with thematic reports.

(change in existing course—eff. fall 16)

248DT. United Nations Human Rights Practicum II (2-3) Seminar—2.3 hours. Offers students the opportunity to work in support of the United Nations Special Rapporteur in the field of cultural rights at an advanced level. They will gain heightened expertise in cultural rights, and in-depth experience with the UN.

(new course—eff. spring 17)

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, unions, strikes, picketing, and collective bargaining agreements.

(change in existing course—eff. spring 17)

253T. Policy Advocacy (2) Seminar—2 hours. In-depth examination of the legislative process both within the California Legislature and from the advocates’ perspective. Students trained in key policy advocacy skills by legislative leaders and social justice advocates.

(new course—eff. spring 17)

254A. Law and Rural Livelihoods Seminar (2) Seminar—2 hours. Provides broad overview of law as it relates and applies to rural people and places.

(change in existing course—eff. spring 17)

255. Pension and Employee Benefits Law (3) Discussion—3 hours. Prerequisite: course 220. Federal regulation and taxation of private pensions and employee benefits. This course will cover the Employee Retirement Income Security Act (ERISA) and Internal Revenue Code issues.

(change in existing course—eff. spring 17)

258. Professional Responsibility (3) Discussion—3 hours. The ABA’s Model Rules of Professional Conduct and the Code of Judicial Conduct, which are enshrined in the MPRE, and the California Rules of Professional Conduct, which are tested on the California Bar Examination. Students who take Law 258A Legal Ethics and Corporate Practice are not eligible to enroll in this course. Students who take Law 258A Legal Ethics and Corporate Practice are not eligible to enroll in this course.

(change in existing course—eff. fall 17)

258A. Legal Ethics and Corporate Practice (3) Lecture/discussion—3 hours. Focus on corporate practice to explore the ethical responsibilities of lawyers. Students who take Law 258 Professional Responsibility are not eligible to enroll in this course.

(change in existing course—eff. spring 17)

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.

(change in existing course—eff. fall 16)

263. Criminal Trial Skills (4) Seminar. Trial advocacy course centered on client relationship building, preparation for trial, and courtroom practice.

(change in existing course—eff. fall 17)

263A. Trial Practice (3) Discussion—2 hours; laboratory—1 hour. Prerequisite: course 219 (can be concurrent). Limited enrollment. Introduction to the preparation and trial of cases, featuring lectures, videotapes, demonstrations, assigned readings and forensic studies. Laboratory held on Tuesday, Wednesday, and Thursday evening.

(change in existing course—eff. fall 16)

263B. Advanced Trial Practice (2) Discussion—2 hours. Prerequisite: course 219; course 263A. Class limited to 40 students. Trains students on the organization and presentation of a complex trial, including pretrial preparation, jury selection, strategy considerations, evidentiary issues, and effective handling of plaintiff and defense cases through verdict.

(change in existing course—eff. fall 16)

266A. Cyberlaw (3) Lecture/discussion—3 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.

(new course—eff. spring 17)

269. Basic Finance for Lawyers (3) Discussion—3 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. Gives background necessary for understanding and advising your clients and for understanding other business-related law school courses.

(change in existing course—eff. fall 17)


(change in existing course—eff. fall 17)

273BT. Special Education Law and Policy (2) Lecture—3 hours. Introduction to the law of special education, including the Individuals with Disabilities in Education Act (IDEA), Section 504 of the Rehabilitation Act, and federal regulations governing special education law.

(new course—eff. fall 17)

275. Complex Litigation in a Civil Rights Context (2) Discussion—2 hours. Study of the issues that frequently arise in large complex litigation involving multiple parties and multiple claims.

(change in existing course—eff. fall 17)

276. Juvenile Justice Process (2) Lecture/discussion—2 hours. Legal and philosophical bases of a separate juvenile justice process for crimes committed by minors. The role of counsel at each phase of the process is examined.

(change in existing course—eff. spring 17)

277. Federal Indian Law (3) Discussion—2 hours. Focuses on legal relations between Native American tribes and the federal and state governments.

(change in existing course—eff. fall 16)

277A. Tribal Justice (2) Lecture. Examines the administration of justice within tribal governments and courts and the efforts of advocates to achieve justice for tribes through litigation, policy advocacy, public education, organizing, and inter-governmental collaboration.

(new course—eff. fall 17)

280B. Problem Solving and Analysis (2) Lecture. Prerequisite: consent of instructor. Restricted to third-year Law students only. Skills focused on the development of legal analytical and organizational methods essential to successful completion of the Performance Test component of the California Bar Exam (other states), and, by extension, to success in the practice of law.

(new course—eff. fall 17)

281. State and Local Government Law (3) Discussion—3 hours. Topics include: federalism, relations between states and localities, governmental liability, zoning, educational equity, and public finance. Readings will be drawn not only from case law and statutes, but from history, theory and public policy.

(change in existing course—eff. fall 17)

283. Remedies (3) Lecture/discussion—3 hours. Survey of modern American civil remedies law in both private and public law contexts. Topics include equitable remedies, equitable defenses, contempt power, injunctive relief, restitution, and money damages in torts and contracts.

(change in existing course—eff. fall 17)

285C. Food and Agricultural Law (2) Lecture—2 hours. Introduction to agricultural law, focusing on legal principles and issues at the forefront of contemporary debates about agriculture in society.

(change in existing course—eff. fall 16)

285G. Environmental Law Seminar: Emerging Technologies and the Environment (2) Seminar—3 hours. Take on the role of Justices of, and advocates before, the Supreme Court of the United States.

(change in existing course—eff. fall 17)

290T. Information Privacy Law (2) Seminar—2 hours. Examine several topics that arise in field of information privacy law, with a special emphasis on law enforcement access to this information.

(new course—eff. fall 17)

298. Supreme Court Simulation Seminar (3) Seminar—3 hours. On the role of Justices of, and advocates before, the Supreme Court of the United States.

(change in existing course—eff. fall 17)

299. Information Privacy Law (2) Seminar—2 hours. Examine several topics that arise in field of information privacy law, with a special emphasis on law enforcement access to this information.

(new course—eff. spring 17)

2011. International Arbitration and Investment Law (2) Lecture. Covers international arbitration involving States, individuals, and corporations; including: the parties; the agreement to arbitrate; the arbitrators; the arbitral proceeding; and, the arbitral award.

(change in existing course—eff. fall 17)

296D. Art Law (2) Discussion—2 hours. Selected issues in Art Law, including meaning of art, how to represent artists, copyright, publicity, first amendment rights, censorship, street art, government regulation, art markets, international protection of art and cultural property, and more.

(change in existing course—eff. spring 17)
Professional

411A. Journal of International Law and Policy (1-2)
The UC Davis Journal of International Law and Policy publishes semi-annually and strives to contribute per-
tinent and interesting scholarly works to the field of
international law. May be repeated for credit up to
five times. Students are allowed to participate in the
journal for more than one term. [S/U grading only]
(change in existing course—eff. spring 17)

411B. Journal of Juvenile Law and Policy
(1-2)
Independent study—1-2 hours. The Journal of Juve-
nile Law & Policy is a biannual publication of the UC
Davis School of Law that addresses the unique con-
cerns of youth in the American legal system. May be
repeated for credit up to five times; students are
allowed to participate in the journal for more than
one term. [S/U grading only]
(change in existing course—eff. spring 17)

411C. UC Davis Business Law Journal
(1-2)
Independent study—1-2 hours. The UC Davis Busi-
ess Law Journal is run by business law students
who are committed to providing current and valu-
able legal and business analysis. May be repeated
for credit up to five times. Students are allowed to
participate in the journal for more than one term.
[S/U grading only]
(change in existing course—eff. spring 17)

416. Law Review Writer (1-2)
Writing of a law review article under the editorial
supervision of editors of the UC Davis Law Review.
Office hours (including but not limited to Bluebook-
ing and cite-checking) are required. 1 or 2 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 toward completing an editor-
ship 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 semes-
ter. Two units are earned the second semester upon
nomination and acceptance of nomination to the Edi-
torial Board. One unit is earned second semester if
only a membership draft and office hours are com-
pleted. May be repeated for credit. [S/U grading only]
(change in existing course—eff. spring 17)

418. Environmental Law and Policy Journal (1-2)
Independent study. Environ is a biannual envi-
ronmental law and policy journal that provides an open
forum for the discussion of current environmental
issues, focusing on laws pertaining to the state of
California. May be repeated for credit up to five
times. Students are allowed to participate in the jour-
nal for more than one term. [S/U grading only]
(change in existing course—eff. spring 17)

445A. Aoki Water Justice Clinic (5)
Clinical activity. Prerequisite: consent of instructor.
Aoki Water Justice Clinic trains students to use com-
mmunity lawyering and transactional legal tools to
ensure that low-income, California communities
receive safe, clean, and affordable drinking water.
(new course—eff. fall 17)

446A. UC Davis Capital Law Scholars Seminar (1)
Seminar—1-2 hours. May be required for students
enrolled in Capital Law Scholars Externship. Covers
issues related to lawyering in California’s state capi-
tal, and helps students maximize educational and
professional experience in their externship place-
ments.
(new course—eff. fall 16)

450. Environmental Law Externship (2-12)
Fieldwork—4-24 hours. Program is designed to pro-
vide students with extended lawyering experience in
a legislative office, with a legislative committee, or
with a government/nonprofit office engaged in legis-
lative and policy work. [S/U grading only]
(new course—eff. fall 16)

495. Instruction in Legal Research and
Writing Skills (1-2)
Discussion—2 hours. Prerequisite: consent of instruc-
tor. Participants assist in instructing the Legal
Research and Writing programs for first-year stu-
dents under the direction of the Legal Research and
Writing instructors. [S/U grading only]
(change in existing course—eff. spring 17)

Letters & Science, College of

New and changed courses in
College of Letters & Science (LTS)

Lower Division

98. Directed Group Study (1-4)
Prerequisite: consent of instructor. Directed group
study. May be repeated for credit. [P/NP grading only]
Offered irregularly.
(new course—eff. winter 17)

Upper Division

198. Directed Group Study (1-4)
Prerequisite: consent of instructor. Directed group
study. May be repeated for credit. [P/NP grading only]
Offered irregularly.
(new course—eff. winter 17)

Linguistics

New and changed courses in
Linguistics (LIN)

Upper Division

103A. Linguistic Analysis I: Phonetics,
Phonology, Morphology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 1 recommended. Introduction to fundamental
methods and concepts used in linguistic analysis,
focusing on phonetic, phonological, and morpholog-
ical phenomena. Emphasizes development of ana-
tical skills and appreciation of structural regularities
and differences among languages. Not open for credit
to students who have completed course 139.
GE credit: ArtHum | AH.–F. | Farrell
(change in existing course—eff. spring 17)

103B. Linguistic Analysis II: Morphology,
Syntax, Semantics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 1 recommended. Introduction to fundamental
methods and concepts used in linguistic analysis,
focusing on morphological, syntactic, and semantic
phenomena. Emphasizes development of analytical
skills and appreciation of structural regularities and
differences among languages. Not open for credit
to students who have completed course 140.
103B GE credit: ArtHum | AH.–W. | Farrell
(change in existing course—eff. winter 17)

112. Phonetics (4)
Lecture—3 hours; term paper. Prerequisite: course 1
recommended. Detailed examination of articulatory
and acoustic phonetics. GE credit: SciEng | SE.–F.
| Farrell
(change in existing course—eff. winter 17)

121. Morphology (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
courses 103A, 103B recommended. 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. | Aranovich
(change in existing course—eff. winter 17)

127. Text Processing and Corpus Linguistics
(4)
Lecture—3 hours; extensive problem solving. Prereq-
usite: course 1, course 5, course 6, or Anthropology
4 recommended. Investigation of the lexical organi-
ation of human languages through corpus linguis-
tics. Application of principles of linguistic analysis,
automatic text processing, and statistical research to
solving problems of textual evaluation and classifica-
tion, as well as information extraction. Offered in
alternate years. GE credit: ArtHum or SocSci | AH or SS, QL.–S. | Aranovich
(change in existing course—eff. winter 17)

131. Introduction to Syntactic Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 103B recommended. Introduction to syntactic
theories, 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. | Aranovich,
Farrell
(change in existing course—eff. winter 17)

141. Semantics (4)
Lecture—3 hours; term paper. Prerequisite: course
103B recommended. The linguistic study of mean-
ings of words and phrases. Meanings expressed by
lexical items and derivational and inflectional mor-
phology. Contribution of argument structure, quantifi-
cation, and coordination to meaning. GE credit:
ArtHum, Wrt | AH.–F. | Ojeda
(change in existing course—eff. winter 17)

150. Languages of the World (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 1 or Anthropology 4 recommended. Survey of
the world’s languages, their geographical distrib-
ution and classification, both genetic and typological.
Illustrative descriptions of several major languages
from different geographical areas; pidgins and cre-
oles, lingua francas and other languages of wide-
spread use. Not open for credit to students who
have completed course 50. GE credit: ArtHum or
SocSci, Wrt | AH or SS, WC.–S. | Hawkins
(change in existing course—eff. winter 17)

151. Historical Linguistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 103A recommended. Description and meth-
ods of the historical study of language, including the
comparative method and internal reconstruction;
sound change, morphological change, syntactic
change, semantic change. Offered irregularly. GE
credit: ArtHum | AH.–Farrell, Hawkins
(change in existing course—eff. winter 17)

152. Language Universals and Typology (4)
Lecture—3 hours; term paper. Prerequisite: course
103A 103B recommended. Investigation into common fea-
tures of all human languages and the classification of
languages in terms of their structural features. The-
ories of universal grammar. Detailed discussion of
non-Indo-European languages and comparison with
English. Offered in alternate years. GE credit:
ArtHum, Wrt | AH.–S. | Farrell, Hawkins
(change in existing course—eff. winter 17)

163. Language, Gender, and Society (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 1 or Anthropology 4 recommended. Investi-
gation of real and putative (stereotyped) gender-
linked differences in language structure and usage,
with a consideration of some social and psychologi-
cal consequences of such differences. Focus is on

11A. Elementary Accounting (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A; course 11B. Development of understanding of the supply and demand of accounting information. Topics include: the general accounting and processing of accounting information, the examination of accounting information by auditors, and the use of accounting information by capital markets and tax authorities. —F. [F] Briscoe
(new course—eff. fall 17)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A; course 11B. Course begins to develop expertise in the accounting for assets and introduces students to the analysis of financial statements. —F. [F] Menard-Warwick
(new course—eff. fall 17)

105. Intermediate Financial Accounting II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 103. Course continues to develop expertise in the preparation of financial statements by studying the accounting for liabilities and stockholders' equity. Course also examines the accounting for contracts that can have significant effects on firms' financial statements. —W. [W]
(new course—eff. fall 17)

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, software, and information systems. Management of information technology and the impact of information systems on modern management. GE credit: SocSci SS. —S. (S.) Aram
(change in existing course—eff. summer 16)

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] Findlay
(change in existing course—eff. winter 17)

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. —F. [F] Goldberg
(change in existing course—eff. fall 16)

160. Financing New Business Ventures (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A; Mathematics 168, 178, or 218; Statistics 13. Concepts/methods used to structure and finance new business ventures. Topics include evaluating the net social (financial) benefit of new investment projects; raising venture capital; the role of the venture capitalist; and the choice of organizational structure in new ventures. GE credit: SocSci SS. —F. [F] Briscoe
(change in existing course—eff. fall 16)

170. Managing Costs and Quality (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11B; or consent of instructor. Designing cost systems in high technology organizations and managing operations to maximize quality and minimize costs. Topics include activity-based costing and management, quality and time to create value, ethical issues in cost assignment, and differential costing for decisions. GE credit: SocSci SS. —S. [S.]
(change in existing course—eff. fall 17)

180. Supply Chain Planning and Management (4)
Lecture—3 hours; discussion—1 hour. Course develops key concepts and methods for supply chain design and business models and strategies. Much of the focus is on quantitative techniques for analysis and management of the production and delivery of goods and services by an organization. GE credit: SocSci SS. —W. [F]
(change in existing course—eff. winter 17)

190. Special Topics in Accounting (4)
Seminar—11 hours. Prerequisite: course 11A; course 11B; course 101. Seminar in the theory and practice of advanced or emerging areas related to the practice of professional accounting. Specific topics will vary according to the interests of the instructor or students. —S. [S.]
(new course—eff. winter 17)

Graduate
253. Speech Perception (4)
Discussion—3 hours; extensive writing—2 hours. Investigation into how listeners map a continuous and variable acoustic signal to a linguistic interpretation. Phonetic context, variation, linguistic knowledge, and sociolinguistics as factors in phonetics. —W. Zellou (new course—eff. winter 17)

Management

New and changed courses in Management (MGT/MGB/MGP)

Lower Division
101. Sources and Uses of Accounting Information (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A; course 11B. Develops an understanding of the supply and demand of accounting information. Topics include the general accounting and processing of accounting information, the examination of accounting information by auditors, and the use of accounting information by capital markets and tax authorities. —F. [F] Menard-Warwick
(new course—eff. fall 17)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A; course 11B. Course begins to develop expertise in the accounting for assets and introduces students to the analysis of financial statements. —F. [F] Menard-Warwick
(new course—eff. fall 17)

105. Intermediate Financial Accounting II (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A; course 11B. Course continues to develop expertise in the preparation of financial statements by studying the accounting for liabilities and stockholders' equity. Course also examines the accounting for contracts that can have significant effects on firms' financial statements. —W. [W]
(new course—eff. fall 17)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 105. Course finishes the Intermediate Financial Accounting series by examining in depth the accounting for contracts related to pensions and leases. Course teaches the preparation of the statement of cash flows and footnote disclosures. —S. [S.]
(new course—eff. spring 17)

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, software, and information systems. Management of information technology and the impact of information systems on modern management. GE credit: SocSci SS. —S. (S.) Aram
(change in existing course—eff. summer 16)

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] Findlay
(change in existing course—eff. winter 17)

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. —F. [F] Goldberg
(change in existing course—eff. fall 16)

160. Financing New Business Ventures (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11A; Mathematics 168, 178, or 218; Statistics 13. Concepts/methods used to structure and finance new business ventures. Topics include evaluating the net social (financial) benefit of new investment projects; raising venture capital; the role of the venture capitalist; and the choice of organizational structure in new ventures. GE credit: SocSci SS. —F. [F] Briscoe
(change in existing course—eff. fall 16)

170. Managing Costs and Quality (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 11B; or consent of instructor. Designing cost systems in high technology organizations and managing operations to maximize quality and minimize costs. Topics include activity-based costing and management, quality and time to create value, ethical issues in cost assignment, and differential costing for decisions. GE credit: SocSci SS. —S. [S.]
(change in existing course—eff. fall 16)

180. Supply Chain Planning and Management (4)
Lecture—3 hours; discussion—1 hour. Course develops key concepts and methods for supply chain design and business models and strategies. Much of the focus is on quantitative techniques for analysis and management of the production and delivery of goods and services by an organization. GE credit: SocSci SS. —W. [F]
(change in existing course—eff. winter 17)

190. Special Topics in Accounting (4)
Seminar—11 hours. Prerequisite: course 11A; course 11B; course 101. Seminar in the theory and practice of advanced or emerging areas related to the practice of professional accounting. Specific topics will vary according to the interests of the instructor or students. —S. [S.]
(new course—eff. winter 17)

Graduate
200B. Managerial Accounting (3)
Lecture—3 hours; discussion—1 hour. Prerequisite: Management 200A or Management Working Professional Bay Area 200A or Management Working Professional 200A. Information managers should know to be effective, including: product costing, motivating people, and differential analysis for decision making. Includes team projects and written and oral presentations. —W. Zellou (new course—eff. fall 17)
Lecture—3 hours. Prerequisite: Management 202A or Management Working Professional Bay Area 202A or Management Working Professional 202A. Examines the influence of government and international factors on the distribution of income, business cycles, inflation and interest rates, the federal debt, monetary policy and international trade and finance. — W. (W) Taylor (change in existing course—eff. fall 17)

2038. Forecasting and Managerial Research Methods (3)
Lecture—3 hours. Prerequisite: Management 303A or Management Working Professional Bay Area 203A or Management Working Professional 303A. Practical statistical techniques for managerial decision making include regression analysis, time series analysis and forecasting, design and analysis of experiments in managerial research and contingency table analysis. Application of these methods to marketing, finance, accounting, production, operations, and public policy. — W. (W) Tsai (change in existing course—eff. fall 17)

223. Power and Influence in Management (3)
Seminar—3 hours. Prerequisite: Management 201A or Management Working Professional Bay Area 201A or Management Working Professional 201A; consent of instructor. Investigation of the bases of power in organizations and the tactics used to translate power into influence. Topics include the control of information, organizational politics and social-psychological processes (including commitment), the construction of meaning, and ethics. — F. (F) Palmer (change in existing course—eff. fall 17)

224. Managing People in High-Performance Organizations (3)
Lecture—3 hours. Prerequisite: Management 201A or Management Working Professional Bay Area 201A or Management Working Professional 201A. Restricted to students in the MBA program. Strategic approach to the management of people within an organization. Analyze employment systems fit with firms’ environments and strategies. Explore consequences of choices firms make in managing people-decisions as to selection, performance evaluation, compensation, and other management policies and practices. Not open to students who have taken Management 224 or Management Working Professional 224. — W. Su. (W, Su.) Greta Peters (change in existing course—eff. fall 17)

234. Pricing (3)
Lecture/discussion—3 hours. Prerequisite: Management 202A or Management Working Professional Bay Area 202A or Management Working Professional 202A; Management 203A or Management Working Professional Bay Area 203A or Management Working Professional 203A; Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Restricted to students in the MBA Program. Combines lectures, cases and homework to teach students to price a product given the product’s cost, the market for the product, and the competing products. Determinants of prices and their role in the overall economy are also covered. — S. (S) Wei (change in existing course—eff. fall 17)

239. Digital Marketing (3)
Lecture/discussion—3 hours. Prerequisite: Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Course equips students for a career in digital marketing and social media. Topics include online advertising, search engine optimization, interactive marketing, online privacy issues, management of social influence, social network theory, measurement of social influence, integrating social and traditional media. — S. (S) Peters (change in existing course—eff. fall 17)

241. New Product Development (3)
Lecture/discussion—3 hours. Prerequisite: Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Open to graduate students in the Graduate School of Management. State-of-the-art concepts and methods to explain the effectiveness of new product development activities. Focuses on the understanding of managerial issues and acquiring the ability to solve problems. — W. Su. (W, Su.) Aravindakshan (change in existing course—eff. fall 17)

243. Customer Relationship Management (3)
Lecture/discussion—3 hours. Prerequisite: Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Restricted to MBA students only. Customer Relationship Management (CRM) is a managerial 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 (change in existing course—eff. fall 17)

244. New and Small Business Ventures (3)
Lecture—3 hours. Prerequisite: Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Student teams develop business plans for their own start-up ventures. Processes include: enterprising, benchmarking, comprehensive bottoms-up financial projections, capital requirements, product differentiation, marketing, service, pricing, and go-to-market strategy development, investor presentation, and comprehensive written business plan. — F. (W, W, W.) Law (change in existing course—eff. fall 17)

248. Marketing Strategies (3)
Lecture—3 hours. Prerequisite: Management 202A or Management Working Professional Bay Area 202A or Management Working Professional 202A; Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Examines process by which organizations develop long-term strategic marketing plans. Includes definition of activities and products, market audits, appraising market opportunities, design of new activities and products, and organizing marketing marketing plans to solve problems in private and public sector marketing. — F. (F) Rubel (change in existing course—eff. fall 17)

249. Marketing Research (3)
Lecture—3 hours. Prerequisite: Management 202A or Management Working Professional Bay Area 202A or Management Working Professional 202A; Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Examines and identifies the major issues and problems of systematically gathering and analyzing information for making private and public sector marketing decisions. Covers the theoretical foundations of research design, information collection, measuring instruments, data analysis, and marketing research applications. — W. (W) Bunch (change in existing course—eff. fall 17)

250. Technology, Competition and Strategy (3)
Lecture—3 hours. Prerequisite: Management 202A or Management Working Professional Bay Area 202A or Management Working Professional 202A; Management 203A or Management Working Professional Bay Area 203A or Management Working Professional 203A; Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Course addresses the managerial issues and problems of high-technology industries. The course focuses on the role that technology plays in these industries, interaction of technology with competition and strategy, and the management of high-technology ventures. — F. (F) Krolak (change in existing course—eff. fall 17)

251. Management of Innovation (3)
Lecture—3 hours. Prerequisite: Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Managing innovative enterprise in changing and uncertain environments. Covers technology forecasting and assessment, program selection and control, financial management, regulation, and ethics. — F. (F) Hargadon (change in existing course—eff. fall 17)

260. Corporate Finance (3)
Lecture—3 hours. Prerequisites: Management 200A or Management Working Professional Bay Area 200A or Management Working Professional 200A; Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Focuses on planning, acquiring, and managing a company’s financial resources. Includes factors affecting, influencing, and considering the legal aspects of mergers and other forms of reorganization; analysis of investment, financial, and dividend policy; and theories of optimal capital structure. — S. (S) Scherbina (change in existing course—eff. fall 17)

261. Investment Analysis (3)
Lecture/discussion—3 hours. Prerequisite: Management 203A or Management Working Professional Bay Area 203A or Management Working Professional 203A; Management 205 or Management Working Professional Bay Area 205 or Management Working Professional 205. Examines asset pricing theories and relevant evidence, including the investment performance of stocks and bonds. Topics include the efficiency of markets, domestic and international portfolio diversification, factors influencing the value of stocks and other investments, and portfolio management and performance. — F. (F) Chen (change in existing course—eff. fall 17)

263. Derivative Securities (3)
Lecture/discussion—3 hours. Prerequisite: course 205 or Management Working Professional Bay Area 205 or Management Working Professional 205; course 203A or Management Working Professional Bay Area 203A or Management Working Professional 203A. Open to students enrolled in the MBA program. Behavior of options, futures, and other derivative securities markets and how public agencies, business and others use these markets. Trading strategies involving options, futures, and financial futures contracts. Pricing of derivative securities, primarily by arbitrage methods. — F. (F) Edelen (change in existing course—eff. fall 17)

265. Venture Capital and the Finance of Innovation (3)
Lecture/discussion—3 hours. Prerequisite: Management Working Professional Bay Area 205 or Management Working Professional 205; Management 203A or Management Working Professional Bay Area 203A or Management Working Professional 203A. Restricted to students in the MBA program. Examines venture capital finance and the related practice of R&D finance. Goal is to apply finance tools and framework to the world of venture capital and financing of projects in high-growth industries. — W. (W) Yasuda (change in existing course—eff. fall 17)

266. International Finance (3)
Lecture—3 hours. Prerequisites: Management 205 or Management Working Professional Bay Area 205 or Management Working Professional 205; Management 203A or Management Working Professional Bay Area 203A or Management Working Professional 203A; Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Open to students enrolled in the MBA program. Examines and identifies the major issues and problems of systematically gathering and analyzing information for making private and public sector marketing decisions. Covers the theoretical foundations of research design, information collection, measuring instruments, data analysis, and marketing research applications. — W. (W) Bunch (change in existing course—eff. fall 17)

267. Venture Capital and the Finance of Innovation (3)
Lecture/discussion—3 hours. Prerequisite: Management Working Professional Bay Area 205 or Management Working Professional 205; Management 203A or Management Working Professional Bay Area 203A or Management Working Professional 203A; Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Open to students enrolled in the MBA program. Examines and identifies the major issues and problems of systematically gathering and analyzing information for making private and public sector marketing decisions. Covers the theoretical foundations of research design, information collection, measuring instruments, data analysis, and marketing research applications. — W. (W) Bunch (change in existing course—eff. fall 17)

Fall 2011 and on Revised General Education (GE): AH—Arts and Humanities; SF—Science and Engineering; SS—Social Sciences; ACH+—American Cultures; BD—Dominant Worldviews; OL—Oral Skills; QL—Quantitative; SL—Scientific; VL—Visual; WC—World Cultures; WE—Writing Experience
Pre-Fall 2011 General Education (GE): ArHums—Arts and Humanities; ScHums—Science and Engineering; SoSocHums—Social Sciences; Div—Dominant Worldviews; Writ—Writing Experience
Quarter Offered: F—Fall; W—Winter; S—Spring; Su—Summer; 2017-2018 offering parenthetical notes
Courses & Programs are subject to change without notice.
rate regimes and its implications for domestic stabilization policies; and the international coordination of monetary and stabilization policies. —Su. (Su.) (change in existing course—eff. fall 17)

270. Corporate Financial Reporting (3) Lecture—3 hours. Prerequisite: Management 200A or Management Working Professional Bay Area 200A or Management Working Professional 200A. Analyzes and evaluates contemporary issues in financial reporting and develops implications of those issues for business decision makers, investment managers, and accounting policymakers. —F. Su. (F. Su.) Wong (change in existing course—eff. fall 17)

271. Strategic Cost Management (3) Laboratory/discussion—3 hours. Prerequisite: Management 202A or Management Working Professional Bay Area 202A or Management Working Professional 202A. Restricted to students in the MBA program. Theoretical frameworks and associated techniques for using organizational design and cost management to achieve a sustainable, profitable cost structure. Topics include: target costing, process design for low cost, total cost of ownership, cost of customer acquisition, implementing structural change, and incentives. —W. (W.) Anderson (change in existing course—eff. fall 17)

272. Evaluation of Financial Information (3) Lecture—3 hours. Prerequisite: Management 200A or Management Working Professional Bay Area 200A or Management Working Professional 200A. Studies users' information needs, and the role of financial information in making investment, lending decisions. Emphasis is placed on the analysis of financial information in a variety of contexts. Where applicable, recent research in finance and economics is discussed. —W. (W.) Skalny (change in existing course—eff. fall 17)

276. Real Estate, Finance and Development (3) Lecture—3 hours. Prerequisite: Management 205 or Management Working Professional Bay Area 205 or Management Working Professional 205. Management 201A or Management Working Professional Bay Area 201A or Management Working Professional 201A. Focus on single family, attached, detached, multi-family, and light commercial development. Students will study factors which make up successful real estate developments. Course will consider financial aspects involved in land acquisition, land development, construction, and project lending. —Su. (Su.)

282. Supply Chain Management (3) Lecture/discussion—3 hours. Prerequisite: Management 203A or Management Working Professional Bay Area 203A or Management Working Professional 203A. Restricted to students in the MBA program. Matching supply with demand is a primary challenge for a firm: excess supply is too costly, inadequate supply irritates customers. Matching supply to demand is easiest when a firm has a flexible supply process, but flexibility is generally expensive. —S. (S.) R. Chen (change in existing course—eff. fall 17)

290. 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. —W. (W.) (change in existing course—eff. fall 16)

405. Business Literature (1) Lecture/discussion—1 hour. Will examine 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. —W. (W.) (change in existing course—eff. winter 17)

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 societies, are presented. —W. (W.) (change in existing course—eff. winter 17)

407. Storytelling for Leadership (1) Lecture/discussion—1 hour. Internalize the fundamental principles behind stories that educate, influence, motivate, inspire, persuade and connect. —S. (Su.) Chansupharindr (change in existing course—eff. fall 16)

410. Corporate Governance (1) Lecture/discussion—1 hour. Covers recent and not-so-recent business and accounting scandals, discuss how corporations can better operate in the interests of shareholders. E. F. Molnar and learn from people who rely on corporate governance in making investment decisions. —W. (W.) (change in existing course—eff. winter 17)

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. (S.)

412. International Marketing (1) Lecture/discussion—1 hour. Basic concepts of international marketing. Understanding and managing heterogeneous, dynamic, and interdependent environments across markets. How to develop and implement an international marketing strategy: where and how to compete, how to adapt your marketing mix. —W. (W.) Peters (change in existing course—eff. winter 17)

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. —W. (W.) (change in existing course—eff. fall 16)

415. Topics in Private Equity (1) Lecture—1 hour. Prerequisite: Management 205 or Management Working Professional Bay Area 205 or Management Working Professional 205. Restricted to students in the MBA program. Focuses on the risk-return trade-off in the private equity (PE) industry, valuation of PE target companies, the structuring of leveraged buyouts (LBOs), and the management of portfolio companies. —W. (W.) (change in existing course—eff. fall 17)

416. Business and Social Entrepreneurship (3) Lecture—3 hours. Prerequisite: Management 200A or Management Working Professional Bay Area 200A or Management Working Professional 200A. Faculty and alumni of the Haas School of Business who are entrepreneurs and social entrepreneurs present their business models. —W. (W.) Rubel (change in existing course—eff. fall 17)

420. Advanced Optimization in a Python-based Modeling Language (1) Lecture—1 hour. Prerequisite: MGT 252 or MGT 252A or MGT 252B or MGT 256 or MGT 256A or MGT 256B. Students develop advanced optimization modeling techniques using Python and related tools. —Su. (F. Su.) Scherbina (change in existing course—eff. fall 17)

421. Monte Carlo Simulation for Managerial Analysis (1) Lecture—1 hour. Students create Excel-based simulation models across business domains, from finance to hypothesis testing and inventory management. By course-end, students are experts at recognizing this decision-making fallacy and fixing it. Offered irregularly. —S. (S.) Saigal (change in existing course—eff. spring 17)

422. Behavioral Finance and Valuation (1) Lecture—1 hour. Prerequisite: MGT 260 or MGB 260 or MGB 260A or MGB 261. Students are introduced to behavioral finance and market frictions (e.g., asset bubbles, momentum, sentiment) which can cause asset prices to deviate from fundamental values, creating profit opportunities for sophisticated investors. The course will cover techniques of financial analysis with the goal of learning how to value assets and identify mispricing. —S. (S.) Schebinya (change in existing course—eff. winter 17)

423. 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 teams and colleagues in order to build trust, overcome challenges and help others discover their own full potential. —S. (S.) Chansupharindr (change in existing course—eff. winter 17)

425. Digital Marketing Techniques (1) Lecture—1 hour. 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
Mathematics

New and changed courses in Mathematics (MAT)

Lower Division

16B. Short Calculus (3)
Lecture—3 hours. Prerequisite: course 16A C- or better or course 17A C- or better or course 21A C- or better or course 21AH C- or better. Integration; calculus for trigonometric, exponential, and logarithmic functions; applications. Not open for credit to students who have completed course 21B, 21C, or 21CH. Only 2 units of credit to students who have completed course 17B. GE credit: SciEng | QL, SE, SL.—F, W, S. (F, W, S, J)

16C. Short Calculus (3)
Lecture—3 hours. Prerequisite: course 06B C- or better or course 17B C- or better or course 21B C- or better. Differentiable equations; partial derivatives; double integrals; applications; series. Not open for credit to students who have completed course 21B. Only 2 units of credit to students who have completed course 17C. GE credit: SciEng | QL, SE, SL.—F, W, S. (F, W, S)

17B. Calculus for Biology and Medicine (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 16A C- or better or course 17A C- or better or course 21A C- or better or course 21AH C- or better. Introduction to integral calculus and elementary differential equations via applications to biology and medicine. Fundamental theorem of calculus, techniques of integration including integral tables and numerical methods, improper integrals, elementary ordinary differential equations, application in biology and medicine. Not open for credit to students who have completed course 16C, 21B, or 21C; only 2 units of credit to students who have completed course 16B. GE credit: SciEng | QL, SE, SL.—F, W, S. (F, W, S)

181. Calculus (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 21A or 21AH with C- or above, or 17A with B or above. Definition of derivative and 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 courses 16B, 16C, 17B, or 17C. GE credit: SciEng | QL, SE, SL.—F, W, S. (F, W, S)

184. Vector Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 21C or 21CH with C- or above, or 17C with B or above. Continuation of course 21C. Delimiting integrals over plane and solid regions in various coordinate systems. Line and surface integrals. Green’s theorem, Stokes’ theorem, divergence theorem. GE credit: SciEng | QL, SE.—F, W, S. (F, W, S, J)

240. Vector Calculus (4)
Lecture—3 hours. Prerequisite: course 181 or 21A. GE credit: SciEng | QL, SE, SL, W.—F, W, S. (F, W, S)

Fall 2011 and on Revised General Education (GE): AH=Arts and Humanities; SC=Science and Engineering; SS=Social Sciences; ACGH=American Cultures; DD=Dominant Ethnicity; OL=Other Ethnicity; QL=Quantitative; SL=Scientific; VL=Visual; WC=World Cultures; WE=Writing Experience
Pre-Fall 2011 General Education (GE): ArthHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Dominant Ethnicity; Writ=Writing Experience
Quarter Offered: F=Fall; W=Winter; S=Spring; Su=Summer; 2017-2018 offering in parentheses
Courses & Programs are subject to change without notice.
22A. Linear Algebra (3)
Lecture—3 hours. Prerequisite: course 18C or better or course 17C and course 21C or better or course 21CH or better. Engineering 6 or Mechanical Engineering 5 or course 22AL can be concurrent. Matrices and linear transformations, determinants, eigenvalues, eigenvectors, diagonalization, factorization. GE credit: SciEng | QL | SE. — F, W, S. (F, W, S.)
(change in existing course—eff. winter 17)

22AL. Linear Algebra Computer Laboratory (1)
Laboratory—3 hours. Prerequisite: course 16C or course 17C or course 21C or course 21CH. Introduction to Matlab and its use in linear algebra. (P/NP grading only.) GE credit: SciEng | QL, SE. — F, W, S. (F, W, S.)
(change in existing course—eff. spring 17)

25. Advanced Calculus (4)
Lecture/discussion—4 hours. Prerequisite: course 21C or better or course 21CH or better. Rigorous treatment of linear algebra; topics include vector spaces, bases and dimensions, orthogonal projections, eigenvalues and eigenvectors, similarity transformations, singular value decomposition and positive definiteness. Only one unit of credit to student who has completed former course 127A. GE credit: SciEng | SE. — F, W, S. (F, W, S.)
(change in existing course—eff. winter 17)

67. Modern Linear Algebra (4)
Lecture/discussion—4 hours. Prerequisite: course 21C or better or course 21CH or better. Rigorous treatment of linear algebra; topics include vector spaces, bases and dimensions, orthogonal projections, eigenvalues and eigenvectors, similarity transformations, singular value decomposition and positive definiteness. Only one unit of credit to student who has completed former course 22A. GE credit: SciEng | SE. — F, W, S. (F, W, S.)
(change in existing course—eff. winter 17)

116. Differential Geometry (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 21D; course 22B; course 22A or course 67. Vector analysis, curves, and surfaces in three dimensions. Offered in alternate years. GE credit: SciEng | SE. — S.
(change in existing course—eff. winter 17)

125B. Real Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 125A; course 67 or (course 22A, course 108). 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.)
(change in existing course—eff. winter 17)

141. Euclidean Geometry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 21B; course 22A or course 67. Axiomatic and analytic examination of Euclidean geometry from an advanced point of view. In particular, a discussion of its relation to other geometries. Designed to serve as preparation for the more rigorous upper-division courses. GE credit: SciEng | SE. — W, S. (W, S.)
(change in existing course—eff. winter 18)

Medical Sciences

New and changed courses in Medical Sciences (MDS)

Professional

400. Summer Pre-Matriculation Program (2)
PE activity—7 hours; independent study—15 hours; lecture—14 hours. Prerequisite: consent of instructor. Two week program provides students from diverse backgrounds an early introduction to learning skills that will facilitate success in medical school. (P/F grading only.)—Su. (Su.)
(change in existing course—eff. summer 16)

411. Doctoring 1 (9)
Discussion—1 hour; clinical activity—1 hour; lecture—1 hour. Prerequisite: consent of instructor. Small group training in patient communication, interviewing techniques, physical exam and clinical identification. Outpatient clinical experiences and didactic presentations also included. (P/F grading only; deferred grading only; pending completion of sequence.)—F, W, S, Su. (F, W, S, Su.)
(Danielson (new course—eff. summer 17)

411A. Doctoring 1 (4)
(canceled course—eff. winter 18)

411B. Doctoring 1 (5)
(canceled course—eff. summer 17)

415. Principles of Public Health and Preventive Medicine (2)
Lecture—36 hours; discussion—12 hours. Prerequisite: consent of instructor. Course focuses on the bedrock themes of public health: populations and prevention. (P/F grading only; deferred grading only; pending completion of sequence.)—F, Su. (F, Su.)
(McCurdy (new course—eff. summer 16)

445. Race and Health in the United States (3)
Discussion—4 hours. Interprofessional course facilitates the professional and personal developmental of medical students and other health professions students who think they would like to be leaders in securing equity in population health and work environments. (P/F grading only.)—F, W, S, Su. (F, W, S, Su.)
(Murray-Garcia (new course—eff. summer 17)

Medicine: Emergency Medicine

New and changed courses in Internal Medicine—Emergency Medicine (EMR)

Lower Division

92C. Joan Viteri Memorial Clinic Preceptorship (1.5)
Clinical activity—3 hours; seminar—1 hour. Prerequisite: consent of instructor. Directed towards the undergraduate students at UC Davis that volunteer at the Joan Viteri Memorial Clinic (JVMC). May be repeated for credit. (S/U grading only.)—F, S
(new course—eff. spring 17)

Graduate

299. Research (1-12)
Laboratory—3-36 hours. Prerequisite: consent of instructor. Directed research in the Department of Emergency Medicine. May be repeated for credit. (S/U grading only.)
(new course—eff. spring 17)

Professional

450. Ambulatory Elective in Emergency Medicine (3-18)
Restricted to MS&E students in good standing; externships/away rotations only. Credit will be given for approved non-AI Emergency Medicine courses at other institutions to which there is not an equal learning experience at UC Davis. May be repeated for credit up to two times. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.)
(Jones (new course—eff. fall 16)

Medicine: Anesthesiology and Pain Medicine

New and changed courses in Anesthesiology and Pain Medicine (ANE)

Professional

435. Primary Care Multidisciplinary Pain Management (3)
Clinical activity—80 hours. Rotation will give 3rd year primary care-bound students an overview of the scope of Pain Medicine. May be repeated for credit. (H/P/F grading only.)—F, W, S. (F, W, S.)
(Sheth (new course—eff. fall 16)

464. Multidisciplinary Approach to the Neurosurgical Patient (3-9)
Clinical Activity—40 hours. Prerequisite: consent of instructor. Participate in the perioperative care of patients undergoing neurosurgical procedures while under the supervision of anesthesia, neurology and neurosurgical ICU residents and attending physicians. May be repeated for credit. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.)
(Schloemer, Tirado (new course—eff. winter 17)
430F. SJVP Longitudinal Family Medicine Clerkship 1 (1.5-6)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Family Medicine Clerkship runs concurrently with Internal Medicine, Pediatrics and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Eidson-Ton, Srinivasan
(change in course eff. spring 17)

430KD. ACE-PC Family Medicine Clerkship D (1.5)
cancelled course eff. summer 17

430R. Rural PRIME Family Medicine Longitudinal Clerkship
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: consent of instructor. Family Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Eidson-Ton, Srinivasan
(change in course eff. spring 17)

430RA. Rural PRIME Family Medicine Longitudinal Clinic (0.5)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: consent of instructor. Family Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—F. (F.) Eidson-Ton, Srinivasan
(new course eff. spring 17)

430RB. Rural PRIME Family Medicine Longitudinal Clerkship (3)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: consent of instructor. Family Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—W. (W.) Eidson-Ton, Srinivasan
(new course eff. spring 17)

430RC. Rural PRIME Family Medicine Longitudinal Clerkship (3)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: consent of instructor. Family Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—W. (W.) Eidson-Ton, Srinivasan
(new course eff. spring 17)

430RD. Rural PRIME Family Medicine Longitudinal Clerkship (1)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: consent of instructor. Family Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Eidson-Ton, Srinivasan
(new course eff. spring 17)

431A. ACE-PC Continuity Clinic (0.5)
Clinical Activity—2 hours. Prerequisite: consent of instructor. Longitudinal clinic component of the 2nd year of the ACE-PC Program. Students start off with a 4 week immersion experience and then 12 additional 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.)—S. (S.) Eidson-Ton, Srinivasan
(new course eff. spring 17)

431KD. ACE-PC Continuity Clinic (0.5)
Clinical Activity—2 hours. Prerequisite: consent of instructor. Longitudinal clinic component of the 2nd year of the ACE-PC Program. Students start off with a 4 week immersion experience and then 12 additional 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, Srinivasan
(new course eff. spring 17)

115. Cannabis and Cannabinoids in Physiology and Medicine (3)
Lecture—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 100 or Neurobiology, Physiology, and Behavior 101 or Neurobiology, Physiology, and Behavior 110B; or consent of instructor. In-depth scientific analysis of cannabis and cannabinoids, topics include biochemical, physiologic, behavioral, pharmacological, social and therapeutic aspects of cannabinoids, with emphasis on the physiological impacts on major organ systems in humans and animals, and the potential medicinal uses. GE credit: SciEng, SE, SL—S. (S.) Lin
(change in course eff. spring 17)

157. Advanced Physiology of Animal/ Human Disease (3)
Lecture—1 hour; lecture/discussion—2 hours. Prerequisite: Neurobiology, Physiology, and Behavior 101 B+ or better or Neurobiology, Physiology, and Behavior 110C B+ or better; consent of instructor.
Limited to 35 students initially. Centers on fundamental mechanisms and pathophysiological basis for animal and human diseases. Course is case-based and uses animal and human diseases to help exemplify the physiological consequences of organ dysfunction. [Same course as Neurobiology, Physiology, and Behavior 157.]—S. (S.) Aronowitz, Fayne (new course—eff. spring 17)

**Medicine: Internal Medicine**

New and changed courses in Internal Medicine (IMD)

**Lower Division**

90. Seminar in Medical Ethics (1)
Lecture—1 hour. Seminar Series covering the current topics in Medical Ethics. (F/NP grading only.)—F. (F.) Farborough. (new course—eff. winter 17)

Graduate

290C. Controversies in Clinical Research (1)
(cancelled course—eff. summer 17)

**Professional**

430FA. SJVP Longitudinal Medicine Clerkship (1.5–6)
Clinical activity—45 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Psychiatry for 32 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.]—Su. (Su.) Aronowitz, Jahl (change in existing course—eff. spring 17)

430FB. SJVP Longitudinal Medicine Clerkship (1.5–6)
Clinical activity—45 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Psychiatry for 32 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.) Aronowitz, Jahl (change in existing course—eff. spring 17)

430FC. SJVP Longitudinal Medicine Clerkship (1.5–6)
Clinical activity—45 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Psychiatry for 32 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.) Aronowitz, Jahl (change in existing course—eff. spring 17)

430RD. Rural PRIME Internal Medicine Longitudinal Clerkship (1)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: consent of instructor. Internal Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. [H/P/F grading only; deferred grading only, pending completion of sequence.]—W. (W.) Aronowitz, Jahl (new course—eff. spring 17)

430RA. Rural PRIME Internal Medicine Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Internal Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. [H/P/F grading only; deferred grading only, pending completion of sequence.]—S. (S.) Aronowitz (new course—eff. spring 17)

430RB. Rural PRIME Internal Medicine Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Internal Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. [H/P/F grading only; deferred grading only, pending completion of sequence.]—F. (F.) Aronowitz. (new course—eff. spring 17)

430RC. Rural PRIME Internal Medicine Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Internal Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. [H/P/F grading only; deferred grading only, pending completion of sequence.]—W. (W.) Aronowitz, Jahl (new course—eff. spring 17)

493. Introduction to Interprofessionalism, Pain Management, and Palliative Care (6)
Clinical activity—24 hours; discussion—4 hours; independent study—4 hours. Prerequisite: consent of instructor. The learners will spend 1 week with the inpatient palliative care service, 1 week with the inpatient pain pharmacy service and 2 weeks with Snowline Hospice. [H/P/F grading only;]—F. W. S. S., Su., Hou. (new course—eff. summer 16)

**Medicine: Internal Medicine—Infectious Diseases**

New and changed courses in Internal Medicine—Infectious Diseases (ID1)

**Professional**

493. Correctional Medicine SSM—Evaluation of HIV and Hepatitis C Patients (6)
Clinical activity—30 hours; discussion—5 hours. Primary agenda locations for the evaluation of treatment of HIV and Hepatitis C patients in the correctional environment. [H/P/F grading only;]—F. W. S., Su., Hou. (new course—eff. spring 17)

**Medicine: Neurosurgery**

New and changed courses in Medicine: Neurosurgery (NSU)

**Professional**

464. Externship (3–9)
Clinical activity. Prerequisite: fourth-year medical student having completed a neurosurgical clerkship or consent of instructor. Clerkship in neurosurgery to be arranged at another institution with accredited residency program in neurosurgery under proper supervision. [H/P/F grading only;]—F. W., S., Su., Hou. (change in existing course—eff. summer 16)

**Medicine: Obstetrics and Gynecology**

New and changed courses in Medicine: Obstetrics and Gynecology (OBG)

**Professional**

430E. SJVP OBGYN Clerkship at UCSF (6–12)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Obstetrics, gynecologic and gynecological oncology experience in the delivery room, operating room, clinics and wards at UCSF Fresno. Rounds, conferences, interactive student presentations and seminars ongoing. [H/P/F grading only;]—F. W., S., Su., Hou. (change in existing course—eff. spring 17)

430RA. Rural PRIME OBGYN Longitudinal Clerkship (2)
Clinical activity—45 hours. Prerequisite: consent of instructor. Obstetrics and Gynecology Longitudinal Integrated Clerkship for the Rural PRIME Program. [H/P/F grading only;]—S. (S.) Hou. (change in existing course—eff. spring 17)

430RB. Rural PRIME OBGYN Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Obstetrics and Gynecology Longitudinal Integrated Clerkship for the Rural PRIME Program. [H/P/F grading only; deferred grading only, pending completion of sequence.]—Su. (Su.) Hou. (new course—eff. spring 17)

430RC. Rural PRIME OBGYN Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Obstetrics and Gynecology Longitudinal Integrated Clerkship for the Rural PRIME Program. [H/P/F grading only; deferred grading only, pending completion of sequence.]—W. (W.) Hou. (new course—eff. spring 17)
430RD. Rural PRIME OBGYN Longitudinal Clerkship (1)  
Clinical activity—45 hours. Prerequisite: consent of instructor. Obstetrics and Gynecology Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Hou  
(new course—eff. spring 17)

Medicine: Ophthalmology

New and changed courses in Medicine: Ophthalmology (OPT)  
Professional  
499. Research in Ophthalmology (1-12)  
Variable—3-36 hours. Prerequisite: medical students with consent of instructor. Individual research on selected topics in optics and visual physiology, cornea and external disease. (P/F grading only)  
[change in existing course—eff. winter 17]

Medicine: Pathology

New and changed courses in Medicine: Pathology (PMD)  
Graduate  
290C. Research Group Conferences (1)  
Seminar—3 hours. Prerequisite: graduate level standing. Focused around the mechanisms of function of the central nervous system under normal and pathogenic conditions. Seminars lead by various speakers from UC Davis and other Institutions, both domestic and international. May be repeated for credit. (S/U grading only)—F, W, S, Su. (F, W, S, Su.)  
[change in existing course—eff. fall 17]  
298. Advanced Group Study in Neurosciences (1-5)  
Prerequisite: consent of instructor. Course will explore mechanisms that impact perinatal development of the cerebral cortex, and other cortical structures, under normal and pathological conditions.  
[change in existing course—eff. winter 17]

Medicine: Pediatrics

New and changed courses in Medicine: Pediatrics (PED)  
Professional  
430FA. SJVP Longitudinal Pediatrics Clerkship (1.5-6)  
Clinical activity—40-60 hours. Prerequisite: consent of instructor. Longitudinal Pediatrics Clerkship runs concurrently with Internal Medicine, Family Medicine and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—F. (F.) Plant  
(new course—eff. spring 17)  
430FB. SJVP Longitudinal Pediatrics Clerkship (1.5-6)  
Clinical activity—40-60 hours. Prerequisite: consent of instructor. Longitudinal Pediatrics Clerkship runs concurrently with Internal Medicine, Family Medicine and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Hou  
(new course—eff. spring 17)

430FC. SJVP Longitudinal Pediatrics Clerkship (1.5-6)  
Clinical activity—40-60 hours. Prerequisite: consent of instructor. Longitudinal Pediatrics Clerkship runs concurrently with Internal Medicine, Family Medicine and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—W. (W.) Plant  
(new course—eff. spring 17)

430FD. SJVP Longitudinal Pediatrics Clerkship (1.5-6)  
Clinical activity—40-60 hours. Prerequisite: consent of instructor. Longitudinal Pediatrics Clerkship runs concurrently with Internal Medicine, Family Medicine and Psychiatry for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Plant  
(new course—eff. spring 17)

430R. Rural PRIME Pediatrics Longitudinal Clerkship (2)  
Clinical activity—45 hours. Prerequisite: consent of instructor. Pediatrics Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—Su. (Su.) Plant  
(new course—eff. spring 17)  
430RA. Rural PRIME Pediatrics Longitudinal Clerkship (3)  
Clinical activity—45 hours. Prerequisite: consent of instructor. Pediatrics Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—F. (F.) Plant  
(new course—eff. spring 17)  
430RB. Rural PRIME Pediatrics Longitudinal Clerkship (3)  
Clinical activity—45 hours. Prerequisite: consent of instructor. Pediatrics Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—W. (W.) Plant  
(new course—eff. spring 17)  
430RC. Rural PRIME Pediatrics Longitudinal Clerkship (3)  
Clinical activity—45 hours. Prerequisite: consent of instructor. Pediatrics Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Plant  
(new course—eff. spring 17)  
430RD. Rural PRIME Pediatrics Longitudinal Clerkship (1)  
Clinical activity—45 hours. Prerequisite: 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. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—F. (F.) Butani, Plant  
(new course—eff. winter 17)  
430TB. TeachMS Longitudinal Pediatrics Clerkship (B) (6)  
Clinical activity—45 hours. Prerequisite: 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. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—W. (W.) Butani, Plant  
(new course—eff. winter 17)  
430TC. TeachMS Longitudinal Pediatrics Clerkship (C) (6)  
Clinical activity—45 hours. Prerequisite: 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. On-going patient write-ups, rounds, conferences are required. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Butani, Plant  
(new course—eff. spring 17)  
460A. Acting Internship: General Inpatient Pediatric Clerkship (3-18)  
Clinical activity. Prerequisite: course 430 with grade of A or consent of instructor; letter of recommendation from Pediatrics faculty member. Limited enrollment. The Ward Acting Intern functions in a manner similar to the Third Year Acting Intern. This Acting Intern takes admissions in the regular sequence and is expected to take night call. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.) Kim  
[change in existing course—eff. fall 16]  
476. Acting Internship in Pediatric Intensive Care (6-18)  
Clinical activity. Prerequisite: course 430 with grade of A or consent of instructor; 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 call every third night during rotation. May be repeated for credit. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.) Plant  
[change in existing course—eff. fall 16]  

Medicine: Pharmacology and Toxicology

New and changed courses in Medicine: Pharmacology and Toxicology (PHA)  
Graduate  
225. Gene and Cellular Therapies (3)  
Lecture/discussion—3 hours. 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 Genetics 225.)—S. (S.) Anderson  
[change in existing course—eff. winter 17]
Medicine: Psychiatry

New and changed courses in Medicine: Psychiatry (PSY) Professional

420. Acting Internship in Psychiatry (3-6)
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 long-term patient management. (H/P/F grading only) — F, W, Su. (F, W, S, Su.) Scher
(change in existing course—eff. summer 16)

430FA. SJVP Longitudinal Psychiatry Clerkship (1.5-6)
Clinical activity—45 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Internal Medicine for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Scher
(change in existing course—eff. spring 17)

430FB. SJVP Longitudinal Psychiatry Clerkship (1.5-6)
Clinical activity—45 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Internal Medicine for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Scher
(change in existing course—eff. spring 17)

430FC. SJVP Longitudinal Psychiatry Clerkship (1.5-6)
Clinical activity—45 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Internal Medicine for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Scher
(change in existing course—eff. spring 17)

430FD. SJVP Longitudinal Psychiatry Clerkship (1.5-6)
Clinical activity—45 hours. Prerequisite: consent of instructor; approval by School of Medicine Committee on Student Progress. Longitudinal Clerkship runs concurrently with Family Medicine, Pediatrics and Internal Medicine for 32 weeks. Time is spent in direct patient care situations under the guidance of faculty. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Scher
(change in existing course—eff. spring 17)

430FE. SJVP Longitudinal Psychiatry Clerkship at UCSF Track 2 (4)
canceled course—eff. summer 17

430FF. SJVP Longitudinal Psychiatry Clerkship at UCSF Track 2 (4)
canceled course—eff. summer 17

430R. Rural PRIME Psychiatry Longitudinal Clerkship (2)
Clinical activity—45 hours. Prerequisite: consent of instructor. Psychiatry Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only) — S. (S.) Scher
(new course—eff. spring 17)

430RA. Rural PRIME Psychiatry Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Psychiatry Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Scher
(new course—eff. spring 17)

430RB. Rural PRIME Psychiatry Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Psychiatry Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—F (F) Scher
(new course—eff. spring 17)

430RC. Rural PRIME Psychiatry Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Psychiatry Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Scher
(new course—eff. spring 17)

430RD. Rural PRIME Psychiatry Longitudinal Clerkship (1)
Clinical activity—45 hours. Prerequisite: consent of instructor. Psychiatry Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence.)—S. (S.) Scher
(new course—eff. spring 17)

Medicine: Public Health Sciences

New and changed courses in Medicine: Public Health Sciences (SPH) Upper Division

102. Introduction to Human Epidemiology (4)
Lecture—2 hours; discussion—2 hours. Practice of epidemiology as it relates to human populations. Content is fundamental to the Public Health minor and a required course. GE credit: SE. — S. Garcia
(change in existing course—eff. spring 17)

105. Health Disparities in the U.S. (3)
canceled course—eff. spring 17

17SW. Health Policy and Health Politics (4)
canceled course—eff. fall 16

190. Topics in Public Health (1)
Seminar—1 hour. Prerequisite: consent of instructor. Seminar on key issues and current topics in public health. May be repeated for credit. (P/NP grading only) — F, W, S, Su. (F, W, S, Su.) Kass, McCurdy
(change in existing course—eff. winter 17)

Medicine: Radiology—Diagnostic

New and changed courses in Medicine: Radiology—Diagnostic (RDI) Professional

477. Advanced Clinical Clerkship in Ultrasound Radiology (3-6)
Clinical activity—30 hours; conference—5 hours; film viewing—3 hours. Prerequisite: four-year medical student with interest in Radiology, 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 may be required for credit. (H/P/F grading only) — F, W, S, Su. (F, W, S, Su.) McGahan
(change in existing course—eff. summer 16)
Medical Studies

New and changed courses in Medieval Studies (MST)

Lower Division

98F. Student Facilitated Course (1-4)
Prerequisite: consent of instructor. Student facilitated course intended primarily for lower division students. Offered irregularly. (P/NP grading only)
(new course—eff. winter 17)

Upper Division

198F. Student Facilitated Course (1-4)
Prerequisite: consent of instructor. Student facilitated course intended primarily for upper division students. Offered irregularly. (P/NP grading only)
(new course—eff. winter 17)

199F. Student Facilitated Course Development (1-4)
Prerequisite: consent of instructor. Under the supervision of a faculty member, an undergraduate student plans and develops the course they will offer under 98F/198F. Offered irregularly. (P/NP grading only)
(new course—eff. winter 17)

199F. Student Facilitated Teaching (1-4)
Prerequisite: consent of instructor. Under the supervision of a faculty member, an undergraduate student teaches a course under 98F/198F. Offered irregularly. (P/NP grading only)
(new course—eff. winter 17)

Middle East/South Asia Studies

New and changed courses in Middle East/South Asia Studies (MSA)

Upper Division

131B. Modern South Asia Cinema (4)
Lecture/discussion —3 hours; film-viewing—3 hours. Prerequisite: upper-division standing or consent of instructor. South Asian cinema of last 100 years in the context of cultural, social, and political changes. South Asian history, Independence, Partition, urban life, class, migration, postcolonial identity, diaspora, gender, sexuality, religion, sport, performance, etc. (Same course as Anthropology 147 and Cinema & Technocultural Studies 146B) Offered in alternate years. GE credit: SocSci [AH, SS, VL, WC, WE]. (new course—eff. winter 17)

Molecular and Cellular Biology

New and changed courses in Molecular and Cellular Biology (MCB)

Upper Division

163. Developmental Genetics (3)
Lecture —3 hours. Prerequisite: course 121 [can be concurrent]. Current aspects of developmental genetics. Historical background and current genetic approaches to the study of development of higher animals. GE credit: SciEng [SE — W. W.] Natle, Rose
(change in existing course—eff. fall 17)

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 genomics research. GE credit: SciEng [SE — W. M.] Natt, Quon
(new course—eff. winter 17)

Graduate

256. Cell and Molecular Biology of Cancer (2)
(canceled course—eff. spring 17)

Music

New and changed courses in Music (MUS)

Lower Division

17B. Intermediate Musicianship, Part 2 (2)
Lecture/laboratory —2 hours. Prerequisite: course 17A; course 7B (can be concurrent); course 7B 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 — W. W.] Craig
(change in existing course—eff. winter 17)

Upper Division

101A. Advanced Theory, Part 1 (4)
Lecture —3 hours; lecture/laboratory —1 hour. Prerequisite: course 7C. Twentieth-century music from 1930 through 1950 and the various analytical tools pertaining to it. Works of Copland, Sessions, Schoenberg, Bartók, and Stravinsky. Composition of small pieces for piano and voice. GE credit: ArtHum [AH — F. F.] Bauer, Peño, Rohde, San Martin
(change in existing course—eff. winter 17)

102. Tonal Counterpoint (4)
Lecture —3 hours; practice —1 hour. Prerequisite: course 6C, or consent of instructor. 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
(change in existing course—eff. winter 17)

105. History and Analysis of Jazz (4)
Lecture —3 hours; discussion —1 hour. Prerequisite: course 3A or course 10 or course 28; or consent of instructor. Jazz and the evolution of jazz styles in his-
torical and cultural context. For non-majors. GE credit: ArtHum; Div | ACGH; AH, DD, WE.—F. [F] J Bauer (change in existing course—eff. winter 17)

106. History of Rock Music (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3A or course 10 or course 28; or consent of instructor. Rock and the evolution of rock styles in historical and cultural context. For non-majors. GE credit: ArtHum; Wt | ACGH; AH, VL, WE — W, WJ, Froh (change in existing course—eff. winter 17)

107B. Handmade Electronic Music (4)
Lecture—5 hours; laboratory—1 hour. Prerequisite: course 107A; consent of instructor. Hacking, bending, and creating electronic circuits to make sound. Learning to use circuit diagrams, to build prototypes, and to solder components together. Repertoire study. Offered in alternate years. GE credit: ArtHum | AH — [W] Nichols (change in existing course—eff. winter 18)

112A. Jazz Fundamentals (2)
Lecture/laboratory—6 hours. Prerequisite: course 3A or better; or consent of instructor. Concurrent enrollment with course 140 or course 146 required. Fundamentals of Jazz music theory, ear training, harmony and composition techniques. Designed to complement participation in Jazz Combo or Jazz Band. First course of a three course sequence. GE credit: ArtHum | AH — F [F] Griffith, Manricks (new course—eff. winter 17)

112B. Jazz Theory (2)
Lecture/laboratory—6 hours. Prerequisite: course 112A or better; or consent of instructor. Concurrent enrollment with course 140 or course 146 required. Intermediate level Jazz music theory, ear training, harmony, and composition techniques including improvisation. Designed to complement participation in Jazz Combo or Jazz Band. Second course of a three course sequence. GE credit: ArtHum | AH — W [W] Griffith, Manricks (new course—eff. winter 17)

112C. Jazz Composition (2)
Lecture—6 hours. Prerequisite: course 112B or better; consent of instructor. Concurrent enrollment in course 140 required. Jazz compositions and arranging. Study of stylistic composition techniques of Jazz theory, harmony and improvisation. Third course of a sequence. GE credit: ArtHum | AH — S [S] J Griffith, Manricks (new course—eff. winter 17)

123. Music as Culture (3)
Lecture/discussion—3 hours. Prerequisite: course 2AC or better; consent of instructor. Introduction to the study of music in cross-cultural perspective. Basic theories and frameworks of ethnomusicology; in-depth case studies of three musical traditions from around the world. Intended for music majors. Offered in alternate years. GE credit: ArtHum | AH, WC, WE — F [F] Lee, Spiller (change in existing course—eff. winter 17)

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 motena, musica andina) as well as its implications in other musical genres. Taught in Spanish or English depending on instructor. Not open to students who have taken SPA 171 or MUS 127. May be repeated for credit up to one time when topic differs. (Same course as Spanish 171.) Offered in alternate years. GE credit: ArtHum, Wt | AH, VL, WE — F [F] Hess, Irwin, Ortiz (change in existing course—eff. winter 18)

127S. 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 or English depending on instructor. Not open to students who have taken SPA 171 or MUS 127. May be repeated for credit up to one time when topic differs. (Same course as Spanish 171.) Offered in alternate years. GE credit: ArtHum, Wt | AH, VL, WC, WE — F [F] Irwin, Ortiz (new course—eff. winter 18)

140. University Jazz Band (2)
Rehearsal—2 hours; practice—4 hours. Prerequisite: consent of instructor; admission by audition. Open to students in any major. Rehearsal, study, and performance of jazz band music and full variety of jazz band style, including swing, be-bop, and contemporary jazz styles. May be repeated for credit. (P/NP grading only)—F [F] W, S [W, S] Griffith (change in existing course—eff. spring 17)

Native American Studies

New and changed courses in Native American Studies (NAS)

Upper Division

133A. Ethnohistory of Native Peoples of Mexico and Central America (4)
Lecture/discussion—4 hours. Ethnohistorical development of pre-colonial, colonial, post-colonial Mexican and Central American indigenous peoples; the impact of economic and political factors on the process of cultural adaptation. Attention is given to the questions of nation-building, forced assimilation, indigenous resistance, organized political responses. GE credit: SocSci, Div | SS (change in existing course—eff. winter 17)

133B. Ethnohistory of Native Peoples of Mexico and Central America 1500 to 15000 (4)
Lecture/discussion—4 hours; term paper. Ethnohistorical development of the indigenous peoples of Mexico and Central America up to and including the earliest period of European contact. Focus is on an indigenous written historical records of the Maya, Mixtec, and Nahua peoples. May be repeated one time for credit. This course can be repeated provided the student presents a new topic for the term paper/project and for the PowerPoint presentations. The material is so extensive that more than one expose to it can be very beneficial to students wanting to focus on ancient Mesoamerica. Offered in alternate years. GE credit: ArtHum or SocSci, Div | AH or SS, VL, WC, WE (change in existing course—eff. winter 17)

133C. Ethnohistory of Native Peoples of Mexico and Central America 1500 to 2000 (4)
Lecture/discussion—4 hours; term paper. Ethnohistory of indigenous peoples of Mexico and Central America from 1500 to contemporary times. Focus on social and cultural dynamics, particularly the role of indigenous peoples in the process of nation-state building in Mexico and Central America. Offered in alternate years. GE credit: ArtHum or SocSci, Div | Wt | AH, OL, SS, WE (change in existing course—eff. winter 17)

133D. Ethnohistory of Native Peoples of Mexico and Central America 1500 to 20000 (4)
Lecture/discussion—4 hours; term paper. Ethnohistory of indigenous peoples of Mexico and Central America from 1500 to contemporary times. Focus on social and cultural dynamics, particularly the role of indigenous peoples in the process of nation-state building in Mexico and Central America. Offered in alternate years. GE credit: ArtHum or SocSci, Div | Wt | AH, OL, SS, WE (change in existing course—eff. winter 17)

Neurobiology, Physiology, and Behavior

New and changed courses in Neurobiology, Physiology, and Behavior (NPB)

Upper Division

100. Neurobiology Laboratory (3)
Lecture—1 hour; laboratory—3 hours; extensive writing or discussion. Prerequisite: course 100 (can be taken concurrently or as 100B). Experimental basis of neurobiology principles discussed in course 100. Topics include neurophysiology, sensory systems, motor systems, cellular neuroscience, cognitive neuroscience, and quantitative data analysis and modeling techniques. GE credit: SciEng | SE — S. [S] Goldman (change in existing course—eff. winter 17)

101. Systemic Physiology (5)
Lecture—5 hours. Prerequisite: Biological Sciences 1A or Biological Sciences 2A; Chemistry 2B; Physics 1B or Physics 7C strongly recommended. Systemic physiology with emphasis on aspects of human physiology. Functions of major organ systems, with the question of those systems described as a basis for understanding the functions. Not open for credit to students who have completed course 110C. GE credit: SciEng | SE — F, W, S [F, W, S] Bautista, Debello, Fuller, Furlow, Games, Ishida, Liets, Usrey, Vanderlin (change in existing course—eff. winter 17)

101D. Systemic Physiology Discussion (1.5)
Discussion—1.5 hour. Prerequisite: course 101 (can be concurrent); 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] (change in existing course—eff. spring 17)

101L. Systemic Physiology Laboratory (3)
Laboratory—3 hours; discussion—2 hours; term paper. Prerequisite: course 101 or course 110C. Selected experiments to illustrate functional characteristics of organ systems discussed in course 101. —F, W, S [F, W, S] Bautista, Liets (change in existing course—eff. winter 17)

108Y. Animal Behavior Laboratory (3)
Lecture—3 hours; web electronic discussion—12 hours. Hybrid course, consisting of limited in-person lectures and the rest laboratory exercises. The laboratory exercises will be online, and will require students to view and score videos of animal behavior in order to test behavioral hypotheses. GE credit: SL — Su (Su) Hedrick (new course—eff. summer 16)
110A. Foundations 1: From Molecules to Individuals (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A, Biological Sciences 2B, Biological Sciences 2C; Chemistry 2A; Chemistry 2B; Physics 7A, Physics 7B recommended. Pass/No Pass grading only. Major concepts in neurobiology with special emphasis on connections between cell biology and behavior. Includes: cellular metabolism, cellular sensing and signaling, membrane structure-function, molecular switches, electrical and chemical signaling, endocrine signaling, cell cycle and differentiation, cytoskeleton, and integrative examples. Credit limited to 3 units for students who have taken Biological Sciences 104. GE credit: SciEng | SE.—F, S, (F, S) Gomes, Hahn (change in existing course—eff. winter 17)

110B. Foundations 2: Neurobiology (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 110A C- or better; Physics 7A and Physics 7B recommended. Open to declared NPB majors only. Core concepts of neurobiology including single-neuron biophysics, synapses and transmitter systems, neuronal development, motor systems, central pattern generation, neuronal circuits, intracellular signaling, synaptic transmission, 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 (F, W) Britten, Sutter (change in existing course—eff. winter 17)

110C. Foundations 3: Physiology (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: Physics 7A; Physics 7B and Physics 7C recommended. Open to declared NPB 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; developmental muscle and movement; cardiovascular and respiratory systems; renal, digestive, immune, and reproductive physiology. Credit limited to two units for students who have taken course 101. GE credit: SciEng | SE.—W, S, (W, S) Furlow, Usrey (change in existing course—eff. spring 17)

111C. Advanced Systemic Physiology Laboratory (3)
cancelled course—eff. winter 17

111L. Advanced Systemic Physiology Laboratory (4)
Lecture—1 hour; discussion—2 hours; laboratory—6 hours; term paper. Prerequisite: courses 101; course 101L. Select experiments create 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. Offered irregularly. GE credit: Wrt.—Liets (change in existing course—eff. fall 08)

112. Neuroscience (3)
cancelled course—eff. winter 17

121L. Physiology of Reproduction Laboratory (1)
Laboratory—3 hours. Prerequisite: course 121 (can be concurrent). Experiments on the reproductive systems of domestic animals including male and female gametes. (P/No Pass grading only.)—W, W) Berger (change in existing course—eff. spring 17)

125. Comparative Physiology: Neurosciences (5)
cancelled course—eff. winter 17

127. Comparative Physiology: Circulation (3)
cancelled course—eff. fall 16

134. General Immunology for Physiologists (3)
Lecture—2 hours; lecture/discussion—1 hour. Prerequisite: course 101 C or better or course 110C or better; or consent of instructor. Immunology for undergraduates interested in physiology aimed at understanding the physiological role of immune responses. Illustrated with examples of human diseases including diabetes, allergies and asthma, and emerging diseases such as Ebola and Zika. Offered in alternate years. GE credit: SE.—Huising (new course—eff. fall 17)

157. Advanced Physiology of Animal Human Disease (3)
Lecture—1 hour; lecture/discussion—2 hours. Prerequisite: course 101 B or better or course 110C or better; consent of instructor. Limited to 35 students. Focuses on fundamental mechanisms and pathophysiological basis for animal and human diseases. Course is case-based and uses animal and human diseases to help exemplify the physiological consequences of organ dysfunction. (Same course as Human Physiology 157.)—S. (S) Horwitz, Payne (new course—eff. spring 17)

160. Molecular Cellular Neurobiology Laboratory (4)
cancelled course—eff. fall 17

160L. Advanced Cellular Neurobiology Laboratory (4)
cancelled course—eff. winter 17

163. Systems Neuroscience (3)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: course 100 or course 110B; or equivalent basic neuroscience training with consent of instructor. Concepts and systems in modern neuroscience: e.g., measuring and manipulating neural activity, structure of neocortex, sensory processing, motor control, storage of information, neural codes, neural mechanisms underlying cognitive functions. GE credit: SE.—S. (S) Ditterich (change in existing course—eff. spring 17)

164. Mammalian Vision (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or course 110B 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 (change in existing course—eff. spring 17)

172. Map Formation in the Brain (3)
Lecture—3 hours. Prerequisite: course 100 C- or better or course 110B C- or better, or equivalent basic neuroscience training with consent of instructor. Topographic map connection is a fundamental principle for establishing neural network in the brain. This course will provide comprehensive understanding of the current concepts of map formation in various sensory and motor nervous systems. GE credit: SE.—S. (S) Cheng (new course—eff. spring 17)

Graduate 211. Advanced Topics in Neuroimaging (3)
Seminar—2 hours; laboratory—1 hour. Prerequisite: Psychology 210; or consent of instructor. Restricted to 16 students. Critical presentation and discussion of the most influential advanced issues in modern neuroimaging, emphasizing fMRI design/analysis and the integration of fMRI with EEG/MEG. May be repeated for credit. (Same course as Neuroscience 211 and Psychology 211.) (S/U grading only.) Offered in alternate years.—S. (S) Miller (change in existing course—eff. spring 17)

212. Light and Fluorescence Microscopy (3)
Lecture—2 hours; laboratory—1 hour. Prerequisite: consent of instructor. Restricted to maximum of 16 students. Theory and practical application of light and fluorescence microscopy in the biological sciences. Laboratory component will focus on an optics bench, where we build simple compound and confocal microscopes on an optical rail. (S/U grading only.) Offered in alternate years.—S. (S) Zito (change in existing course—eff. spring 17)

287A. Topics in Theoretical Neuroscience (2)
Lecture/discussion—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 Neuroscience 287A.) (S/U grading only.) Offered in alternate years.—F. Goldman (change in existing course—eff. spring 17)

Neuroscience
New and changed courses in Neuroscience (NSC)

Upper Division

160. Molecular and Cellular Neurobiology (3)
cancelled course—eff. fall 17

Graduate

211. Advanced Topics in Neuroimaging (3)
Seminar—2 hours; laboratory—1 hour. Prerequisite: Psychology 210; or consent of instructor. Restricted to 16 students. Critical presentation and discussion of the most influential advanced issues in modern neuroimaging, emphasizing fMRI design/analysis and the integration of fMRI with EEG/MEG. May be repeated for credit. (Same course as Neuroscience 211 and Psychology 211.) (S/U grading only.) Offered in alternate years.—S. (S) Miller (change in existing course—eff. spring 17)

287A. Topics in Theoretical Neuroscience (2)
Lecture/discussion—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 Neuroscience 287A.) (S/U grading only.) Offered in alternate years.—F. Goldman (change in existing course—eff. spring 17)

212. Light and Fluorescence Microscopy (3)
Lecture—2 hours; laboratory—1 hour. Prerequisite: consent of instructor. Restricted to maximum of 16 students. Theory and practical application of light and fluorescence microscopy in the biological sciences. Laboratory component will focus on an optics bench, where we build simple compound and confocal microscopes on an optical rail. (S/U grading only.) Offered in alternate years.—S. (S) Zito (change in existing course—eff. spring 17)

287A. Topics in Theoretical Neuroscience (2)
Lecture/discussion—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 Neuroscience 287A.) (S/U grading only.) Offered in alternate years.—S. (S) Miller (change in existing course—eff. spring 17)

Nursing, School of
professional approach to stimulate new thinking in the practice, process, and delivery of health care. Focus on improving overall health outcomes. —W. [W] (new course—eff. winter 17)

222A. Research Quality Improvement and Evidence Based Practice (2)
Lecture/discussion—2 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. Introduction to providing safe, competent, and compassionate care in a highly technical and digital environment. Emphasis on safety, quality, and research to clinical practice. Accessing and analyzing reliable sources of evidence for integration in care-plan. —Su. [Su.] (new course—eff. summer 16)

222B. Research Quality Improvement and Evidence Based Practice (2)
Lecture/discussion—2 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. Introduction to providing safe, competent, and compassionate care in a highly technical and digital environment. Emphasis on quality and research to clinical practice. Accessing and analyzing reliable sources of evidence for integration in care-plan. —F. [F] (new course—eff. fall 16)

223. Quality and Safety Education in Health Care (2)
Lecture/discussion—2 hours. Prerequisite: course 221; course 272; course 420; course 421; course 273; course 422; course 423; course 425; consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Implementing best practices alongside technological tools and focusing on continuous quality improvement. Emphasis on providing safe, competent care in a highly technical and digital environment. Building capacity to apply concepts related to safety, quality and research to clinical practice. —S. [S.] (new course—eff. spring 17)

224. Developing Future Nurse Leaders (2)
Lecture/discussion—2 hours. Prerequisite: NRS 221; course 272; course 420; course 421; course 273; course 422; course 423; course 425; course 223; course 422; consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Development of effective decision making, fiscal and environmental stewardship, initiating and maintaining effective working relationships, using mutually respectful communication and collaboration, career coordination, delegation and supervision. Emphasis on conflict resolution, leadership and interprofessional teamwork. —Su. [Su.] (new course—eff. summer 17)

225. Professional Nursing Role Formation (3)
Lecture/discussion—3 hours. Prerequisite: NRS 221; course 220; course 221; course 222A; course 272; course 420; course 421; course 429A; course 222B; course 273; course 422; course 423; course 429B; course 203; course 212; course 425; course 429C; course 202; course 223; course 426; course 429D; course 224; course 427; course 429E; consent of instructor. Open to graduate students in the Nursing Science and Health-Care Leadership Graduate Group or by consent of the instructor. Transition from nursing student to professional nurse. Focus on ethical comportment, professional role, and leadership competencies. —F. [F] (new course—eff. fall 17)

Professional

493A. Improving Quality in Health Care (4)
Lecture/discussion—4 hours. Open to Nursing Science and Health-Care Leadership Students. Students will apply theoretical and practical methods being employed to make improvement in health care systems while providing an opportunity for interprofessional educational experience. —F. [F] (new course—eff. fall 17)

493B. Improving Quality in Health Care (4)
Lecture/discussion—4 hours. Prerequisite: course 493A; consent of instructor. Open to Nursing Science and Health-Care Leadership 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 while providing an opportunity for interprofessional educational experience. —W. [W] (new course—eff. summer 17)

493C. Enhancing Patient Safety in Health Care (3)
Seminar—1 hour; clinical activity—1 hour; discussion—1 hour. Prerequisite: consent of instructor; Nursing Science and Health-Care Leadership Graduate Students. 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 interprofessional educational experience. —S. [S.] (new course—eff. spring 17)

Nutrition

New and changed courses in Nutrition (NUT)

Lower Division

10Y. Discoveries and Concepts in Nutrition (3)
Web Virtual Lecture—3 hours; project—1 hour. Nutrition as a science; historical development of nutrition concepts; properties of nutrients and foods. Not open for credit to students who have taken an upper-division course in nutrition. No credit will be granted to students who have completed course 10 or an upper-division nutrition course. GE credit: SciEng [SE, SL—F, W, S, Su, F, W, S, Su]; Applegate. (new course—eff. fall 16)

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/toxicological perspective. Emphasis: role of biofactors on modulation of signal transduction pathways, role of specific interactions in the regulation of nutrient transport, major cofactors and protein metabolism with regard to understanding nutrient/toxicant metabolism. (Same course as Environmental Toxicology 104.) GE credit: SciEng [OL, SE, SL—F, F]; Haje, Oteiza. (new course—eff. fall 16)

112. Nutritional Assessment (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Animal Biology 102, Animal Biology 103 or Biological Sciences 102, Biological Sciences 103; course 111AY, Statistics 13 or Plant Sciences 120. Restricted to upper division or graduate level Nutrition students only. Methods of human nutritional assessment, including dietary, anthropometric, biochemical methods. Principles of precision, accuracy, and interpretation of results for individuals and populations. GE credit: SciEng [OL, SE—S. [S.] Sate, Stewart (change in existing course—eff. spring 17).

Graduate

260. Nutrition During Pregnancy (6)
(cancelled course—eff. fall 16)

261. Lactation and Infant Nutrition (6)
(cancelled course—eff. fall 16)

262. Child and Adolescent Nutrition (6)
(cancelled course—eff. fall 16)

(cancelled course—eff. winter 18)

264A. Current Topics in Maternal and Child Nutrition: Principles of Adult Education (2)
(cancelled course—eff. spring 17)

264B. Current Topics in Maternal and Child Nutrition: Epidemiology and Evidence-Based Practice (2)
(cancelled course—eff. spring 17)

264C. Current Topics in Maternal and Child Nutrition: Public Policy Development and Implementation (2)
(cancelled course—eff. fall 17)

Persian

New and changed courses in Persian (PER)

Lower Division

2. Elementary Persian (5)
Lecture/discussion—5 hours. Prerequisite: course 1; or consent of instructor. Introduction to the Persian alphabetic system and to Persian culture. GE credit: ArtHum, Div [WC—W. [W] Sharlet (new course—eff. winter 17)

3. Elementary Persian (5)
Lecture/discussion—5 hours. Prerequisite: course 1; or consent of instructor. Introduction to Persian culture. GE credit: ArtHum, Div [WC—S. [S.] Sharlet (new course—eff. spring 17)

21. Intermediate Persian (5)
Lecture/discussion—5 hours. Prerequisite: course 3; or the equivalent. Integrated presentation of listening, speaking, reading and writing skills as well as cultural topics in Intermediate Persian. GE credit: ArtHum, Div [AH, WC—F. [F] Sharlet (new course—eff. fall 16)

22. Intermediate Persian (5)
Lecture/discussion—5 hours. Prerequisite: course 21; or the equivalent. Integrated presentation of listening, speaking, reading and writing skills as well as cultural topics in Intermediate Persian. GE credit: ArtHum, Div [AH, WC—W. [W] Sharlet (new course—eff. winter 17)

23. Intermediate Persian (5)
Lecture/discussion—5 hours. Prerequisite: course 22; or the equivalent. Integrated presentation of listening, speaking, reading and writing skills as well as cultural topics in Intermediate Persian. GE credit: ArtHum, Div [AH, WC—S. [S.] Sharlet (new course—eff. spring 17)
98. Directed Group Study (1-5)
Prerequisite: consent of instructor; Directed group study. May be repeated for credit. [P/NP grading only.]
(new course—eff. winter 17)

Upper Division
101. Advanced Persian: Topics in Modern Persian Culture 1900-Present (5)
Lecture/discussion—3 hours; term paper. Prerequisite: course 23; or consent of instructor. Integrated work on reading, listening, discussion and writing about modern Persian cultural production using fiction and poetry as well as cinema and theory. May be repeated for credit up to one time if content is different from the first time. GE credit: ArtHum, Div, Wnt | AH, WC, WE. —Oshana
(change in existing course—eff. winter 17)

198. Special Study for Undergraduates (1-5)
Prerequisite: consent of instructor. Special study. May be repeated for credit. [P/NP grading only.]
(new course—eff. winter 17)

Professional
396. Teaching Assistant Training Practicum (1-4)
Prerequisite: consent of instructor. Restricted to graduate students. Teaching practicum. May be repeated for credit up to eighteen times. (S/U grading only. — F, W, S. (F, W, S.)
(new course—eff. winter 17)

Philosophy

New and changed courses in Philosophy (PHI)

Lower Division
10. Introduction to Cognitive Science (4)
Lecture/discussion—4 hours. Pass One open to Cognitive Science majors only. 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. [Same course as Cognitive Science 1.] GE credit: SciEng | SE, SL. —F. (F.)
Drayson, Molyneux
(change in existing course—eff. fall 17)

21. Philosophical Classics of the Ancient Era (4)
Lecture—3 hours; discussion—1 hour. Survey of ancient Western philosophy with special attention to the Pre-Socratics, Plato, Aristotle, and the Sceptics. GE credit: ArtHum, Wnt | AH, WE. —W. (W.)
Zsalá
(change in existing course—eff. spring 17)

22. Philosophical Classics of the Modern Era (4)
Lecture—3 hours; discussion—1 hour. Survey of modern Western philosophy, including Descartes, Locke, Hume, and Kant. GE credit: ArtHum, Wnt | AH, WE. —W. (W.)
Matvey, Zsáli
(change in existing course—eff. spring 17)

Upper Division
118. Political Philosophy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: one course in philosophy recommended. Intensive examination of some central concepts of political thought such as the state, sovereignty, rights, obligation, freedom, law, authority, and responsibility. GE credit: SciEng, Div, Wnt | AH, WE. —W. (W.)
Oshana
(change in existing course—eff. winter 17)

119. Philosophy of Law (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor; one course in philosophy recommended. 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, Wnt | AH, SS, WE. —Oshana
(change in existing course—eff. winter 17)

133. Logic, Probability, and Artificial Intelligence (4)
Lecture/discussion—4 hours. Prerequisite: course 112; course 112. Introduction to theoretical artificial intelligence with a focus on nonmonotonic logic, Bayesian networks, and learning theory. Offered in alternate years. —F. (F.)
Kao
(change in existing course—eff. fall 16)

145. Christian, Islamic, and Jewish Philosophers of the Middle Ages (4)
Lecture/discussion—4 hours. Prerequisite: course 21 recommended. Major Christian, Islamic, and Jewish philosophers of the Middle Ages. Offered irregularly. GE credit: ArtHum | AH, WC. —S. (S.)
Zsalá
(change in existing course—eff. spring 17)

Physics

New and changed courses in Physics (PHY)

Lower Division
9A. Classical Physics (5)
Lecture—3 hours; laboratory—2.5 hours; discussion—1 hour. Prerequisite: Mathematics 21B; Mathematics 21M. Introduction to general principles and analytical methods used in physics for physical science and engineering majors. Only 2 units of credit for students who have completed 1A or 7B. Not open for credit to students who have completed course 9HA. GE credit: SciEng | SE. —F, S. (F, S.)
Tyson, Zhu
(change in existing course—eff. spring 17)

10CY. Physics of California (3)
Web virtual lecture—1 hour; web electronic discussion—0.5 hours; discussion—1.5 hours. Conceptual understanding of the physics underlying regional sports in CA. Focus on skiing, surfing, and scuba diving. Atmospheric phenomena common in CA, local weather patterns and microclimates, applications to CA energy, and water are also discussed. Not open for credit to students who have completed Physics 10C, any quarter of Physics 9A, 9B, 9C, 9D, 9HA, 9HB, 9HC, 9HD, or 9HE, or any upper division physics course. GE credit: SciEng | SE, SL. —F, F. (F.)
Broad
(new course—eff. winter 17)

12. Visualization in Science (3)
Lecture—3 hours. Production, interpretation, 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, SL. —S. (S.)
Teng
(change in existing course—eff. winter 17)

Upper Division
110A. Electricity and Magnetism (4)
Lecture—3 hours; prerequisite: course 98 C or better; course 9D C or better; Mathematics 210D C- or better; Mathematics 22A C- or better; Mathematics 22B C- or better; course 104A; course 105A; or consent of department. The ory of electrostatics, electromagnetism, Maxwell’s equations, electromagnetic waves. GE credit: SciEng | SE. —W. (W.)
Yu
(change in existing course—eff. winter 18)

12A. Advanced Laboratory in Condensed Matter Physics (4)
Laboratory—8 hours. Prerequisite: course 104A; course 105A; course 110B; course 115A; course 112 [can be concurrent]; or consent of the department. Registration by Permission to Add (PTA) number only; prior given to graduating PHY and APP majors. Experimental techniques and measurements in solid-state physics. Students perform three to six experiments depending on difficulty. Individual work is stressed. Through write-ups of the experiments are required. GE credit: SciEng | SE. —W. (W.)
Tyan, Zhu
(change in existing course—eff. winter 18)

122B. Advanced Laboratory in Particle Physics (4)
Laboratory—8 hours. Prerequisite: course 104A; course 105A; course 110B; course 115A; course 112 [can be concurrent]; or consent of the department. Registration by Permission to Add (PTA) number only; priority given to graduating PHY and APP majors. Experimental techniques and measurements in nuclear and particle physics. Students perform three to six experiments depending on difficulty. Individual work is stressed. Through write-ups of the experiments are required. GE credit: SciEng | SE. —W. (W.)
Pantic, Tyson, Zhu
(change in existing course—eff. winter 18)

157. Astronomy Instrumentation and Data Analysis Laboratory (4)
Laboratory—8 hours. Prerequisite: course 104A; course 105A; course 110A; course 115A [can be concurrent]; course 110B [can be concurrent]; and consent of instructor. Registration by Permission to Add (PTA) number only; priority given to graduating PHY and APP majors. Experimental techniques, data acquisition and analysis involving laboratory astrophysics plus stellar, nebular and gal axy digital imaging, photometry and/or spectroscopy. Students perform three to six experiments, depending on difficulty and individual work is stressed. Minimum 10-15 page journal style articles of two experiments are required. Offered in alternate years. GE credit: SciEng | SE. —S. (S.)
Beeshar, Tyson
(change in existing course—eff. winter 18)

Graduate

(cancelled course—eff. spring 17)

256A. Physics of Information (4)
Lecture—3 hours, extensive problem solving. Prerequisite: consent of instructor; advanced undergraduate or introductory graduate differential equations, applied linear algebra, and probability theory; e.g., Mathematics 119A/B or 207A, 167 or 226A, and 135A/B or 235A, respectively, or in courses 104A/C or 204A/B. Class size limited to 30 students. Nonlinear dynamics, deterministic chaos, bifurcations, pattern formation, symbolic dynamics, measurement theory, stochastic processes, elementary information theory, information in complex systems, computational laboratory. —W. (W.) Crichton
(change in existing course—eff. spring 17)

256B. Physics of Information (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 256A; consent of instructor; advanced undergraduate or introductory graduate differential equations, applied linear algebra, and probability theory; e.g., in Mathematics 119A/B or 207A, 167 or 226A, and 135A/B or 235A, respectively, in courses 104A/C or 204A/B. Class size limited to 30 students. Structural complexity, computational
mechanics, information measures, causal inference, applications to complex materials, quantum dynamics, and nonequilibrium thermodynamics, computational laboratory. — S. (S.) Crutchfield (change in existing course—eff. spring 17)

### Plant Biology

**New and changed courses in Plant Biology (PLB)**

### Lower Division

**102. California Floristics (5)**

Lecture—2 hours; laboratory—7 hours; fieldwork—2 hours. Prerequisite: Plant Sciences 2 or Biological Sciences 2C; or equivalent course in Plant Science. Survey of the California flora, emphasizing recognition of important plant families and genera and use of taxonomic keys to identify species. Phylogenetic relationships among families. Principles of systematics and taxonomy. Two Saturday field trips. [Same course as Plant Biology 102.] GE credit: SciEng | SE, VL, S. (S.) Potter (change in existing course—eff. fall 17)

**105. Concepts in Pest Management (3)**

Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: course 2 or Biological Sciences 2C; or equivalent course in Plant Science. Survey of the California flora, emphasizing recognition of important plant families and genera and use of taxonomic keys to identify species. Phylogenetic relationships among families. Principles of systematics and taxonomy. Two Saturday field trips. [Same course as Plant Biology 102.] GE credit: SciEng | SE, VL, S. (S.) Potter (change in existing course—eff. fall 17)

### Plant Pathology

**New and changed courses in Plant Pathology (PLP)**

### Lower Division

**90. Introduction to Global Disease Biology (1)**

[cancelled course—eff. fall 14]

### Plant Sciences

**New and changed courses in Plant Sciences (PLS)**

### Upper Division

**100A. Metabolic Processes of Cultivated Plants (3)**

Lecture—3 hours. Prerequisite: course 2 or Biological Sciences 2C; 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: SciEng | SE.—F. (F.) Gilbert (change in existing course—eff. spring 17)

**100B. Growth and Yield of Cultivated Plants (3)**

Lecture—3 hours. Prerequisite: course 100A; or the equivalent of course 100A. Principles of the cellular mechanisms and hormonal regulation underlying plant growth, development, and reproduction. Emphasis on how these processes contribute to the harvestable yield of cultivated plants and can be managed to increase crop productivity and quality. GE credit: SciEng | SE.—W. (W.) Bradford, Melotto (change in existing course—eff. spring 17)

**100C. Environmental Interactions of Cultivated Plants (3)**

Lecture—3 hours. Prerequisite: course 100A; or the equivalent of course 100A. Principles of 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 environmental conditions affect crop productivity. GE credit: SciEng | SE.—S. (S.) Brown (change in existing course—eff. spring 17)

**102. California Floristics (5)**

Lecture—2 hours; laboratory—7 hours; fieldwork—2 hours. Prerequisite: course 2 or Biological Sciences 2C; or equivalent course in Plant Science. Survey of the California flora, emphasizing recognition of important plant families and genera and use of taxonomic keys to identify species. Phylogenetic relationships among families. Principles of systematics and taxonomy. Two Saturday field trips. [Same course as Plant Biology 102.] GE credit: SciEng | SE, VL, S. (S.) Potter (change in existing course—eff. spring 17)

**105. Concepts in Pest Management (3)**

Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: course 2 or Biological Sciences 2C; or equivalent course in Plant Science. Survey of the California flora, emphasizing recognition of important plant families and genera and use of taxonomic keys to identify species. Phylogenetic relationships among families. Principles of systematics and taxonomy. Two Saturday field trips. [Same course as Plant Biology 102.] GE credit: SciEng | SE, VL, S. (S.) Potter (change in existing course—eff. fall 17)

### 110C. Crop Management Systems for Vegetable Production (4)

Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 2 or Biological Sciences 2C; or equivalent course in Plant Science. Survey of the California flora, emphasizing recognition of important plant families and genera and use of taxonomic keys to identify species. Phylogenetic relationships among families. Principles of systematics and taxonomy. Two Saturday field trips. [Same course as Plant Biology 102.] GE credit: SciEng | SE.—F. (F.) Al-Khatib (change in existing course—eff. winter 17)

### 110L. Principles of Agronomic Crop Production in Temperate and Tropical Systems (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 2 or Biological Sciences 2C; or equivalent course in Plant Science. Survey of the California flora, emphasizing recognition of important plant families and genera and use of taxonomic keys to identify species. Phylogenetic relationships among families. Principles of systematics and taxonomy. Two Saturday field trips. [Same course as Plant Biology 102.] GE credit: SciEng | SE.—F. (F.) Gilbert (change in existing course—eff. spring 17)

### 110A. Principles of Agronomic Crop Production in Temperate and Tropical Systems (4)

Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 2 or Biological Sciences 2C; or equivalent course in Plant Science. Survey of the California flora, emphasizing recognition of important plant families and genera and use of taxonomic keys to identify species. Phylogenetic relationships among families. Principles of systematics and taxonomy. Two Saturday field trips. [Same course as Plant Biology 102.] GE credit: SciEng | SE.—F. (F.) Gilbert (change in existing course—eff. spring 17)

### 110B. Growth and Yield of Cultivated Plants (3)

Lecture—3 hours. Prerequisite: course 100A; or the equivalent of course 100A. Principles of the cellular mechanisms and hormonal regulation underlying plant growth, development, and reproduction. Emphasis on how these processes contribute to the harvestable yield of cultivated plants and can be managed to increase crop productivity and quality. GE credit: SciEng | SE.—W. (W.) Bradford, Melotto (change in existing course—eff. spring 17)

### 110C. Crop Management Systems for Vegetable Production (4)

Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 2 or Biological Sciences 2C; or equivalent course in Plant Science. Survey of the California flora, emphasizing recognition of important plant families and genera and use of taxonomic keys to identify species. Phylogenetic relationships among families. Principles of systematics and taxonomy. Two Saturday field trips. [Same course as Plant Biology 102.] GE credit: SciEng | SE.—F. (F.) Gilbert (change in existing course—eff. spring 17)

### 111. Principles of Agronomic Crop Production Systems (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 2 or Biological Sciences 2A.C. Principles, practices and technologies of agronomic cropping systems, including crop systems, physiology, agroecology, equipment, and management. Crop- ping systems analysis and integration of economic and ecological decision-making considerations involved in crop production. One weekend field trip required. Not open for credit to students who have completed Plant Sciences 110C. (Former course Plant Sciences 110C.) Offered in alternate years. — F. Mitchell (new course—eff. winter 17)

### 130. Rangelands: Ecology, Conservation and Restoration (3)

Lecture—3 hours. Prerequisite: Plant Sciences 2 or Biological Sciences 2B or Biological Sciences 2C; or consent of instructor; upper division standing. 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: SciEng | SE, VL.—S. (S.) Potter (change in existing course—eff. spring 17)

### 131. Identification and Ecology of Grasses (2)

Lecture—7.5 hours; laboratory—20 hours; discussion—5 hours. Prerequisite: course 130 or course 102 or course 147 recommended. Taxonomy and identification of western grasses. Development of skills in using plant identification keys. Ecology and evolution of grasses in grazing ecosystems. Given the week following spring quarter. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 131. (Former course Agricultural Management and Rangeland Resources 131.) Offered in alternate years. GE credit: SciEng | SE, VL.—S. DiTomaso (change in existing course—eff. spring 17)

### 162. Urban Ecology (3)

Lecture/discussion—3 hours. Prerequisite: Course in general or plant ecology such as Plant Biology 117, Environmental Sciences and Policy 100, Evolution and Ecology 101, Evolution and Ecology 120 or course 163. Application of fundamental concepts and approaches in landscape and ecosystem ecology to urban ecosystems. Ecological and social drivers and responses. Landscape heterogeneity, nutrient dynamics, invasive species, altered hydrology and climate, and pollution. Discussion of primary literature. Discussion of primary literature. GE credit: SciEng | SE, SL—W. (W.) Cadness (change in existing course—eff. winter 17)

### 170A. Fruit and Nut Cropping Systems (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 2 or Biological Sciences 2C; or consent of instructor. Overview of production and handling systems of major pomological crops, analysis of current cultural and harvesting problems and concerns associated with commercial fruit growing. Not open for credit to students who have completed Agricultural Management and Range Resources 170A. (Former course Agricultural Management and Rangeland Resources 170A.) Offered in alternate years. GE credit: SciEng | SE.—F. Gradziel (change in existing course—eff. spring 17)

### 170B. Fruit and Nut Cropping Systems (2)

Lecture—1 hour; laboratory—3 hours. Prerequisite: course 2 or Biological Sciences 2C; or consent of instructor. Overview of production and handling systems of major pomological crops, analysis of current cultural and harvesting problems and concerns associated with commercial fruit growing. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 170A. (Former course Agricultural Management and Rangeland Resources 170A.) Offered in alternate years. GE credit: SciEng | SE.—F. Gradziel (change in existing course—eff. spring 17)

### 173. Molecular and Cellular Aspects of Postharvest Biology (3)

Lecture/discussion—3 hours. Prerequisite: course 2, Biological Sciences 1C, 2C or equivalent. Basic concepts and current knowledge of issues relevant to postharvest biology. Mechanisms of fruit ripening, senescence, programmed cell death. Metabolism and functions of phytohormones, carbohydrates, lipids, pigments, flavor compounds, and phytofactors at molecular and cellular levels. GE credit: SciEng | SE.—S. (S.) Zakharov (change in existing course—eff. spring 17)
Graduate

206. Applied Multivariate Modeling in Agricultural and Environmental Sciences (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 120; Statistics 106 or Statistics 108 or course 205. Multivariate linear and nonlinear models. Model selection and parameter estimation. Analysis of manipulative and observational agricultural 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 (F) Luca (change in existing course—eff. winter 17)

Political Science

New and changed courses in Political Science (POL)

Lower Division

11A. America Decides: Who Will Win This Year’s Election? (4)
Lecture—3 hours; term paper or discussion—1 hour. Survey of factors influencing presidential and congressional elections. Analysis of candidate nominations, campaign strategy, campaign finance, media coverage, and voter decision-making. Offered irregularly. GE credit: ACGH, SS, WE.—F, W, S. (F, W, S.) Boydston (new course—eff. fall 16)

11B. Citizen Lawmaking: Direct Democracy, Public Policy & Political Representation in America (4)
Lecture—3 hours; term paper or discussion—1 hour. Analysis of direct participation by citizens in the lawmaking process. Offered irregularly. GE credit: ACGH. SS, WE.—F, W, S. (F, W, S.) Mackenzie (new course—eff. fall 16)

11C. Politics and Film (4)
Lecture—3 hours; paper or discussion—1 hour. Survey of portrayals of politics and policy issues in moving pictures. Analysis of political processes, policy development, social mores, and historical periods as depicted in Hollywood movies, television, and/or documentary films. Offered irregularly. GE credit: ACGH, VL, WE.—F, W, S. (F, W, S.) Boydston (new course—eff. fall 16)

11D. Political Persuasion (4)
Lecture—3 hours; term paper or discussion—1 hour. Examination of political influence and persuasion. Offered irregularly. GE credit: SS, WE.—F, W, S. (F, W, S.) Boudreau (new course—eff. fall 16)

12A. Politics and Sports (4)
Lecture—3 hours; term paper or discussion—1 hour. Core issues in American and world politics through the lens of sports and the athletes who play them. The introduction of sports to civil rights movements, the Cold War, Middle East Tensions, and democratization. Offered irregularly. GE credit: SS, WE.—F, W, S. (F, W, S.) Scheiner (new course—eff. fall 16)

12B. Climate Change and Politics (4)
Lecture—3 hours; term paper or discussion—1 hour. Analysis of policymakers’ response and adaptation to climate change. Offered irregularly. GE credit: SS, WE.—F, W, S. (F, W, S.) Shugart (new course—eff. fall 16)

13. Political Science

Psychology

New and changed courses in Psychology (PSC)

Lower Division

1. General Psychology (4)
Lecture—4 hours. Principles and basic concepts of psychology. The empirical study of individual behavior including perception, cognition, development, personality, social interactions and the biological underpinnings of behavior. Not open for credit to students who have taken course 1Y. GE credit: SocSci SS.—F, W, S. (F, W, S.) Simonston, Thompson, Traxler (change in existing course—eff. winter 17)

2. General Psychology (4)
Lecture—1 hour; discussion—1 hour; web virtual lecture—2 hours. Principles and basic concepts of psychology. Introduction to empirical approaches. Focus on perception, cognition, personality and social psychology, and biological aspects of behavior. Not open for credit to students who have taken course 1. GE credit: SS.—F, W, S. (F, W, S.) Ferreira, Henderson, Luck, Simonston, Thompson, Traxler (change in existing course—eff. winter 17)

41. Research Methods in Psychology (4)
Lecture—3 hours; extensive writing. Prerequisite: course 1 course 1Y; course 12Y, Statistics 13, or Statistics 100 strongly recommended. Introduction to experimental design, data collection, statistical and observational methods, reliability, and statistical inference. GE credit: QL.—F, W, S. (F, W, S.) Cross, Vazire (change in existing course—eff. winter 17)

415. Research Methods in Psychology (4)
(new course—eff. winter 17)

51. Relationship Science: Lust, Love, and Evolution (4)
Lecture—4 hours. Prerequisite: course 1 or introductory social science course or introductory life science course. Evolutionary perspectives on attraction and close relationships. Integrating social psychological and evolutionary theories with empirical evidence pertaining to human mating. GE credit: SE, SS.—W. (W.) Eastwick (new course—eff. winter 17)

104. Applied Psychometrics: An Introduction to Measurement Theory (4)
Lecture—4 hours. Prerequisite: course 1; course 103A; Statistics 13; upper division standing in Psychology. 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. (change in existing course—eff. spring 17)

126. Health Psychology (4)
Lecture—4 hours. Prerequisite: course 1; course 101 recommended. Pass One open to Psychology majors. Psychological factors influencing health and illness. Topics include stress and coping, personality and health, symptom perception and reporting, heart disease, cancer, compliance, and health maintenance and promotion. Not open for credit to students who have completed former course 160.—W, S. (W.) Emmons (change in existing course—eff. spring 17)

130. Human Learning and Memory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1; course 12Y or Statistics 13 or Statistics 100; or consent of instructor. Consideration of major theories of human learning and memory with critical examination of relevant experimental data.—F, W, S. (F, W, S.) Ranganath, Yonelinas (change in existing course—eff. winter 18)

131. Perception (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 1; course 41; course 100 or course 135. Cognitive organizations related to measurable physical energy changes mediated through sensory channels. Perception of objects, space, motion, events.—F, W, S. (F, W, S.) Geng, Hender son (change in existing course—eff. fall 17)

138. Consciousness and Cognition (4)
Lecture—4 hours. Prerequisite: course 1; course 41; course 100 or course 135. Current theoretical and empirical evidence in the study of cognition and consciousness. Theories of consciousness, psychological and neural basis of conscious and unconscious processes such as attention, intentionality, and dreams. (Same course as Cognitive Science 138.)—W. (W.) Isham (new course—eff. fall 17)

139. Advanced Cognitive Neuroscience (4)
Lecture—3 hours; term paper. Prerequisite: course 1; course 41; course 135; or consent of instructor. Advanced integrative survey of cognitive neuroscience, including perception, attention, memory, and navigation. Emphasis on reviewing literature in psychology, neuroscience, and statistics; understanding methods in cognition; and presentation skills. GE credit: SL.—S. (S.) Ekstrom, Geng (new course—eff. spring 17)

146. The Development of Memory (4)
Lecture—3 hours; term paper. Prerequisite: courses 1; course 41; and any Psychology upper division course from Core Group A or D. Pass One open to Psychology majors. Theory and research on memory development with focus on infancy and childhood. Not open for credit to students who have completed course 133. (Former course 133.) GE credit: WE.—S. (S.) Ghetti, Rivera (change in existing course—eff. winter 17)

151. Social Psychology (4)
Lecture—4 hours. Prerequisite: course 1; course 41. Pass One open to Psychology majors. Behavior of the individual in the group. The study of psychological processes in social situations, surveying various problems of social interaction: group tensions, norm development, attitudes, values, public opinion, status. Not open for credit to students who have completed former course 145. GE credit: DD.—F, W, S. (F, W, S.) Ledgerwood, Pickett, Sherman (change in existing course—eff. fall 17)

180D. Research in Developmental Psychology (4)
Lecture—hours; laboratory—4 hours. Prerequisite: course 41; consent of instructor; four upper division Psychology courses. Empirical research on selected topics in developmental psychology (research design and analysis, development, cognitive development, social and personality development etc.). May be repeated for credit up to one time when content differs.—S. (S.) Gradziel (new course—eff. winter 17)

192. Fieldwork in Psychology (1-6)
Fieldwork—1-6 hours. Prerequisite: consent of instructor; upper division standing in psychology. Limited enrollment. Supervised internship off and on campus, in community and institutional settings. Maximum of six units may be used towards satisfaction of upper division major requirement. May be repeated for credit up to one time per internship site. (P/NP grading only.)—S. (S.) Gradziel, Isham (change in existing course—eff. winter 17)
Graduate

205A. Applied Multivariate Analysis of Psychological Data (4) 
Lecture—4 hours. Prerequisite: course 204A; course 204B, course 204D, or consent of instructor. Review of the major methods of multivariate data analysis for psychological data. Students will program statistical routines using a linear algebra-based computing language. Topics will include multivariate analysis of variance, discriminant analysis, canonical analysis factor analysis, and component analysis. Not open for credit to students who have completed course 207B. Former course 207B offered in alternate years. —W. (W.) Ferrer 
(change in existing course—eff. spring 17)

211. Advanced Topics in Neuroimaging (3) 
Seminar—2 hours; laboratory—1 hour. Prerequisite: course 210, or consent of instructor. Restricted to 16 students. Critical presentation and discussion of the most influential advanced issues in neuroimaging, emphasizing fMRI design/analysis and the integration of fMRI with EEG/MEG. May be repeated for credit. (Same course as Neuroscience 211 and Neurobiology, Physiology, and Behavior 211.) [S/U grading only.] Offered in alternate years. —(S.) Miller 
(change in existing course—eff. spring 17)

Professional

390. The Teaching of Psychology (4) 
Seminar—4 hours. Prerequisite: consent of instructor; advanced graduate standing in Psychology or a closely related discipline. Methods and techniques of testing understanding of the psychology. Integration of learning outcomes with effective evaluation. Practical experience in the application of pedagogical principles. [S/U grading only.] —W. (W.) Cross 
(new course—eff. winter 17)

Religious Studies

New and changed courses in Religious Studies (RST) 

Lower Division

11. Fundamentalism (4) 
Lecture—3 hours; discussion—1 hour. Introduction to comparative religion, focusing on the idea of fundamentalism in different religious traditions. No credit given to students that have taken course 3E. GE credit: ArtHum or SocSci, Div | AH, Sl, SS, OL, WE, —Miller, Watenpaugh 
(change in existing course—eff. fall 17)

5. Comparative Religion (2) 
Lecture—2 hours. Comparative Religion based on rotating topics such as Dreams and Revelations, Evil, Prophecy, Salvation, and Crime and Punishment. May be repeated for credit. GE credit: ArtHum, Div, Wrt | AH, WE, —S. (S.) 
(new course—eff. winter 18)

Russian

New and changed courses in Russian (RUS) 

Upper Division

120. Topics in Russian Literature and Culture (4) 
Laboratory/discussion—4 hours. Prerequisite: upper division standing or consent of instructor. Knowledge of Russian not required. Investigation of significant themes and issues of Russian literature and culture within their European context. May be repeated for credit up to one time. GE credit: AH, OL, WC, WE 
(new course—eff. spring 17)

142. Women in Russian Culture (4) 
Lecture/discussion—3 hours; term paper. Study of the representation of 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, OL, VL, WC, WE. —Kaminer 
(change in existing course—eff. winter 17)

Science and Society

New and changed courses in Science and Society (SAS) 

Lower Division

7V. Terrorism and War (4) 
Web Virtual Lecture—3 hours, autotutorial—5 hours, web electronic discussion—1 hour, extensive writing, term paper or discussion. Terrorism and war from science and social sciences perspectives: terrorism (terrorist cells, WMD's, religious extremism), warfare (military strategy, genocide), and statecraft (diplomacy, clash of civilizations, epochal war). Students may not take both course 7V and course 2 for credit. GE credit: SocSci, Wrt | SS, WC, WE. —Carey 
(change in existing course—eff. spring 17)

14. Forests and Society (3) 
Lecture—2 hours; discussion—1 hour; term paper. Class size limited to 120 students. Sociology, natural history and current issues of the world's forests. Application of scientific principles in outdoor laboratories and on-campus field trips. GE credit: ACGH, SE or SS, OL, WE, —S. (S.) Horwath 
(new course—eff. fall 16)

15. AIDS and Society (4) 
(cancelled course—eff. fall 17)

35. The Good, the Bad, and the Ugly (3) 
(new course—eff. spring 17)

90C. Herbal Medicine: Relevance for the 21st Century (2) 
(cancelled course—eff. fall 17)

90D. Saving Endangered Plant Species: Problems and Prospects (2) 
(cancelled course—eff. fall 17)

91A. Explorations in Science and Society: Cultures and Identities (2) 
(cancelled course—eff. fall 17)

91B. Explorations in Science and Society: Leadership and Collaboration (2) 
(cancelled course—eff. fall 17)

91C. Explorations in Science and Society: Engagement (2) 
(cancelled course—eff. fall 17)

Upper Division

109. Environmental Change, Disease and Public Health (4) 
Lecture/discussion—3 hours; project. Analysis of environmental changes from pre-history to the present and their influence on disease distribution, virulence and public health. Focus on critical study of many human-driven environmental changes and the accelerated transformation/spread of pathogens under globalization. Not open for credit to students who have taken course History 109B. GE credit: SciEng, SocSci, Div | SS, SS, SS, WC, WE. —F. (F.) Davis 
(new course—eff. fall 16)

1355. Biodiversity and Society in South Africa (4) 
(cancelled course—eff. winter 17)

140. Genetics and Social Issues (4) 
(cancelled course—eff. fall 17)

Science and Technology Studies

New and changed courses in Science and Technology Studies (STS) 

Lower Division

2. Introduction to the History of Science and Technology (4) 
Lecture—3 hours; discussion—1 hour. Introduction to topics and methods of the history of science and technology. Emphasis on understanding the role of science and technology in the modern world through a longitudinal historical perspective. [Same course as History 2.] GE credit: AH, Sl, SS, WC, WE. 
(new course—eff. fall 17)

Upper Division

101. Introduction to Data Studies (4) 
Lecture/discussion—4 hours. Introduction to basic data science concepts, defining problems, clarifying questions, identifying stakeholders, caring for and cleaning data, interviewing techniques, structuring presentations, use of Excel for data problems. GE credit: SS. —Dumit 
(new course—eff. fall 17)

152. Sounding Data: Critical Approaches to Sonification (4) 
Lecture/discussion—3 hours; term paper/discussion—3 hours. Critical and creative approaches to auditory data and display in art, science, and technology. Practical introduction to sonification techniques through sound studies and sensory ethnography. Heuristic listening and collaborative sound design. GE credit: SS, WE. —S. (S.) Marshall 
(new course—eff. spring 17)

Sociology

New and changed courses in Sociology (SOC) 

Lower Division

6. Health and Illness (4) 
Lecture—3 hours; discussion—1 hour. Introduction to the sociology of health and illness, including social determinants of health, social inequalities in health/illness disparities, social construction of health, the
(new course—eff. fall 16)

Upper Division

162. Society, Culture, and Health (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, 2, 3, or 6 recommended. Analysis of how socio-cultural factors shape illness experience. Evaluation of how certain conditions come to be understood as health conditions, illness identities and biographies; doctor-patient interactions; biomedical cultures; and how race, ethnicity, and gender shape health practices. GE credit: SS, DD, -F, S. (F, S.) Lo
(new course—eff. fall 16)

163. Population Health: Social Determinants and Disparities in Health (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, 2, 3, or 6 recommended. Survey of the social determinants and disparities in health: measurement of population health; health transitions and global disparities; domestic disparities in health by class, race/ethnicity, nativity, gender, and sexual orientation; social determinants including social support, social stress, neighborhoods, and policy. GE credit: SS, DD, -F, F. (F, S.) Hamilton
(new course—eff. fall 16)

164. Health Policy and Politics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1, 2, 3, or 6 recommended. Introduction to health policy and politics, including health care access and delivery, and policies related to health inequalities, the social determinants of illness and health behaviors. GE credit: SS, DD, -F, F. (F, S.) Halfmann
(new course—eff. fall 16)

178. Punishment and Corrections (4)
Lecture—3 hours; term paper. Prerequisite: course 1, 2, or 3 recommended. Origins, characteristics, and consequences of various sanctions and punishment regimes including lines, bans, isolation, incarceration, deportation, and execution. GE credit: SS, -S. (S.) McCarthy
(new course—eff. spring 17)

Soil Science

New and changed courses in Soil Science (SSC)

Upper Division

112. Soil Ecology (3)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2B and 2C or course 100 or consent from instructor. Overview of living constituents of soils, their interactions, importance to, and impact on biogeochemical cycles, decomposition, and soil properties. Practical applications of soil biological diversity are emphasized. GE credit: SE, -F. (F) Rodrigues
(change in existing course—eff. fall 17)

Graduate

202. Topics in Advanced Soil Chemistry (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor; general chemistry; course 100 or equivalent recommended. Restricted to 18-20 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 detoxication of solution ions; solubility and mineral stability diagrams. May be repeated for credit up to one time if topic differs. —W. (W) Parikh
(change in existing course—eff. winter 18)

Spanish

New and changed courses in Spanish (SPA)

Lower Division

21. Intermediate Spanish (5)
Lecture/discussion—5 hours; laboratory—1 hour. Prerequisite: course 2 or 3. Review and development of the grammar, vocabulary and composition acquired in the first year through exercises and reading of modern texts. Students transferring from other institutions are recommended to start the second year program at this point. Not open for credit to students who have completed course 21S. GE credit: AH, WC, -F, W, S. (F, W, S.)
(change in existing course—eff. spring 16)

22. 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 grammar concepts and further practice on composition. Development of all language skills through exercises and reading of modern texts. Not open for credit to students who have completed course 22S. GE credit: AH, WC, -F, W, S. (F, W, S.)
(change in existing course—eff. spring 16)

98F. Student Facilitated Course (1-4)
Prerequisite: consent of instructor. Student facilitated course intended primarily for lower division students. Offered irregularly. GE credit only: F, W, S. (F, W, S.)
(new course—eff. winter 17)

Upper Division

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 motena, musica andina) as well as its implications in other musical genres. Taught in English or Spanish depending on instructor. Not open to students who have taken Spanish 171S or Music 127S. May be repeated for credit up to one time when the topic differs. Same course as Music 127C. Offered in alternate years. GE credit: ArtHum, Writ| AH, VL, WC, WE, -F. (F) Hess, Irizir, Ortiz
(change in existing course—eff. winter 18)

1275. 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 or English depending on instructor. Not open to students who have taken SPA 171 or MUSC 127. May be repeated for credit up to one time when credit differs. Same course as Music 127C. Offered in alternate years. GE credit: ArtHum, Writ| AH, VL, WC, WE, -F. (F) Irizir, Ortiz
(new course—eff. winter 18)

151N. Survey of Spanish-American Literature 1900 to Present (4)
(cancelled course—eff. fall 16)

199F. Student Facilitated Course (1-4)
Prerequisite: consent of instructor. Student facilitated course intended primarily for upper division students. GE credit only: F, W, S. (F, W, S.)
(new course—eff. winter 17)

199F. Student Facilitated Course (1-2)
Prerequisite: consent of instructor. Open to upper division Spanish majors only. Under the supervision of a faculty member, an undergraduate student plans and develops the course they will offer under 99F/199F/P/SP grading only; F, W, S. (F, W, S.)
(new course—eff. spring 17)

199F. Student Facilitated Teaching (1-4)
Prerequisite: course 199FA, consent of instructor. Must have completed course 199FA, and be teaching a course 99F or 199F, open to upper division Spanish majors only. Student-facilitated course under the supervision of a faculty member, an undergraduate student teaches a course under 99F/199F/P/SP grading only. GE credit: AH, WC, -F, W, S. (F, W, S.)
(new course—eff. spring 17)

Graduate

230. Topics in Latin American Cultural Studies (4)
Seminar—3 hours; term paper. Discussion of select contemporary theoretical debates in Latin American Cultural Studies. Application of critical questions to the analysis of cultural texts. May be repeated for credit up to two times when content differs. —Irwin
(change in existing course—eff. fall 07)

Statistics

New and changed courses in Statistics (STA)

Lower Division

32. Introductory Statistical Analysis Through Computers (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: Mathematics 168 or Mathematics 218 or Mathematics 178; ability to program in a high-level computer language. Probability concepts: Events and sample spaces; random variables; mass, density and distribution functions; parametric families; parameter estimation and confidence intervals; hypothesis testing; 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 13, or 102; not open for credit to students who have taken course 100. GE credit: SciEng | QL, SE, -W, S. (W, S.)
(change in existing course—eff. spring 17)

Upper Division

100. Applied Statistics for Biological Sciences (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: Mathematics 168 or Mathematics 178 or Mathematics 218. Descriptive statistics, probability, sampling distributions, estimation, hypothesis testing, contingency tables, ANOVA, regression; implementation of statistical methods using computer package. Only two units of credit allowed to students who have taken course 13, 32 or 103; not open for credit to students who have taken course 102. GE credit: SciEng | QL, SE, -F, W, S. (F, W, S.)
(change in existing course—eff. spring 17)

103. Applied Statistics for Business and Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Statistics 13 or Statistics 32 or Statistics 100; Mathematics 168 or Mathematics 178 or Mathematics 218. Descriptive statistics; probability; random variables; expectation; binomial, normal, Poisson, other univariate distributions; joint distributions; sampling distributions, central limit theorem; properties of estimators; linear combinations of random variables; testing and estimation; Minilab computing package.
Two units credit given to students who have completed course 100. GE credit: SciEng | QL, SE — F, W, S. (F, W, S, Su.)
(change in existing course — eff. spring 17)

130A. Mathematical Statistics: Brief Course (4)
Lecture — 3 hours; discussion — 1 hour. Prerequisite: Mathematics 16C or Mathematics 17C or Mathematics 21C. Basic probability, densities and distributions, moment, 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 2 units of credit allowed to students who have taken course 131A. GE credit: SciEng | QL, SE. — F. (F)
(change in existing course — eff. winter 18)

131B. Introduction to Mathematical Statistics (4)
Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 131A or Mathematics 135A; or consent of 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. — W. (W)
(change in existing course — eff. winter 17)

141. Statistical Computing (4)
(canceled course — eff. fall 16)

141A. Fundamentals of Statistical Data Science (4)
Lecture — 3 hours; discussion — 1 hour. Prerequisite: course 13 or course 32 or course 100; course 108 or course 106. Introduction to computing for data analysis and visualization, and simulation, using a high-level language (e.g., R). Computational reasoning, computationally intensive statistical methods, reading tabular and non-standard data. Not open for credit to students who have taken course 141 or course 242. — F. (F)
(change in existing course — eff. spring 17)

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 a faculty adviser. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE. — (F, W, S, Su.)
(change in existing course — eff. fall 16)

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 a faculty adviser. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | SE. — (F, W, S, Su.)
(change in existing course — eff. fall 16)

Technocultural Studies

New and changed courses in Technocultural Studies (TCS)

Lower Division

100. Experimental Digital Cinema I (4)
Lecture/discussion — 3 hours; laboratory — 3 hours. Prerequisite: Cinema & Technocultural Studies 20 or Dramatic Art 12 or course 7B, course 170B, or equivalent with consent of instructor. Class size limited to 20 students. Experimental approaches to the making of film and video in the age of digital technologies. Builds upon foundation provided by course 20. Instruction in technical, conceptual, creative, and critical skills for taking a project from idea to fruition. GE credit: AH, OL, VL — Wyman
(change in existing course — eff. spring 17)

121. Introduction to Electronic Sound (4)
Lecture/discussion — 3 hours; laboratory — 3 hours. Introduction to the use of electronic sound within the arts. Techniques and aesthetics of experimental contemporary practices. Creation of original sound works. — Oster tag
(change in existing course — eff. winter 18)

Textiles and Clothing

New and changed courses in Textiles and Clothing (TXC)

Upper Division

180A. Introduction to Research in Textiles (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 completed and completed in course 180B. (Deferred grading only, pending completion at sequence.) GE credit: SocSci | SS, WE. — F, W, S. (F, W, S, J)
(change in existing course — eff. fall 16)

180B. Introduction to Research in Textiles (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 completed and completed in course 180B. (Deferred grading only, pending completion of sequence.) GE credit: SocSci | SS, WE. — F, W, S. (F, W, S, J)
(change in existing course — eff. fall 16)

UC Davis Washington Center

New and changed courses in UC Davis Washington Center (WAS)

Upper Division

175. Health Policy and Health Politics (4)
(canceled course — eff. fall 16)

University Writing Program

New and changed courses in University Writing Program (UWP)

Lower Division

23. Advanced Academic Reading and Writing for Multilingual Students (4)
Lecture/discussion — 4 hours. Prerequisite: course 22. Pass One passed course 22 with a C- or better or a score of 80-89 on the English Language Placement Examination (ELPE) offered by the UWP. Reading and writing source/ research-based texts for academic purposes. Suitable for students whose primary home language was not English. — F, W, S. (F, W, S, J)
(canceled course — eff. fall 16)

28. Persuasive Writing for Multilingual Students (4)
Lecture/discussion — 4 hours. Prerequisite: course 1 C- or better or course 1Y C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better. Instruction in analyzing style of persuasive texts, using appropriate vocabulary, and applying English grammatical structures in argumentation. Suitable for multilingual students desiring additional instruction in persuasive English writing. GE credit: AH, WE — F, W, S. (F, W, S, J)
(new course — eff. fall 17)

29. Research Writing for Multilingual Students (4)
Lecture/discussion — 4 hours. Prerequisite: course 1 C- or better or course 1Y C- or better or course 1Y C- or better or English 3 C- or better or Comparative Literature 1 C- or better or Comparative Literature 2 C- or better or Comparative Literature 3 C- or better or Comparative Literature 4 C- or better or Native American Studies 5 C- or better. Instruction in writing effectively in various research genres across the disciplines. Suitable for multilingual students desiring additional instruction in the linguistic and rhetorical features of research writing in English for academic purposes. GE credit: AH, WE — F, W, S. (F, W, S, J)
(new course — eff. fall 17)

Upper Division

102N. Writing in the Disciplines: Anthropology (4)
Lecture — 3 hours; term paper. Prerequisite: course 1 C- or better; English 3 C- or better; Comparative Literature 1 C- or better; Comparative Literature 2 C- or better; Comparative Literature 3 C- or better; Comparative Literature 4 C- or better; Native American Studies 5 C- or better; 4 or 5 on AP English Lit and Comp exam; 6 or better on IB HL English Exam. Restricted to upper division standing; Anthropology Major or Minor. Advanced instruction in writing and practice in effective styles of communication in Anthropology and related academic and professional fields. GE credit: AH, WE. — W. (W)
(new course — eff. winter 17)

Veterinary Medicine: Medicine and Epidemiology

New and changed courses in Veterinary Medicine: Medicine and Epidemiology (VMF)

Upper Division

158. Infectious Disease in Ecology and Conservation (3)
Lecture — 3 hours. Prerequisite: Biological Sciences 2A; Biological Sciences 2B; Biological Sciences 2C; or equivalent; Evolution and Ecology 100 is recommended. Introduction to the dynamics and control of infectious disease in wildlife and zoonotic diseases and those threatening endangered species. Basic epidemiological models and application to field data. Scientists’ role in developing disease control policies. — F, W, S.
(change in existing course — eff. winter 17)
Veterinary Medicine: Pathology, Microbiology, and Immunology

New and changed courses in Veterinary Medicine: Pathology, Microbiology, and Immunology (PMI)

Graduate
206. Mentored Scientific Writing (1)
Discussion—1.5 hours. Prerequisite: consent of instructor. Enrollment limited to 12 students. Drafting a scientific manuscript for publication based on research results. Students engage in collaborative peer review and learn effective writing, including how to convey a persuasive message and write clearly and succinctly. May be repeated for credit up to one time. (S/U grading only) 1–3. (S.) Spahr (change in existing course—eff. winter 17)

Veterinary Medicine: Population Health and Reproduction

New and changed courses in Veterinary Medicine: Population Health and Reproduction (PHR)

Graduate
(cancelled course—eff. spring 17)

Veterinary Medicine: Preventive Veterinary Medicine

New and changed courses in Veterinary Medicine: Preventive Veterinary Medicine (MPM)

Graduate
208. Research Planning and Reporting I (2)
Lecture/discussion—2 hours. Prerequisite: MPVM standing or consent of instructor. Identify and implement research questions through hypothesis construction, articulation of aims, acquiring permits, working as a team, and all other techniques needed to develop a successful research program. Not open for credit to students who have previously taken course 408B. —F. (F.) (change in existing course—eff. fall 16)

209. Research Planning and Reporting II (1)
Lecture/discussion. Prerequisite: course 208. Concepts and skills in effective scientific writing for publication in a peer-reviewed journal in animal health or biomedicine. Includes developing an argument, organizing and writing a manuscript, improving readability, and responding to peer review. —W. (W.) Christopher (change in existing course—eff. fall 16)

210. Advanced Health Leadership (1.5)
Lecture; discussion. Class size limited to 33 students. Develop skills for effective scientific leadership, including: project management and collaboration, conflict resolution, communication with the public, dynamic distribution of health information, and evidence-based policy influence. —F. (F.) Mazet (change in existing course—eff. winter 17)

212. Concepts and Methods in Infectious Disease Surveillance and Control (3)
Lecture—2 hours; discussion/laboratory—1 hour. Prerequisite: consent of instructor. Basic and advanced level of conceptual and methodological foundations in infectious disease epidemiology necessary for veterinarians to develop and evaluate programs for detection, prevention, and control of infectious diseases in animal populations. —W. (W.) Lobe (new course—eff. fall 16)

Professional
410. Animal Health Policy and Risk Communication (1)
(cancelled course—eff. winter 17)

Viticulture and Enology

New and changed courses in Viticulture and Enology (VEN)

Upper Division
123. Analysis of Musts and Wines (2)
Lecture—2 hours. Prerequisite: Chemistry 2C; Chemistry 8B; Plant Sciences 21. Fundamental principles of analytical chemistry as they relate to specific methods used in winemaking. GE credit: SciEng | SE—F. (F.) Waterhouse (change in existing course—eff. winter 18)

123L. Analysis of Musts & Wines Laboratory (2)
Lab—3 hours; independent study—3 hours. Prerequisite: course 123 (can be concurrent); Chemistry 2C; Chemistry 8B; Plant Sciences 21. Or equivalent of Chemistry 8B. Restricted to upper division and graduate students in Viticulture & Enology; others by approval of instructor. Fundamental principles of analytical chemistry as they relate to specific methods used in winemaking. Laboratory exercises demonstrating various chemical, physical and biochemical methods. Data will be analyzed and results interpreted in weekly lab reports; includes student-designed independent project and written report. GE credit: SciEng | WR—F. (F.) Waterhouse (change in existing course—eff. winter 18)

125. Wine Types and Sensory Evaluation (2)
Lecture—2 hours. Prerequisite: Plant Sciences 120 or Statistics. Open to upper division and graduate students in Viticulture & Enology; others by approval of instructor. Principles of sensory evaluation and application to wines. Factors influencing wine flavor, data from sensory analysis of model solutions. GE credit: SciEng | QR—F. (F.) Heymann (change in existing course—eff. spring 18)

127L. Post-Fermentation Wine Processing Laboratory (3)
Laboratory—9 hours. Prerequisite: course 123; course 123L; course 126; course 126L; course 135 (can be concurrent); consent of instructor. Restricted to upper division or graduate standing. Sensory and chemical impact of processing on wines; bench-
scale analytical results to make and implement processing decisions; principles and theories of equipment operation and automation. — S. (S.) Kunnebaum
(new course—eff. spring 18)

128. Wine Microbiology (2)
Lecture—2 hours. Prerequisite: course 123, course 124, Microbiology 102, Food Science and Technology 104; Food Science and Technology 104L; Microbiology 103L; course 125, course 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. —W. (W.) Bisson
(change in existing course—eff. winter 18)

128L. Wine Microbiology Laboratory (2)
Laboratory—6 hours. Prerequisite: course 123; course 124; course 128 (can be concurrent); Food Science and Technology 104; Food Science and Technology 104L; Microbiology 103L. Restricted to upper division major students in fermentation science or viticulture & enology; graduate students in the food science program. Nature, development, physiology, biochemistry and control of yeasts and bacteria involved in the making, aging and spoilage of wine. GE credit: SciEng | SE, VI, WE. —W. (W.) Bisson
(change in existing course—eff. winter 18)

135. Wine Technology and Winery Systems (4)
Lecture—3 hours; discussion/laboratory—2 hours. Prerequisite: course 21; Mathematics 16A; Mathematics 16B; Physics 18 or Physics 7A. Process technologies and process systems that are used in modern commercial wineries. Lectures, demonstrations, problem solving sessions, and possible field trips. Includes grape preparation and fermentation equipment; postfermentation processing equipment; winery utilities, cleaning systems, and waste treatment. GE credit: SciEng | SE. — S. (S.) Block
(change in existing course—eff. spring 18)

Graduate

216. Sustainable Vineyard Development (5)
Lecture/discussion—3 hours; fieldwork—3 hours; term paper. Prerequisite: course 101A, course 101B, course 101C; course 115 or course 118; or consent of instructor. 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
(change in existing course—eff. winter 17)

Upper Division

122. Population Dynamics and Estimation (4)
Lecture—2 hours; laboratory—2 hours. Prerequisite: Biological Sciences 2A-2C; Mathematics 16A and 16B; and Statistics 13 or the equivalent; an upper division course in ecology. Description of bird, mammal and fish population dynamics, modeling philosophy, techniques for estimation of animal abundance (e.g., mark-recapture, change-in-ratio, etc.), mathematical models of populations (e.g., Leslie matrix, logistic, dynamic pool, recruitment); case histories. — S. (S.) Battford
(change in existing course—eff. winter 17)

130. Physiological Ecology of Wildlife (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A-2C; Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course, can be taken concurrently. 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 climatic change and other threats to biodiversity. Tropical, temperate, and polar ecosystems are highlighted. GE credit: SciEng | SE. — W. (W.) Fangue
(change in existing course—eff. winter 17)

134. Herpetology (3)
Lecture—2 hours; term paper. Prerequisite: Biological Sciences 2A, 2B, 2C; upper division ecology course recommended. Evolution and ecology of the world’s diverse reptiles and amphibians. Emphasis on adaptations to environments, species interactions, management, and conservation. Offered in alternate years. — W. Todd
(change in existing course—eff. winter 17)

134L. Herpetology Laboratory (3)
Laboratory—6 hours. Prerequisite: course 134 (may be taken concurrently) and consent of instructor. Diagnostic characteristics and functional attributes 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
(change in existing course—eff. winter 17)

136. Ecology of Waterfowl and Game Birds (4)
Lecture—3 hours; laboratory—3 hours; fieldwork—1 hour. Prerequisite: course 111, course 111L (strongly recommended) or consent of instructor. Detailed examination of distribution, behavior, population dynamics, and management of waterfowl and upland game birds. Offered in alternate years. — W. (W.) Eadie
(change in existing course—eff. winter 17)

141. Behavioral Ecology (4)
Lecture—3 hours; film viewing—1 hour. Prerequisite: Biological Sciences 2A-2C; Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course (can be taken concurrently). 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. GE credit: SciEng | SE. — W. (W.) Caro
(change in existing course—eff. winter 17)

152. Ecology of Human—Wildlife Conflicts (3)
Lecture—3 hours. Prerequisite: Biological Sciences 2B or equivalent. Ecological approaches to managing wildlife conflicts that come into contact with agriculture, public health, or the conservation of biodiversity. Offered in alternate years. — W. Van Vuren
(change in existing course—eff. winter 17)

154. Conservation Biology (4)
Lecture—3 hours; term paper. Prerequisite: Biological Sciences 2A-2C; Evolution and Ecology 101 or Environmental Science and Policy 100 or equivalent course (can be taken concurrently). 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, WE. — F. (F.) Todd
(change in existing course—eff. winter 17)

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, humans as well as color in fashion, plants and the military. Topics include history, protective coloration, warning coloration, mimicry, sexual dichromatism and color change. Offered in alternate years. — W. (W.) Caro
(change in existing course—eff. winter 17)

Women’s Studies

New and changed courses in Women’s Studies (WMS)

Upper Division

165. Feminist Media Production (6)
Lecture/discussion—3 hours; laboratory—3 hours; fieldwork—6 hours. Prerequisite: Cinema & Technocultural Studies 20 or equivalent; one course in Women and Gender Studies or consent of instructor. Media production as a mode of cultural criticism, furthering feminist/ social justice activist goals. Fundamentals of camera, editing and distribution via a social engagement model. Study and hands-on response to key historic and contemporary feminist and social justice media discourses. (Same course as Cinema and Digital Media 105.) Offered in alternate years. GE credit: ArtHum, SoSci, Div | AH, SS, ACGH, DD, VL—Wyman.
(change in existing course—eff. winter 17)
Advanced Placement (AP) Examinations

Changes to Advanced Placement (AP) Examinations table
(change—eff. fall 17)

Changes to:
- Computer Science A—* 4 transferable unit maximum for Computer Science A and Computer Science AB exams.
- Computer Science AB (2 rows)—* 4 transferable unit maximum for Computer Science A and Computer Science AB exams.
- Computer Science Principles —New exam information.

See “College Board Advanced Placement (AP) Examination Credit” on page 49.

American History and Institutions

Changes to Completion of the Advanced Placement (AP) Examination in United States Government and Politics
(change—eff. fall 17)

The American History and Institutions requirement ensures that every graduating student will have at least a minimum knowledge of the background of this country’s development and an understanding of the political, economic and social interrelationships of its way of life.

You may meet this requirement in any of these ways:
- Complete one high school unit in American history, or 1/2 high school unit in American history and 1/2 high school unit in civics or American government, with a grade of C or better in each course
- Complete any one of the following courses:
  - African American and African Studies 10, 100
  - Asian American Studies 1, 2
  - Chicana/Chicano Studies 10
  - Economics 111A, 111B
  - Native American Studies 1, 10, 116, 130A, 130B, 130C
  - Political Science 1, 5, 100, 102, 104, 105, 106, 108, 109, 113, 130, 131, 160, 163

Students electing to complete one of the above courses in order to meet this requirement are subject to the rules for prerequisites and majors
- Present evidence that the requirement has been accepted as satisfied at another collegiate institution
- Present evidence that the requirement has been satisfied through courses in the area of American History and Institutions at another collegiate institution whose credits are acceptable for transfer to UC Davis

- Successful completion of the Advanced Placement (AP) Examination in United States (American) History with a score of 3 or higher.
- Successful completion of the Advanced Placement (AP) Examination in United States Government and Politics taken May 2014 and prior with a score of 3 or higher. As of May 2015 AP examination, AP United States Government and Politics no longer satisfies the American History and Institutions requirement.
- Successful completion of the International Baccalaureate (IB) Examination in History of the Americas Higher Level (HL) with a score of 5, 6, or 7
- Successful completion of the SAT Subject Examination in U.S. History with a score of 550 or higher

International students, regardless of the type of visa they hold, must meet the university’s American History and Institutions requirement for graduation.

Graduation Honors

Update Grade Point Average by College table
(change—eff. fall 17)

Grade point averages from the winter quarter prior to graduation are used to determine the averages that will earn an honors designation. Following are the averages for winter quarter 2017. These averages will be used through winter quarter 2018.

Grade Point Average by College

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<th>Percent Determining Cut-Off Point</th>
<th>Agricultural &amp; Environmental Sciences</th>
<th>Biological Sciences</th>
<th>Engineering</th>
<th>Letters and Sciences</th>
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**Fall 2011 and on Revised General Education (GE):**
- **AH:** Arts and Humanities
- **SE:** Science and Engineering
- **SS:** Social Sciences
- **AGCH:** American Cultures
- **DD:** Domestic Diversity
- **OL:** Oral Skills
- **SL:** Quantitative
- **VI:** Visual
- **WC:** World Cultures

**Fall 2011 General Education (GE):**
- **Arthum:** Arts and Humanities
- **Scileng:** Science and Engineering
- **SocSci:** Social Sciences
- **Div:** Domestic Diversity

**Quarter Offered:**
- **F:** Fall
- **W:** Winter
- **S:** Spring
- **Su:** Summer

**Courses & Programs are subject to change without notice.**
## College Board Advanced Placement (AP) Examination Credit

<table>
<thead>
<tr>
<th>Examination \ 1</th>
<th>Score</th>
<th>Credit Toward Degree Requirements \ 2</th>
<th>UC Transferable to UC \ 3</th>
<th>UC Davis Course Equivalencies</th>
<th>Duplicate Credit Allowance \ 4</th>
<th>Continuing UC Davis Course</th>
<th>Comments \ 5</th>
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<td>French Language and Culture</td>
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<td>French 3 No French 21</td>
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<td>Mathematics—Calculus AB</td>
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<td>UCM 2A</td>
<td>Mathematics 12, 16A, 17A or 21A</td>
<td>Mathematics 16B, 17B</td>
<td>– – b</td>
<td>Credit for Mathematics 16A, 17A or 21A equivalents may fulfill prerequisite for Mathematics 16B, 17B or 21B. Students electing to register in Mathematics 12, 16A, 17A or 21A must take the math placement exam and receive a qualifying score, regardless of AP score. Details at math.ucdavis.edu/undergrad/majors/program.</td>
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<td>Mathematics 16A, 17A or 21A</td>
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<td>* 8 transferable unit maximum for all mathematics-calculus exams.</td>
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1. Examinations are subject to change without notice. Courses & Programs are subject to change without notice.
2. Contact the appropriate U.S. institution for the most up-to-date information.
3. UC Transferable to UC: UC transferable to UC.
4. UC Davis Course Equivalencies: UC Davis course equivalencies.
5. Duplicate Credit Allowance: Duplicate credit allowance.
6. Continuing UC Davis Course: Continuing UC Davis course.
7. Comments: Comments.
# College Board Advanced Placement (AP) Examination Credit

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<tr>
<td>Music Theory</td>
<td>5, 4, 3 ⁵</td>
<td>8 UCH –</td>
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<td>Music</td>
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<tr>
<td>Physics 1</td>
<td>5, 4, 3 ⁵</td>
<td>8 * UCB 5A/5C</td>
<td>A</td>
<td>Physics</td>
<td>Physics 1A, 1B No</td>
<td>–</td>
<td>–</td>
<td>b</td>
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<tr>
<td>Physics 1</td>
<td>3 ⁶</td>
<td>8 * UCB 5A/5C</td>
<td>A</td>
<td>Physics</td>
<td>Physics 1A No</td>
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<td>b</td>
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<td>Physics 2</td>
<td>3 ⁶</td>
<td>8 * UCB 5A/5C</td>
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<td>Physics</td>
<td>Physics 1A No</td>
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<td>Physics 1A, 1B No</td>
<td>–</td>
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<td>Physics B</td>
<td>3 ⁶</td>
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<td>Physics C—I Mech</td>
<td>5, 4, 3 ⁵</td>
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<td>A</td>
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<td>b</td>
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<tr>
<td>Physics C—I Mech</td>
<td>3 ⁶</td>
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<td>A</td>
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<td>–</td>
<td>b</td>
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<td>Physics C—EM</td>
<td>5, 4, 3 ⁵</td>
<td>4 * UCB 5A/5C</td>
<td>A</td>
<td>Physics</td>
<td>Physics 1A No</td>
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<tr>
<td>Physics C—EM</td>
<td>3 ⁶</td>
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<td>A</td>
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<td>Spanish Language</td>
<td>5 ⁷</td>
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<tr>
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<td>4 ⁷</td>
<td>8 * UCH 3B/3A Spanish 22</td>
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<td>Spanish Language and Culture</td>
<td>5 ⁷</td>
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<td>4 ⁷</td>
<td>8 * UCH 3B/3A Spanish 22 No</td>
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<td>Spanish 22 or consult with adviser</td>
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<td>f</td>
<td>f</td>
</tr>
</tbody>
</table>

² Duplicate Credit Allowance: 8 transferable units maximum for all mathematics-calculus exams.

³ Students electing to register in Mathematics 12, 16A, 17A or 21A must take the math placement exam and receive a qualifying score, regardless of AP score. Details at math.ucdavis.edu/undergrad/math_placement.

⁴ Prior to the May 2016 AP exam, completion of AP Music Theory with a score of 3, 4 or 5 is awarded credit for Music 10.

⁵ *8 transferable unit maximum for all physics exams.


⁷ *8 transferable unit maximum for all Spanish Language and Culture exams. Maximum credit awarded to the exam with the highest score.
### College Board Advanced Placement (AP) Examination Credit

<table>
<thead>
<tr>
<th>Examination</th>
<th>Score</th>
<th>Credit Toward Degree</th>
<th>UC Transfer Admission Eligibility Area</th>
<th>IGETC Area</th>
<th>UC Davis Course Equivalencies</th>
<th>Duplicate Credit Allowance</th>
<th>Continuing UC Davis Course</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spanish language and Culture</td>
<td>3</td>
<td>B *</td>
<td>UCH</td>
<td>3B and 6A</td>
<td>Spanish 21</td>
<td>No</td>
<td>Spanish 22 or中国文化与文学</td>
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<td>Spanish literature</td>
<td>5, 4</td>
<td>B *</td>
<td>UCH</td>
<td>3B and 6A</td>
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<td>UCH</td>
<td>3B and 6A</td>
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<td>No</td>
<td>Spanish 24 or中国文化与文学</td>
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<td>UCH</td>
<td>3B and 6A</td>
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<td>UCH</td>
<td>3B and 6A</td>
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<td>Statistics</td>
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<td>2A</td>
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<td>Studio Art (Drawing/Potential)</td>
<td>5, 4</td>
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<td>–</td>
<td>Art Studio 2</td>
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<tr>
<td>Studio Art (Design/Filmmaking)</td>
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<td>B</td>
<td>–</td>
<td>–</td>
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<td>–</td>
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<td>–</td>
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<tr>
<td>United States Government and Politics</td>
<td>5, 4</td>
<td>3</td>
<td>4</td>
<td>UCB</td>
<td>4 *</td>
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<tr>
<td>World History</td>
<td>5, 4</td>
<td>3</td>
<td>8</td>
<td>UCB/H</td>
<td>3B or 4</td>
<td>17A</td>
<td>Yes</td>
<td>–</td>
</tr>
</tbody>
</table>

Note: This is not a comprehensive list. If your exam is not listed, credit will be determined in consultation with an advisor.

* Students who take the Calculus BC exam and earn a score of 3 or higher on the Calculus AB portion of the Calculus I exam will receive credit for the Calculus AB exam, even if they do not receive a score of 3 or higher on the BC exam. The Calculus BC/AB subscore satisfies IGEC Area 2A.

**Examination**

Last test administration for discontinued exams:

- May 2009—Computer Science AB, French Literature, Italian, Latin Literature
- May 2011—French Language, German Language, Italian Language, Italian Literature
- May 2012—Spanish Literature, Latin (Vergil)
- May 2013—Spanish language
- May 2014—Physics B

**UC Transfer Admission Eligibility Area**

- UCB=Behavioral and Social Sciences; UC=English, UC=Arts & Humanities, UCM=Math, UC=Biological and Physical Sciences
- UCE: If English AP test score of 3, 4, 5 was achieved prior to completing any transferable English composition course(s), 8 quarter units of transfer credit are awarded for the AP exam, and one of two English Composition requirements (UCE) satisfied. UC Davis articulates (AP) English Language and Composition, and English Literature and Composition, with scores of 4 or 5 as WAP 1 and English 3; therefore, we will not allow transfer credit for any duplicated English courses.

**IGETC Area**

- Each AP exam may be applied to one IGEC Area as satisfying one course requirement, with the exception of Language other than English (LOTE).
- There is no equivalent AP exam for the Area 1B—Critical Thinking/Composition requirement.

**Duplicate Credit Allowance for Coursework/Exams**

- UC Davis College Area Requirements
  - a. Partially satisfies area breadth requirements for the A.B. degree.
  - b. Allows 4 units of credit toward Natural Sciences credit or preparatory coursework for science majors in each Natural Sciences exam passed, and 8 units of credit allowed for Mathematics BC and Physics BC exams.
  - c. Satisfies 4 low-division units of the English Composition requirement.
  - d. Satisfies the foreign language requirement.
  - e. Exam awards units toward the University Honors requirement.
  - f. Language exams, except any Latin exam, satisfy the foreign language requirement.

**UC Davis Pattern of General Education**

Courses for which AP credit has been granted may not be used as a substitute for courses required as part of the UC Davis GE requirement; see Advanced Placement (AP) examinations on page 40 and page 50.
Minor Programs Offered By UC Davis

Addition to Minor Programs listing
(change—eff. fall 17)
Accounting ........................................ GSM

The Minor

Changes to Minor section in the Academic Information chapter
(change—eff. fall 16)

College of Letters and Science

With the exception of interdisciplinary minors approved by the College Executive Committee, students in the College of Letters and Science may not complete a minor offered by the department or program in charge of the student’s major. You can elect only one minor in a subject area.

No more than one course applied to the satisfaction of requirements in the major program shall be accepted in satisfaction of the requirements of a minor. No course used to satisfy the requirements of one minor shall be applied toward any other minor.

Students wishing to pursue a minor offered by the College of Letters and Science, must have completed at least one upper division course toward the minor with a GPA of 2.00 or higher to be eligible to declare that minor.

School of Management

The Graduate School of Management offers the Technology Management Minor and Minor in Accounting. To complete the Technology minor, students must complete a minimum of 20 units of coursework in the minor with a GPA of 2.00 or better. Coursework in the Tech minor will complement the student’s undergraduate major studies with training in accounting, finance, marketing, organizational behavior and operations. The minor also provides students with business and management skills that will enable them to apply training from their major program in a business setting. The UC Davis Graduate School of Management’s Undergraduate Accounting Minor gives you the opportunity to enhance your coursework with a carefully crafted series of five upper-division courses. These courses are designed to prepare you for accounting-related careers or advanced study in accounting. All five courses, 20 units total, must be completed to receive the minor certification.

Undergraduate Education

Changes to College of Letters and Science Natural Sciences and Mathematics & College Board Advanced Placement Examination sections in the Undergraduate Education chapter
(change—eff. fall 17)

Natural Sciences and Mathematics

• Psychology 41, 100, 100Y, 101, 103A, 103B, 104, 113, 121, 122, 123, 124, 125, 126, 127, 129, 130, 131, 132, 135, 137, 146, 180B

College Board Advanced Placement Examination. A score on an AP exam taken in high school must be equivalent to UC Davis course 3 or higher in a foreign language to satisfy the College Foreign Language requirement. Consult the AP chart for course equivalency information.

African American and African Studies

Changes to A.B. Major Requirements
(change—eff. fall 17)

Related Upper Division Courses

The following courses are offered by faculty members in other disciplines and focus on African American studies, African diaspora studies, or African studies.


Anthropology

Changes to Anthropology A.B. & B.S. Major, & Anthropology Minor Requirements
(change—eff. fall 17)

A.B. Major Requirements:

Evolutionary Emphasis:
Preparatory Subject Matter ..................... 19-21
Anthropology 1, 2, 3 ................................ 12
Anthropology 15, 23, 24, 50, or 54 ........ 4-5
Anthropology 13, Sociology 46B, or Statistics 13, 32, 100 or 102 ................................ 3-4
Depth Subject Matter ......................... 42-47
Two courses from:
Anthropology 153, 157, or 159 .......... 3-5
Anthropology 151 or 152 ................. 4-5
One course from:
Anthropology 170, 171, 172, 173, 174, 175, 176, 177, 179, 180, 182, 183, 184 or 185 ........................................ 4
One course from:
Select 20 additional units from any upper division evolutionary track Anthropology courses (see list below) chosen in consultation with an evolutionary track undergraduate adviser. Up to 4 units of Anthropology 191, 192, 194H, 198, or 199 can be used towards this requirement .................. 20
Total Units for the Major......................... 62-69
Note: Evolutionary track courses at the upper division level are courses 101, 103, 105, 122A, 128A, 141B, 141C, and 151 to 186A

Sociocultural Emphasis:
Preparatory Subject Matter ..................... 20-22
Anthropology 2 ................... ............................. 4
Two courses from: Anthropology 1, 3, or 4 ........................................ 8
Select one of the following two options:
(1) Two additional quarters of the foreign language used to meet the L&S language requirement ........................................ 8-10
(2) Two additional lower division sociocultural track courses .................. 8-10
Depth Subject Matter ......................... 42-46
Anthropology 100 .................. ............................. 4
Two upper division area-focus sociocultural track courses from the following:
Anthropology 140A, 140B, 141C, 142, 143A, 144, 145, 146N, 148A, 149A, 149B, 149H, 192, 194H, 198, or 199 units) .................................. 30-34
Select one of the following two options in consultation with sociocultural track undergraduate adviser (see list below identifying upper division sociocultural courses; see list above identifying evolutionary track courses):
(1) Eight additional upper division anthropology courses (two courses may be in the evolutionary track; and up to six units can be Anthropology 192, 194H, 198, or 199 units) ........................................ 30-34
(2) Eight additional upper division courses that may combine six sociocultural track courses and either 8 units of Study Abroad
Fall 2011 and on Revised General Education (GE): AH=Arts and Humanities; SF=Science and Engineering; SS=Social Sciences;
ACGH=American Cultures; DD=Domestic Diversity; 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; Sciling=Science and Engineering; SocSci=Social Sciences; Div=Domestic Diversity; Writ=Writing Experience
Quarter Offered: Fall, Winter, Spring, Summer; 2017-2018 offering in parentheses
Courses & Programs are subject to change without notice.

B.S. Major Requirements:

UNITS
Preparatory Subject Matter.............54-60
Anthropology 1, 2, 3....................12
Biological Sciences 2A, 2B, 2C, 14
Chemistry 2A, 2B, and 8A, 8B, or 118A, 118B................16-18
Mathematics 1A-18A-18C or 17A-17B-17C or 21A-21B........16-20
Anthropology 13, Sociology 46B, Statistics 13, 32, 100, or 102......3-5

Depth Subject Matter..................45
Anthropology 151 or 152..................4-5
Anthropology 153, 157, or 159...........3-5
Anthropology 154A or 154B..............5
Anthropology 170 through 139BN, excluding 128A...................4
Anthropology 100 through 139BN, excluding 128A...............6-13

Evolutionary emphasis..................18-30
Any five upper division Anthropology courses chosen in consultation with an evolutionary track advisor.........3-5

Minor Advisor. Consult Department office in 1282 Social Sciences & Humanities.

Communication

UNITS
Changes from Program to Department

Michael Neff, Ph.D., Department Chair

Department Office. 101 Art Building 530-752-0890; http://catcs.ucdavis.edu

A.B. Major Requirements:

UNITS
Preparatory Subject Matter.............29-30
Anthropology 4 or Linguistics 1...........4
Communication 101, 102, or 5/Linguistics 5........4
Computer Science 15 or Philosophy 12......4
Psychology 1..................................4
Sociology 1....................................5
Statistics 13 or Sociology 46B.............4.5

Depth Subject Matter..................40
Communication 101; 102; 120; 140, 170/170V; 172, 174, 176, 180, 182, 183, 184, 185; 4
Anthropology 140A through 149B, 178 or any other sociocultural track course that refers in its title to one or more peoples or regions of the world; 4

Archaeology emphasis..................20-25
Anthropology 170............................4
Two courses from:
Anthropology 172, 173, 174, 175, 176, 177, 178, or 179......8
Two courses from:
Anthropology 156A, 156B, 180, 181, 182, 183, 184, or 185........8

Evolutionary emphasis..................18-30
Any five upper division Anthropology courses chosen in consultation with an evolutionary track advisor.........3-5

Minor Advisor. Consult Department office in 1282 Social Sciences & Humanities.

Community and Regional Development

Changes to B.S. Major Requirements

UNITS
Preparatory Subject Matter.............22-26
Community and Regional Development
1, 2...........................................8
Community and Regional Development 118, 140, 141, 162, or 163; Economics of Community Change: Two courses from: Community and Regional Development 118, 140, 141, 162, or 163; 4
Economics 1A or 1B..........................4
Anthropology 2 or Sociology 1.............4.5
Statistics 13 or Sociology 468.............3.5

Depth Subject Matter..................40-43
Core Issues in Community Development:
Three courses from: Community and Regional Development 147, 149, 154, 157, 158, or 171; 8
Politics and Community Change:
Two courses from: Community and Regional Development 147, 149, 154, 157, 158, or 171; 8

Methods for Community Research:
Two courses, including at least one *d course from: Community and Regional Development 151, *156, *Communication 102,
Areas of Specialization
Take 20 units from each of two options, including at least one Community and Regional Development course from each option, or 40 units from one option, including at least two Community and Regional Development courses. These courses cannot overlap with the depth subject. Up to 4 units of variable credit courses may be counted toward this requirement; e.g., Community and Regional Development 192. 4

Global Communities Option ........................ 40

Gender and Development Sociology 132, 145A, 145B, Anthropology 126B, Women and Gender Studies 102, 182
Globalization and Politics: Political Science 124, 130, 131, 175
Experiential Learning, Area Studies, and Language: Total number of units of credit in Experiential learning, Area Studies, and Language courses cannot exceed 32. Up to 12 credits transferred from any accredited foreign program or foreign internship, including UCD EAP and Summer Abroad programs. Up to 12 credits in regional area studies classes; e.g., Middle East, China, Latin America.
Organization and Management Option........................ 40
Students must consult with a faculty advisor to identify an emphasis within the option and to select suitable courses. Administration: Community and Regional Development 151, 172, 176, Communication 102, Economics 151B, Sociology 120, 128, 129
Policy, Planning, and Social Services Option ........................ 40
Students must consult with a faculty advisor to identify an emphasis within the option and to select suitable courses. General: Community and Regional Development 118, 142, 151, 153A, 153B, 156C, 156, 157, 162, 176, 180, 194A and 194B, Environmental Science and Policy 165N, Political Science 100, 105, 108, 109, 142A, 142B, 142C, 154, 155, 158, 183, Sociology 120, 140, 154, 155, 158, 159, 183
Education and Community: Agricultural Education 100, 160, Communication 101, 146, Education 100, 110, 120, 151, 152, 153, Psychology 100, 132, Sociology 124
Family and Community: American Studies 152, Community and Regional Development 147, Human Development 100A, 100B, 100C, 101, 102, 103, 110, 130, 140, 140L, 141, 143, 180, 163, Psychology 140, Sociology 122, 131, 134, 135, 152
Three courses in English Composition from the following list:

- English 3, University Writing Program 1, 18, 19, 101, 102A, 102B, 102D, 102E, 102F, 102G, 102H, 102L, 104A, 104B, 104C, 104D, 104E, 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, 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 Advisor. M. Kenney, mikenney@ucdavis.edu

Computer Science

Changes to Major Preparatory Requirements & Minor Program Requirements

The Major Program

The Department of Computer Science administers two majors: Computer Science and Engineering (CSE), in the College of Engineering, and Computer Science (CS), in the College of Letters and Science. It also administers two minors: Computer Science, in the College of Letters and Science, and Computer Science Engineering, in the College of Engineering. For information on the Computer Science and Engineering curriculum and the minor in Computational Biology, see Engineering: Computing Science, on page 289.

The primary differences between the CSE and CS majors are the extent of hardware coverage and curricular flexibility. The CSE major develops a solid understanding of the entire machine, including hands-on experience with hardware components. The CS major teaches some hardware, at the design level, on simulators. The CSE major has fewer free electives. The CS major’s more generous electives make it easier to complete a minor or double major.

Students in the CS major receive a solid grounding in the fundamentals of computer languages, operating systems, computer architecture, and the mathematical abstractions underpinning computer science. Students are prepared for both industry and post-graduate study.

Preparatory Requirements Before declaring a major in Computer Science, students must complete the following five courses with an overall UC Davis grade point average of at least 3.000. All five courses must be completed with a grade of C- or better.


Engineering: Computer Science 20, 30, 40

B.S. Major Requirements:

Preparatory Subject Matter .......................... 50-55


Computer Science Engineering 20, 30, 40

Computer Science 100

Computer Science 105

B.S. Major Requirements:

Preparatory Subject Matter .......................... 50-55


Computer Science Engineering 20, 30, 40

Computer Science 100

Computer Science 105

Unit 8: Computer Science 20, 30, 40

B.S. Major Requirements:

Preparatory Subject Matter .......................... 50-55


Computer Science Engineering 20, 30, 40

Computer Science 100

Computer Science 105

Unit 8: Computer Science 20, 30, 40

B.S. Major Requirements:

Preparatory Subject Matter .......................... 50-55


Computer Science Engineering 20, 30, 40

Computer Science 100

Computer Science 105

Unit 8: Computer Science 20, 30, 40

B.S. Major Requirements:

Preparatory Subject Matter .......................... 50-55


Computer Science Engineering 20, 30, 40

Computer Science 100

Computer Science 105

Unit 8: Computer Science 20, 30, 40
Economics

Changes to Major Requirements & Minor Program Requirements
(change—eff. fall 17)

A.B. Major Requirements:

Preparatory Subject Matter ............................ 44

Economics 1A-1B ........................................ 8
Statistics 13, 32, or 102 ............................... 3-4
Mathematics 16A-16B or 21A-21B ................. 6-8

Depth Subject Matter ................................. 44

Economics 100A, 100B, 101 ......................... 12
Economics 102 ........................................... 4

Choose one specialization below:

Specialization: General
One course from: Economics 110A, 110B, 111A, 111B ....... 4
Choose 12 units from:

Specialization: Behavior and Strategy
Choose 1 course from:
Economics 110A, 110B, 111A, 111B ....... 4
Economics 121A or 122 .......... 4

Choose 2 courses from:

Specialization: Data Analytics and Economics
Choose 1 course from:
Economics 110A, 110B, 111A, 111B ....... 4
Economics 121A or 122 .......... 4

Choose 2 courses from:

Specialization: International Macrole-Finance
Choose 1 course from:
Economics 110A, 110B, 111A, 111B ....... 4
Choose 3 courses from:

Choose 3 courses from:

Specialization: Policy
Choose 1 course from:
Economics 110A, 110B, 111A, 111B ....... 4
Choose 3 courses from:
Economics 125, 130, 131, 145, 151A, 151B, 160A-HA ........... 12

Choose 1 course from:

Specialization: Poverty and Inequality
Choose 1 course from:
Economics 110A, 110B, 111A, 111B ....... 4
Select 3 courses from:
Economics 115A, 115B, 130, 151B .......... 12
Choose 3 courses from:

Specialization: Economic History
Choose 4 courses from:

Choose 4 courses from:

Total Units for the Major .................. 61–64

Depth Subject Matter .................. 44

English

Changes to A.B. Major Requirements
(change—eff. fall 16)

A.B. Major Requirements:

Preparatory Subject Matter .................. 20

English 3 or University Writing
Program 1 ............................................ 4

Choose 4 courses from:
English 40, 41, 44, 45 ........... 4

Choose 1 course from:
English 10A, 10B, 10C ....... 1
Materials Science and Engineering
Mechanical Engineering

Engineering: Chemical Engineering

Changes to Chemical Engineering Undergraduate Program (change—eff. fall 17)

Lower Division Required Courses ..... 76-77
Mathematics 21A-21B-21C-21D ............ 16
Mathematics 22A-22B .................................. 6
Physics 9A-9B-9C .................. 15
Chemistry 2A, 2B or Chemistry 2AH, 2BH, 2CH .................. 15
Chemical Engineering 5, 51, 60, 80, 120 Engineering 17 or 35 or 45 or 45Y 4
Biototechnology 1 or 1Y or Biological Sciences 2A 4 or 5
Environmental Science and Urban Writing Program 1, 1V, 1Y, or Comparative Literature 1, 2, 3, or 4, Native American Studies 5 (grade of C- or better is required) ................................... 4

Upper Division Required Courses ..... 80-84
Chemical Engineering and Materials Science Electives ...................................... 8
Chemical Engineering Biototechnology 161A, 161B, Food Science and Technology 102B, 104L, 123L; Molecular and Cellular Biology 120L, 160L; Neurobiology, Physiology, and Behavior 101, 107; Plant Biology 112; Plant Sciences 100A, 152A, 152B, 152C, 158A, 158B, 158C 116
Upper Division Composition Requirement ................................... 0 or 4
One course from the following (grade of C- or better is required): University Writing Program 102E, 102F, 104A, 104E, 104T or passing the Upper Division Composition Exam.

Changes to Biochemical Engineering Undergraduate Program (change—eff. fall 17)

Lower Division Required Courses

Mathematics 21A-21B-21C-21D ............ 16
Mathematics 22A-22B .................................. 6
Physics 9A-9B-9C .................. 15
Chemistry 2A, 2B or Chemistry 2AH, 2BH, 2CH .................. 15
Biological Sciences 2A .................................. 15
Chemical Engineering 5, 51, 60, 80, 120 English 3 or University Writing Program 1, 1V, or Comparative Literature 1, 2, 3, or 4, Native American Studies 5 (grade of C- or better is required) ................................... 4

Upper Division Required Courses

Biological Sciences 102, 128A, 128B, 128C 60
Microbiology 102, 103L .................................. 5

Biochemical Engineering electives ................................. 9
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 an internship (192) or independent study (199), or Biotechnology 189L with the approval of a petition, provided that the course is a laboratory-based experimental project, related to the biological and/or biochemical engineering sciences, and you submit a written report that demonstrates proficiency in laboratory skills, techniques, and methods. Research does not replace the required lab elective.

Laboratory elective list: Biochemical Engineering 161L, Biototechnology 161A, 161B, Food Science and Technology 102B, 104L, 123L; Molecular and Cellular Biology 120L, 160L; Neurobiology, Physiology, and Behavior 101, 107; Plant Biology 112; Viticulture and Enology 123L, 124L

Lecture elective list: Biological Sciences 28, 2C, 101, 103, 104, Biological Systems Engineering 115A, 1165B, Chemical Engineering 102, 107, 109, 117, 140, 161A, 162A, Biotechnology 160, 188; Chemical Engineering 144, 166, 170; Chemistry 130A, 130B; Food Science and Technology 102A, 104, 123; Microbiology 140, 150, Molecular and Cellular Biology 123; Neurobiology, Physiology, and Behavior 101, 107; Plant Biology 112; Plant Sciences 100A, 152A, 152B, 152C, 158A, 158B, 158C 124

Upper Division Composition Requirement ................................... 0 or 4
One course from the following (grade of C- or better is required): University Writing Program 102E, 102F, 104A, 104E, 104T or passing the Upper Division Composition Exam.

Engineering: Civil and Environmental

Change to the Civil Engineering Undergraduate Program and New B.S. in Environmental Engineering Undergraduate Program (new degree—eff. fall 17)

Areas of Specialization

Environmental Engineering

This area focuses on understanding and managing of physical, chemical, and biological processes in natural and engineered systems. Areas of emphasis include improvement of air, land, and water quality in the face of increasing population, expanding industrialization, and global climate change. Examples of environmental engineering include innovative analysis and design of air, water, wastewater, and solid waste treatment systems; mathematical modeling of natural and engineered systems; life cycle analysis; sampling, analysis, and transformation of natural and anthropogenic pollutants; and modeling of air pollutant emissions.


Additional information on areas of specialization and potential faculty advisor can be obtained from the departmental website.

Civil Engineering Undergraduate Program

The Civil Engineering program is accredited by the Engineering Accreditation Commission of ABET; see http://www.abet.org.

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 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 Advisors. R.W. Boulanger, Y.F. Daftalas, J.T. Dejong, J.T. Harvey, B. Jeremic, B.L. Kutter, P.C. Lucia, A. Martinez, K. Ziotopoulou

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 the 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 clean energy), and technological feasibility (such as vehicle, infrastructure, and information technologies).


Water Resources Engineering. This area includes hydrology, hydraulics, fluid mechanics, and water resources systems planning and design. Hydrology deals with quantifying and understanding all aspects of the hydrologic cycle, including the relationships between precipitation, runoff, ground-water, and surface water. Water quality and contaminant transport issues are linked to hydrologic conditions. Hydraulics and fluid mechanics deal with flows in pipes, open-channel water-distribution systems, and natural systems, such as lakes and estuaries. Water resources systems planning and design deals with the comprehensive development of water resources to meet the multiple needs of industry, agriculture, municipalities, recreation, and other activities.


Additional information on areas of specialization and potential faculty advisor can be obtained from the departmental website.

Fall 2011 and on Revised General Education (GE): AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; ACGH—American Cultures; DD—Diverse Domesticity; 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=Domestic Diversity; Wrt=Writing Experience
### Lower Division Required Courses  

<table>
<thead>
<tr>
<th>Course</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics 21A/21B-C21D</td>
<td>16</td>
</tr>
<tr>
<td>Mathematics 22A-22B</td>
<td>6</td>
</tr>
<tr>
<td>Physics 9A-9B-CN and/or 9A-9B-SC</td>
<td>6</td>
</tr>
<tr>
<td>Chemistry 2C, Biological Science 2A or</td>
<td>6</td>
</tr>
<tr>
<td>Geology 50-50L</td>
<td>19</td>
</tr>
<tr>
<td>Chemistry 2A-2B or 2AH-ZBH</td>
<td>10</td>
</tr>
<tr>
<td>Civil and Environmental Engineering 3</td>
<td>6</td>
</tr>
</tbody>
</table>

Civil and Environmental Engineering 3 is designed for lower division students and is not open to upper-division students.

Students who do not take this course will substitute four units of additional upper-division Civil and Environmental Engineering electives.

**Choose one:**
- Civil and Environmental Engineering 19, Engineering 6, or Computer Science Engineering 30  
- Engineering 35 or 45, 45L  
- English 3 or University Writing Program 1, 1V, or 1Y, or Comparative Literature 1, 2, 3, 4, or Native American Studies 5 (grade of C- or better)  
- Communication 1 or 3 or Engineering 3  

### Upper Division Required Courses  

<table>
<thead>
<tr>
<th>Course</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering 103, 104, 104L, 106</td>
<td>12</td>
</tr>
<tr>
<td>Engineering 102 or 105</td>
<td>4</td>
</tr>
<tr>
<td>Civil and Environmental Engineering 114</td>
<td>190</td>
</tr>
</tbody>
</table>

One course from Civil and Environmental Engineering 115, 153, Mathematics 118A; or Statistics 108  

**Civil & Environmental Engineering Breadth**

Select one course from four of the following group options:  

- 14-17 Environmental Engineering  
- Engineering 140 or 148A or 149  
- Geotechnical: Both Civil and Environmental Engineering 171 and 171 lab  
- Structures: Civil and Environmental Engineering 130  
- 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 or more courses from two of the four group options selected for Civil and Environmental Engineering Breadth:  

**are required:**
- Engineering 131, 132, 135, 136  
- Transportation: Civil and Environmental Engineering 153, 161, 162, 179  
- Water Resources: Civil and Environmental Engineering 144 and 146, 155  

**Civil & Environmental Engineering electives**

- Civil & Environmental Engineering electives may include any upper division, letter-graded Civil and Environmental Engineering course not already used towards another degree requirement, Engineering 102 or 105, and may include, but not exceed, a combination of six units from Civil and Environmental Engineering 198 and 199.  
- Civil & Environmental Engineering 193A & 193B  

*Due to variability in series course offering, consent of minor advisor is required.

**Minor advisors.** J.L. Darby, J.T. Harvey, J.R. Lund

### Sustainability in the Built Environment 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 2.00 or better.
### Engineering: Computer Science

#### Changes to Computer Science and Engineering Undergraduate Program

*change—eff. fall 17*

The Computer Science and Engineering program is accredited by the Engineering Accreditation Commission of ABET, see [http://www.abet.org](http://www.abet.org). Exclusive of General Education units, the minimum number of units for the Computer Science and Engineering major is 144.

Students are encouraged to adhere carefully to all prerequisites required. The instructor is authorized to drop students from a course for which stated prerequisites have not been completed.

<table>
<thead>
<tr>
<th>UNIT</th>
<th>Lower Division Required Courses.....78-79</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mathematics 21A-21B-21C-21D.............16</td>
</tr>
<tr>
<td></td>
<td>Mathematics 22A or 67....................3</td>
</tr>
<tr>
<td></td>
<td>Mathematics 22B...........................3</td>
</tr>
<tr>
<td></td>
<td>Physics 9A-9B-9C-9D......................19</td>
</tr>
<tr>
<td></td>
<td>Chemistry 2A................................5</td>
</tr>
<tr>
<td></td>
<td>Computer Science Engineering 20, 30, 40, 60...16</td>
</tr>
<tr>
<td></td>
<td>Computer Science Engineering 50 or Electrical and Computer Engineering 70...........4</td>
</tr>
<tr>
<td></td>
<td>Engineering 17...........................4</td>
</tr>
<tr>
<td></td>
<td>English 3 or University Writing Program 1, 1V, 1Y or Comparative Literature 1, 2, 3, 4, or Native American Studies 5 (grade of C- or better required)...........4</td>
</tr>
<tr>
<td></td>
<td>Communication 1................................4</td>
</tr>
<tr>
<td></td>
<td>Upper Division Required Courses.....62-66</td>
</tr>
<tr>
<td></td>
<td>Computer Science Engineering 120 or 122A..............4</td>
</tr>
<tr>
<td></td>
<td>Electrical and Computer Engineering 100, 172........................................9</td>
</tr>
<tr>
<td></td>
<td>Computer Science electives................15</td>
</tr>
<tr>
<td></td>
<td>A minimum of four courses and a minimum of 15 units chosen from Computer Science Engineering courses numbered 120 to 189 inclusive; approved course of 3 to 5 units from Computer Science and Engineering 192 or 199; Electrical and Computer Engineering 171, 180A, 180B; one course taken from the following restricted elective list: Economics 122, Linguistics 127, 177; Mathematics 135A, 135B, Psychology 120; Statistics 131A, 131B. New course can count as both a required course and a computer science and engineering elective. Upper Division Composition Requirement.................................................0-4</td>
</tr>
<tr>
<td></td>
<td>University Writing Program 101 (a grade of C- or better is required) or passing the Upper- Division Composition Exam.</td>
</tr>
</tbody>
</table>

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### Engineering: Materials Science and Engineering

#### Changes to Materials Science and Engineering Undergraduate Program & Materials Science Minor

*change—eff. fall 17*

<table>
<thead>
<tr>
<th>UNIT</th>
<th>Lower Division Required Courses.....78</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mathematics 21A-21B-21C-21D.............16</td>
</tr>
<tr>
<td></td>
<td>Mathematics 22A-22B........................6</td>
</tr>
<tr>
<td></td>
<td>Physics 9A-9B-9C-9D........................19</td>
</tr>
<tr>
<td></td>
<td>Chemistry 2A, 2B, 2C or Chemistry 2AH, 2BH, 2CH.....................................15</td>
</tr>
<tr>
<td></td>
<td>Engineering 17, 45 or 45Y..................8</td>
</tr>
<tr>
<td></td>
<td>Materials Science and Engineering 2........2</td>
</tr>
<tr>
<td></td>
<td>Chemical Engineering 60...................4</td>
</tr>
<tr>
<td></td>
<td>English 3 or University Writing Program 1 or Comparative Literature 1, 2, 3, 4, or Native American Studies 5 (grade of C- or better required)...........4</td>
</tr>
<tr>
<td></td>
<td>Communication 1................................4</td>
</tr>
<tr>
<td></td>
<td>Upper Division Required Courses.....75-83</td>
</tr>
<tr>
<td></td>
<td>Engineering 190...........................3</td>
</tr>
<tr>
<td></td>
<td>Select one course from: Engineering 180, Mathematics 135A, Statistics 120, 131A, Civil and Environmental Engineering 114, Chemical Engineering 140, Mechanical Engineering 115, or Physics 104A.....................4</td>
</tr>
<tr>
<td></td>
<td>Select one course from: Chemical Engineering 158A, Materials Science and Engineering 170, Engineering 106, 160, 188, or Civil Engineering 123, 125, 143..................................4</td>
</tr>
<tr>
<td></td>
<td>A minimum of 14 units from one of the following focus areas: Biomedical Engineering: Biology 2A, Biomedical Engineering 20, 106*, 109 Biological Systems Engineering: Biology 2A, Engineering 100, Biological Systems Engineering 75, 165</td>
</tr>
<tr>
<td></td>
<td>Chemical Engineering: Chemical Engineering 31, 140, 141, 142 Civil Engineering: Engineering 35, 104, Civil Engineering 130, 132</td>
</tr>
<tr>
<td></td>
<td>Electrical Engineering: Engineering 100, Electrical Engineering 140A, 140B, 146A Mechanical Engineering: Engineering 35, 102, 103, 104..................................................14</td>
</tr>
<tr>
<td></td>
<td>Depending on area of focus, 6-9 units of upper division electives .........................6-9</td>
</tr>
<tr>
<td></td>
<td>Students may receive up to a maximum of 4 units of credit for engineering 199 courses, when these courses are approved by the departmental undergraduate studies committee. Students must submit a summary of their research to the committee. A letter of support from the faculty mentor is also required to verify that you have conducted substantial research activity.</td>
</tr>
</tbody>
</table>

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### Engineering: Mechanical and Aerospace Engineering

#### Changes to Mechanical and Aerospace Engineering Undergraduate Programs

*change—eff. fall 17*

The Department of Mechanical and Aerospace Engineering administers two undergraduate programs in the College of Engineering: (1) Mechanical Engineering, (2) Aerospace Science and Engineering.

#### 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 prepare its graduates to practice mechanical and/or aerospace engineering in a broad range of industries, to enable interested graduates to pursue graduate education, to prepare its graduates to participate in research and development, and in other creative and innovative efforts in science, engineering, and technology and to allow interested graduates to pursue entrepreneurial endeavors.

#### Mechanical Engineering Undergraduate Program

The Mechanical Engineering program is accredited by the Engineering Accreditation Commission of ABET, see [http://www.abet.org](http://www.abet.org).

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, chem-
istry, material science, applied mechanics, thermodynamics, heat transfer, mass transfer, electricity, manufactoring 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 study 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 the 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 the primary activities of a professional mechanical engineer. The development of a product from concept generation to detailed design, manufacturing process selection and planning, quality control and assurance, and life cycle considerations are areas of study and specialization 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 basic physical and engineering sciences and have the ability to synthesize the information from such a background in 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, 135
- Biological Systems Engineering 114, 120, 165
- Biomedical Engineering 118/Electrical and Computer Engineering 117 Engineering 122, 160 (only one unit of credit towards Technical Electives requirement)
- Materials Science and Engineering 180, 181, 182
- Mechanical Engineering 121, 134, 1508, 151, 152, 154, 161, 163


Biomedical and 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 circulation and its potential role in the regulation of normal physiological function and in the development of disease; groundwater and atmospheric flows and their implications for pollutant transport and environmental concerns; aerodynamic flow around 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 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 many other applications. Mechanical engineers are often heavily involved with the design of combustion systems (internal combustion engines, gas turbines, furnaces, etc.) and deal with aspects of combustion ranging from combustion efficiencies to reducing pollutant emissions. This specialization is for those who would like to work in fields that use combustion, or that deal with pollution related to combustion. With the recent increased emphasis on 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 Advisors: R.C. Aldredge, R. Davis, P.A. Erickson, B.D. Shaw

Heat Transfer, Thermodynamics, and Energy Systems. This specialization emphasizes the fundamentals of heat transfer and thermodynamics, and their application to the design of advanced engineering systems. The objective of the program is to introduce students to the fundamental processes of heat transfer and thermodynamics in complex engineering systems so that they are able to design more 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 efficient, cost-effective systems for power generation, propulsion, heat exchangers, industrial processes, refrigeration, and chemical processing. This area of specialization is important to many industries—aerospace, defense, automotive—as well as to the thermal design of electronic and computer packaging.

Suggested technical electives:
- Aerospace Science and Engineering 138
- Mechanical Engineering 161, 163

Suggested Advisor: R.C. Aldredge, R. Davis, P.A. Erickson, J.W. Park, B.D. Shaw

Manufacturing. Manufacturing is concerned with the conversion of raw materials into finished products by a variety of processes, such as machining, forming, casting, and molding. Modern manufacturing technology is increasingly dependent upon integration with computer-aided design systems and precision computer controls. State-of-the-art laboratories offer the opportunity for hands-on experience with a wide spectrum of manufacturing equipment. Manufacturing engineers must have expertise in design, materials, computer-aided design, computer software, and microprocessor applications.

Suggested technical electives:
- Biomedical Engineering 118/Electrical and Computer Engineering 147
- Electrical and Computer Engineering 160
- Materials Science and Engineering 180, 181
- Mechanical Engineering 1508, 151, 154


System Dynamics and Control. Engineers are increasingly concerned with the performance of integrated dynamic systems in which it is not possible to optimize component parts without considering the overall system. System dynamics and control specialists are concerned with the modeling, analysis, and simulation of all types of dynamic systems and with the use of automatic control techniques to change the dynamic characteristics of systems in useful ways. The emphasis in this program is on the physical systems that are closely related to mechanical engineering, but the techniques for studying these systems apply to social, economic, and other dynamic systems.

Ongoing research includes projects on continuously variable transmissions, active and semi-active suspension systems, modeling and control of vehicle dynamics, electromechanical actuator design, electronically controlled steering, the analysis of fuel management systems, and the design of light-control systems with humans in the loop.

Suggested technical electives:
- Aerospace Science and Engineering 129, 139, 141
- Electrical and Computer Engineering 160
- Mechanical Engineering 121, 134, 154

Suggested Advisors, S. Joshi

Ground Vehicle Systems. An important aspect of mechanical engineering is the design of more environmentally benign surface vehicles that provide efficient individual and public transportation. Innovations in the field require competence in vehicle dynamics, control of vehicle dynamics, power sources and power transmission, lightweight structures and systems, alternatively fueled power systems, including electrical drives and fuel cells, and mechanical systems.

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 Advisors, P.A. Erickson, M. Hill, J. Park, N. Sarigul-Klijn, S. 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 and control, and an understanding of the problems caused by present-day modes of transportation. Vehicle control requires an understanding of sensors and actuators, and the integration of yet-to-be-proposed concepts into overall vehicular dynamics. Competence in these areas allows for the development of alternative propulsion concepts, such as electric, hybrid, and fuel cell.

Suggested technical electives:
- Aerospace Science and Engineering 127, 129
- Civil and Environmental Engineering 114, 120
- Mechanical Engineering 121, 134

Suggested Advisors, 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.
Environmental Horticulture and Urban Forestry

Changes to B.S. Major Requirements

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: 50-62

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, 104E, or other upper division composition course (may overlap with college composition requirement; may be satisfied by passing the English Composition Exam) ........................................... 0-4
Lower division restricted electives ........................................... 6

Select one lower division resource science course and one lower division social science/humanities course in consultation with advisor; minimum 6 units.

Depth Subject Matter: 39-43

Environmental Horticulture 102 or Plant Sciences 100A ........................................... 3-4
Environmental Horticulture 105 or Plant Sciences 102 or Plant Biology 104 ........................................... 4-5
Plant Biology 117 or Plant Sciences 150 ........................................... 4
Plant Sciences 171 ........................................... 4
Soil Science 100 ........................................... 5

The minor is sponsored by the Department of Human Ecology.

Geographic Studies

(College of Agricultural and Environmental Sciences)
The minor in Geographic Studies is defined by its concern with place. Geographers strive to answer spatial questions regarding the Earth’s surface; to describe and explain the character of regions; to ascertain the ways in which historical and contemporary humans have used and shaped the Earth’s surface; and to understand the interactions of physical, biotic, and human systems within our global environment. The minor is compatible with a variety of environmental majors in the college.

The minor is sponsored by the Department of Human Ecology.

Minor Program Requirements: UNITS
Landscape Architecture 10 ........................................... 3

Courses & Programs are subject to change without notice.
Select at least one course from three of the following areas:  
17
  130 | Community and Regional Development  
140 | Agriculture  
141 | Nutrition  
142 | African American and African Studies  
100 | 107C  
155A | 155B  
172 | 176  
180 | 182  

or other upper division courses approved by the advisor.

Methods in Geography:

150A/150B Applied Biological Systems Technology  
150C Environmental Science and Management  
156A, 156B, 180A, Applied Biological Systems Technology  
181N, 182, Hydrologic Sciences  
or other upper division courses approved by the advisor.

Individual Study:

Select a maximum of 4 units of 192  
(Internship) or 199 (Research) in any appropriate department.

Minor Advisor. S. E. Greco

International Commercial Law  
(A Graduate Group)

Suspension of Program  
(change—eff. spring 17)

The International Commercial Law program is no longer admitting students; admissions are suspended as of spring 2017.

Managerial Economics

Changes to B.S. Major Requirements  
(change—eff. fall 17)

Total Depth Subject Matter.................52-55
Core ...........................................20
Agricultural and Resource Economics 100A,  
100B, 106, 155 and Economics 101

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 107, 112, 118,  
119, 136, 157, 171A, 171B,  
132, 138, 139, 140, 143, 144, 145,  
146, 150, 156, 165, 175, 176, 194A-H,  
194B, Economics 115A, 115B, 121A,  
or Environmental Science & Policy 175.

International Business Economics emphases

Choose at least 20 units from Agricultural and Resource Economics 107, 115A,  
115B, 120, 121, 130, 132, 138, 139, 140, 143, 144, 145,  
146, 150, 156, 165, 175, 176, 194A-H,  
194B, Economics 115A, 115B, 121A,  
or Environmental Science & Policy 175.

Accounting Emphases

Choose at least 4 units each:  
Agricultural and Resource Economics 175A  
or Economics.

Economics 130, 171A, 171B, 175, 176,  
Economics 121A, 121B, Political Science  
130 or Environmental Science & Policy  
175.

Environmental and Resource Economics  
emphasizes

Agricultural and Resource Economics 175  
and 176 ........................................8

Choose at least 20 units from: Agricultural and Resource Economics 107, 120, 132,  
138, 140, 145, 146, 150, 156,  

Select the remaining 4 units from the above list or upper-division courses in Agricultural and Resource Economics, Economics, or Environmental Science and Policy 160, 161, 163, 165N, 166N, 167, 171, 172,  
173 or Environmental Toxicology 138.

Agribusiness Emphasis

Choose at least 16 units from Agricultural and Resource Economics 107, 120, 121,  
130, 132, 138, 140, 145, 150,  
Select the remaining 16 units from the above list or upper division courses in  
Agricultural 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.

Management, Graduate School of

Changes to Minor Requirements  
(change—eff. fall 17)

Accounting Minor

The UC Davis Graduate School of Management’s Undergraduate Accounting Minor gives you the opportunity to enhance your coursework with a careful, fully crafted series of five upper-division courses. These courses are designed to prepare you for accounting-related careers or advanced study in accounting. All five courses, 20 units total, must be completed to receive the minor certification.

The accounting minor courses are open to all undergraduate and graduate majors at UC Davis. All minor courses must be taken at UC Davis. Prerequisites for minor courses are required and you should plan accordingly.

Minor Requirements:  

UNITS

Accounting ..................................................20

Management 101 .................................. 4
Management 103 .................................. 4
Management 105 .................................. 4
Management 107 .................................. 4
Management 170 .................................. 4

To complete the minor, students must complete the 20 units of coursework in the minor with a GPA of 2.00 or better. Students may petition to have the minor noted on their transcript by following the process designated by their college, which allows the Graduate School of Management to approve the minor electronically. Contact your college’s academic advisor for more information. Most prerequisites could be used to partially satisfy the University’s General Education requirements for science and engineering majors. No grade lower than a C- will be accepted in any prerequisite course.

Mathematics

Changes to Major Requirements  
(change—eff. fall 16)

A.B. Major Requirements:

UNITS

Preparatory Subject Matter..............43-47
Mathematics 21A, 21B, 21C, 21D, 22B,  
25 ...................................................... 23
One of the following two options:  
(a) Mathematics 22A and 108 CR (b)  
Mathematics 67 ...................................... 4
Computer Science 30 or Engineering 6 ... 4
Mathematics 22AL or equivalent MATLAB  
knowledge .............................................. 4
-1 Additional non-Mathematics courses chosen from natural sciences ......................... 12
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.........................35-36

A. Core ........................................... 16
Mathematics 125A .................................. 4
Mathematics 125B .................................. 4
Mathematics 135A .................................. 4
Mathematics 150A .................................. 4
B. Choose one Plan from the following two;  
up to 4 of these 16 units may be approved upper division courses outside of the  
Department of Mathematics with extensive use of mathematics ......................... 16
Plan 1: General Mathematics  
Choice of four Mathematics courses from  
Mathematics 111 through Mathematics  
185B (excluding Mathematics 180) worth  
at least four units each .............................16
Plan 2: Secondary Teaching

Courses & Programs are subject to change without notice.
**Mathematics Major Requirements:**

**Total Units for the Major** 89-97

- **Depth Subject Matter** 47-48
  - A. Core 28
    - Mathematics 150A 4
    - Mathematics 150B 4
    - Mathematics 150C 4
    - Mathematics 152A 4
    - Mathematics 152B 4
    - Mathematics 154A 4
  - B. Enrichment 20
    - Choice of four Mathematics courses from Mathematics 111 through 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.

**Preparatory Subject Matter** 42-49

- One of the following two options: (a) Mathematics 22A and 108 OR (b) Mathematics 67 47
- Mathematics 22AL or equivalent basic knowledge of MATLAB 0-1
- Computer Science 30, 40 8
- One approved upper division course in Engineering, Mechanical Engineering or in the one unit course Mathematics 22AL (can be taken concurrently).

**Total Units for the Major** 78-83

**Applied Mathematics**

**B.S. Major Requirements:**

<table>
<thead>
<tr>
<th>Preparatory Subject Matter</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>One of the following two options: (a) Mathematics 22A and 108 OR (b) Mathematics 67</td>
<td>47</td>
</tr>
<tr>
<td>Mathematics 22AL or equivalent basic knowledge of MATLAB</td>
<td>0-1</td>
</tr>
<tr>
<td>Computer Science 30, 40</td>
<td>8</td>
</tr>
<tr>
<td>One approved upper division course outside the Department of Mathematics with extensive use of mathematics</td>
<td>4</td>
</tr>
</tbody>
</table>

**Depth Subject Matter** 47-48

- A. Core 28
  - Mathematics 150A 4
  - Mathematics 150B 4
  - Mathematics 150C 4
  - Mathematics 152A 4
  - Mathematics 152B 4
  - Mathematics 154A 4
- B. Enrichment 20
  - Choice of four Mathematics courses from Mathematics 111 through 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.

**Total Units for the Major** 81-87

**Mathematics and Scientific Computation**

**B.S. Major Requirements:**

**Preparatory Subject Matter** 35-39

| One of the following two options: (a) Mathematics 22A and 108 OR (b) Mathematics 67 | 47 |
| Mathematics 22AL or equivalent basic knowledge of MATLAB | 0-1 |
| Computer Science 30, 40 | 8 |

**Depth Subject Matter** 47-48

- A. Core 28
  - Mathematics 150A 4
  - Mathematics 150B 4
  - Mathematics 150C 4
  - Mathematics 152A 4
  - Mathematics 152B 4
  - Mathematics 154A 4
- B. Enrichment 20
  - Choice of two Mathematics courses from Mathematics 111 through 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.

**Total Units for the Major** 97-102

**Mathematical Analytics and Operations Research**

**B.S. Major Requirements:**

**Preparatory Subject Matter** 43-47

| One of the following two options: (a) Mathematics 22A and 108 OR (b) Mathematics 67 | 47 |
| Mathematics 22AL or equivalent basic knowledge of MATLAB | 0-1 |
| Computer Science 30 | 8 |
| Economics 1A, 1B | 8 |
| Statistics 32 or 100 | 4 |

**NOTE:** Basic knowledge of MATLAB is required in both Mathematics 67 and 22A.

**Depth Subject Matter** 54-55

- A. Core 35
  - Mathematics 125A, 125B 8
  - Mathematics 128A, 128B, or 128C 4

**Total Units for the Major** 82-87

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**Fall 2011 and Revised General Education (GE): AH—Arts and Humanities; SS—Science and Engineering; SS—Social Sciences; ACH—Arts and Humanities; DD—Diverse Disciplines; OL—Oral Skills; QL—Quantitative; SL—Scientific; VL—Visual; WC—World Cultures; WE—Writing Experience**

**Pre-Fall 2011 General Education (GE): AH—Arts and Humanities; SS—Science and Engineering; SocSci—Social Sciences; Div—Diverse Disciplines; Writing—Writing Experience**

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

**Courses & Programs are subject to change without notice.**
Middle East/South Asia Studies

Changes to Iran & Persian Studies Minor Requirements  
(change—eff. fall 16)

Iran & Persian Studies ..................... 20-24
Middle East/South Asia 100 .............. 4
Middle East/South Asia 180 .............. 4
Choose one from: History 190D or History 193D .......... 4
Comparative Literature 151, History 181A or 182A ........ 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 151A, 181A, 182A, Comparative Literature 125, History 190D, 193D.

Music

Changes to A.B. Major & Minor Requirements  
(change—eff. fall 17)

A.B. Major Requirements:

Preparatory Subject Matter ............. 27-45
Music 6A, 6B, 6C ..................................... 9
Plus Music 2A, 2B, 2C, 2D, 6A, 6B, 6C ........... 0-6
And Music 16A, 16B, 16C .............................................. 0-6
Music 7A, 7B, 7C .................................................. 9
Plus Music 17A, 17B, 17C ......................... 0-6

* May be excused by diagnostic examination at the beginning of each quarter.

Depth Subject Matter ...................... 40-43
Choose upper division courses from one of the following tracks:

Track 1: Music Composition ................. 42
Music 123, 124A, 124B ......................... 9
Music 121 or 122 ...................... 4
Music 131 (three quarters) ....................... 6
Music 195 .............................. 2
At least 6 units selected from: Music 140-151  ...... 6
Music 101A, 101B .............................. 8
Music 103 .............................. 3
At least 4 further units selected from:
Track 2: Music History, Theory, and Ethnomusicology ...................... 43
Music 123, 124A, 124B ......................... 9
Music 121 and/or 122 ................... 8
Music 131 (three quarters) ....................... 6
Music 195 .............................. 2
At least 6 units selected from: Music 140-151  ...... 6
At least 12 further units selected from:

Track 3: Music Performance ................. 40
Music 123, 124A, 124B ......................... 9
Music 121 or 122 ...................... 4
Music 131 (three quarters) ....................... 6
Music 195 .............................. 2
At least 13 units selected from:
Music 140-151 .............................................. 13
At least 6 further units selected from:

Total Units for the Major .................. 64-85

Note: A minimum of 19 units in performance courses [Music 131, 140-151] apply toward the degree, see University Credit Guidelines. College of Letters and Science degree requirements section. Faculty of the College of Letters and Science bylaws makes it possible for students to take more than 19 units of performance classes without those additional units counting toward the 225-unit cap on units.

Composition Honors Track ............... 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 6 units selected from: Music 140-151 ...... 6
Two quarters of Music 194H for a total of at least 6 units resulting in a Senior thesis ......................... 6
At least four-eight further units from:
Music History, Theory and Ethnomusicology Honors Track ............... 47
Music 123, 124A, 124B ......................... 9
Music 121 and/or 122 ................... 8
Music 131 (three quarters) ....................... 6
At least 6 units selected from:
Music 140-151 .............................................. 6
Two quarters of Music 194H for a total of at least 6 units resulting in a Senior thesis ......................... 6
At least 12 further units selected from:

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 3.000 or above and write a thesis or submit a portfolio that meets the criteria for high honors 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 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 end of their junior year. Interested students are urged to consult with faculty in their field early in their junior year.

Major Advisors. C. Reynolds (A-F), A. Triest (G-M), L. San Martin (N-Z)

Minor Program Requirements:  

Units  

A minimum of 16 units of upper division music courses ......................... 16
Courses chosen from:

Native American Studies

Changes to Major Program Requirements: Plan III  
(change—eff. fall 17)

Plan III—South American Emphasis ...... 20
Two courses from Native American Studies 107, 110A, 110B, 110C, 110D, 120 (Study Abroad) ................. 8
Two courses from: African Studies 107A, 155A, 163, 180, Anthropology 103, 144, 175, History 162, 165, Political Science 143A, Sociology 104, Spanish 170 170S, 171, 171S (Summer Abroad) .... 8
One course from History 1638, 164, 167, Political Science 143A ................. 4

Changes to Minor Program Requirements  
(change—eff. fall 16)

Minor Program Requirements:  
The Native American Studies minor provides an interdisciplinary introduction to the Native experience in the Americas through coursework in history, literature, art, performance, languages, values, philosophy, religion, current events, political economy, and the environment.

Natural Sciences

Changes to Major Admissions  
(change—eff. fall 17)

The Natural Sciences major is closed to on-campus transfers beginning 2017-2018. Students interested in exploring a career in math or science education are encouraged to consider coursework in the CalTeach/MAST program which include an exploration of effective teaching practices and methods and include an active internship in local K-12 and UC Davis classrooms. For additional information, see http://mast.ucdavis.edu.

Physics

Changes to Physics Major Requirements: A.B. & B.S.  
Materials Science Concentration, & Applied Physics—Physical Oceanography Concentration, (change—eff. fall 17)

Physics

A.B. Major Requirements:

Preparatory Subject Matter.............45-52
  Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE..................19-25
  Physics 80 ..............4

Depth Subject Matter .....................35-37
  At least one course from: 129A, 130A, 140A, 151, 152, or 153......4
  Physics 102 (1 unit) waived if 104B taken..........................0
  At least one additional fixed-unit upper division Physics course excluding 160...3-4

Total Units for the Major ...............80-86

B.S. Major Requirements:

Preparatory Subject Matter.............49-55
  Physics 9A, 9B, 9C or 9D or 9HA, 9HB, 9HC, 9HD, 9HE.............19-25
  Computer Science Engineering 30 (or equivalent programming course)....4
  Physics 80 ..............4

Depth Subject Matter .....................56-64
  Physics 102 (1 unit) or 104B ...........................................1
  Laboratory Requirement ..............4
  Physics 122A or 122B or 116A, B and C................................22
  Concentration Courses (complete all of the following)..............12
  Two courses from one specialty (General Relativity/ASTR Phys. Applications, Condensed Matter, or Nuclear/Particle Physics) and one course from a different specialty. Lists of courses in each specialty are available from the department.
  Additional upper division Physics courses excluding 160 for total of 15 upper division Physics courses of three or more units each. With prior departmental approval, one course from mathematics, engineering, or natural science may be used to meet this requirement. May include only one course from: 194H, 195, 196, 199..............................0-9

Total Units for the Major ...............108-117

Astrophysics Emphasis

Preparatory Subject Matter.............49-55
  Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE.............19-25
  Computer Science Engineering 30 (or equivalent programming course)....4
  Physics 80 ..............4

Depth Subject Matter .....................59-65
  Physics 102 or 104B ...........................................1
  Laboratory Requirement ..............4
  Physics 122A or 122B ...........................................1
  Concentration Courses..................................................4
  Additional Concentration Electives (choose four from the following)....16
  Electrical and Computer Engineering 110A, 110B, 140A, 140B, 150A, or 150B

Total Units for the Major ...............116-120

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 Curriculum Committee Chairperson.

Applied Physics—Physical Electronics Concentration

B.S. Major Requirements:

Preparatory Subject Matter.............53-59
  Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE.............19-25
  Computer Science Engineering 30 (or equivalent programming course)....4
  Physics 116C or 122A or 122B ...........................................4
  Concenation Courses (complete all of the following)..................12
  Physics 104B or 116C or 151; Geology 146 or 163; Atmospheric Science 120 or 121A or 121B

Total Units for the Major ...............106-115

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 Curriculum Committee Chairperson.

Applied Physics—Geophysics Concentration

B.S. Major Requirements:

Preparatory Subject Matter.............45-51
  Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE.............19-25
  Computer Science Engineering 30 (or equivalent programming course)....4

Depth Subject Matter..............60-61
  Laboratory Requirement ..............4
  Physics 122A or 116C or 116D; Geology 146 or 163; Atmospheric Science 120 or 121A or 121B

Total Units for the Major ...............105-112

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 Curriculum Committee Chairperson.

Applied Physics—Materials Science Concentration

B.S. Major Requirements:

Preparatory Subject Matter.............45-51
  Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE.............19-25
  Computer Science Engineering 30 (or equivalent programming course)....4

Depth Subject Matter..............57-60
  Physics 102 (1 unit) or 104B ...........................................1
  Laboratory Requirement ..............4
  Physics 122A or 116C or 116D; Geology 146 or 163; Atmospheric Science 120 or 121A or 121B

Total Units for the Major ...............102-111

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 Curriculum Committee Chairperson.

Applied Physics—Oceanography Concentration

B.S. Major Requirements:

Preparatory Subject Matter.............45-51
  Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE.............19-25
  Computer Science Engineering 30 (or equivalent programming course)....4

Depth Subject Matter..............63
  Laboratory Requirement ..............4
  Physics 122A or 116C or 116D; Geology 146 or 163; Atmospheric Science 120 or 121A or 121B
Concentration Courses ........................................ 23
Physics 105C, Atmospheric Sciences 120, 121A, 121B; Geology 116N, 150A
Additional Electives (choose one from the following) ........................................ 4
Physics 101B, 112 or 116C; Mathematics 118A or 118B
* Substitutions: Physics 102 is waived for students who take PHY 104B

Total Units for the Major .................. 108-114

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 Curriculum Committee Chairperson.

Political Science

Changes to Political Science A.B. & International Relations A.B. Major Requirements
(change—eff. fall 17)

Political Science

A.B. Major Requirements:

Preparatory Subject Matter ........................................... 24
Three lower division Political Science courses from: 1, 2, 3, 4, 5, 7, 11A-11D, 12A, 12B, 12C
One additional lower division Political Science course from: 1, 2, 3, 4, 5, 7, 11A-11D, 12A, 12B, 12C
Political Science 51 (required course) ...................................... 4
Statistics 13 or 32 ........................................ 4

Depth Subject Matter ........................................... 44-45
Four courses in one of the fields of concentration listed below ...................................... 16
Three courses in another field of concentration listed below ...................................... 12
Two courses in another field of concentration listed below ...................................... 8
Two other upper division courses in Political Science. Only five units of Political Science 192 may be counted toward the depth subject matter. ........................................ 8-9

Fields of Concentration

American Politics (courses with Political Science 1 is recommended): Political Science 100, 102, 104-109, 150-155, 160, 162-166, 168, 170-172, 174-176, 180, 183, 187, 193, 196A
Comparative Politics (courses with Political Science 2 is recommended): Political Science 126, 140A-140E, 142A-142C, 143A-143B, 144A-144B, 146A-146B, 147A-147D, 148A-148C, 179, 196B.
International Relations (courses with Political Science 3 is recommended): Political Science 120-124, 126, 129, 130-132, 134-137, 139, 190, 196C, International Relations 131.
Political Theory (courses with Political Science 4 is recommended): Political Science 110, 112-117, 118A-118C, 119, 187, 196D

Total Units for the Major .................. 68-69

International Relations

A.B. Major Requirements:

Preparatory Subject Matter ........................................... 28-54
Economics 1A or Anthropology 2 ...................................... 4
Economics 1B ...................................... 4
History 4C or 10C ...................................... 4
Political Science 3 ...................................... 4
Political Science 12Y or Statistics 13 or Sociology 468 ...................................... 4-5

Political Science 2 ...................................... 4
Political Science 51 ...................................... 4
Note: Preparatory Subject Matter courses do not cover all potential prerequisite courses for upper division curriculum.

Track IV: Peoples and Nationalities

Area Studies Requirement

Western Europe
History: History 140, 141, 142A, 144B, 145, 146A, 146B, 147B, 147C, 151D

Sociology

Changes to A.B. Degree Requirements; Law and Society emphasis
(change—eff. fall 17)

Law and Society emphasis:

Preparatory Subject Matter ........................................... 30
Sociology 1, 3, 4, 11, 46A & 46B ...................................... 8
Select from Anthropology 2, 20, Political Science 1, 3, 4, 7, 11

Depth Subject Matter ........................................... 43-44
Sociology 100 and 155 ...................................... 8
Select courses from the following categories: Individual Culture and Society: Sociology 125, 126, 135, 136, 137
Stratification and Socialization: Sociology 130, 132, 140, 144
Crime and Social Dynamics: Sociology 120, 150, 151, 152, 171 ...................................... 12

Psychology

Changes to Psychology Biological Emphasis B.S. Major Requirements
(change—eff. fall 17)

Biological Emphasis

B.S. Major Requirements:

Preparatory Subject Matter ........................................... 53-61
Psychology 1 or the equivalent ...................................... 4
Psychology 41 ...................................... 4
Statistics 13 or 106, 108 ...................................... 4
Statistics 130A, 130B ...................................... 8
Statistics 137 or 141 or 141A ...................................... 4
Three courses from: Statistics 104, 135, 137, 141, 141A, 141B or 141C, 144, 145, 160; Mathematics 168; one approved course of 4 units from Statistics 194HA, 194HB, or 199 may be used ...................................... 12
Three other upper division courses approved by major advisor; 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 quantitative aspects of the discipline.

Total Units for the Major .................. 73-74

Statistics

Changes to A.B. Major, B.S. Major, & Minor Requirements
(change—eff. fall 17)

A.B. Major Requirements:

Preparatory Subject Matter ........................................... 20-23
Computer Science Engineering 10 or 30 or 40 (or the equivalent) .............................. 4
Statistics 32 ...................................... 4

Depth Subject Matter ........................................... 45-48
Statistics 106, 108, 138 or the equivalent ...................................... 12
Statistics 130A, 130B ...................................... 8
Statistics 137 or 141 or 141A ...................................... 4
Three courses from: Statistics 104, 135, 137, 141, 141A, 141B or 141C, 144, 145, 160; Mathematics 168; one approved course of 4 units from Statistics 194HA, 194HB, or 199 may be used ...................................... 12
Three upper division courses approved by major advisor; 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 quantitative aspects of the discipline.

Total Units for the Major .................. 65-71

B.S. Major Requirements:

General Statistics Track

Preparatory Subject Matter ........................................... 31-32
Mathematics 21A, 21B, 21C, 21D, 26 ...................................... 16
Mathematics 22A or 67 ...................................... 3-4
Mathematics 25 ...................................... 4
Computer Science Engineering 10 or 30 or 40 (or the equivalent) .............................. 4
Any one introductory statistics course except Mathematics 168 or the equivalent ...................................... 4

Depth Subject Matter ........................................... 51-52
Statistics 131A, 131B, 131C ...................................... 12
Three courses from: Statistics 104, 135, 137, 141 or 141A, 141B, 141C, 144, 145, 160; Mathematics 168; one approved course of 4 units from Statistics 194HA, 194HB, or 199 may be used ...................................... 12
Mathematics 125A, 125B, 125C, and 167 ...................................... 12
Related elective courses ...................................... 4
One upper division course approved by major advisor; it should be in mathematics,
Preparatory Subject Matter.......................... 27-31
Mathematics 16A, 16B, 16C, or 17A, 17B, 17C, or 21A, 21B, 21C (21 series recommended)........ 9-12
Mathematics 22A........................................... 3
Computer Science Engineering 10 or 30 or 40 (or the equivalent)................................. 4
Two introductory courses serving as the prerequisites to upper division courses in a chosen discipline to which statistics is applied. 7-8
Any one introductory statistics course except Statistics 10................................................. 4

Depth Subject Matter.................................. 48-52
Statistics 130A-130B. 8
Three courses selected from Statistics 104, 135, 137, 141A or 141C, 144, 145, 160;
Mathematics 168; one approved course of 4 units from Statistics 194A or 194B, 199 may be used........................................ 12
Four upper division elective courses outside of Statistics. ................................. 12-16
Elective courses must be approved by the major advisor. 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................................. 75-83

Computational Statistics Track

Preparatory Subject Matter.......................... 27
Mathematics 21A, 21B, 21C, 21D ............. 16
Mathematics 22A ........................................... 3
Computer Science Engineering 60............. 4
Any one introductory statistics course except Statistics 10................................................. 4

Depth Subject Matter.................................. 52
Statistics 131A-131B. 8
Two courses from:
Statistics 104, 135, 137, 138, 144, 145, 160; one approved course of 4 units from Statistics 194A or 194B, 199 may be used........................................ 8
Two courses from: Mathematics 124, 128A,

Total Units for the Major................................. 79

Statistical Data Science Track

Preparatory Subject Matter.......................... 27
Mathematics 21A, 21B, 21C, 21D ............. 16
Mathematics 22A ........................................... 3
Computer Science Engineering 10 or 30 or 40....................................................... 4
One introductory statistics course except Statistics 10 (32 or 100 preferred)................. 4

Depth Subject Matter.................................. 52
Statistics 131A, 131B, 131C, 141A-141F........ 12
Statistics 135. 4
Statistics 160.................................................. 4
Computer Science Engineering 171........... 4
Mathematics 167 or 168............................. 4
Mathematics 167 or 168; one course from Statistics 104, 137, 138, 144, 145; Mathematics 129A; Computer Science Engineering 122A, 158, 163, 165A; one approved course of 4 units from Statistics 194A, 194B, or 199 may be used.

Total Units for the Major................................. 79

Major Advisor. Debasish Paul
Students are encouraged to meet with an advisor 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 advisor to plan the remainder of their undergraduate programs.

Minor Program Requirements: The Department offers a minor in Statistics that consists of five upper division level courses focusing on the fundamentals of mathematical statistics and of the most widely used applied statistical methods.

Sustainable Agriculture and Food Systems

Changes to B.S. Major Requirements

B.S. Major Requirements: UNITS
English Composition Requirement .......... 4-8
See College requirement, must include Communications 1.
Core Courses ...............................23-26
Plants Sciences 15 ........................................... 4
Community and Regional Development 20 .................................................. 4
Animal Science 112 or Plant Science 150 .................................................. 3-4
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, six of which must be completed off campus or must involve advanced responsibilities if on campus.

Applied Production ............................... 6-9
Select 1 course from: Animal Science 49A, Animal Science 49B or 49C, Animal Science 49D or 49E .................................................. 2-3
Select 1 course from: Applied Biological Systems Technology 49, 52, 101, 142, Food Science and Technology 530 .................................................. 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 Advisor. W. Harvath, Ph.D.

Preparatory Subject Matter ............. 60-61
Mathematics 22A ........................................... 3
Computer Science Engineering 10 or 30 or 40 (or the equivalent)................................. 4
Two introductory courses serving as the prerequisites to upper division courses in a chosen discipline to which statistics is applied. 7-8
Any one introductory statistics course except Statistics 10................................................. 4

Depth Subject Matter ............. 34-38
Agricultural and Resource Economics 120 or 147 .................................................. 3-4
Environmental Science and Policy 161 or 169 .................................................. 3-4
Soil Science 100 or Soil Science 109 .................................................. 4-5
Additional upper-division restricted electives chosen in consultation with the track faculty advisor. 20

Track II: Food and Society

Focuses on issues related to the social, cultural, political and community development aspects of agriculture and food systems.

Track II Advisor. R. Galt, Ph.D.

Preparatory Subject Matter ............. 57-64
Philosophy 5 or 31 .................................................. 4
Select one course from: Philosophy 14, 15, 24 .................................................. 4
Sociology 46B or Statistics 13.................................................. 4
Select at least one course from: Community and Regional Development 151, Landscape Architecture 150, Statistics 130, Sociology 106 .................................................. 3-6
Chemistry 2A .................................................. 5
Biological Sciences 2A or 10 .................................................. 5
Plant Sciences 2A .................................................. 4
Select one course from: Biological Sciences 2B or Environmental Science and Policy 1 or 30 or Wildlife, Fish, and Conservation Biology 10 or 11 .................................................. 3-5
Food Science 1 .................................................. 3
Soil Science 10 .................................................. 3
Economics 1A .................................................. 4
Political Science 4 .................................................. 4
Select one course from: Anthropology 2, Sociology 1, Sociology 3 .................................................. 4-5
Community and Regional Development 1, 2 .................................................. 8

Depth Subject Matter ............. 43-44
Agricultural and Resource Economics 112 or 150 .................................................. 4
Select 1 course from: Agricultural and Resource Economics 147, 176, Environmental Science and Policy 160, 161, 169, 172, 179 .................................................. 3-4
Choose 12 units from: Anthropology 101, Community and Regional Development 112, 142, 152, 155, 160, 160, 120 .................................................. 12
Additional upper-division restricted electives chosen in consultation with the track faculty advisor. 20

Courses & Programs are subject to change without notice.
Track III: Economics and Policy
Focuses on issues related to agricultural and resource economics, policy and management.
Track III Advisor: T. Tomich, Ph.D.

Preparatory Subject Matter .................................. 60-64
Mathematics 16A ................................................. 5
Mathematics 16B ................................................. 6
Sociology 46B or Statistics 13 .............................. 4
Select 1 course from: Agricultural and Resource Economics 106, Statistics 103, Sociology 106, Chemistry 2A, 2B, Biological Sciences 2A or 10 ..................... 5
Plant Sciences 2 .................................................. 4
Select 1 course from: Biological Sciences 28, Environmental Science and Policy 1, 30, Wildlife, Fish, and Conservation Biology 10, 11 ........................................... 3-5
Food Science 1 ............................................... 3
Soil Science 10 .................................................. 3
Economics 1A, 1B, 18 ......................................... 8
Political Science 4 ............................................. 4
Select 1 course from: Anthropology 2, Sociology 1, Sociology 3 ................................. 4-5
Community and Regional Development 1 .... 4
Select 1 course from: Philosophy 14, 15, 24 .................................................. 4

Depth Subject Matter ........................................... 43-44
Select 1 course from: Agricultural and Resource Economics 112, 150, 157 .......................... 4
Select 1:12 units from: Agricultural and Resource Economics 120, 130, 147, 176, Environmental Science and Policy 100, 161, 169, 172, 179 .......................... 11-12
Select 8 units from: Anthropology 101, Community and Regional Development 118, 142, 149, 152, Sociology 130, 160 .......................... 8
Additional restricted electives chosen in consultation with an advisor .................................. 20

Total units for the major ....................................... 140-163

Theatre and Dance

Changes to A.B. with Honors Major Requirements
(change—eff. fall 17)

A.B. with Honors Major Requirements:

Preparatory Subject Matter .................................. 24
Dramatic Art 28, 55, 56A, 56B, 56C, 56D .... 20
Choose 4 units from: Dramatic Art 21A, 40A, 40B, 42A, 42B .................................................. 4

Depth Subject Matter .......................................... 56
Two courses from: Dramatic Art 142, 150, 155, 155A, 156A, 156B, 156C, 156D, 158, 159 ....................................... 8
One course from Drama Art 120, 141, 144A, 146A .................................................. 4
One course from: Dramatic Art 127A, 140A, 160A .................................................. 4
Choose 2 units from at least 2 of: Dramatic Art 145, 180A, 180B, 180C .................................................. 6
Dramatic Art 180D ............................................. 4

Viticulture and Enology

Changes to B.S. Major Requirements
(change—eff. fall 17)

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 advisor approval .................................................. 0-3
Mathematics 16A or 16B .................................. 6
Physics 1A, 1B or 7A ........................................ 6
Viticulture and Enology 23, 125, 126, 125, 125, 125 .......................... 15
Deph Subject Matter .......................................... 48-54
Biological Sciences 102, 103 or 105, 36 ........................................... 4
Microbiology 102, 103L or 101 ........................................... 5
Plant Sciences 120 or Statistics 106 .............. 4
Viticulture and Enology 101A, 101B, 101C, 110, 118 .................................................. 15
Viticulture and Enology 123, 125, 126, 125, 125, 125 and in consultation with the advisor, choose 3 of the following courses: 123L, 124L, 125L, 126L, 127L, 128L .......................... 16
If more than 3 are taken, the extra courses will count as restricted electives in Area B .......................... 21-22
Restricted Electives ........................................... 28

In consultation with advisor, choose 28 units from the following five areas. At least 12 units must be from one of the following areas: (A) Plant Science; (B) Food Science and Microbiology; or (C) Economics and Business.

(A) Plant Science area: Applied Biological Systems Technology 130 Atmospheric Science 133, Biological Sciences 101, Biotechnology 160, Entomology 110, Hydrologic Science 110, Molecular and Cellular Biology 126, Botany 100, Botany 111, 112, 123, 143, Plant Pathology 120, Plant Sciences 154, 157, 158, 171, 176, Soil Science 100, 102, 109, 118, Viticulture and Enology 111.

(B) Food Science and Microbiology area: Biological Sciences 101, Food Science and Technology 150, Food Science 102, 104, 104I, 109, 110, 110L, 127, Microbiology 140, 150, 155L, Viticulture and Enology 140.


Restricted Electives ........................................... 12-24

Choose one from the four Areas of Specialization shown below. No course can be used to simultaneously satisfy the Depth Subject Matter and the Area of Specialization.

Areas of Specialization

Wildlife, Fish, and Conservation Biology

Changes to B.S. Major Requirements
(change—eff. fall 16)

B.S. Major Requirements:

Preparatory Subject Matter .................................. 50-51
Biological Sciences 2A, 2B, 2C ........................................... 15
Chemistry 2A, 2B, 8A, 8B ........................................... 16
Mathematics 16A, 16B ........................................... 6
Physics 1A, 1B ........................................... 6
Statistics 100, 102, or Plant Sciences 120 ........................................... 8
Wildlife, Fish, and Conservation Biology 10, 11, or 50 .................................................. 3-4

Depth Subject Matter .......................................... 45-50
Students graduating with this major are required to attain at least a C average (2.00) in all courses taken at the university in depth and area of specialization subject matter.

Environmental Science and Policy 100 or Evolution and Ecology 101 ........................................... 4
Evolution and Ecology 100 ........................................... 4
Biological Sciences 101 ........................................... 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, 110L, 111, 111L, 120, 120A, or 134, 134L; 14-15
Wildlife, Fish, and Conservation Biology 100, or 101 & 101L, or 102 & 102L; 47
Strongly recommended, but not required, Statistics 104, 106, or 108 ........................................... 4
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 to simultaneously 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 & 112L 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 158.
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 advisor 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 .......... 115-133

Major Advisor. N.A. Fangue