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.
### Version History

The Version History records each version and the changes made for that version. Click on the blue department name to go directly to the department.

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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: AfrHum, Div, WrtAH; SS, WC, WE.—W. (W.) Adebanwi, Adejunmol (change in existing course—eff. fall 17)

Upper Division
107B. African Descent Communities and Culture in North America (4)
Lecture—4 hours. Prerequisite: upper division standing. Study of the origin and development of African descent communities and cultures in the U.S.A., Canada, and Mexico. GE credit: AfrHum or SocSci, Div, WrtAH or SS, DD—F, W, (F, W) White (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 or Economics 1AV C- or better; Economics 1B C- or better, Mathematics 16A C- or better or Mathematics 17A-B C- or better or Mathematics 21A C- or better, Mathematics 21B C- or better. Pass One open to Managerial Economics (AMGE), Animal Science and Management (AAMN), and Textiles and Clothing (ATTXC) Majors and Agricultural and Resource Economics (GARE), International Agricultural Development (GIAD), Viticulture and Enology (GVEN) and Transportation Technology and Policy (TTTP) Graduate Majors. Theory of individual consumer and market demand; theory of production and supply of agricultural products, with particular reference to the individual firm; 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. winter 18)

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 conditions of monopoly, oligopoly, and monopolistic competition. GE credit: SocSci/QL, SS.—F, W, S, Su. (F, W, S, Su) (change in existing course—eff. winter 18)

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)
Lecture—4 hours. Prerequisite: upper division standing. Pass One restricted to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Role of organizational design and behavior in business and public agencies. Principles of planning, decision making, individual behavior, management, leadership, informal groups, conflict and change in the organization. GE credit: SocSci/QS.—F, W, S, Su. (F, W, S, Su) (change in existing course—eff. fall 17)

113. Fundamentals of Marketing Management (4)
Lecture—4 hours. Prerequisite: Economics 1A or Economics 1AV; for non-majors only. Nature of product marketing by the business firm. Customer-product relationships, pricing and demand; new product development and marketing strategy; promotion; product and advertising; product life cycles; the distribution system; manufacturing, wholesaling, retailing, Government regulation and restraints. Not open for credit to students who have completed course 136. Offered irregularly. GE credit: SocSci/QS. (change in existing course—eff. winter 18)

115A. Economic Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A or Economics 1AV, Economics 1B. Major issues encountered in emerging from international poverty, problems of growth and structural change, human welfare, population growth and health, labor markets and internal migration. Important issues of policy concerning international trade and industrialization. (Same course as Economics 115A) GE credit: SocSci/Dv1/SS, WC.—F, W, (F, W, S) (change in existing course—eff. winter 18)

120. Agricultural Policy (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A C- or better. Pass One open to Managerial Economics (AMGE), Animal Science and Management (AAMN) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Analytical treatment of historical and current economic problems and governmental policies influencing American agriculture. Uses of economic theory to develop historical and conceptual understanding of the economics of agriculture; how public policy influences the nature and performance of American agriculture. GE credit: SocSci/ACGH, SS.—S. (2) (change in existing course—eff. winter 18)

121. Economics of Agricultural Sustainability (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Economics 1A or Economics 1AV, 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 policies, agricultural trade, product differentiation, all linked to sustainability issues. Case studies include biofuels, genetically modified foods and geographically differentiated products. GE credit: SocSci/QS. (change in existing course—eff. winter 18)

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.

139. Futures and Options Markets (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A or better; Statistics 103 or better. Pass One open to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. History, mechanics, and economic functions of futures and options markets; hedging; theory of inter-temporal price formation and behavior of futures and options prices. Price forecasting, futures and options as policy tools. GE credit: SocSci SS—F, S. (F, S.) (change in existing course—eff. winter 18)

140. Farm Management (4) Lecture—4 hours. Prerequisite: Economics 1A or Economics 1AV. Pass One open to Managerial Economics (AMGE) Majors and Form organization and research; economic and technological principles in decision making; analytical techniques and management control; problems in organizing and managing the farm business. GE credit: SocSci SS—W. (W.) (change in existing course—eff. winter 18)

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)

155. Operations Research and Management Science (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A or better; Statistics 103 or better. Pass One open to Managerial Economics (AMGE) and Animal Science and Management (AANM) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Introduction to quantitative methods used to analyze business and economic processes: decision analysis for management, mathematical programming, competitive analysis, and other methods. GE credit: SocSci SS, QL, F, W, S, Su. (F, W, S, Su.) (change in existing course—eff. spring 17)

150. Agricultural Labor (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A or better. Pass One open to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Analysis of labor markets with focus on U.S. and world agriculture. Labor supply, demand, market equilibrium; why farm labor markets are different; global trends in farm labor; U.S. farm labor history; unions and collective bargaining; immigration policy. GE credit: SocSci, Div, Wtr1SS—S. (S.) (change in existing course—eff. winter 18)

165. Emerging Economies and Globalization (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A or better; course 115A; course 115B; completion of course 106 and Economics 162 strongly recommended. Pass One open to Managerial Economics and graduate majors. Economic drivers and policy challenges in the major emerging markets, with an emphasis on the effects of rising incomes, population growth, urbanization, and relative wages on world markets and natural resources. GE credit: SocSci SS—F. (F) (change in existing course—eff. winter 18)

166. The Economics of Global Poverty Reduction: What Works and Why (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 100B or Economics 100; course 106 or Economics 140; course 115A or Economics 115A. Pass One open to Managerial Economics (AMGE) and Economics (LECN) majors only. Application of micro-economic theory and econometrics to understand causes of poverty and critically evaluate poverty alleviation policies in low income countries. GE credit: SocSci SS, QL—S. (S.) (new course—eff. spring 17)

171A. Financial Management of the Firm (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 106; Management 11A/11B. Pass One open to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Financial analysis at the firm level: methods of depreciation; influence of the tax structure; inventory, cash, and accounts receivable management; sources of short-term and long-term financing; and financial problem solving using a computer spreadsheet program. Not open for credit to students who have completed Economics 134. GE credit: SocSci QL, SS—F, W, Su. (F, W, Su.) (change in existing course—eff. winter 17)

171B. Financial Management of the Firm (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 171A. Pass One open to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Financial analysis at the firm level: methods of capital budgeting; calculating the cost of capital; dividend policies; mergers and acquisitions; and special current topics in finance. GE credit: SocSci QL, SS—W, S, Su. W, S, Su.) (change in existing course—eff. winter 17)

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

176. Environmental Economics (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 100B or Economics 100. Pass One open to Managerial Economics (AMGE) Majors and Agricultural and Resource Economics (GARE) Graduate Majors. Role of the environment in economic activity and methods for protecting and enhancing environmental quality; implications of market failures for public policy; design of environmental policy; theory of welfare measurement; measuring the benefits of environmental improvements. GE credit: SocSci SS—W. (W.) (change in existing course—eff. winter 17)

American Studies

New and changed courses in American Studies (AMS)

Lower Division

55. Food in American Culture (4) Lecture—3 hours; discussion—1 hour. Relationship between food and culture; relationship between food and the social order; influences on eating habits and the tensions between them including identity, convenience, and responsibility; multiple disciplines and genres. (Same course as Food Science & Technology 55.) GE credit: ArtHum and SocSci, Div, Wtr1ACGH, AH or SS, DD, WE—W. (W) Blitzkoef (change in existing course—eff. winter 18)

Upper Division

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

120. American Folklore and Folklife (4) (cancelled 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, S) (change in existing course—eff. winter 17)

Animal Behavior

New and changed courses in Animal Behavior (ANB)

Graduate

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

Animal Biology

New and changed courses in Animal Biology (AB1)

Upper Division

189. Senior Practicum (2) Independent study—6 hours. Prerequisite: course 50A; course 50B; course 187; junior standing. The practicum may be an experimental research project, a library research project or some other creative activity that will serve as a capstone
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, operations 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.

135. Production Animal Laboratory (3)
Lecture/discussion—1 hour; laboratory—3 hours; fieldwork—3 hours. Prerequisite: Animal Biology 102; Animal Biology 103; Neurobiology, Physiology, and Behavior 101 or course 100. Pass One restricted to Animal Science and Animal Science and Management students. Biochemical methods for developing and conducting research with production animals, and interpreting and presenting data. Laboratory focus course which uses sheep as model. There may be one or two mandatory all day Saturday field trips. GE credit: SciEng|SE.—F. (F.) Sainz
(new course—eff. spring 17)

136. Techniques and Practices of Fish Culture (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: course 2, Biological Sciences 2A; Biological Sciences 2B; Biological Sciences2C; Chemistry 8A and Chemistry 008B or Chemistry 118A and Chemistry 118B. Restricted to upper division standing. Daily care and maintenance of fish in residential aquaria, 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, Wrt|QL., SL., VL., WE.—F. (F.) Hung
(change in existing course—eff. winter 17)

137. Techniques and Practices of Avian Culture (3)
Lecture—1 hour; laboratory—6 hours. Prerequisite: course 2, Biological Sciences 2A, 2B, 2C, Chemistry 8A and 8B or 118A and 118B. Restricted to upper division standing. Daily care and maintenance of birds for research, commercial production and companion or hobby uses. Biological and environmental factors important to sound management of birds. Laboratories focus on bird husbandry, management and care and include growth trials and biochemical assays. Not open for credit to students who have previously completed course 136B or 137. GE credit: SciEng, Wrt|QL., SE., SL., VL., WE.—S. (S.) Hung
(change in existing course—eff. winter 17)

147. Dairy Processing and Marketing (3)
Lecture—2 hours; laboratory—3 hours. Prerequisite: course 2 or consent of instructor. Restricted to upper division standing. Examination of distribution systems, processing practices, product quality, impact of governmental policy (domestic and foreign), marketing alternatives and product development. GE credit: SciEng|SE.
(change in existing course—eff. winter 17)

Anthropology

New and changed courses in Anthropology (ANT)

Lower Division
1Y. Human Evolutionary Biology (Hybrid Version) (4)
Web virtual lecture—1.5 hours; lecture/discussion—1.5 hours; discussion/laboratory—1 hour. Evolutionary theory and mechanisms of evolution; basic population and quantitative genetics; primatology; biological and cultural diversity within Homo sapiens; paleoanthropology. Students may not take both course 1 and course 1Y for credit. GE credit: SE., SL., WE.—W. (W.) Weaver
(change in existing course—eff. winter 17)

2. Cultural Anthropology (5)
Lecture—3 hours; discussion—1 hour; term paper. Introduction to cultural diversity in its many forms and methods used by anthropologists to account for it. Relational dynamic of culture, history, and power in constituting “social facts” and “realities.” Critical thinking of contemporary concerns. GE credit: SocSci, Div, Wrt|A|CH|H, DD, SS., WC, WE.—F. W., S.. (F., W., S.)
(change in existing course—eff. winter 17)

15. From Birth to Death: The Evolution of the Human Life Cycle (5)
Lecture—3 hours; discussion—1 hour; term paper—3 hours. Introduction to the biology of birth, childhood, marriage, the family, old age, and death. Examines comparative characteristics of nonhuman primates and other animals as well as cross-cultural variation in humans by study of selected cases. GE credit: SciEng, Div, Wrt|SE., SL., VL., WE.—F. (F.) Crofoot
(change in existing course—eff. winter 18)

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 125J. Offered in alternate years. GE credit: SocSci, Div i | SS., WC, WE. GE credit: SocSci, Div|SS, WC, WE.
(change in existing course—eff. winter 17)

133. 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, social media, hologram, algorithm, remediation, curation, animation. GE credit: AH or SS. (S)—Elhai

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. Wt/SS, WC, WE—de la Cerna

147. 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 131B and Cinema & Technocultural Studies 146B) Offered in alternate years. GE credit: SocSci/AAH, SS, VL, WC. (new course—fall 17)

181. Field Course in Archeological Method (9)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 3; or consent of instructor. Fieldwork—18 hours; lecture/discussion—2 hours. Prerequisite: course 3. Survey of archeological field methods and techniques for survey and site location, mapping of artifacts and features, geophysical techniques, and hand excavation and analysis of stratigraphy. GE credit: SciEng/DE, SE, SL, SS—S (S). (new course—fall 17)

181L. Field Course in Archeological Methods (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 181; or consent of instructor. On-site course using archaeological methods and techniques held at a field location in the western United States, generally California or Nevada. Incorporates basic methods of archaeological survey, mapping, and excavation. GE credit: GE—Su. (Su.) (new course—spring 17)

191. Topics in Anthropology (4)
Lecture/discussion—3 hours; term paper. Prerequisite: upper division standing. Intensive treatment of a special anthropological topic or problem. May be repeated for credit.

210. Intermediate Topics in Cultural Ecology (4)
cancelled course—fall 17

Applied Biological Systems Technology

New and changed courses in Applied Biological Systems Technology (ABT)

Upper Division

150. Introduction to Geographic Information Systems (4)
Lecture—3 hours; laboratory—3 hours. Pass One restricted to Landscape Architecture and Sustainable Design majors. Basic concepts, principles, and methods of GIS are presented. Data structures, database design, GIS data creation, GPS, and spatial analysis. Not open for credit to students who have completed Applied Biological Systems Technology 180/Plant Sciences 180 or Applied Biological Systems Technology 191N. (Same course as Landscape Architecture 150.) GE credit: SciEng/SE, VL—F. (F) Greco, Upadhyaya

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, geocodification, surface models, analysis, and spatial data visualization. Offered in alternate years. GE credit: SE—VL, WC—Hijmans

Graduate

212. Path to Zero Net Energy (4)
Lecture—3 hours; term paper/discussion—3 hours. Prerequisite: Engineering; Biological Systems 216; or consent of instructor. Open to upper division or graduate students. Zero Net Energy concepts and social, technical, economic, and environmental considerations. Multidisciplinary research and analysis for clients.—S. (S) Kornbluth

218L. Field Course in Archeological Methods (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 181; or consent of instructor. On-site course using archaeological methods and techniques held at a field location in the western United States, generally California or Nevada. Incorporates basic methods of archaeological survey, mapping, and excavation. GE credit: GE—Su. (Su.) (new course—fall 17)

21A. Accelerated Intermediate Intensive 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 ARB 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/AAH, VL—Su. (Su.)

221C. Colloquial Egyptian Arabic (4)
Lecture/discussion—3 hours; lecture/laboratory—3 hours. Prerequisite: course 3; or consent of instructor. Continuation of the Colloquial Egyptian Arabic covered in the first year of Arabic; courses 1, 2, and 3. May be repeated for credit up to one time if instruction material changes. GE credit: ArtHum/AAH, VL—W. (W) Hassouna, Radwan, Sharlet

22L. Colloquial Levantine Arabic (4)
Lecture/discussion—4 hours. Prerequisite: course 3; or consent of instructor. Continuation of colloquial Levantine Arabic presented in Arabic 21, 22, and 3. Integrate presentation of speaking and listening skills in colloquial Levantine Arabic, with reading and writing in Modern Standard Arabic that is related to Levantine cultural production and social life. GE credit: ArtHum, Divi/AAH, VL—W. (W) Hassouna

22C. Colloquial Egyptian Arabic (4)
Lecture/discussion—3 hours; lecture/laboratory—1 hour. Prerequisite: course 21C, or consent of instructor. Continuation of the Colloquial Egyptian Arabic covered in first year of Arabic; courses 1, 2, and 3 and the first quarter of Colloquial Arabic course 21C. May be repeated for credit up to one time if instruction material changes. GE credit: ArtHum/AAH, VL—W. (W) Hassouna, Radwan, Sharlet

22L. Colloquial Levantine Arabic (4)
Lecture/discussion—4 hours. Prerequisite: course 21L, or consent of instructor. Continuation of colloquial Levantine Arabic presented in Arabic 202L. Integrated presentation of speaking and listening skills in colloquial Levantine Arabic; reading and writing in Modern Standard Arabic related to Levantine social life. Offered in alternate years. GE credit: ArtHum, Divi/AAH, VL—W. (W) Hassouna, Radwan, Sharlet

22C. Colloquial Levantine Arabic (4)
Lecture/discussion—3 hours; lecture/laboratory—1 hour. Prerequisite: course 22C, or consent of instructor. Continuation of Colloquial Egyptian Arabic covered in course 22C. May be repeated for credit up to one time if instruction material changes. GE credit: ArtHum/AAH, VL—W. (W) Hassouna, Radwan, Sharlet

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

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

(new course—fall 17)

22L. Colloquial Levantine Arabic (4)
Lecture/discussion—4 hours. Prerequisite: course 3; or consent of instructor. Continuation of colloquial Levantine Arabic presented in Arabic 1, 2, and 3. Integrated presentation of speaking and listening skills
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 metaphors 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. (F.) Grigor (new course—eff. fall 16)

148. Theory and Criticism: Painting & Sculpture (4)
Lecture—2 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 48.) Offered in alternate years. GE credit: ArtHum, Wrt1AHI, VL, WE.—Pardee (change in existing course—eff. winter 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, individual and state, for the free market versus art for the state, expressions of modernity. China on the world stage. Offered in alternate years. GE credit: ArtHum, Div, Wrt1AHI, VL, WC, WE.—Burnett (change in existing course—eff. 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, Div, Wrt1AHI, VL, WC, WE.—Roller (change in existing course—eff. spring 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 debates and to cultural, economic, technological and environmental change. Offered in alternate years. GE credit: ArtHum, Div, Wrt1AHI, VL, WE. (change in existing course—eff. 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 artists since 1970. Topics explore contemporary thought within the visual arts using the forms and strategies of painting, sculpture, installation, performance, photography, and video in collaborative, ephemeral and multimedia approaches. Intended for Art and non-Art majors. GE credit: ArtHum/ART, VL. (change in existing course—eff. winter 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/ART, VL.—Pardee (new course—eff. fall 17)

105B. Advanced Drawing: Figure (4)
Studio—6 hours. Prerequisite: course 103A or course 103B; course 2. Pass One restricted Art Studio majors. Study of the figure through drawing of the model. Exploration of different methods and process of figure-drawing. May be repeated for credit one time. GE credit: ArtHum/ART, VL.—Pardee, Werfel (change in existing course—eff. winter 18)

114A. Intermediate Video: Animation (4)
Studio—6 hours. Prerequisite: course 12 or Cinema & Technocultural Studies 20; one drawing course. Pass One restricted to Art Studio majors. Exploration of animation. Relationship between drawing, digital stills, and multiple images. Animation using traditional drawing techniques, collage, and digital processes. May be repeated for credit one time. GE credit: ArtHum/ART, VL.—Martin (change in existing course—eff. winter 18)

14B. Intermediate Video: Experimental Documentary (4)
Studio—6 hours. Prerequisite: course 12 or Cinema & Technocultural Studies 20. Pass One restricted to Art Studio majors. Experimental documentary practice. Use of interviews, voice-overs, and still and moving images. Production of alternative conceptual and visual projects. May be repeated for credit one time. GE credit: ArtHum/ART, VL.—Martin (change in existing course—eff. winter 18)

14C. Intermediate Video: Performance Strategies (4)
Studio—6 hours. Prerequisite: course 12 or Cinema & Technocultural Studies 20. Pass One restricted to Art Studio majors. Use of video to explore performative art production. Exploration of improvisation, direction, projection, and image processing in real time. May be repeated for credit one time. GE credit: ArtHum/ART, VL.—Martin (change in existing course—eff. winter 18)

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/ART, VL.—Rosen (change in existing course—eff. spring 17)

Professional
401. Museum Training: Curatorial Principles (4)

Asian American Studies

New and changed courses in Asian American Studies (ASA)

Lower 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, Div, Wrt1ACGH, AH or SS, DD, OL, WE. (change in existing course—eff. spring 17)

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

Astronomy

New and changed courses in Astronomy (AST)

Lower Division
10L. Observational Astronomy Laboratory (1)
Laboratory—2.5 hours. Not open for credit to students who have taken Astronomy 2 or Astronomy 10. Introduction to observations of the night sky using small telescopes in nighttime laboratory. Not open for credit to students who have completed course 2 or 10. GE credit: SciEng/SE, VL.—F, W, S. (F, W, S.) Boeshaar (change in existing course—eff. winter 18)

25. Introduction to Modern Astronomy and Astrophysics (4)
Lecture—3 hours; discussion/laboratory—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 10L. GE credit: SciEng/SE, SL, VL.—F, W, S. (F, S.) Fassnacht, Lubin (change in existing course—eff. spring 17)
Atmospheric Science

New and changed courses in Atmospheric Science (ATM)

Upper Division

111. Weather Analysis and Prediction (3)
Lecture—3 hours. Prerequisite: course 110; course 121B; course 111L (can be concurrent) or course 111F (can be concurrent); knowledge of a programming language. Tools for analyzing observed properties of mid-latitude weather systems. The analysis-forecast cycle, including various weather forecast models. General properties of mid-latitude weather systems. Offered in alternate years. GE credit: SciEng/QL, SE, VL.—W. Grotjahn (change in existing course—eff. winter 18)

116. Modern Climate Change (4)
Lecture—3 hours. Factors that determine the Earth’s climate, including natural and human-caused changes. Impacts of climate change. Possible future climates and policies to reduce human emissions of greenhouse gases. GE credit: SciEng/QL, SE, SL, VL.—S. (F.) Anastasio (change in existing course—eff. fall 17)

149. Air Pollution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21D, Mathematics 22B; Chemistry 2B C- or better; Atmospheric Science 121A or Engineering 103 C- or better or Civil and Environmental Engineering 100 C- or better. Physical and technical aspects of air pollution. Emphasis on geophysical processes and air pollution meteorology as well as physical and chemical properties of pollutants. (Same course as Civil and Environmental Engineering 149) GE credit: SciEng/QL, SE, SL.—F. (F.) Cappa (change in existing course—eff. winter 18)

Avian Science

New and changed courses in Avian Science (AVS)

Lower Division

13. Birds, Humans and the Environment (3)
Lecture—2 hours; discussion—1 hour. Restricted to students with lower division standing. Interrelationships of the worlds of birds and humans. Lectures, discussions, field trips and projects focus on ecology, avian evolution, physiology, reproduction, flight, behavior, folklore, identification, ecotolog- ical and conservation. Current environmental issues are emphasized. Half-day field trip. GE credit: SciEng, WRI, QL, SL.—S. (S.) Marcu (change in existing course—eff. winter 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)

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 across scales 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. Su. (F. W. Su. Su.) (change in existing course—eff. fall 17)

11L. Basic Life Sciences Laboratory (1)
Laboratory—3 hours. Prerequisite: consent of instructor. Limited to Biology Undergraduate Scholars Program (BUSP) students. Basic laboratory skills in life sciences research, including microbiology, molecular biology, and genetics.—S. (F.) Conners (change in existing course—eff. winter 18)

Upper Division

101. Genes and Gene Expression (4)
Lecture—4 hours. Prerequisite: course 2A C- or better; course 2B C- or better; Chemistry 8A or Chemistry 118A or Chemistry 128A, Statistics 13 or Statistics 130A or Statistics 130B or Statistics 130C or Statistics 100 or Statistics 102 or Statistics 130A or Statistics 100 preferred. Nucleic acid structure and function; gene expression and its regulation; replication; transcription and translation; transmission--genetics; molecular evolution. GE credit: SciEng/QL, SE, SL.—F. W. Su. (F. W. Su. Su.) Brady, Comai, Dvorak, Ellefson-Crowder, Engbercht, Klibenstein, Langley, Lott, Nord, Rodriguez, Ross-ibera, Turelli (change in existing course—eff. winter 18)

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 neuroscience. Emphasis on understanding models, their assumptions, and implications for modern biology. GE credit: SciEng, WRI, 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. Su. (F. W. Su.) Marcu (new course—eff. fall 16)

Biophysics

New and changed courses in Biophysics (BPH)

Graduate

241. Membrane Biology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 102, 103, 104 or consent of instructor. Advanced topics on membrane biochemistry and biophysics. Relationship of the unique properties of biomembranes to their roles in cell biology and physiology.—S. (F.) Crowe, Longo, Voss (change in existing course—eff. winter 17)

255. Nanoscale Imaging for Molecular Medicine (3)
Lecture/discussion—3 hours. Prerequisite: Biomedical Engineering 202 highly recommended; graduate standing. Current and emerging technologies to visualize biological structures and processes at size scales ~ 100 nanometers and their application towards the advancement of molecular medicine. Technologies include superresolution optical microscopy, electron microscopy and tomography. Emphasis on quantitative imaging. Same course as Biomedical Engineering 255.—S. (F.) Cheng, Chuang (change in existing course—eff. spring 17)

271. Optical Methods in Biophysics (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: Biological Sciences 102, Applied Science Engineering 103B; Chemistry 100A; or equivalents. Principal optical techniques used to study biological structures and their related functions. Specific optical techniques useful in the studies of protein-nuclear acid, protein-membrane and protein-protein interactions. Biomedical applications of optical techniques. (change in existing course—eff. spring 17)

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 models of organization, dynamics and energy dissipation, molecular transport, motility, regulation, and adaptability. Same course as Materials Science and Engineering 288 and Biomedical Engineering 288.—W. (W.) Parkh (new course—eff. winter 17)

Biotechnology

New and changed courses in Biotechnology (BIF)

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.) Yoder (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. Su. (F. W. Su.) (new course—eff. fall 16)

Upper Division

150. Applied Bioinformatics (4)
Lecture—2 hours; laboratory/discussion—2 hours. Prerequisite: Biological Sciences 110; 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 instructors. Limited enrollment. Concepts and programs needed to apply bioinformatics in biology 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/QL, SE, VL.—Runcie (change in existing course—eff. winter 17)

General Education (GE): AH—Arts and Humanities; SE—Science and Engineering; LS—Social Sciences. AGCH—American Cultures; DD—Domestic Diversity; OL—Oral Skills; SL—Scientific; VL—Visual; WC—World Cultures; WE—Writing Experience.
Biotechnology; Design Emphasis

New and changed courses in Biotechnology; Design Emphasis (DEB)

Graduate

282. Biotechnology Internship (7-12)
Internship—21-36 hours. Prerequisite: graduate standing and consent of instructor. Open only to students participating in the Designated Emphasis in Biotechnology program. Research at a biotechnology company or interdisciplinary cross-college lab for a minimum of 3 months as part of the Designated Emphasis in Biotechnology Program.—F, W, S. Su. (F. W. S. Su.) Danevak, Kjelstrom (new course—eff. winter 17)

294. Current Progress in Biotechnology (1)
Seminar—3 hours. Prerequisite: graduate standing. Seminars presented by guest lecturers on subjects of their own research activities. May be repeated for credit. Prerequisite as Same: Use as Chemical Engineering 294.) (S/U grading only)—F, W, S, F. W, S) Kjelstrom, McDonald, Rodriguez (change in existing course—eff. winter 18)

Business Analytics

New and changed courses in Business Analytics (BAX)

Professional

401. Introduction to Business Analytics (2)
Lecture—2 hours. Introduction to the process of analyzing raw data to gain profitable business insight. Applications selected across organizational functions include prediction, process improvement, and general operational decision-making. (new course—eff. fall 17)

402. Organizational Issues in Implementing Analytics (2)
Lecture—2 hours. Review the evolution of analytics in business, how to assemble and manage analytics teams, and the decision life-cycle. Emphasis on structuring communications to improve buy-in from peers and non-quantitatively-inclined colleagues. (new course—eff. winter 18)

403. Organizational Effectiveness Workshop (2)
Lecture—2 hours. Examine leadership, communication, and project management within the business, legal and social contexts in which analytics is applied. Emphasis on privacy, data security, responsibility, and ethics.—F. (F) (new course—eff. fall 17)

411. Problem Structuring (2)
Lecture—2 hours. Synthesize data-rich business challenges using analytic frameworks and techniques for modeling business problems. Emphasis on modeling uncertainty, optimizing multiple criteria, and building consensus.—F. (F) (new course—eff. fall 17)

421. Data Management (2)
Lecture—2 hours. Introduction to the extraction, assembly, storage and organization of data in IT systems.—F. (F) (new course—eff. fall 17)

422. Big Data (2)
Lecture—2 hours. Introduction to business applications involving standard, streaming, and network data. Emphasis on scalable technologies for processing and analyzing big data for diverse applications.—F. (F) (new course—eff. fall 17)

423. Data Design and Representation (2)
Lecture—2 hours. Students learn computational reasoning about data representations by mapping conceptual data models to relational structures and analyzing database architectures and design trade-offs.—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. Standard (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. Students 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 reasoning using maximum likelihood estimation, Bayesian 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. Using spreadsheets and specialized modeling tools, explore structured problem solution through meta-heuristics, Monte Carlo simulation, and mathematical optimization.—F. (F) (new course—eff. fall 17)

452. Machine Learning (3)
Lecture—3 hours. Construct algorithms for learning from data and analyze the process for deriving business intelligence. Coverage of supervised and unsupervised learning, neural networks, etc.—F. (F) (new course—eff. fall 17)

453. Application Domains (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/operations analytics, and marketing analytics.—F. (F) (new course—eff. winter 17)

461. 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 solution approach for the core problem, and assess data quality and project risks.—F. (F) (new course—eff. fall 17)

462. Practicum Elaboration (2)
Lecture—2 hours. Building on problems chosen in course 461, teams refine the business opportunity and draw insights from exploratory data analysis.—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 prototypes. Offered irregularly.—F. (F) (new course—eff. fall 17)

464. Practicum Implementation (4)
Lecture—2 hours; project—2 hours; term paper—2 hours; discussion—1 hour. Project teams complete analysis, plan deployment and obtain client buy-in. The course culminates in a project presentation, preferably including representatives from the client organization.—F. (F) (new course—eff. fall 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/laboratory—4 hours. Prerequisite: Biological Sciences 104. Limited enrollment. 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 demonstrating 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/laboratory—3 hours. Open to graduate students in the biomedical sciences (no consent required); advanced undergraduates seeking research careers in the biomedical sciences (consent of instructor required). The growing importance of the use of gene knock-out studies and imaging technology requires significant understanding 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)
cancelled 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) SAT Mathematics score = 600+; (B) ACT Mathematics score = 27+; (C) AP Chemistry exam score of 3+; (D) SAT Chemistry subject test score = 700+; (E) UC Davis Chemistry Placement Examination score = 24+ on first attempt; in lieu of A-E, either completion of ALEKS online Pre-
paratory Chemistry course with 100% Pie Mastery or completion of Workload 4IC with a grade of C or better. Workload is defined in full quarter only to students who do not meet A-E. Periodic table, stoichiometry, chemical equations, physical properties and kinetic theory of gases, atomic and molecular structure. Not open for credit in fall quarter only to students who have completed course 118C. GE credit: SciEng (OL, SE, SL; F, W, F, W) (change in existing course—eff. fall 16)

Upper Division

103A. Chemistry for Life Sciences: Determining Organic Structures and Properties (5)
Lecture—3 hours; discussion—1 hour; laboratory—1 hour. Prerequisite: course 2C C- or better or course 2CH C- or better; course 8A or 118A or 128A. Continuation of course 3C. Core concepts of organic structure, nomenclature, functional groups, organic acids and bases, resonance and delocalization, aromaticity, intermolecular forces, three-dimensional structure and conformational analysis, spectroscopy. Only 3 units of credit for students who have completed course 8A with a C- or better; only 2 units of credit for students who have completed 118A or 128A with a C- or better; not open for credit to students who have completed courses 8B, 118B, 118C, 128B, 128C with a C- or better. GE credit: SciEng (SE, SL; F, W, F, W) (new course—eff. fall 16)

103B. Chemistry for Life Sciences: Predicting and Controlling Organic Pathways (5)
Lecture—3 hours; discussion—1 hour; laboratory—1 hour. Prerequisite: course 103A C- or better. Continuation of course 103A. Core concepts of functional group transformations, synthesis, mechanisms, sustainable chemistry, structure and function of biomolecules, organic reactions in biological systems, molecular design, detection, separation, and identification of organic molecules. Not open for credit to students who have completed course 8B, 118B, 118C, 128B, or 128C. GE credit: SciEng (SE, SL; GE credit: SciEng (SE, SL; W, W) (new course—eff. fall 16)

107A. Physical Chemistry for the Life Sciences (3)
Lecture—3 hours. Prerequisite: course 2C or course 2CH. Mathematics 16C or Mathematics 17C or Mathematics 21C, Physics 7C or Physics 9C or Physics 9HC. Physical chemistry intended for majors in the life sciences. Core development of classical and statistical thermodynamics including equilibrium processes and solutions of both non-electrolytes and electrolytes. The thermodynamic basis of electrochemistry and membrane potential. GE credit: SciEng(SE; F, W, F, W) (change in existing course—eff. spring 17)

110A. Physical Chemistry: Introduction to Quantum Mechanics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 7C or Physics 9C or Physics 9HC; course 2C or course 2CH. Mathematics 16C or Mathematics 17C or Mathematics 21C, completion of Mathematics 21D, 22A, and 22AL, and Physics 9C or 9HC, strongly recommended. Introduction to the postulate structure and chemical properties of quantum mechanics. Approximations based on variational method and time independent perturbation theory. Application to harmonic oscillator, rigid rotor, one-electron and many-electron and homo-and hetero-nuclear diatomic molecules. GE credit: SciEng (QL, SE; F, F, F, F) (change in existing course—eff. spring 17)

118A. Organic Chemistry for Health and Life Sciences (4)
Lecture—3 hours; laboratory/discussion—1.5 hours. Prerequisite: course 103B 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. A rigorous, in-depth presentation of basic principles with emphasis on organic chemistry 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 8B or course 128A. 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 course 118B. GE credit: SciEng (SE, SL; F, W, F, W) (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 118B and 129A. Open to students changing from the Chemistry 128 course sequence only if they have completed prior organic laboratory work (at least course Chemistry 129A). Continuation of course 118B, with emphasis on the preparation, reactions and identification of carboxylic acids and their derivatives, alky and acyl amines, ß-dicarbonyl compounds, and various classes of naturally occurring, biologically important compounds.—F, S, F, S) (change in existing course—eff. spring 17)

128A. Organic Chemistry (3)
Lecture—3 hours. Prerequisite: course 2C C- or better or course 2CH C- or better. Introduction to the basic concepts of organic chemistry with emphasis on stereochemistry and the chemistry of hydrocarbons. Designed primarily for majors in chemistry. Chemistry majors should enroll in course 129A concurrently. Only two units credit allowed for students who have completed course 8A; not open for credit to students who have completed courses 8B or 118A. GE credit: SciEng (SE, SL; W, W) (change in existing course—eff. winter 17)

128B. Organic Chemistry (3)
Lecture—3 hours. Prerequisite: course 128A or consent of instructor. Continuation of course 128A with emphasis on the chemistry of alcohols, ethers, their sulfur analogs, and carbohydrate compounds. Introductions to the application of spectroscopic methods in organic chemistry. Introduction to synthesis of moderately complex organic molecules. Full credit to students who completed 8B or 118A, not open for credit to students who have completed course 118B. GE credit: SciEng (SE; F, F, S, F, S) (change in existing course—eff. winter 17)

128C. Organic Chemistry (3)
Lecture—3 hours. Prerequisite: course 128B. Continuation of course 128B with emphasis on enolate condensations and the chemistry of amines, phenols, and sugars; selected biologically important compounds. Full credit to students who completed course 118B; not open for credit to students who have completed course 118C. GE credit: SciEng (SE; F, F, S, F, S) (change in existing course—eff. winter 17)

129A. Organic Chemistry Laboratory (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: C- or better in course 2C or course 2CH; course 129A (may be taken concurrently). Introduction to laboratory techniques of organic chemistry. Emphasis on methods used for separation and purification of organic compounds. Full credit to students who completed course 8B; not open for credit to students who have completed course 118B.—F, W, F, W) (change in existing course—eff. winter 17)

129B. Organic Chemistry Laboratory (2)
Lecture—6 hours. Prerequisite: courses 129A, CHE 129B (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 118B or open for credit to students who have completed course 118C. GE credit: SciEng (SE; F, S, F, W) (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)

130C. Case Studies in Pharmaceutical Chemistry (1)
Seminar—2 hours; independent study. Prerequisite: course 130A (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) (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). Separation, purification, identification and biological evaluation of organic compounds using modern methods of synthesis, computational chemistry and instrumentation. Emphasis on pharmaceutical and medicinal substances.—F, S, S, S) (change in existing course—eff. fall 17)

Graduate

280. Seminar in Ethics for Scientists (2)
(canceled course—eff. fall 17)

Chicana/o Studies

New and changed courses in Chicana/o Studies (CHI)

Lower Division

92. Internship (1-12)
Internship—3-36 hours. Prerequisite: course 10 or course 21 or course 50; Spanish 3 or Spanish 3V; or equivalent of Spanish 3. Academic guidance required. Students planning professional school studies in health professions. Designed primarily for majors in chemistry. GE credit: SciEng (SE; F, W, F, W) (change in existing course—eff. fall 17)

Upper Division

181. Chicanas and Latinas in the U.S.: Historical Perspectives (4)
Lecture/discussion—4 hours. Prerequisite: course 10 or Women’s Studies 50; Women’s Studies 50, or equivalent of Women’s Studies 50. GE credit: Chicano/Latino Studies (CHI). GE credit: Chicano/Latino Studies (CHI) (change in existing 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...
Chinese

New and changed courses in Chinese (CHN)

Upper Division

107. Traditional Chinese Fiction (in English) (4)
Lecture—3 hours; discussion—1 hour. English-language course studying the dawn of Chinese fiction and its development down to modern times. Combines survey history with close reading of representative works such as The Story of the Stone and famous Ming-Qing short stories. GE credit. GE credit: AH, Div. Wrt, CHN, WC, WE.—Chin, S. (S.)

108. Poetry of China and Japan (in English) (4)
Lecture—3 hours; discussion—1 hour. A comparative approach to Chinese and Japanese poetry; examining poetic practice in the two cultures; includes a general outline of the two traditions, plus study of poetic forms, techniques, and distinct treatments of universal themes: love, nature, war, etc. Offered in alternate years. (Same course as Japanese 108.) GE credit. Div. Wrt, CHN, WC, WE.—Yeh, He

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. Div. Wrt, CHN, WC, WE.—Heh, He

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 4/3BL, further development of communication skills in Modern Standard Mandarin-speaking environments. Reading of dialogues/articles pertaining to contemporary China. GE credit. CHN, Wrt, CHN, WC, WE.—Jiang, F.

112. Modern Chinese: Reading and Discussion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 111; or placement exam or consent of instructor. Further development of communication skills from course 111 in Modern Standard Mandarin-speaking environments. Reading dialogues/articles pertaining to contemporary China issues and discussing ethical, moral, aesthetic, social, and cultural concerns. GE credit. Div. Wrt, CHN, WC, WE.—W. (W.)

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, (F, W, S.)

Cinema & Digital Media

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

Lower Division

72. Introduction to Games (4)
Lecture—3 hours; extensive writing/discussion—3 hours. Introduction to the history, theory, and practice of play. Survey of both analog and digital games. Overview of gaming cultures, aesthetics, industries, and technologies. Offered irregularly. (Same course as English 72.) GE credit: AH, VL.

Upper Division

105. Feminist Media Production (6)
Lecture/discussion—3 hours; laboratory—3 hours; fieldwork—6 hours. Prerequisite: Cinematic & 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 historical and contemporary feminist and social justice media discourses. (Same course as Women’s Studies 165.) Offered in alternate years. GE credit. Div. Wrt, SoSci, Div/IAH, CHN, SS, ACGH, DD, VL, W. (W.)

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 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 Dramatic Art 124E.) GE credit: Div/IAH, VL, W. (W.)

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: AH, VL, W. (W.)

170. Cultural Interactions in the Ancient Mediterranean World (4)
Lecture/discussion—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, travel routes, and theories pertaining to culture contact. Offered in alternate years. GE credit. Div/IAH, Wrt/IAH, VL, WC, WE.—F, W, S. (F, W, S.)

Classics

New and changed courses in Classics (CLA)

Lower Division

10Y. Greek, Roman, and Near Eastern Mythology—Hybrid (3)
Lecture—2 hours; virtual lecture—1 hour. Examination of major myths of Greece, Rome, and the Ancient Near East; their place in the religion, literature and art of the societies that produced them; their subsequent development, influence and interpretation. GE credit. Art/IAH, VL, W, SCE—F, W, S. (F, W, S.)

10O. 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: Div/IAH, Wrt, WE.—Stem

Upper Division

103. Love and Beauty in the Ancient World (4)
Lecture/discussion—3 hours; extensive writing—3 hours. Philosophical and literary traditions connecting 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. Div/IAH, Wrt/IAH, VL, WC, WE.—F, W, S. Uhlig, Webster

F, W, S. (F, W, S.)

111. Forms of Knowledge in the Ancient World (4)

170. Cultural Interactions in the Ancient Mediterranean World (4)
Lecture/discussion—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, travel routes, and theories pertaining to culture contact. Offered in alternate years. GE credit. Div/IAH, Wrt/IAH, VL, WE.—Stem

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: Div/IAH, Wrt, Wrt/IAH, VL, WC, WE.—Roller

(change in existing course—eff. spring 17)
New and changed courses in Clinical Research (CHL)

Graduate
205. Introduction to Medical Statistics (4) (canceled 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. Focuses 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. Prerequisite—1 hour. (F) Tran
(new course—eff. fall 16)

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. Focuses 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. Prerequisite—1 hour. (F) 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-, 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) 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: WrtAH, OL, SS, WE—F, W, S, Su, (F, W, S, Su) Shubik
(change in existing course—eff. winter 17)

3. Interpersonal Communication Competence (4)
(change in existing course—eff. winter 18)

3Y. Interpersonal Communication Competence (4)
(new course—eff. winter 18)

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 10V. GE credit: SS—F, W, S, Su, (F, W, S, Su) Ruiz, Taylor
(new course—eff. fall 16)

114. Communication and Cognition (4)
(change in existing course—eff. winter 18)

124. Family Communication (4)
(change in existing course—eff. winter 18)

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—Rether
(new course—eff. fall 16)

140. Introduction to Mass Communication (4)
(change in existing course—eff. fall 17)

141. Media Effects: Theory and Research (4)
Lecture/discussion—4 hours. Pass One open to Communication majors only. Social scientific studies of the effects of media messages on audience members’ actions, attitudes, beliefs, and emotions. Topics include the cognitive processing of media messages, television violence, political socialization, credit to students who have taken course 10V. 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 Statistics 13Y, or equivalent of Statistics 13. 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, Su, (F, W, S) Bell, Palomares, Yegian
(change in existing course—eff. winter 18)

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: WrtAH, OL, SS, WE—F, W, S, Su, (F, W, S, Su) Shubik
(change in existing course—eff. winter 17)

3. Interpersonal Communication Competence (4)
(change in existing course—eff. winter 18)

3Y. Interpersonal Communication Competence (4)
(new course—eff. winter 18)

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 10V. GE credit: SS—F, W, S, Su, (F, W, S, Su) Ruiz, Taylor
(new course—eff. fall 16)
142. Newsmaking (4) Lecture/discussion—4 hours. 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, technol-
yogy’s challenges to journalism, analysis, interpreta-
tion, and evaluation of media messages, including those disseminated through broadcasting, print, and new technologies. GE credit: SocSci, WrtA(ACGH, SS), Wrt.—F, W, S. (F, W, S.) Cho, Theobald (change in existing course—eff winter 18)

143. Analysis of Media Messages (4) Lecture/discussion—3 hours; term paper. Pass One open to Communication majors only. Examination of alternative approaches to the analysis, interpreta-
tion, and evaluation of media messages, including those disseminated through broadcasting, print, and new technologies. GE credit: SocSci, WrtA(ACGH, SS), Wrt.—F, W, S. (F, W, S.) Cho, Theobald (change in existing course—eff winter 18)

144. Media Entertainment (4) Lecture/discussion—3 hours; term paper. Pass One open to Communication majors only. Effects and appeal of media entertainment, emphasizing emo-
tional 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, W, S.—S. (S.) Taylor (change in existing course—eff spring 17)


147. Children, Adolescents, and the Media (4) Lecture/discussion—4 hours. Open to Communication-
majors only on Pass 1. Research on the adaptive and maladaptive uses of new media (television, movies, video games, social media) on the social, emotional, cognitive, and physical development of youth, considering the protective role of parents, teachers, ethics, and policy. GE credit: SocSci/SS—F, W, (F, W) Cingel (new course—eff fall 16)


150. Web 2.0 and Social Media (4) Web lecture—2 hours; web electronic discussion—2 hours. Tontechnical survey of modern computational research methods. Web scraping, artificial intelligence, visualizing social networks, and com-
puter simulations. Hands-on use of diverse software applications. Professors from ten UC campuses contribute. GE credit: QL, SS.—F, S. (F, S.) Hilbert (new course—eff winter 17)

151. Simulating Communication Processes (4) Lecture/discussion—3 hours; term paper—3 hours. Simulations of communication and sociability using agent-based models. Focus on strategic behavior, cooperation, coordination, self-organization, infor-
mando, and other communication phenom-

161. Health Communication (4) Lecture/discussion—3 hours. Health communication theories and research. Health literacy, social support and coping, doctor-
patient interaction, health communication cam-
paigns, media influence on health, and applications of new technologies in health promotion. GE credit: SocSci/ISS, WE.—F, S. (F, S.) Bell (change in existing course—eff fall 17)

165. Media and Health (4) Lecture/discussion—4 hours. Content and effects of health messages in the media. Topics include health news reporting; flu vaccines; diseases and disability; death and health-related behaviors; promotion of drugs and other health products; and tobacco and alcohol advertising. GE credit: SocSci/ISS, WE.—W, S. (W, S.) Taylor, Yegian (change in existing course—eff winter 18)

172. Computer-Mediated Communication (4) Lecture—3 hours; discussion—1 hour. Pass One open to Communication majors only. Theories and research findings on how people use technologies for interpersonal and relational purposes, including expression, self-presentation, deception, anonymity, friendship maintenance, online dating, and emotional expression. GE credit: SocSci/SS—S. (S.) Peña (change in existing course—eff fall 18)

178. Persuasive Technologies (4) Lecture/discussion—3 hours; term paper. Designing and testing ethical, technology-based communica-
tion interventions in the domains of health, market-
ing, education, and environment. Social media, mobile apps, wearable devices, recommendation systems, social games, and augmented reality. GE credit: SS, WE.—S. (S.) Zhang (new course—eff fall 17)

192. Internship in Communication (1-12) Internship—3-36 hours. Prerequisite: communication-
tions majors who have completed 20 units of upper division communication courses; consent of instruc-
tor. Open to Communication majors only. Super-
vised work experience requiring the application of communication principles and strategies or the eval-
uation of communication practices in a professional setting. Relevant experiences include public rela-
tions, advertising, sales, human resources, health promotion, political campaigns, journalism, and broadcasting. GE credit: SS, WE.—S. (S.) Zhang (new course—eff fall 17)

Graduate

201. Theoretical Perspectives on Communication (4) Lecture/discussion—4 hours. Prerequisite: consent of instructor; graduate standing in Communication. Open to Communication graduate students only. Social scientific study of Communication. Research on interpersonal, organizational, mass, political, and health communication; communication technologies (e.g., video games, social media, persuasive tech-
nologies); and communication network analysis. (F) (F) Feng (change in existing course—eff fall 17)

204. Biological Foundations of Communication (4) Lecture/discussion—3 hours; term paper—3 hours. Communicobiological, evolutionary, neuroscience, and neurophysiological perspectives on commu-
nication. Methodologies for examining human physio-
logical responses to messages; emotion, health, skin conductance, electromyography, and cortical activity. Offered in alternate years.—S. (S.) Yegian (new course—eff fall 17)

233. Persuasive Technologies for Health (4) Lecture/discussion—3 hours; term paper. Theoriz-
ing, and evaluating ethical 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. Zhang (change in existing course—eff fall 17)

251. Digital Technology and Social Change (4) Seminar—9 hours; term paper. Conceptual, theoreti-
cal, and international consideration of how digital communication technologies transform social orga-
nization and development. Topics include social media, big data, political revolutions, e-democracy, digital divide, e-education, e-health, entrepreneur-
ship, public policies, poverty reduction, technologi-
cal innovations, microfinance, and entertainment. Not open to students who have taken course 251Y. Offered in alternate years.—S. (S.) Hilbert (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 technolo-
gies transform our lives through social media, mobil-
ity, 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.) Hilbert (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 uses and effects of traditional and new media on children and adolescents, emphasizing social, emotional, cognitive, and physi-
ical development. Methodological approaches and ethical issues in studies of underage populations. Parent and family mediation of effects. Offered in alternate years.—S. (S.) Cho (change in existing course—eff winter 17)

260. Political Communication (4) Lecture/discussion—3 hours; term paper. Theory and research on the connections between media, politics, and citizens in the digital age. Critical frame-
work for understanding the nature of mediated poli-
tics by assessing inter-relationships between the produc-
tion of news, political elites’ campaign strate-
gies, and behaviors of citizens. Offered in alternate years.—S. (S.) Cho (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)
Lecture—4 hours; extensive writing; project. Prerequisite: course 1, Statistics 13 or Statistics 13Y or Sociology 46B; any upper division Community and Regional Development course is recommended. Emphasis on the design and analysis of community research considering the relationship between theory and practice. Study of community research methods, including structural analysis, elite interviewing, and ethnographic approaches. Course requires design and completion of field research project. GE credit: Social Sci, Div/Writ/ACGH, DD, OL, SS, VL, WE.—S. (S.) Tarallo (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 practice of organizations with social change agendas at the community level. Emphasis on non-profit organizations and philanthropic foundations.—S. (S.) (change in existing course—eff. spring 17)

242S. Community Development Organizations (International) (4)
Fieldwork—10 hours; lecture—5 hours; workshop—5 hours. Prerequisite: course 240. Class size limited to 10 students. Theory and practice of organizations with social change agendas at the community level. Emphasis on local governance, non-profit organizations and philanthropic foundations at an international level.—S. (S.) (change in existing course—eff. spring 17)

243. Critical Environmental Justice Studies (4)
Seminar—5 hours; extensive writing—3 hours. Prerequisite: consent of instructor. Open to graduate students only. Application of social science theories of race, ethnicity, class, gender, and power to understand the production and contestation of environmental inequities.—F. (F.) London (new course—eff. fall 17)

248. Social Policy, Welfare Theories and Communities (4)
Seminar—4 hours. Prerequisite: graduate standing. Theories and comparative histories of modern welfare states and social policy in relation to legal/normative, organizational, and administrative aspects. Analysis of specific social issues within the U.S./California context. Not open for credit to students having completed Community & Regional Development 248A and 248B. Same course as Geography 248B. Offered in alternate years.—S. (S.) (change in existing course—eff. spring 17)

248A. Social Policy, Welfare Theories and Communities I (2)
Seminar—2 hours. Prerequisite: graduate standing. Theories and comparative histories of modern welfare states. Theories of welfare and social policy in relation to normative, organizational, and administrative aspects of welfare and social policy. Offered in alternate years.—S. (change in existing course—eff. spring 17)

248B. Social Policy, Welfare Theories and Communities II (2)
Seminar—2 hours. Prerequisite: graduate standing. Concurrent enrollment in course 248A. Analysis of a specific set of social issues within the U.S./California context. Issues may include poverty, hunger, housing, health, family, disability, economic opportunity, affirmative action orientations, gender, old age, or special social groups. Offered in alternate years.—S. (change in existing course—eff. spring 17)

250. Professional Skills for Community Development (4)
Lecture/discussion—2 hours; project—2 hours; fieldwork; extensive writing or discussion. Prerequisite: course 240. Priority enrollment for Masters and Ph.D. students in Community and Regional Development. Help students develop the practical skills needed to work professionally in organizations that are involved in community development. Provides an overview of community development planning, project management, and consultation skills.—W. (W.) London (change in existing course—eff. spring 17)

290. Seminar (1)
Seminar—1 hour. Analysis of research in applied behavioral sciences. (S/U grading only)–F. W. S. (F. W. S.) (change in existing course—eff. spring 17)

Professional

440. Professional Skills for Community Development (4)
cancelled course—eff. winter 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 “postcolonial 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, Writ/AH, VL, WC, WE.—L. (change in existing course—eff. spring 17)

110. Hong Kong Cinema (4)
Lecture/discussion—3 hours; film viewing—3 hours. Prerequisite: completion of entry level writing requirement, upper division standing, or consent of instructor. Hong Kong cinema, its history, industry, styles, genres, directors, and stars. Special attention to its polyglot, multicultural, transnational, colonial, and postcolonial environment. GE credit: ArtHum, Div, Writ/AH, VL, WC, WE.—L. (change in existing course—eff. spring 17)

Design

New and changed courses in Design (DES)

Lower Division

37. Coding for Designers (4)
cancelled course—eff. spring 18

Upper Division

107. Advanced Structural Design for Fashion (4)
Studio—4 hours; lecture/discussion—2 hours. Prerequisite: course 1; course 14 or course 21; course 15; course 16; course 77; or consent of instructor. Priority given to Design majors. Advanced study and practice of designing clothing for the human body through pattern development and structural joining. Emphasis on draping techniques and advanced conceptualization for fashion design. Not open for credit to students who have taken course 77B. GE credit: ArtHum/AH, VL.—S. (S.) Koo (change in existing course—eff. winter 17)

113. Photography and Digital Imaging (4)
Studio—12 hours. Prerequisite: course 1; course 15; course 16; or consent of instructor. Pass One restricted to Design majors. Digital imaging techniques using black/white and color. Critical analysis of photographs and the role of photography in society. Explore use and meaning of single, sequence and single composite images. Not open for credit to students who have taken Design 31. GE credit: SE, VL.—F. W. S. (F. W. S.) Drew (change in existing course—eff. spring 18)

126. Design Ethnography (4)
Lecture/Studio—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: AH.—S. (S.) Maiarana (new course—eff. fall 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.—Cogdell (change in existing course—eff. winter 17)

144. History of Interior Architecture (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor. Pass One 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—Housefield. (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, methods, and materials that open up new possibilities for content creation and invention in design practice. GE credit: VL—W (W) Maiorana (new course—eff fall 17)

169. Advanced Explorations in Textile Design (4) Studio—12 hours. Prerequisite: course 1; course 14 or course 21; course 15; course 16; course 160 or course 161; or consent of instructor; course 70 recommended. Pass One restricted to Design majors. Advanced exploration of textile design aimed at developing unique textiles for a specific end product such as a fashion collection, functional interior design, art textile or surface design competition. May be repeated for credit up to one time with consent of instructor; topics and themes change yearly; criteria is 1) space with first priority to students not previously taken the course and 2) course content must be sufficiently different from the previous time the student took the course. GE credit: AH—W (W) Avila (new course—eff spring 17)

178. Design and Wearable Technology (4) Studio—6 hours. Prerequisite: course 1; course 14; course 15; course 16; 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—S (S) Sny ders. (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; course 16. 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)

165. Studio Practices in Industrial Design (4) Studio—12 hours. Prerequisite: course 1; course 14 or course 21; course 15; course 51 or course 150A; or consent of instructor. Pass one restricted to Design majors. 3D studio methods for design, including: historic and contemporary developments in industrial design; innovation in material and fabrication technology; design based projects for everyday objects including soft goods, electronics, transportation. GE credit: SE, VL—W (W) Ferguson. (new course—eff fall 17)

166. Human Centered Design (4) Studio—12 hours. Prerequisite: course 1; course 14; course 15. Pass One restricted to Design majors. Human-centered approach to problem solving, ethnography, ideation, project framing, rapid prototypes, visual communication, and experiential learning. Creative approaches to graphic design, industrial design, fashion, business, and entrepreneurship. GE credit: AH, VL—F, S (F, S) Maiorana. (new course—eff fall 17)

167. Prototyping: From Objects to Systems (4) Studio—12 hours. Prerequisite: course 1; course 14; course 15; course 50; or consent of instructor. Pass one restricted to Design majors. Exploration of rapid prototyping techniques for objects, interactive experiences, services and organizations. Understanding of additive manufacturing, foam models, digital interfaces and business models. GE credit: SE, VL—W. (W) Maiorana (new course—eff fall 17)

180A. Plotting the Course 2016 (4) Lecture/discussion—4 hours. Prerequisite: consent of instructor. Pass One restricted to Theatre and Dance majors. Experience in individual and group contact and communication, theatre games, advanced improvisation, sound and movement dynamics. Viewing of theatre productions. GE credit: OL, VL—Leavy, Mer ling. (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 dance. GE credit: ArtHum/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)

Graduate

225. Studio Practice in Design (4) Studio—12 hours. Prerequisite: course 221. Restricted to graduate standing in Design or consent of instructor. Pass One restricted to Theatre and Dance majors. Scene design processes, working drawings, sketching techniques, scale models, methods and materials of scenery construction. GE credit: ArtHum/AH, VL—Iacovelli (change in existing course—eff winter 18)

242. Principles of Theatrical Design: Scenery (4) Lecture/discussion—4 hours. Prerequisite: consent of instructor. Pass One restricted to Theatre and Dance majors. Scene design processes, working drawings, sketching techniques, scale models, methods and materials of scenery engineering. GE credit: ArtHum/AH, VL—Iacovelli (change in existing course—eff winter 18)

243. Principles of Theatrical Design: Lighting (4) Lecture/discussion—4 hours. Prerequisite: consent of instructor. Pass One restricted to Theatre and Dance majors. Analysis of plays in terms of scenic design, elements of design, execution of designs for modern and period plays. GE credit: ArtHum/AH, VL—Iacovelli (change in existing course—eff winter 18)
212B. Environmental Policy Evaluation (4)
Lecture—2 hours; discussion—1 hour; seminar—2 hours. Prerequisite: Statistics 108 or Agricultural and Resource Economics 106; Agricultural and Resource Economics 176; Intermediate microeconomics (e.g., Economics 100); policy analysis (e.g., Environmental Science and Policy 168A or the equivalent). Method and practice, philosophical basis, and political role of policy analysis. Reviews basic concepts from economic theory; how and why environmental problems emerge in a market economy, and tools necessary for solving environmental problems. (Same course as Environmental Science and Policy 212B & Environmental Policy & Management 200B.)—W. (W) Springborn
(change in existing course—eff. winter 18)

213. Population, Environment, and Social Structure (4)
(cancelled 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. Delves deeper into different social science topics related to this broader idea. Applying of course readings to case studies chosen by students and a final paper.—W. (W) Lubell
(new course—eff. fall 16)

Lecture—2 hours; discussion—0.5 hours; labora- tory—0.5 hours. Prerequisite: undergraduate genetics and ecology/conservation biology courses recommended. Restricted to graduate students, 2nd or 3rd year veterinary students; advanced undergraduate students with consent of instructor. Introduction to the field of applied ecological genetics to include applications in conservation ecology, population genetics, population biology, wildlife health and disease ecology.
(change in existing course—eff. spring 17)

Economics

New and changed courses in Economics (ECN)

Lower Division

1AV. Principles of Microeconomics (4)
Web virtual lecture—3 hours; web electronic discus- sion—1 hour. Analysis of the allocation of resources and the distribution of income through a price sys- tem; competition and monopoly; the role of public policy; comparative economic systems. GE credit: SocSci/ACGH, QL, SS.
(new course—eff. fall 17)

Upper Division

100A. Intermediate Micro Theory: Consumer and Producer Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A C- or better or course 1AV C- or better, course 1B C- or better, Mathematics 16A C- or better or Mathematics 17A C- or better or Mathematics 011A C- or better or Mathematics 16B C- or better Mathematics 17B C- or better or Mathematics 021B C- or better. Consumer and producer theory. Equilibrium and welfare analysis. Topics include competitive markets, consumer surplus and producer surplus at an intermediate level. Not open for credit to students that have taken Agricultural and Resource Econom- ics 100A or course 100.
/change in existing course—eff. winter 18)
100B. Intermediate Micro Theory: Imperfect Competition and Market Failure (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100A. Imperfect competition and market failure. Topics include exchange, monopoly, game theory, uncertainty, asymmetric information, and public goods. Not open for credit to students who have taken Agricultural and Resource Economics 100B.
*(new course—eff. fall 17)*

101. Intermediate Macro Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A C- or better or course 1AV C- or better; course 1B C- or better; Mathematics 16A C- or better; Mathematics 16B C- or better or Mathematics 21A C- or better, Mathematics 21B C- or better or Mathematics 17A C- or better, Mathematics 17B C- or better. Theory of income, employment and prices under static and dynamic conditions, and long term growth.
*(change in existing course—eff. winter 18)*

102. Analysis of Economic Data (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV; course 1B; Statistics 13 or Statistics 13Y or Statistics 32; Mathematics 16A or Mathematics 17A or Mathematics 21A; Mathematics 16B or Mathematics 17B or Mathematics 21B; or consent of instructor. Analysis of economic data to investigate key relationships emphasized in introductory micro and macroeconomics. Obtaining, transforming, displaying data; statistical analysis of economic data; basic univariate and multivariate regression analysis. Only two units of credit for students who have completed course 140 or Agricultural and Resource Economics 106, and Statistics 108. GE credit: VL.—F, W, S, (F, W, S)
*(change in existing course—eff. winter 18)*

103. Economics of Uncertainty and Information (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV; or Agricultural and Resource Economics 100A, Agricultural and Resource Economics 100B, Mathematics 16A or Mathematics 17A or Mathematics 21A, Mathematics 16B or Mathematics 17B or Mathematics 21B. Optimal decisions under uncertainty, expected utility theory, economics of insurance, asymmetric information, signalling in the job market, incentives and Principal-Agent theory, optimal search strategies and the reservation price principle.
*(change in existing course—eff. winter 18)*

106. Decision Making (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 16A-B C- or better or Mathematics 17A-B C- or better or Mathematics 17A-B C- or better; Statistics 13 or Statistics 13Y or Statistics 32; Mathematics 16A C- or better or Statistics 32 C- or better; or consent of the instructor. Descriptive and normative analysis of individual decision making, with applications to personal, professional, financial, and public policy decisions. Emphasis on decision making under uncertainty and over time. Heuristics and biases in the psychology of decisions; overcoming decision traps. Offered irregularly.
*(change in existing course—eff. winter 18)*

110B. World Economic History Since the Industrial Revolution (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV, course 1B. Development and application of analytical models to explain the nature and functioning of economies since the Industrial Revolution. Examples will be drawn from a variety of societies, including England, China, Germany, and India. GE credit: SocSci 5S.
*(change in existing course—eff. winter 18)*

115A. Economic Development (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV, course 1B. Major issues encountered in emerging from international poverty, including problems of growth and structural change, human welfare, population growth and health, labor markets and internal migration. Important issues of policy concern international trade and industrialization. (Same course as Agricultural and Resource Economics 115A.) GE credit: SS, WC.
*(change in existing course—eff. winter 18)*

115BY. Economic Development (4)
Lecture—15 hours; web virtual lecture—15 hours; term paper. Prerequisite: courses 1A, 1B. 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)*

121A. Industrial Organization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV, course 1B; course 100 or Agricultural and Resource Economics 100A-B; or consent of the instructor. Analysis of the role of competition and monopoly in the American economy; market structure, conduct, and economic performance of a variety of industries. GE credit: SocSci 5S.
*(change in existing course—eff. winter 18)*

121B. Industrial Organization (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV, course 1B; course 100 or Agricultural and Resource Economics 100A-B; or consent of instructor. The study of antitrust and economic regulation; the pricing of strategic resources and the performance of a variety of industries. GE credit: ACGH.
*(change in existing course—eff. winter 18)*

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 role of energy in the economy. Balance of payments adjustment mechanism, international energy economics issues; international financial institutions and their policies. Only 2 units of credit allowed to students who have completed two or more of the following courses: Economics 102, Agricultural and Resource Economics 106 or Statistics 108. GE credit: SoSci SS—W. (W)
*(change in existing course—eff. winter 18)*

160B. International Macroeconomics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV; course 1B; course 100 or Agricultural and Resource Economics 100A-B; course 101; or consent of instructor. Macroeconomic theory in an open economy. Balance of payments adjustment mechanism, international monetary policies; current issues. Course intended especially for non-majors. Not open for credit to students who have completed course 150A or 160B. GE credit: SS, WC.
*(change in existing course—eff. winter 18)*

162. International Economic Relations (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1A or course 1AV, course 1B; or consent of instructor. International trade and monetary relations, trade policy, exchange rate policy, policies toward international capital migration and investment. Emphasis on current policy issues. Course intended especially for non-majors. Not open for credit to students who have completed course 162.
*(change in existing course—eff. winter 18)*

Graduate

233. Poverty and Public Policy (4)
Lecture—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 models; linear restrictions; heteroskedasticity, autocorrelation; lagged dependent variables. (Same course as Agricultural and Resource Economics 240A.)
*(change in existing course—eff. fall 17)*
Education

New and changed courses in Education (EDU)

Lower Division

65A. Foundations for University Success; Introduction to the University System (2)
Lecture/discussion—3 hours; field work—1 hour. Prerequisite: consent of instructor; student must be a part of an approved Foundations for University Success program. Introduction to resources supporting first year of academic success and transition to a tier one research university. (P/NP grading only) F, S, W, Su. (F, W, S, Su.)

65B. Foundations for University Success; Introduction to Research at a Tier 1 University (2)
Lecture/discussion—3 hours; field work—1 hour. Prerequisite: consent of instructor; student must be a part of an approved Foundations for University Success program. Development of important skills necessary for research including critical thinking, study skills, writing skills, and presentation skills. (P/NP grading only) F, S, W, Su. (F, W, S, Su.)

65C. Foundations for University Success; Internships, Graduate School and Careers (2)
Lecture/discussion—3 hours; field work—1 hour. Prerequisite: consent of instructor; student must be a part of an approved Foundations for University Success program. Resources to explore academic and career connections and opportunities including internships, volunteer opportunities, graduate schools and careers. (P/NP grading only) F, W, S, Su. (F, W, S, Su.)

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 examined 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, Writ/SS, VL, WE. — F, S, W, Su. (F, S, S.) Watson-Gegeo, White

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, SS, WE. — S. (S.) Cuellar, Gonzalez

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.)

180B. Computers in Education (1)
Lecture/discussion—1 hour; laboratory — 2 hours; project—3 hours. Prerequisite: acceptance in Teacher Credential Program; successful completion of course 180A. Restricted to Teaching Credential Majors. Applications of computers in education as instructional, intellectual, and communication tools. (Deferred grading only, pending completion of sequence.)

180C. Computers in Education (1)
Lecture/discussion—1 hour; laboratory — 2 hours; project—3 hours. Prerequisite: consent of instructor. Research. May be repeated for credit. (S/U grading only)

Education Abroad Program

New and changed courses in Education Abroad Program (EAP)

Upper Division

192. Internship in Education Abroad (1-12)
Internship—3-36 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.)

Energy (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)
and without damping; vibrations in coupled systems; electrochemical analogs; use of energy conserva-
tion principles. GE credit: SciEng/SE—F. (F.)
(change in existing course—eff. 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 (2)
Lecture—2 hours. History of aircraft and its influence on society. Topics covered will include Unmanned Aerial Vehicles, safety considerations, economics and privacy issues. Aerodynamics, stability and control will also be introduced. GE credit: SciEng or SocSci 1SE or SS—Su. (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—W. (W.) Hess, Kong
(change in existing course—eff. fall 17)

129. Stability and Control of Aerospace Vehicles (4)
(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 130A 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 multilayer beam cross-sections, buckling of flat and curved sheets, tension field beams, local buckling. GE credit: SciEng/QL, SE—W. (W.) La Saponara
(change in existing course—eff. fall 17)

138. Aircraft Propulsion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mechanical Engineering 106 C- or better. Analysis/design of modern aircraft gas turbine engines. Development/application of cycle performance prediction techniques. Introduction to design of inlets, compressors, burners, turbines, and nozzles. Cycle design for specific applications. GE credit: SciEng/SE—W. (W.) R. Davis
(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

216. Energy Systems (4)
Lecture/discussion—4 hours. Prerequisite: Engineering 105. Theory and application of energy systems. System analysis including input-output analysis, energy balances, thermodynamic availability, economics, environmental considerations. Energy conversion systems and devices including cogeneration, heat pump, fuel cell, hydroelectric, wind, photovoltaic, and biomass conversion processes. Offered in alternate years.—W. Jenkins
(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)

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. Facciotti
(new course—eff. spring 17)

144. Fundamentals of Biophotonics and Bioimaging (4)
Lecture/discussion—4 hours. Prerequisite: Mathematics 22B; 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
217. Biomedical Fluid Mechanics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 106 C- or better; Neurobiology, Physiology, and Behavior 101 or course 116. Theories of fluid mechanics, including Navier Stokes Equation and Conservation Laws, will be presented to understand dynamics of human circulatory systems. Fluid dynamics will be analyzed using partial differential equations. GE credit: SciEngSE—S. (S.) Tan
(new course—eff. spring 17)

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

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

255. Nanoscale Imaging for Molecular Medicine (3)
Lecture/discussion—3 hours. Prerequisite: course 202 highly recommended; graduate standing. Current and emerging technologies to visualize biological structures and processes at size scales ~100 nanometers – and their application towards the advancement of molecular medicine. Technologies include superresolution optical microscopy, electron microscopy and tomography. Emphasis on quantitative imaging. Same course as Biophysics 255.—S. (S.) Cheng, Chuang
(change in existing course—eff. spring 17)

258. Advanced Biophotonics and Bioimaging (4)
Lecture—4 hours. Prerequisite: course 108B; Physics 108B, or an equivalent undergraduate optics course to Physics 108B. Quantitative basis for biophotonics and bioimaging, with an emphasis on the physical and mathematical description of optics, light propagation, and light-tissue interactions. Advantages and limitations of various imaging and sensing technologies. Illustrative applications in diagnostics, basic research, and therapy.—F. (F.) Srivivasan
(new course—eff. winter 17)

262. Cell and Molecular Biophysics for Bioengineers (4)
Lecture—4 hours. Prerequisite: course 284 or equivalent; graduate standing; undergraduate students by consent of instructor. Introduction to fundamental mechanisms governing the structure, function, and assembly of bio-macromolecules. Emphasis is on a quantitative understanding of the nano-to-microscale interactions between and within individual molecules, as well as of their assemblies, in particular membranes. Not open for credit to students who have completed Biomedical Engineering 162. (Same course as Chemical Engineering 269.)—F. (F.) Heinrich
(change in existing course—eff. winter 17)

264. Synthetic and Systems Engineering of Cells (4)
Lecture—4 hours. Introduction to the design, engineering, and control of biological systems for biomedical and biological materials. Offered in alternate years.—F. (F.) Tan
(new course—eff. fall 16)

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—eff. spring 17)

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 Materials Science and Engineering 288 and Biophysics 288.—W. (W.) Panikh
(new course—eff. winter 17)

Diagnoses. Three units of credit for students who have taken course 161S. Offered in alternate years. GE credit: SciEngQL, SE—F. (F.) Aviran
(change in existing course—eff. spring 17)

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: SciEngSE—W. (W.) Chiagola
(new course—eff. winter 17)

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; Neurobiology, Physiology, and Behavior 101 recommended. Restricted to Biomedical Engineering majors only. Clinical applications for biomedical devices with emphasis in the pathophysiology of common diseases as it relates to the biomedical design process, biosensors principles, in vitro diagnostics, needs assessment, and regulatory considerations. GE credit: SE—F. (F.) Tran
(new course—eff. 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. IS&U grading only.—F. (F.) Leach
(new course—eff. 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.) Athanasiou
(change in existing course—eff. fall 17)

215. Biomedical Fluid Mechanics and Transport Phenomena (4)
Lecture/colloquium—4 hours. Restriction: Prerequisite—course 161S. Offered in alternate years. GE credit: SciEngSE—W. (W.) Silva
(new course—eff. winter 17)

221. Drug Delivery Systems (4)
Lecture/discussion—4 hours. Prerequisite: course 204 recommended but not required. Fundamental engineering and biotechnology principles critical for the formulation and delivery of therapeutic agents, including peptide/protein drugs and small molecules.—S. (S.) Silva
(new course—eff. winter 17)

254. Statistical Methods in Genomics (4)
Lecture—4 hours. Statistical approaches to problems in computational molecular biology and genomics; formulation of questions via probabilistic models and statistical inference methods for parameter estimation, and interpretation of results to address biological questions; application to high-impact problems in functional genomics and molecular biology.—F. (F.) Aviran
(new course—eff. winter 17)
Upper Division

140. Mathematical Methods in Biochemical and Chemical Engineering (4)
Lecture/discussion—3 hours; laboratory—1 hour.
Prerequisite: Math 222B; course 122B (can be concurrent). Open to majors in Chemical Engineering, Biochemical Engineering, or Chemical and Biochemical Engineering. Laboratory experiments in biochemical and medical applications. GE credit: SciEng SE, WE—W (F).

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, Biochemical Engineering, Materials Science, and Chemical Engineering. Laboratory experiments in chemical engineering thermodynamics. GE credit: SciEng SE; WE—W (F).

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, Biochemical Engineering, Materials Science, and Biochemical Engineering. Laboratory experiments in chemical engineering transport phenomena. GE credit: SciEng SE, WE—S (S).

152A. Chemical Engineering Thermodynamics (3)
Lecture—3 hours. Prerequisite: 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 separation of variables. Sturm-Liouville eigenvalue problems. Similarity transformations. Tensor analysis. Finite difference methods for solving time-dependent diffusion problems. Not open for credit to students who have completed course 159. GE credit: SciEng SE—F (F).

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 thermodynamics/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. 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: Biological Systems 268.) Offered in alternate years. —F. (F) Jeoh (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 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. (Same course as Biomedical Engineering 162.) —F. (F) Heinrich (new course—eff. winter 17)

294. Current Progress in Biotechnology (1)
Seminar—3 hours. Prerequisite: graduate standing. Seminars presented by guest lecturers on subjects of their own research activities. May be repeated for credit. (Same course as Same course as Designated Emphasis, Biotechnology 294.) (Summer grading only)—F, W, S, (F, W, S) Kijelstrom, McDonald, Rodriguez (change in existing course—eff. winter 18)

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 17)

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

94H. Honors Discussion Section (1)
(canceled course—eff. fall 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)

189I. 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)

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

189M. Special Topics in ECM; Ceramics and Minerals (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)
280. Seminar in Ethics for Scientists (2) (canceled course—eff. fall 17)
281. Green Engineering: Theory and Practice (3) (canceled course—eff. fall 16)
290. Chemical Engineering & Materials Science Seminar (1) (canceled course—eff. fall 17)

Engineering: Civil and Environmental

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

Lower Division
17. Surveying (2) (canceled course—eff. spring 18)

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 22B C- or better; Physics 9B C- or better. Pass One restricted to Civil Engineering, Environmental Engineering and Hydrology majors. Fluid flow in civil and environmental engineering, basis for design, buoyancy, hydrostatics, gravity dams, hydraulic modeling: similarity & scaling, conservation laws, flow in bends, nozzles, pipes, pumps, turbines, complimentary lab experiments. 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)

126. Integrated Planning for Green Civil Systems (4) (canceled course—eff. spring 18)
127. Integrated Design for Green Civil Systems: Senior Design Experience (4) (canceled course—eff. spring 18)
128. Integrated Construction for Green Civil Systems (4) (canceled course—eff. spring 18)

136. Building Design (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: course 130 or 131; course 135 or 122. Design of a building structure for a specific need under the multiple constraints of safety, serviceability, cost and aesthetics. GE credit: SciEng/SE.—S. (S.)
(change in existing course—eff. fall 17)

140. Environmental Analysis of Aqueous Systems (3) (canceled course—eff. winter 18)
140A. Environmental Analysis of Aqueous Systems (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: Chemistry 2B 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 associated 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 28B 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)

140C. Biological Principles for Environmental Engineering (4) Lecture—4 hours. Prerequisite: course 40A C- or better or course 140B C- or better. Fundamental microbiology concepts for environmental engineers; provides background needed for the application of water and wastewater treatment, bioremediation, air pollution control and biotransformations in environmental engineered systems. Only two units of credit for students who have taken Microbiology 101 or 102. GE credit: SE.—W. (W.) Kyuma (change in existing course—eff. winter 18)

140D. Water and Wastewater Treatment System Design (4) Lecture—3 hours; discussion—3 hours. Prerequisite: Engineering 103 C- or better or course 100 C- or better; course 140 C- or better or course 140A C- or better or course 140B C- or course or course 140C C- or better or course 146A C- or better. Evaluation and design of water and wastewater treatment systems. Not open for credit to students who have taken Civil & Environmental Engineering 148B. GE credit: SE.—S. (S.) Darby (new course—eff. winter 18)

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

141. Engineering Hydraulics (3) Lecture—3 hours. Prerequisite: Engineering 103 C- or better or course 100 C- or better. Nature of flow of a real fluid; flow in pipes; open channel flow; turbomachinery; fluid motion and forces on objects: boundary layers, lift and drag. GE credit: SciEng/SE.—F. (F, W.) Bombardelli, Schladow, Younis (change in existing 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, W.—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/QL, SE, SL, W.—S. (S.) Cappa (change in existing course—eff. winter 17)

146. Water Resources Simulation (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 103 C- or better or course 140 C- or better. Computer simulation techniques in the analysis, design and operation of surface water systems; modeling concepts and practices with application to surface runoff, water quality in rivers and streams and dispersion of contaminants in water bodies. GE credit: SciEng, Writ/SE.—W. (W.)Younis (change in existing course—eff. winter 18)

147A. Environmental Engineering Senior Design Experience I (4) (canceled course—eff. winter 18)
147B. Environmental Engineering Senior Design Experience II (4) (canceled course—eff. spring 18)
148B. Water and Wastewater Treatment System Design: Senior Design Experience (4) (canceled course—eff. winter 18)

149. Air Pollution (4) Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21D; Mathematics 22B; Chemistry 2B C- or better; Atmospheric Science 121A or Engineer- ing 103 C- or better or course 100 C- or better. Physical and technical aspects of air pollution. Emphasis on geophysical processes and air pollution meteorology as well as physical and chemical properties of pollutants. (Same course as Atmospheric Science 149.) GE credit: SciEng/QL, SE, SL.—F. (F.) Cappa (change in existing course—eff. winter 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 and systems. GE credit: SciEng/SE.—W. (W.) Cappa (change in existing course—eff. fall 17)

155. Water Resources Engineering Planning (4) Lecture—4 hours. Prerequisite: course 106; or Economics 1A or Economics 1AV; or course 114. Basic engineering planning concepts; role of engineering, economic, environmental and social information and analysis; institutional, political and legal aspects. Case studies and computer models illustrate the planning of water resource systems. GE credit: SciEng or SocSci; Writ/QL, SE or SS, SL,—W. (W.) Herman, Lurin (change in existing course—eff. winter 18)

162. Transportation Land Use Sustainable Design: Senior Design Experience (4) (canceled course—eff. spring 18)

173. Foundation Design (4) Lecture—4 hours. Prerequisite: course 171. Foundation analysis and design, including site characterization, evaluation of shallow and deep foundation alternatives, evaluation of bearing capacity and settlement, design of retaining structures, and case-based design experiences. GE credit: SciEng/SE.—S. (S.) Boulanger (change in existing course—eff. winter 18)

175. Geotechnical Earthquake Engineering (4) Lecture—4 hours. Prerequisite: course 171 C- or bet- ter. Tectonics, faults, site characterization, and probabilistic ground motion prediction equations. Cyclic loading and liquefaction of soil elements and layers. Empiri- cal procedures and field tests for evaluation of trig- gering and consequences, of liquefaction. GE credit: SciEng/SE.—F. (F.) Boulanger, Kutter (change in existing course—eff. fall 17)

190. The Civil Engineer in Society (2) (canceled course—eff. spring 18)

193A. Civil and Environmental Engineering Senior Design (4) Lecture—2 hours; laboratory—6 hours. Prerequisite: course 140D C- or better or course 171 C- or better, course 171 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, course 141L C- or better; consent of instructor; one ECI major depth course with a C- or better; students must be in final year of study. Culminating design experience for civil engineering and environmental engineering majors. Student teams work closely with faculty, city officials and/or engineering clients to pro- pose, 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 (change in existing course—eff. winter 18)
254. 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 Geog 279.)—W (W) Niemeier (change in existing course—eff. fall 17)

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

273. Water Resource Systems Engineering (4)  
Lecture—4 hours. Prerequisite: course 194; course 153, or the equivalent. Planning and management of water resource systems. Deterministic and stochastic simulation and optimization techniques. Capacity design and operation of reservoir systems for water supply, hydropower, flood control, and environmental objectives.—W (W) Lund, Herman (change in existing course—eff. winter 18)

Upper Division

124. Theory and Practice of Bioinformatics (4)  
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 10 or course 030 or Engineering 6; Statistics 12 or Statistics 13 or Statistics 32 or Statistics 100 or Statistics 124 or Statistics 134A or Biomedical Engineering 105; Biological Sciences 2A or Molecular and Cellular Biology 101. Pass One open to Computer Science, Computer Science Engineering, and Biotechnology majors only. Introduction to the design and analysis of algorithms for biological applications. Trees, hashing, sorting, graph algorithms, and software engineering. GE credit: SciEng SE—F, W, S, (F, W) S. Chen, Gygi (change in existing course—eff. spring 17)

150. Operating Systems and System Programming (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: course 40; course 50 or Electrical and Computer Engineering 70 or Electrical and Computer Engineering 170. Pass One open to Computer Science, Computer Science Engineering, and Computer Engineering Majors only. Introduction to system programming 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, S) 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. Interface 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)

158. Programming on Parallel Architectures (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: course 150; course 154B recommended. Pass One open to Computer Science, Computer Science Engineering, and Computer Engineering Majors only. Techniques for software development using the shared-memory and message-passing paradigms, on parallel architectures and networks of workstations. Locks, barriers, and other techniques for synchronization. Introduction to parallel algorithms. GE credit: SciEng SE—F (F) Gygi (change in existing course—eff. winter 18)

161. Modern Programming Tools (4)  
Lecture—3 hours; laboratory—2 hours. Prerequisite: course 40, or equivalent. 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 SE—Devanbu (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 skills for developing 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 134A or Mathematics 135A or Electrical and Computer Engineering 161 or Computer Science Engineering 132, Mathematics 22A or Mathematics 67. Pass One open to Computer Science and Computer Science Engineering Majors only. Technical skills for developing websites, including both server-side and client-side software development. GE credit: SE, VL—Amenta (new course—eff. fall 17)

188. Ethics in an Age of Technology (4)  
Koehl, Matloff, Rogaway

193A. Senior Design Project (3)
Lecture/discussion—3 hours. Prerequisite: course 193A (can be concurrent); senior standing in Computer Science or Computer Science and Engineering or consent of instructor. Pass One open to Computer Science Engineering Majors only; Pass Two open to Computer Science and Computer Science Engineering Majors only. Responding to real-life client design challenges, student teams plan, implement, and evaluate large-scale projects involving computer and computational systems. The project is supervised by a faculty member. Students must take course 193A and 193B to receive credit. (Deferred grading only, pending completion of sequence.) GE credit: SciEng/SE.—W. (W.) Liu

(change in existing course—eff. winter 18)

193B. Senior Design Project (3)
Lecture/discussion—3 hours. Prerequisite: course 193A IP or better. Pass One open to Computer Science Engineering Majors only; Pass Two open to Computer Science and Computer Science Engineering Majors only. Responding to real-life client design challenges, student teams plan, implement, and evaluate large-scale projects involving computer and computational systems. The project is supervised by a faculty member. Students must take course 193A and 193B to receive credit. (Deferred grading only, pending completion of sequence.) GE credit: SciEng/SE.—S. (S.) Liu

(change in existing course—eff. winter 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.—(F, S.) D’Souza

(change in existing course—eff. winter 17)

Engineering: Electrical and Computer

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

Upper Division

110A. Electronic Circuits I (4)
Lecture—3 hours. Prerequisite: course 100; course 140A (can be concurrent). Use and modeling of nonlinear solid-state electronic devices in basic analog and digital circuits. Introduction to the design of amplifiers and logic gates. GE credit: SciEng/SE, VL.—W. S. (W., S.)

(change in existing course—eff. fall 17)

146A. Integrated Circuits Fabrication (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: course 140A. Theoretical and experimental study of basic fabrication processes for metal oxide semiconductor integrated circuits, including oxidation, photolithography, impurity diffusion, metallization, wet chemical etching, and characterization. GE credit: SciEng/SE.—F. (F.)

(change in existing course—eff. winter 18)

150A. Introduction to Signals and Systems I (4)
Lecture—4 hours. Prerequisite: course 100; Engineering 6 (can be concurrent). Mathematics 224A (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. Stability of linear systems. GE credit: SciEng/QL, SE.—W. S. (W.)

(change in existing course—eff. fall 13)

165. 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 digitally modulated signals. Signal-to-noise ratio, probability of error, matched filters. Intersymbol interference, pulse shaping and equalization. Carrier and clock synchronization. GE credit: SciEng/SE.—W. (W.)

181A. Digital Systems Design Project (3)
Workshop—1 hour; laboratory—6 hours. Prerequisite: course 180B; course 170. Digital-system and computer-engineering design course involving architecture, design, implementation and testing of a prototype application-specific processor under given design constraints. This is a team project that includes a final presentation and report. (Deferred grading only, pending completion of sequence.) GE credit: SciEng/SE.—W. (W.)

(change in existing course—eff. winter 18)

189V. Special Topics in Electrical Engineering and Computer Science, Computer Networks (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topics Computer Networks. May be repeated for credit. Offered irregularly. GE credit: SciEng/SE.—F, W. S. (F, W. S.)

(new course—eff. winter 18)

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/SE.—F. (F.)

(change in existing course—eff. fall 16)

Graduate

225. Graph Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: graduate standing in electrical engineering or computer science or consent of instructor. Open to Graduate Students in Computer Science only. Fundamental concepts. Planar graphs; Kuratowski’s theorem. Packings and coverings. Menger’s theorem, representation of cuts, Hamilton graphs, rigid graphs, chordal graphs, graph coloring, graph isomorphism, applications and some algorithms. Offered irregularly.—W. S. (W.) Gusfield

(diff in existing course—eff. winter 18)

289V. Special Topics in Electrical and Computer Engineering: Computer Networks (1-5)
Lecture/laboratory—1-5 units. Prerequisite: consent of instructor. Special topics in Computer Networks. May be repeated for credit.—F, W. S. (F, W. S.)

(new course—eff. winter 18)

Engineering: Materials Science and Engineering

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

Lower Division

2. Materials Marvels: The Science of Superheroes (3)
Lecture—2 hours; discussion—1 hour. Introduction to science and technology of materials as key engineering ingredients. Explores the relationship between art and materials, and how superheroes are both products and resources of ideas for new materials’ technologies. GE credit: SciEng/SE, SL, WE.—F, W. S. (F, S.) Castro

(change in existing course—eff. winter 18)

Upper Division

147. Principles of Polymer Materials Science (3)
Lecture—3 hours. Prerequisite: Chemistry 2A; Chemistry 2B; Chemistry 8A and Chemistry 8B or Engineering 45; introductory physics. Basic principles of polymer science presented including polymer structure and synthesis; polymerization mechanisms, polymer classes, properties, and reactions; polymer morphology, rheology, and character-
Engineering: Mechanical

160. Thermodynamics of Materials Processes and Phase Stability (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 C- or better or Engineering 45Y C- or better; Physics 9B C- or better; Mathematics 22B C- or better; Chemistry 2C recommended. Review of thermodynamic principles of interest to materials scientists and engineers. Application of thermodynamics to material processing, phase stability, corrosion. GE credit: SciEng/GL, SE, SL, VL, WE.—W (W)

Lecture—4 hours. Prerequisite: Engineering 45 C- or better or Engineering 45Y C- or better; Mathematics 22A C- or better; Physics 9B 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 using x-ray diffraction techniques. GE credit: SciEng/GL, SE.—W (W)

164. Rate Processes in Materials Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 C- or better or Engineering 45Y C- or better; course 160. Basic kinetic laws and the principles of material transformations. Applications in diffusion, oxidation, nucleation, growth and spinodal transformations. GE credit: SciEng/GL, SE, SL, VL.—W (W)

170. Sustainable Energy Technologies: Batteries, Fuel Cells, and Photovoltaic Cells (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 C- or better or Engineering 45Y C- or better; course 162 recommended. Microscopic and macroscopic aspects of the mechanical behavior of engineering materials, with emphasis on recent developments in materials characterization by nondestructive testing. Fundamental aspects of plasticity in engineering materials, strengthening mechanisms and mechanical failure modes of materials systems. GE credit: SciEng, WR, OL, SL, ST, VL.—S (S)

174. Mechanical Behavior of Materials (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 C- or better or Engineering 45Y C- or better; course 162 recommended. Microscopic and macroscopic aspects of the mechanical behavior of engineering materials, with emphasis on recent developments in materials characterization by nondestructive testing. Fundamental aspects of plasticity in engineering materials, strengthening mechanisms and mechanical failure modes of materials systems. GE credit: SciEng, WR, OL, SL, ST, VL.—S (S)

180. Materials in Engineering Design (4)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: Engineering 45 C- or better or Engineering 45Y C- or better. Restricted to students with upper division standing. Quantitative treatment of material selection for engineering applications. Discussion of design and material selection strategy; process and process selection strategy; process economics; life-cycle thinking and eco-design. Use of materials selection software. GE credit: SciEng, WR, OL, SL, VL, WE.—S (S)

181. Materials Processing (4)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: Engineering 45 C- or better or Engineering 45Y C- or better; Engineering 105 or Chemical Engineering 152B or Electrical & Computer Engineering 140A or course 164. Principles of phase equilibria, thermodynamics and reaction kinetics applied to materials processing. Effects of processing variables on the structure-property relationship. Fundamentals of the manufacturing processes for electronic, optical, functional and structural materials. GE credit: SciEng, WR, OL, SL, VL, WE.—W (W)

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 regulation, and cell adaptability. Same course as Biomedical Engineering 288 and Biophysics 288.—W (W) Parikh

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 subjects covered will vary from year to year and will be announced at the beginning of each quarter. May be repeated for credit. (SU grading only)—F, W, S (W, S)

Engineering: Mechanical

New and changed courses in Engineering: Mechanical (EME)

109. Experimental Methods for Thermal Fluids (4)
Lecture—2 hours; laboratory—15 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 151L, one unit of credit for students who have already completed course 107A (former version of course 109). GE credit: SciEng/SE.—W, S, Su. (F, W, S, Su) Erickson, Kennedy, Park, Shaw

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 5 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) Karmpop

124. 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 studies of the dynamics, stability and control of vehicles such as cars, trailers, airplanes, motorcycles, bicycles and rail cars. GE credit: SciEng/SE.—S (S)

150A. Mechanical Design (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 45 C- or better or Engineering 45Y C- or better; Engineering 104 C- or better; Engineering 50 C- or better (can be concurrent). Restricted to Mechanical Engineering, Aerospace Science & Engineering, and Mechanical Engineering/Materials Science Engineering majors. Principles of mechanics applied to design. Deformation and stress analysis. Structural integrity under static and fluctuating loads. Projects demonstrate progression from concept to engineering analysis, with emphasis on strength and durability. GE credit: SciEng/SE.—W, S, Su. (F, S, Su) Hill, Moore, Ravani, Schaaf

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/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. Design projects are based on conceptual design, engineering analysis, methods of manufacture, material selection, and cost. GE credit: SciEng/SE.—W, S (W, S) Parikh, Linke

Courses & Programs are subject to change without notice.
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/Materials Science and Engineering. 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/ Materials Science and Engineering. Principles of computer-aided mechanism design. Computer-aided kinematic, static, and dynamic analysis and design of planar mechanisms such as multiple-loop linkages and geared linkages. Introduction to kinematic synthesis of mechanisms. 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 Science and 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 for mechatronics systems, actuator drives. GE credit: SciEng SE.—S (S.) Soshi, Yanazaki (change in existing course—eff. fall 17)

153. Combustion and the Environment (4)
Lecture—3 hours; laboratory—3 hours. 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, furnaces and incinerators; alternative fuels. Offered in alternate years. GE credit: SciEng SE.—Shaw (change in existing course—eff. fall 17)

163. Internal Combustion Engines and Future Alternatives (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mechanical Engineering 106 C- or better; Mechanical Engineering 050 C- or better. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. Fundamentals of internal combustion engine design and performance. Future needs to adapt to environmental concerns, and the feasibility of better alternatives in the future. GE credit: SciEng SE.—F (F.) Erickson, Park (change in existing course—eff. fall 17)

165. Heat Transfer (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 5 C- or better or Engineering 6 or Computer Science Engineering 30; Engineering 103 C- or better; Engineering 105 C- or better. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. Conduction, convection, and radiation heat transfer; Computational modeling of heat transfer in engineering applications. To engineering equipment with the use of digital computers. GE credit: SciEng SE.—F, S, Su. (F, S, Su.) R. Davis, Narayanan, Shaw (change in existing course—eff. winter 17)

171. Analysis, Simulation and Design of Mechatronic Systems (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Engineering 100 C- or better; Engineering 102 C- or better. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/Materials Science and Engineering. Modeling of dynamic engineering systems in various energy domains. Analysis and design of dynamic systems. Response of linear systems. Digital computer simulation and physical experiments. GE credit: SciEng SE.—F. W. (F.) Assadian, Horsley, Kanopp (change in existing course—eff. fall 17)

172. Automatic Control of Engineering Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Engineering 102 C- or better; Engineering 102 C- or better. Restricted to Mechanical Engineering, Aerospace Science and Engineering, Mechanical Engineering/ Materials Science and Engineering. Classical feedback control systems; block diagrams; performance specifications; steady state errors; rise and settling times; root locus; PID controllers; Bode and Nyquist plots; stability; phase and gain margins; advanced topics as time allows. GE credit: SciEng SE.—F. W. S. Su. (F, W, S.) Eke, Horsley, Joshi (change in existing course—eff. fall 17)

185A. 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 (ME). 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 OL, SE, VL.—W (W.) Moore, Velinsky (change in existing course—eff. fall 17)

185B. Mechanical Engineering Systems Design Project (4)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 185A; 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: SciSE.—S (S.) 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)
(canceled course—eff. fall 16) 215. Biomedical Fluid Mechanics and Transport Phenomena (4)
(canceled course—eff. fall 16)

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

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

236. Aerodynamics in Nature and Technology (4)
canceled 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 governing, 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)
canceled course—eff. fall 16)

264. Computational Aerodynamics (4)
canceled course—eff. fall 16)

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

English

New and changed courses in English (ENL)

Lower Division
4. Critical Inquiry and Literature: Freshman Seminar (4)
Seminar—4 hours. Prerequisite: consent of instructor; completion of Entry Level Writing requirement. 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,W1/AH,WE.—S. (S.) (cancelled course—eff. winter 17)

10A. Literatures in English I: To 1700 (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program IV or University Writing Program VI, or equivalent. Historical introduction to English language and literature from 800-1700. Linguistic borrowing, innovation, and change. Emergence of key literary genres. Colonial America as a new site of English literary production and consumption. GE credit: ArtHum/AH, WE.—F, W. S. (F, W. S.) (change in existing course—eff. winter 18)

10B. Literatures in English II: 1700-1900 (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program IV or University Writing Program VI, or equivalent. Historical introduction to English language and literature from 1700-1900. Linguistic borrowing, innovation, colonization, and change. Emergence and development of key literary genres. America, Britain, Ireland, Scotland, and India as important sites of English literary production and consumption. GE credit: ArtHum/AH, WE.—F, W. S. (F, W. S.) (change in existing course—eff. winter 18)

10C. Literatures in English III: 1900 to Present (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program IV or University Writing Program VI, or equivalent. Historical
introduction to English language and literature from 1900-present. Linguistic borrowing, innovation, and change. Emergence and development of key literary genres. Formal experimentation. Modernism as transnational phenomenon. GE credit: AH, WE
(change in existing course—eff. winter 18)

40. Introductory Topics in Literature (4)
Lecture/discussion—3 hours; extensive writing. Pre-requisite: course 3 or University Writing Program for University Writing Program IV or University Writing Program Y, or equivalent. Close reading of, and topics relating to selected works of British and American drama from a range of historical periods. May be repeated two times for credit when content differs. GE credit: ArtHum, WrtAH, WE.
(change in existing course—eff. winter 18)

43. Introductory Topics in Drama (4)
Lecture/discussion—3 hours; extensive writing. Pre-requisite: course 3 or University Writing Program for University Writing Program IV or University Writing Program Y, or equivalent. Close reading of, and topics relating to selected works of British and American drama from a range of historical periods. May be repeated two times for credit when content differs. GE credit: ArtHum, WrtAH, WE.
(change in existing course—eff. winter 18)

51. Hot Bars, Supreme Lyrics, and Rhymes for Days: Hip Hop as Poetry (3)
Lecture/discussion—3 hours. Literary approaches to hip hop as poetry. Formal examination of rap lyrics in relation to technology, visual expression, dance, and knowledge production. Historical and cultural consideration of race, ethnicity, gender, urban culture, and politics. Offered irregularly. GE credit: ArtHum/ACGH, AH, DD.
(new course—eff. winter 18)

52. Pop Culture Shakespeare (3)
Lecture/discussion—3 hours. Critical approaches to the study of Shakespeare’s afterlife in contemporary American media. Focus on visual, audio, and kinesgetic modes of analysis and presentation. Relation of Shakespeare to contemporary society, politics, media, and economics. Offered irregularly. GE credit: ArtHum/ADH, DD, VL—Bloom
(new course—eff. winter 18)

72. Introduction to Games (4)
Lecture—3 hours; extensive writing/discussion—3 hours. Introduction to the history, theory, and practice of play. Survey of both analog and digital games. Overview of gaming cultures, aesthetics, industries, and technologies. Offered irregularly. (Same course as Cinema and Digital Media 72.) GE credit: AH, VL.
(new course—eff. fall 17)

92. Internship in English (1-12)
Internship—3-36 hours. Prerequisite: course 3 or University Writing Program 1 or University Writing Program IV or University Writing Program Y; or equivalent. Internships in fields where students can practice their skills. May be repeated for credit for a total of 12 units. (P/NP grading only—Y)—F, W, S, (F, W, S)
(change in existing course—eff. winter 18)

98. Directed Group Study (1-5)
Prerequisite: course 3 or University Writing Program 1 or University Writing Program IV or University Writing Program Y; consent of instructor. (P/NP grading only)—F, W, S, (F, W, S)
(change in existing course—eff. winter 18)

Upper Division

100F. Creative Writing: Fiction (4)
Discussion—4 hours. Prerequisite: course 5F or course 5F; course 5NF; consent of instructor. Priority given to English (Creative Writing) majors. Writing of fiction. May be repeated for credit.—F, W, S, (F, W, S)
(change in existing course—eff. winter 17)

100NF. Creative Writing: Non-Fiction (4)
Discussion—4 hours. Prerequisite: course 5F or course 5F or course 5NF; 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 5F or course 5F or course 5NF; 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)

106. English Grammar (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 3 or Linguistics 1 or University Writing Program 1 or University Writing Program IV or University Writing Program Y or course 5F or course 5F or course 5NF; consent of instructor. Survey of present-day English grammar as informed by contemporary linguistic theories. The major syntactic structures of English; their variation across dialects, styles, and registers; their development; and their usefulness in describing the conventions of English. (Same course as Linguistics 106 and University Writing Program 106) GE credit: ArtHum/AH
(change in existing course—eff. winter 18)

110A. Introduction to Literary Theory (4)
Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program IV or University Writing Program Y or consent of instructor. Survey of present-day English literature as informed by contemporary linguistic theories. The major syntactic structures of English; their variation across dialects, styles, and registers; their development; and their usefulness in describing the conventions of English. GE credit: ArtHum/AH, AH, WE.
(change in existing course—eff. winter 18)

113B. Chaucer: The Canterbury Tales (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program IV or University Writing Program Y; or equivalent. Literary analysis of the complete “Canterbury Tales.” Courtly love, literary forms, medieval science and astrology, theology and dogma as they inform the reading of Chaucer’s work. GE credit: ArtHum, WrtAH, WC, WE.
(change in existing course—eff. winter 18)

117. Shakespeare (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program IV or University Writing Program Y; or equivalent. Historically, generically, or thematically focused study of Shakespeare’s works. May be repeated two times for credit. GE credit: ArtHum, WrtAH, WC, WE.—F, W, S
(change in existing course—eff. winter 18)

122. Milton (4)
Lecture/discussion—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program IV or University Writing Program Y; or equivalent. Historically, generically, or thematically focused study of Shakespeare’s works. May be repeated two times for credit. GE credit: ArtHum, WrtAH, WC, WE.—F, W, S
(change in existing course—eff. winter 18)

149. Topics in Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program IV or University Writing Program Y. Intensive examination of literature con-
sidered in topical terms, not necessarily historically. May be repeated for credit when content differs. GE credit: ArtHum, WrtAH, WE.
(change in existing course—eff. winter 18)

154. The Graphic Novel (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program IV or University Writing Program Y. The short story as a genre; its historical development, techniques, and formal character as a literary form. European as well as American writers. GE credit: ArtHum, WrtAH, WE.
(new course—eff. fall 16)

156. The Short Story (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program IV or University Writing Program Y. The short story as a genre; its historical development, techniques, and formal character as a literary form. European as well as American writers. GE credit: ArtHum, WrtAH, WE.
(change in existing course—eff. winter 18)

157. Detective Fiction (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program IV or University Writing Program Y; course 45. Intensive examination of various topics expressed in poetry from all periods of English and American literature. May be repeated for credit when topics cover different poets and poems. GE credit: ArtHum, WrtAH, WE.
(change in existing course—eff. winter 18)

166. Love and Desire in Contemporary American Poetry (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program IV or University Writing Program Y; or standing above freshman level. Comparative study of what constitutes “American” literature. Possible emphases: North American or Latin American literature; Pacific Rim or Circum-Atlantic approaches; interrelations among different modes of racialization within and beyond U.S. borders. May be repeated two times for credit when topic differs. GE credit: Div, ArtHum, Wrt/ACGH, AH, WE.
(change in existing course—eff. winter 18)

179. Topics in Comparative American Literatures (4)
Lecture—3 hours; extensive writing or discussion—1 hour. Prerequisite: course 3 or University Writing Program 1 or University Writing Program IV or University Writing Program Y; or standing above freshman level. Comparative study of what constitutes “American” literature. Possible emphases: North American or Latin American literature; Pacific Rim or Circum-Atlantic approaches; interrelations among different modes of racialization within and beyond U.S. borders. May be repeated two times for credit when topic differs. GE credit: Div, ArtHum, Wrt/ACGH, AH, WE.
(change in existing course—eff. winter 18)

180. Children’s Literature (4)
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program IV or University Writing Program Y. Historical backgrounds and development of types of children’s literature, folklore and oral tradition, levels of interest, criticism and evaluation, illustration and bibliography. GE credit: ArtHum, WrtAH, WE.
(change in existing course—eff. winter 18)
181A. African American Literature to 1900 (4) 
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. African American literature from the colonial period to 1900. Particular attention to the rapid development of the African American literary culture from a primarily oral tradition to various literary genres, including the slave narrative. GE credit: ArtHum, Div, WritACGH, AH, DD, WE. 
(change in existing course—eff. winter 18)

182. Literature of California (4) 
Lecture/discussion—3 hours; term paper. Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. Internship fields where students can practice skills. A maximum of four units is allowed toward the major in English. May be repeated for credit for a total of 12 units. (P/N grading only—F, W, S, P, W, S.)

198. Directed Group Study (1-5) 
Prerequisite: course 3 or course 5F or course 5P or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y. (P/N grading only)

199FA. Student Facilitated Teaching (1-4) 
Prerequisite: course 3 or University Writing Program 1 or University Writing Program 1V or University Writing Program 1Y, consent of instructor. STU FAC. Under the supervision of a faculty member, an undergraduate student teaches a course under 98F/198F. Offered irregularly. (P/N grading only.)

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 2B. 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. ScEIng1SE.—F (F) Volder

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: ScEIng1SE, WE.—F (F) Evans

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: ScEIng1SE, OL, SL, WE.—F (F)

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 vector. Discussion includes demonstration of vectors and techniques. 
(change in existing course—eff. fall 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)

200B. Environmental Policy Evaluation (4) 
Lecture—2 hours; discussion—1 hour; seminar—2 hours. Prerequisite: Statistics 108 or Agricultural and Resource Economics 106; Agricultural and Resource Economics 176, Intermediate microeconomics (e.g., Economics 100); policy analysis (e.g., Environmental Science and Policy 168A or the equivalent). Method and practice, philosophical basis, and political role of policy analysis. Reviews basic concepts from economic theory; how and why environmental problems emerge in a market economy; and tools necessary for solving environmental problems. (Same course as Ecology 212B & Environmental Policy & Management 200B.)—W (W) Springborn 
(new course—eff. winter 18)

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, Environmental Science and Policy 212A.)—S (S) Arnold 
(change in existing course—eff. fall 17)

201. Environmental Law (3) 
Lecture—3 hours. Prerequisite: graduate standing. Roles of legislatures, agencies, and courts in creating and interpreting law; legal strategies for addressing environmental problems; major environmental statutes; and the relationship between federal and state/local legal authority.—F (F) 
(change in existing course—eff. spring 18)

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 analyze 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, S (W, S) 
(new course—eff. winter 18)
Environmental Science and Policy

New and changed courses in Environmental Science and Policy (ESP)

Lower Division

1. Environmental Analysis (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: University Writing Program 101 (can be concurrent) or University Writing Program 1 1/2 (can be concurrent) or English 1 (can be concurrent); or equivalent; sophomore standing. Economics 1A and Biological Sciences 2B recommended. Analysis of the physical, biological, and social interactions which constitute environmental problems. Emphasis on analysis of environmental problems, the consequences of proposed solutions, and the interaction of environmental science and public policy in creating solutions. GE credit: SciEng or SocSci SL or SL—F. (F.) Arnold, Holyoak
   (change in existing course—eff. winter 18)

Upper Division

110. Principles of Environmental Science (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 1A or Physics 7A; Mathematics 16B or Mathematics 17B; Biological Sciences 2A or Biological Sciences 10 recommended; upper division standing. Application of physical and chemical principles, ecological concepts, and systems approach to policy analysis of atmospheric environments, freshwater and marine environments, land use, energy supplies and technology, and other resources. GE credit: SciEng/QL, SE, SL—W. (W.) Largier
   (change in existing course—eff. winter 18)

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)

162. Environmental Policy (4)
   Lecture—3 hours; discussion—1 hour. Prerequisite: Environmental Policy 101A, 101V. Compares economic with socio-cultural approaches to understanding the causes of environmental problems and strategies for addressing them. Includes different approaches to the policy process, policy instruments, and environmental behavior. Applies these principles to several problems. GE credit: SocSci SS—W. (W.) Springborn
   (change in existing course—eff. winter 18)

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. GE credit: SL—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; consent of instructor. Limited enrollment. Overview of U.S. and International ocean and coastal policy, including energy, coastal land-use and water quality, protected areas and coastal and oceanic issues. Offered in alternate years. GE credit: SciEng/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: course 1 or course 10; Statistics 13 or Statistics 100; 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: SS—S. (S.) Lin
   (change in existing course—eff. winter 18)

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 and Planning (AEEP) Majors and Agricultural and Resource Economics (GARE) Graduates. 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.) GE credit: SocSci SS—S. (S.) Arnold
   (change in existing course—eff. fall 17)

212B. Environmental Policy Evaluation (4)
   Lecture—2 hours; discussion—1 hour; seminar—2 hours. Prerequisite: Statistics 108B or Agricultural and Resource Economics 106; Agricultural and Resource Economics 176; Intermediate microeconomics (e.g., Economics 100); policy analysis (e.g., course 168A or the equivalent). Methods and practices of policy analysis; philosophical and intellectual bases of policy analysis and the political role of policy analysis. (Same course as Ecology 212B & Environmental Policy & Management 200B.) GE credit: SocSci SS—S. (S.) Arnold
   (change in existing course—eff. spring 17)

396. Teaching Assistant Training Practicum (1-4)
   Prerequisite: consent of instructor. Teaching assistant training practicum. May be repeated for credit. GE credit: SocSci SL—W. (W.) Arnold
   (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-16B or Mathematics 17A-B) or Mathematics 21A-B; Statistics 102, Statistics 108, or Population Health and Reproduction 402 and 403 or equivalent of any 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 applications 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 generalization, 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. GE credit: SL—S. (S.) Largier
   (change in existing course—eff. winter 17)

231. Infectious Disease Epidemiology (3)
   (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) lust (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.)—Q (new course—eff. fall 18)

Evolution and Ecology

New and changed courses in Evolution and Ecology (EVE)  
**Lower Division**

17. Dining with Darwin: Evolutionary Insights Into Your Diet (3)  
Lecture—3 hours. Crave salty, fatty, sugary foods? Want to know why? Evolution of cravings, metabolism and dentition, and of cooking our food. Relate Paleo, South Beach, and vegan diets to ancestral and global diets and current metabolism. For majors and nonmajors. GE credit: SE, SS, WC.—S. (S.)

100. Introduction to Evolution (4)  
Lecture—3 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A, Biological Sciences 2B, Biological Sciences 2C; Mathematics 16A or Mathematics 21A; Mathematics 16B or Mathematics 17B or Mathematics 21B; Statistics 100 recommended. General survey of the origins of biological diversity and evolutionary mechanisms. GE credit: SciEng/QL, SE, SL.—F, W, S. (F, W, S.) Begun, Cooper, Ramirez (change in existing course—eff. winter 18)

101. Introduction to Ecology (4)  
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: Biological Sciences 2A, Biological Sciences 2B, Biological Sciences 2C; Mathematics 16A or Mathematics 21A; Mathematics 16B or Mathematics 17B or Mathematics 21B; or the equivalent. General survey of the principles of ecology. GE credit: SciEng/QL, SE, SL, VL.—F, W, S. (F, W, S.) Gaylord, Rejmanek, Schoener, Strong (change in existing course—eff. winter 18)

Exercise Science

New and changed courses in Exercise Science (EXS)  
**Graduate**

227. Research Techniques in Biomechanics (4)  
Lecture—3 hours. Prerequisite: course 101 or Neurobiology, Physiology, and Behavior 101 or Neurobiology, Physiology, and Behavior 101C. Exercise metabolism, with emphasis on skeletal muscle and cardiac muscle metabolism during activity and inactivity. Basics of bioenergetics, substrate utilization, and cell signaling; mechanisms that regulate these properties, and differences between skeletal muscle and cardiac muscle metabolism. GE credit: SciEng/SE.—S. (S.) Gomes (change in existing course—eff. winter 18)

Upper Division

103. Analysis and Control of Human Movement (4)  
Lecture—4 hours. Prerequisite: course 101 or Neurobiology, Physiology, and Behavior 101 and 102 (Former Exercise Science 101 and 102). GE credit: SciEng/SE, SL.—F, S. (F, S.) Bodine, Shaffrath (change in existing course—eff. winter 18)

110. Exercise Metabolism (3)  
Lecture—3 hours. Prerequisite: course 101 or Neurobiology, Physiology, and Behavior 101 or Neurobiology, Physiology, and Behavior 101C. Exercise metabolism, with emphasis on skeletal muscle and cardiac muscle metabolism during activity and inactivity. Basics of bioenergetics, substrate utilization, and cell signaling; mechanisms that regulate these properties, and differences between skeletal muscle and cardiac muscle metabolism. GE credit: SciEng/SE.—S. (S.)

126. Tissue Mechanics (3)  
Lecture—3 hours. GE credit: SciEng/SE.—F, S. (F, S.)

Fiber and Polymer Science

New and changed courses in Fiber and Polymer Science (FPS)  
**Upper Division**

100. Principles of Polymer Materials Science (3)  
Lecture—3 hours. Prerequisite: Chemistry 2A; Chemistry 2B; Chemistry 8A, Chemistry 8B or Engineering 45 or Engineering 45Y; introductory physics. Basic principles of polymer science are presented including polymer structure and synthesis; polymerization mechanisms, polymer classes, properties, and reactions; polymer morphology, rheology, and characterization; polymer processing. (Same course as Materials Science Engineering 147.) GE credit: SciEng/QL, SE.—W. (W) Pan (change in existing course—eff. winter 18)

Fine Arts & Humanities

New and changed courses in Fine Arts & Humanities (FAH)  
**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)

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/SE, SL.—F, W, S. (F, W, S.) Bamforth (change in existing course—eff. fall 17)

3V. Introduction to Brewing and Beer (3)  
Web virtual lecture—1 hour; web electronic discussion—1 hour; project—15 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/SE, SL.—S. (S.)

50. Introduction to Food Preservation (3)  
Lecture—3 hours; discussion—1 hour. Relationship between food and culture; relationship between food and the social order; influences on eating habits and the tensions between them including identity, convenience, and responsibility; multiple disciplines and genres. (Same course as American Studies 55.) GE credit: ArtHum or SocSci, Div. W/1ACGH, AH or SS, DD, WE.—S. (S.) Bittkeoff (change in existing course—eff. winter 18)

55. Food in American Culture (4)  
Lecture—3 hours; discussion—1 hour. Relationship between food and culture; relationship between food and the social order; influences on eating habits and the tensions between them including identity, convenience, and responsibility; multiple disciplines and genres. (Same course as American Studies 55.) GE credit: ArtHum or SocSci, Div. W/1ACGH, AH or SS, DD, WE.—S. (S.) Bittkeoff (change in existing course—eff. winter 18)

Upper Division

101A. Food Chemistry Laboratory (3)  
Discussion—1 hour; lecture—1 hour; laboratory—3 hours. Concurrent enrollment in course 100A required. 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.—W.—F. (F.) Slupsky (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 indus-
trial practices and product quality. Not open for credit to students who have taken course 102. GE credit: SciEng/BSE—F. J. Bamforth (new course—eff. fall 17).

104. Food Microbiology Laboratory (4)
Lecture—1 hour; discussion—1 hour; laboratory—6 hours. Prerequisite: Biological Sciences 2A; Biological Sciences 103; course 104. Cultural and morphological characteristics of microorganisms involved in food spoilage, in food-borne disease, and food fermentation. Analysis of microbiological quality of foods. GE credit: SciEng/GL, 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/GL, SE, WE.—F. (F.) O’Mahony (change in existing course—eff. spring 17).

109. Principles of Quality Assurance in Food Processing (3)
Lecture—1 hour; discussion—1 hour. Prerequisite: Statistics 13. Quality assurance measurement techniques applied to selected processed foods emphasized. Rationale for establishing valid quality assurance programs, including selection of critical points. Statistical problems in quality assurance programs used by the food industry. GE credit: SciEng/GL, SE, VL, WE.—S. (S.) O’Mahony (change in existing course—eff. spring 17).

110. Food Processing (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Physics 7A, 7B, 7C; Mathematics 16A, 16B, 16C, or equivalent to Physics 7 series or Mathematics 16 series. Application of the conservation of mass and energy to food processing. Elements of engineering thermodynamics, fluid mechanics, heat and mass transfer. Quantitative analysis through problem solving and simulation. Not open for credit to students enrolled in College of Engineering. GE credit: SciEng/GL, SE, VL.—F. (F.) Simmons (change in existing course—eff. spring 17).

110L. 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 equipment and pilot plant scale. GE credit: SciEng/GL, SE, VL.—F. (F.) Bonhorst (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)

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/GL, SE, VL.—S. (S.) Rosenberger (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 reaction conditions on activity are stressed. Specificity and mechanism of action illustrated by use of selected enzymes. (Former course Biochemistry and Biophysics 123) GE credit: SciEng/GL, 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 SociSci/AH or SS, OL, WE.—F. (F.) Biltekoff (change in existing course—eff. spring 17).

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, reactions, 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, dehydration, and concentrating of food materials.—S. (S.) Dungan (change in existing course—eff. winter 17).

230. Food & Gut Microbiota (4)
Lecture—15 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).

252. Landscape and Power (4)
Lecture discussion—3 hours. GE credit: SciEng/GL, SE, VL, WE.—F. (F.) Yoder (change in existing course—eff. spring 17).

270. Experimental Design and Analysis (5)
Lecture discussion—3 hours. GE credit: SciEng/GL, SE, VL, WE.—F. (F.) Yoder (change in existing course—eff. spring 17).

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.) Niemeier (change in existing course—eff. fall 17).

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 extraterrestrial 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/BSE—W. (W.) Montañez (change in existing course—eff. winter 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)
Lecture discussion—3 hours. GE credit: SciEng/GL, SE, VL, WE.—F. (F.) Yoder (change in existing course—eff. fall 16).

270. Experimental Design and Analysis (5)
Lecture discussion—3 hours. GE credit: SciEng/GL, SE, VL, WE.—F. (F.) Yoder (change in existing course—eff. fall 16).

279. Applying Multivariate Modeling in Agricultural and Environmental Sciences (4)
Lecture discussion—3 hours. GE credit: SciEng/GL, SE, VL, WE.—F. (F.) Yoder (change in existing course—eff. fall 16).

281. 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.) Niemeier (change in existing course—eff. fall 17).

Geology (A Graduate Group)

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 extraterrestrial 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/BSE—W. (W.) Montañez (change in existing course—eff. winter 17).
9. Geology Field Experience (1)
Fieldwork—30 hours. Prerequisite: consent of instructor; at least one previous Geology class, or concurrent enrollment. Pass One open to non-Geology Majors only. Exposure to geologic features and earth processes in the field. Experimental instruction in earth-science concepts, spatial visualization, landscape evolution, deep time, critical thinking skills, and integrative scientific themes. May be repeated for credit up to one time when field trip destination differs. GE credit: SE, F, F, S, Oxeiger, Pinter
(new course—eff. fall 16)

91. Geology of Campus Waterways (1)
canceled 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: ScEng, Wrt15E, VL, WE—Su. (Su.) 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 geology of resources, topography, and water. GE credit: ScEng or SocSci, Wrt11OL, SE, WE—S. (S.) Verosub
(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, SS, WE—F, W, S; F, W, S; Pinter, Stevenson
(change in existing course—eff. fall 17)

185A. Conceptual Integrated Science for Non-Science Majors: The Physical World (2)
(new course—eff. winter 17)

185B. Conceptual Integrated Science for Non-Science Majors: Earth System Science (2)
(new course—eff. fall 16)

186. Facilitating Learning in STEM Classrooms (2)
Lecture/discussion—1 hour. STEM Learning Assistance 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, W, S; F, W, S; 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, W, S; F, W, S; Rizzo
(change in existing course—eff. fall 17)

Upper Division

101. Epidemiology (4)
Lecture—2 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: Science and Society 13; Biological Science 2A; Biological Science 2B; Biological Science 2C; Statistics 13 or Statistics 13Y; Statistics 100 or Plant Sciences 120. Principles and practice of epidemiology as applied to human, animal, and plant populations and the environment in which these populations co-exist. Quantitative analysis of both infectious and non-infectious diseases. Interdependence between epidemiological analysis, decision making and policy formulation will be highlighted. GE credit: ScEng/SE, QL—W, W, MRoberts, Papageorgiou
(change in existing course—eff. winter 18)

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, epylls, idylls, epic, natural history and other texts from the hexameter tradition. May be repeated for credit. GE credit: ArHum, Wrt1AH, WE—F, W, S; F, W, S; Bramanti, Ullrich
(new course—eff. fall 17)

131. Readings in Ancient Greek Philosophy and Science (4)
Extensive writing—3 hours; lecture/discussion—3 hours. Prerequisite: course 100 (can be concurrent); or consent of instructor. Selected readings from ancient Greek philosophical and scientific writers. Texts on logical truth and empirical sense data, material and social contexts of ancient Greek philosophy and science. May be repeated for credit. Offered in alternate years. GE credit: ArHum, Wrt1AH, WE—F, W, S; F, W, S; Webster
(new course—eff. fall 17)

Health Informatics

New and changed courses in Health Informatics (MHI)

Graduate

289E. Clinical Knowledge for the Health Informaticist (3)
Lecture—2 hours; laboratory—2 hours. Prerequisite: consent of instructor. Basic clinical knowledge for health informatics students. Human systems, disease states and conditions, treatments and prognosis.—W. (W)
(change in existing course—eff. winter 18)

289I. Programming in Health Informatics (3)
Lecture—2 hours; laboratory—2 hours. Prerequisite: consent of instructor. Basics of computer programming essential to the study of informatics. Impacts on systems within healthcare, public health, nursing, research, and others.—W. (W)
(change in existing course—eff. winter 18)

Hebrew

New and changed courses in Hebrew (HEB)

Lower Division

2. 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: ArHum, AH, OL, WE—W, (W) Franco
(change 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: ArHum, AH, OL, WE—S. (S.) Franco
(change in existing course—eff. fall 17)

11. Introduction to Biblical Hebrew (3)
(change in existing course—eff. winter 18)

12. Introduction to Biblical Hebrew (3)
(change in existing course—eff. winter 18)

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 100 or 100A. GE credit: ArHum, AH, OL, WE—F, (F) Franco
(change 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.
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/Urdu or the equivalent. Students will continue to practice their skills in listening, speaking, and reading. GE credit: ArtHum/AH, OL, WC, WE. MS Chauhan (change in existing course—eff. fall 17)

22. Intermediate Hindi/Urdu II (4)
Lecture/discussion—4 hours. Prerequisite: course 21. Intermediate level course where students will continue to practice their skills in listening, speaking, and reading writing in Hindi and Urdu. GE credit: ArtHum/AH, OL, WC, WE. MS Chauhan (change in existing course—eff. fall 17)

23. Intermediate Hindi/Urdu III (4)
Lecture/discussion—4 hours. Prerequisite: course 22. Intermediate level course where students will continue to practice their skills in listening, speaking, and reading writing in Hindi and Urdu. GE credit: ArtHum/AH, OL, WC, WE. MS Chauhan (change 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 practicum. May be repeated for credit up to eighteen times. (S/U grading only) (new course—eff. winter 17)

Hindi

New and changed courses in Hindi (HIN)

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; 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, Wt IAH or SS, WC. (change in existing course—eff. winter 17)

13. Global Sexualities (4)
Lecture—3 hours; discussion—1 hour. Global history of sexualities, including comparative study of gender, marriage, and fertility before 1800, followed by the modern history of sexualities worldwide as it intersects with imperialism, race, population control, law, and globalization. GE credit: AH, DD, SS, VL, WC. (new course—eff. fall 17)

15. Introduction to African History (4)
(new 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)

18A. Race in America to 1865 (4)
Lecture—3 hours; discussion—1 hour. Introduction to history of race and racial formation in the United States to the Civil War through a comparative approach. Examines the experiences of African Americans, Asian Americans, Native American, Mexican Americans and other Latino/a groups. One unit of credit to students who have previously completed History 178A. GE credit: ACGH, AH or SS, DD. (new course—eff. fall 17)

20. The Vietnam War (4)
Lecture—3 hours; extensive writing—3 hours. A history of the Vietnam War, including its origins, fighting, and repercussions. GE credit: ACGH, AH or SS, DD, VL, WC, WE. (new course—eff. fall 17)

92. Internship in History (1-12)
Internship—3-36 hours. Prerequisite: consent of instructor. Supervised internship and study as a historian, archivist, editor, or in another historically related capacity, in an approved organization or institution. May be repeated for credit. (P/NP grading only) (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 prehistory 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 109B. (Same course as Science and Society 109.) GE credit: SciEng or SocSci, Div, WE. MS Davis (new course—eff. fall 18)

110A. Global Environmental History (4)
(new course—eff. winter 17)

110B. Environmental Change, Disease and Public Health (4)
(new course—eff. winter 18)

115A. History of West Africa (4)
Lecture—3 hours, term paper. Prerequisite: course 15 recommended. Western Africa from 1500 to the present. Origins and impact of precolonial states and societies, slavery, trade, colonialism, decolonization, nationalism, and changes in religion, politics, economics, gender, and culture. Offered in alternate years. GE credit: ArtHum, Div, Wt IAH, WC, WE. (change in existing course—eff. winter 18)

115B. History of East Africa and the Indian Ocean (4)
Lecture—3 hours, term paper. Prerequisite: course 15 recommended. Eastern Africa and the Indian Ocean world from 1500 to the present. Origins and impact of precolonial states and societies, slavery, trade, colonialism, decolonization, nationalism, and changes in religions, politics, economics, gender, and culture. Offered in alternate years. GE credit: ArtHum, Div, SocSci, Div, Wt IAH, WC, WE. (change in existing course—eff. winter 18)

115C. History of Southern Africa from Exploration to the Rainbow Nation (4)
Lecture—3 hours, term paper. Prerequisite: course 15 recommended. Southern Africa from 1500 to the present. Origins and impact of precolonial states and societies, slavery, trade, colonialism, decolonization, nationalism, and changes in religions, politics, economics, gender, and culture. GE credit: ArtHum, SocSci, Div, Wt IAH, WC, WE. (change in existing course—eff. winter 18)

115D. Postcolonial Africa (4)
Lecture—3 hours, term paper. Prerequisite: course 115A recommended. Survey of social, political, cultural and economic change in African societies since the ending of European colonial rule in the twentieth century. Themes include development, health and medicine, war and conflict, urbanization, and global and inter-continental migration, and family and gender. GE credit: ArtHum or SocSci, Div, Wt IAH or SS, WC. (change in existing course—eff. spring 17)

115E. Slavery, Africa, and the Atlantic World (4)
Lecture—3 hours, term paper. History of the African Slave trades, from the early Egyptian and Saharan trades in the pre-modern period to the trans-Atlantic
126Y. The History of Rights in Europe (4)
Lecture—3 hours; web electronic discussion—1 hour.
History of the origins, development, and state of international humanitarian law (IHL) and international human rights law (IHRL) in Europe. Emphasis on Enlightenment-era and modern theories of the source, utility, and limits of human rights. Offered in alternate years. (Same course as Human Rights 162Y) GE credit: SS, WE.
(change in existing course—eff. fall 17)

133. European Thought and Culture from the Renaissance to the Enlightenment (4)
Lecture—3 hours; term paper. History of European thought on politics, society, science, and religion from 1400 to 1800. Cultural impact of printing press, Protestant Reformation, wars, exploration, and empire. Offered in alternate years. GE credit: AH.
(new course—eff. spring 18)

158. Special Topics in Latin American History (4)
Lecture—3 hours; term paper—3 hours. Topics in the history of Latin America. Topics may be framed geographically (e.g., Central America), chronologically (e.g., the Cold War) or thematically (e.g., environmental history). May be repeated for credit up to three times when topic differs. Offered in alternate years. GE credit: AH, WC, WE.
(new course—eff. fall 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 the war itself and the problems of reconstruction after the war. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Wrtl/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 birthright citizenship; overthrow of biracial Southern governments; segregation and disfranchisement; culture of reconciliation. GE credit: AH.
(new course—eff. spring 17)

172. American Environmental History (4)
Lecture—3 hours; term paper. Examination of changing relationships 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, Wrtl/ACGH, AH or SS, WE.
(change in existing course—eff. winter 18)

178A. Race in America, 1492-1865 (4)
cancelled course—eff. fall 17

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 standing during the twentieth century, from colonialism to the war on terror, including political, diplomatic, cultural, and economic activities of both 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. State and society 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, SocSci, Div, Wrtl/ACGH, AH or SS, DD, WE.
(change in existing course—eff. fall 17)

195C. A History of Vietnam (4)
Lecture/discussion—3 hours. Overview of Vietnamese history: early state formation in Southeast Asia; expansion/contention in the 17th and 18th centuries; colonial period; 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. Offered in alternate years. GE credit: AH.
(new course—eff. fall 17)

Human Development

New and changed courses in Human Development (HDE)
Upper Division
100A. Infancy and Early Childhood (4)
Lecture—4 hours. Prerequisite: Psychology 1 or Psychology 1Y, Biological Sciences 2A or Biological Sciences 10 or Biological Sciences 1A or Biological Sciences 10V or Molecular and Cellular Biology 10 or Neurology, Physiology, and Behavior 10 or Neurolgy, Physiology, and Behavior 12 or Microbiology 10. Pass One restricted to Human Development majors. Biological, social, and cultural influences in the psychological growth and development of children, prenatally through age six. Two observations of preschool children required.—F, W. Su. (F, W, Su.) Hibbel
(change in existing course—eff. winter 18)

100B. Middle Childhood and Adolescence (4)
Lecture—4 hours. Prerequisite: course 100A or Psychology 140; Psychology 1 or Psychology 1Y. Interpretation of biological and social-cultural factors in the emotional, cognitive and social development from middle childhood through adolescence.—W, W, Su. (W, S, Su.) Guyer, Nishina
(change in existing course—eff. winter 18)

110. Contemporary American Family (4)
Lecture—4 hours. Prerequisite: Psychology 1 or Psychology 1Y or Sociology 1 or Sociology 2. Factors currently influencing American families including changing economic conditions, changing sex roles, divorce, and parenthood; theories and research on family interaction.—W, W. Coniger
(change in existing course—eff. winter 18)

120. Research Methods in Human Development (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Statistics 13 or Statistics 13V or Statistics 13Y or Education 114 or Psychology 41 or Sociology 46A and Sociology 46B. Scientific process, research design, and experimental controls; APA manuscript style and scientific writing; statistical analysis and interpretation of results. Laboratory exercises to collect data, analyze and interpret results, and write scientific papers. GE credit: SS, WE.—F, S. (F, S.) Liu, Nishina
(change in existing course—eff. winter 18)

Graduate
220. Research Methods in Human Growth and Development (4)
Lecture—4 hours. Prerequisite: Statistics 13 or Statistics 13Y, or the equivalent and at least two upper division courses in Human Biology or Developmental Psychology. Overview of qualitative and quantitative approaches to empirical inquiry in the social sciences, with a focus on theory and research methods in biological growth and cognitive and social-emotional development from prenatal period to death.—W, (W.) Liu
(change in existing course—eff. winter 18)

Human Rights

New and changed courses in Human Rights (HMR)
Upper Division
162Y. The History of Human Rights in Europe (4)
Lecture—3 hours; web electronic discussion—1 hour. History of the origins, development, and state of international humanitarian law (IHL) and international human rights law (IHRL) in Europe. Emphasis on Enlightenment-era and modern theories of the source, utility, and limits of human rights. Offered in alternate years. (Same course as History 126Y) GE credit: SS, WC.
(new course—eff. fall 17)

190. Seminar (4)
Seminar—4 hours; term paper. Emphasis on current scholarly debate about the methods for analyzing and comparing diverse human rights issues with the intention of integrating disciplined study of the field. Shape in course—eff. fall 16)

Professional
396. Teaching Assistant Training Practicum (1-4)
Prerequisite: consent of instructor; graduate standing. Restricted to graduate students. Teaching Assistant Training Practicum. May be repeated for credit. (SU grading only)—F, W, S. (F, W, S.)
(new course—eff. fall 17)
Hydrology

New and changed courses in Hydrology (HYD)

Upper Division

143. Ecoholicydrology (4)
Lecture/discussion—3 hours; course 10 or course 141 or Environmental Science and Policy 1 or Environmental Science and Management 100 or Environmental Science and Management 120 or Geology 1 or Geology 50 or Soil Science 100; or 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, 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.) Dahlke (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)
Lecture—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, Har- ter (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; Fogg, Puente (change in existing 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.) Vosti (change in existing course—eff. winter 17)

202N. Analysis and Determinants of Farming Systems (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Plant Sciences 10C 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. Prerequisites: 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.) (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 with peers in classroom setting. GE credit: OL, WC.—F, S. (F, S.) (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. (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)
New and changed courses in Japanese (JPN)

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 death as portrayed in Japanese cinema. Lectures, discussion, and readings in English. Films with English subtitles. GE credit: Arthum, Div, WtIAH, VL, WC—Chang, Gundry (change in existing course—eff. spring 17)

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, and fantasy. Offered in alternate years. GE credit: Arthum, Div/AH, VL, WC. (change in existing course—eff. fall 17)

110. Modern Japanese: Reading and Discussion (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 6 C- or better, or 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.) Gomez (new course—eff. fall 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 culture 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 1, course 1A, course 15, course 2, course 25. GE credit: AH, OL, WC.—W. (W.) Gomez (new course—eff. fall 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)

117S. 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, or 112; an exception can be made for students who have taken course 6 or its equivalent, provided that those five units are deducted from the 19 total unit load. GE credit: Arthum/AH, OL, WC. (change in existing course—eff. winter 17)

130. Readings in Modern Japanese Literature to 1926 (4)
Lecture/discussion—4 hours. Prerequisite: course 113, or equivalent language proficiency, or consent of instructor. 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, Tankastr, Jun'ichirô and Akutagawa Ryûnosuke. Readings and discussion in Japanese with some emphasis on translation into English. GE credit: Arthum/AH, WC.—S. Sorensen (change in existing course—eff. fall 18)

131. Readings in Modern Japanese Literature: 1920-1945 (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 113, or equivalent language proficiency, or consent of instructor. Fourth-year level reading of representative works of modern Japanese literature including short stories, diaries, memoirs, poetry and excerpts from novels and plays from 1920 through the militaristic era, to the end of the war years in 1945. GE credit: Arthum/AH—Chang, Gundry (change in existing course—eff. fall 18)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 113, or equivalent language proficiency, or consent of instructor. Continuation of course 131, but may be taken independently. Covers selected texts from the immediate post-war years beginning in 1945 down to 1970 and the post-war recovery. GE credit: Arthum/AH.—Chang (change in existing course—eff. fall 18)

133. Readings in Modern Japanese Literature: 1970-Present (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 113, or equivalent language proficiency, or consent of instructor. Continuation of course 132, but may be taken independently. Covers selected texts from 1970 to the present. Offered in alternate years. GE credit: Arthum/AH, WC.—Chang (change in existing course—eff. fall 18)

134. Readings in the Humanities: Traditional Culture (4)
Lecture—3 hours; discussion—1 hour; term paper. Prerequisite: course 113, or equivalent language proficiency, or consent of instructor. Fourth-year level reading of modern works written by intellectuals on traditional Japanese culture: history, religion, thought, art, international relations, and literary history and criticism. Focus is equally on developing reading skills and learning about Japanese culture. GE credit: Arthum/AH, WC.—Sorensen (change in existing course—eff. fall 18)

135. Readings in the Humanities: The Modern Period (4)
Lecture—3 hours; term paper. Prerequisite: course 113, or equivalent language proficiency, or consent of instructor. Fourth-year level reading of authentic modern writings on Japanese culture, history, philosophy, society, religion, law, politics, international relations, aesthetics, and comparative culture by prominent critics, commentators, and scholars. GE credit: AH, WC.—Chang (change in existing course—eff. fall 18)

136. Readings in Newspapers and Magazines (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 113, or equivalent language proficiency, or consent of instructor. Readings of newspapers and magazine articles, and editorials on domestic and international affairs relating to contemporary Japan. GE credit: Arthum/AH, WC.—Chang (change in existing course—eff. fall 18)

137. Reading in Contemporary Japanese Literature (4)
Lecture/discussion—4 hours. Prerequisite: course 113, or equivalent language proficiency, or consent of instructor. Readings of short stories and essays by contemporary writers. Representative writers include Yoshimoto Banana, Otsuchi, Suzuki Koji, Kyogoku Natsuki, Ogawa Yoko, and Murakami Haruki. Readings and discussion in Japanese with some emphasis on translation into English. GE credit: AH, WC.—Sorensen (change in existing course—eff. fall 18)

138. Readings in the Humanities: Japan Today (4)
Lecture/discussion—4 hours. Prerequisite: course 113, or equivalent language proficiency, or consent of instructor. Restricted to completion of course 113 or equivalent as determined by taking a placement exam or consent of instructor. Topical essays focused on contemporary 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 mainstay of Japan’s cultural currency. GE credit: Arthum/AH, WC.—Sorensen (change in existing course—eff. fall 18)
Landscape Architecture

New and changed courses in Landscape Architecture (LDA)

Lower Division

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, W/1ACGH, SS, VL, WE—S. (S. J. Wheeler)

21. Landscape Representation I (4)
   Lecture—3 hours; laboratory—3 hours. Prerequisite: course 1 can be concurrent; or consent of instructor. Pass One is 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/Art, OL, VL—F. (P. F. Boults)

23. Landscape Representation II (3)
   Studio—6 hours; project—3 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—F. (P.)

31. Photography for Designers (4)
   Lecture—3 hours; laboratory—3 hours. Prerequisite: course 21; or consent of instructor. Restricted to Pre-Landscape Architecture and Sustainable Environmental Design majors only. Spot photography for application in landscape architecture. GE credit: ArtHum/Art, OL, VL—W. (W.)

60. Landform and Grading Studio (5)
   Studio—8 hours, extensive problem solving—2 hours; project—8 hours. Prerequisite: course 70. Pass One restricted to Pre-Landscape Architecture majors. Introduction of landform and topography as landscape medium and utilization of grading and drainage to design meaningful and functional spaces. Intro to site analysis and site planning, with specific attention to topography. GE credit: ArtHum, SciEng/Art, OL, VL, SE—S. (S.)

70. Introduction to Spacemaking (5)
   Lecture—3 hours; laboratory—3 hours. Prerequisite: course 21; or consent of instructor. Pass One 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 spacetaking. GE credit: ArtHum/Art, OL, VL—W. (W.) Napawan

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.) Napawan

102. Methods in Design and Landscape Research (3)
   Lecture—3 hours. Prerequisite: course 171; or consent of instructor. Open to Landscape Architecture majors only. Research, design, and planning methods employed in landscape architecture. Exercises allow students to design independent landscape research. Lectures provide a historical overview of research methodology. GE credit: ArtHum/Art, OL, VL, WE—W. (W.)

120. Landscape Representation III (3)
   Studio—6 hours; project—3 hours. Prerequisite: course 23; or consent of instructor. Restricted to Landscape Architecture majors. Provides hands-on workshop environment to explore advanced representation and modeling skills. Digital drawing explored as an analytical research method and generative design technique for creating presentation graphics—W. (W.) Milligan

150. Introduction to Geographic Information Systems (4)
   Lecture—3 hours; laboratory—3 hours. Pass One restricted to Landscape Architecture and Sustainable Environmental Design majors. Basic concepts, principles, and methods of GIS are presented. Data structures, database design, GIS data creation, GPS, and spatial analysis techniques are emphasized. Lab topics include: online data sources, aerial photography, GPS data input, suitability analysis, cartographic design, and graphic communication. Not open for credit to students who have completed Applied Biological Systems Technology 180/Plant Sciences 180. GE credit: SE, VL.

161. Professional Practice and Construction Documents (6)
   Studio—8 hours; project—6 hours; fieldwork. Prerequisite: course 171. Open to Landscape Architecture majors only. Legal and professional aspects of landscape architecture, including the development of construction documents (drawings and specifications), proposal writing, fee calculations, project management, cost estimation, and insurance. GE credit: ArtHum/Art, OL, VL—W. (W.)

170. Site Planning and Design Studio (6)
   Studio—8 hours; fieldwork—2 hours. Prerequisite: course 160. Open to Landscape Architecture majors. Application of place-making and problem-solving skills to local landscape sites. Analysis of social and environmental conditions in the field. Lectures link design projects to contemporary theories and practices. GE credit: ArtHum/Art, OL, VL—W. (W.)

180A. Special Topics in Landscape Architecture: Postmodern Landscapes (2)
   Lecture/discussion—2 hours. Prerequisite: course 180A. GE credit: ArtHum/Art, OL, VL—W. (W.)

180B. Special Topics in Landscape Architecture: Art of the Environment (2)
   Lecture/discussion—2 hours. Prerequisite: course 180B. GE credit: ArtHum/Art, OL, VL—W. (W.)

180C. Special Topics in Landscape Architecture: Regenerative Landscape Systems (2)
   Lecture/discussion—2 hours. Prerequisite: course 180C. GE credit: ArtHum/Art, OL, VL—W. (W.)

180D. Special Topics in Landscape Architecture: Planting Design (2)
   Lecture/discussion—2 hours. Prerequisite: course 180D. GE credit: ArtHum/Art, OL, VL—W. (W.)

180E. Special Topics in Landscape Architecture: Urban and Community Design (2)
   Lecture/discussion—2 hours. Prerequisite: course 180E. GE credit: ArtHum/Art, OL, VL—W. (W.)

180F. Special Topics in Landscape Architecture: Landscape Ecology (2)
   Lecture/discussion—2 hours. Prerequisite: course 180F. GE credit: ArtHum/Art, OL, VL—W. (W.)

180G. Special Topics in Landscape Architecture: Landscape and Regional Land Planning (2)
   Lecture/discussion—2 hours. Prerequisite: course 180G. GE credit: ArtHum/Art, OL, VL—W. (W.)

180H. Special Topics in Landscape Architecture: The Bioregional Landscape (2)
   Lecture/discussion—2 hours. Prerequisite: course 180H. GE credit: ArtHum/Art, OL, VL—W. (W.)

180I. Special Topics in Landscape Architecture: The Bioregional Landscape (2)
   Lecture/discussion—2 hours. Prerequisite: course 180I. GE credit: ArtHum/Art, OL, VL—W. (W.)

180J. Special Topics in Landscape Architecture: Community Participation in Design (2)
   Lecture/discussion—2 hours. Prerequisite: course 180J. GE credit: ArtHum/Art, OL, VL—W. (W.)

180K. Special Topics in Landscape Architecture: Social Factors in Landscape Architecture (2)
   Lecture/discussion—2 hours. Prerequisite: course 180K. GE credit: ArtHum/Art, OL, VL—W. (W.)

180L. Special Topics in Landscape Architecture: Public Open Space (2)
   Lecture/discussion—2 hours. Prerequisite: course 180L. GE credit: ArtHum/Art, OL, VL—W. (W.)

180M. Special Topics in Landscape Architecture: Urban and Community Design (2)
   Lecture/discussion—2 hours. Prerequisite: course 180M. GE credit: ArtHum/Art, OL, VL—W. (W.)

180N. Special Topics in Landscape Architecture: Planting Design (2)
   Lecture/discussion—2 hours. Prerequisite: course 180N. GE credit: ArtHum/Art, OL, VL—W. (W.)

180O. Special Topics in Landscape Architecture: Current Issues in Landscape Architecture (2)
   Lecture/discussion—2 hours. Prerequisite: course 180O. GE credit: ArtHum/Art, OL, VL—W. (W.)

180P. Special Topics in Landscape Architecture: Water in Community Planning and Design (2)
   Lecture/discussion—2 hours. Prerequisite: course 180P. GE credit: ArtHum/Art, OL, VL—W. (W.)

General Education (GE): AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; AGCH—American Cultures; DD—Domestic Diversity; OL—Oral Skills; QA—Quantitative; SL—Scientific; VL—Visual; WC—World Cultures; WE—Writing Experience

Courses & Programs are subject to change without notice.
180Q. Historic Preservation (2) (canceled course—eff. winter 17)
181A. Postmodern Landscapes Design and Planning Studio (3) (canceled course—eff. fall 16)
181C. Art of the Environment Design and Planning Studio (3) (canceled course—eff. fall 16)
181P. Landscape Ecology Design and Planning Studio (3) (canceled course—eff. fall 16)
181G. Special Topics in Landscape Architecture: Landscape and Regional Land Planning Studio (3) (canceled course—eff. fall 16)
181H. The Bioregional Landscape Design and Planning Studio (3) (canceled course—eff. fall 16)
181L. Public Open Space Design and Planning Studio (3) (canceled course—eff. fall 16)
181M. Urban and Community Design: Design and Planning Studio (3) (canceled course—eff. fall 16)
181N. Public Open Space Design and Planning Studio (3) (canceled course—eff. fall 16)
181Q. Special Topics in Landscape Architecture: Historic Preservation Studio (3) (canceled course—eff. fall 16)
182. Advanced Landscape Architecture Studio I (6) Studio—8 hours. Prerequisite: course 171. Restricted to Landscape Architecture majors (ALDA) or consent of instructor. Landscape architecture studio featuring advanced studies and applications of creative work, design, technology and/or theory. One day long fieldtrip required. —F. (F.) (new course—eff. fall 16)
183. Advanced Landscape Architecture Studio II (6) Studio—8 hours. Prerequisite: course 182. Restricted to Landscape Architecture majors (ALDA) or consent of instructor. Landscape architecture studio featuring advanced studies and applications of creative work, design, technology and/or theory. One day long fieldtrip required. —W. (W) (new course—eff. fall 16)
184. Capstone Landscape Architecture Studio (6) Studio—8 hours. Prerequisite: course 183. Restricted to Landscape Architecture majors or consent of instructor. Capstone studio that synthesizes learning objectives within the senior-level Landscape Architecture studio sequence. Students required to apply creative problem solving, design theory, technology, and representation skills towards a design approach that addresses complex, real-world environmental design problems. —S. (S.) (new course—eff. fall 16)
Graduate
240. Historic, Cultural Landscapes: Concept, Perception, Preservation (4) (canceled course—eff. fall 16)
250. Life-Place: Bioregional Theory and Principles (4) (canceled course—eff. fall 16)
260. Landscape and Power (4) (canceled course—eff. fall 16)
Latin
New and changed courses in Latin (LAT)
Upper Division
122. Early Christian Writers (4) Extensive writing—3 hours; lecture/discussion—3 hours. Prerequisite: course 100 (can be concurrent); or consent of instructor. Latin style of selected early Christian writers. Topics may include: Latin translations of Greek and Hebrew scriptures, Christian Latin, with focus on North Africa, Palestine, or Spain; High literary Christian Latin; Christian Latin oratorical style. GE credit: ArtHum: Wt/AH, WC, WE—F, W, S. (F, W, S.) Albou, Chin, Rundin (new course—eff. fall 17)
135. Themes in Latin Literature (4) Extensive writing—3 hours; lecture/discussion—3 hours. Prerequisite: course 100 (can be concurrent); or consent of instructor. Readings in Latin that trace a theme across times, genres, and authors. May be repeated for credit. GE credit: ArtHum: Wt/AH, WC, WE—F, W, S. (F, W, S.) Albou, Chin, Rundin, Seal, Stem (new course—eff. fall 17)
Law
New and changed courses in Law (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 17)
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 method which includes learning various forms of legal writing and speaking. (new course—eff. fall 17)
200BT. 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 17)
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 17)
200CT. U.S. Legal Methods B (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. (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 taught by Wydick Fellowship Program faculty is an integrated legal research and writing skills course. Basic legal research resources and strategies are introduced and practiced. (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 strategic defense office memorandum, a motion to dismiss in federal court, and an appellate brief with oral arguments. (change in existing course—eff. spring 17)
208B. Introduction to U.S. Legal Methods A (3) Lecture. Prerequisite: consent of instructor. Restricted to LL.M. students. Designed to provide foreign students with background skills at a more basic level than U.S. Legal Methods A and B. Students will audit carefully selected courses in the regular curriculum and complete assignments related to those courses. (new course—eff. fall 17)
208F. Introduction to U.S. Legal Methods B (LL.M.) (3) Seminar. Prerequisite: consent of instructor. Restricted to LL.M. students. Designed to provide foreign students with background skills at a more basic level than U.S. Legal Methods A and B. Stud-
208G. U.S. Legal Methods A (LL.M.) (3)
Lecture. Restricted to LL.M. Students. Designed to provide foreign and other students with background skills necessary to succeed in both law school and legal practice.
(new course—eff. fall 17)

208H. U.S. Legal Methods B (LL.M.) (3)
Seminar. Description of the evolution and use of sources of law and secondary authority.
(new course—eff. fall 17)

209AT. Patent Prosecution and Practice (3)
cancelled course—eff. fall 17

209B. Patent Prosecution and Practice (3)
Seminar. 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 USPTO examiners to gain the experience of getting a patent issued.
(new course—eff. fall 17)

209C. Patentable Subject Matter: Genes, Methods, and Software (2)
Seminar. In-depth look at recent cases and debates behind genetic patenting, software, business models, diagnostic methods, and others. Reviews the crucial and rapidly evolving field of patent law which affects some of the most important hi-tech industries.
(new course—eff. spring 18)

209CT. Patentable Subject Matter: Genes, Methods, and Software (2)
cancelled course—eff. spring 18

209DT. Innovation Law (2)
Seminar—2 hours. Explores the laws affecting innovation by entrepreneurs, and other organizations when trying to address legal issues relating to technology. Seminar's approach is both practical and multidisciplinary, and it encourages students to develop the roles of a wide range of stakeholders (including lawyers, policy advocates, and policymakers, business persons and technologists) in developing legal and business strategies.
(new 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)

235B. Counseling and Legal Strategy in the Digital Age (2)
Lecture. Explores the complex challenges that entrepreneurs, businesses, and other organizations face when trying to address legal issues relating to technology. Seminar's approach is both practical and multidisciplinary, and it encourages students to develop the roles of a wide range of stakeholders (including lawyers, policy advocates, and policymakers, business persons and technologists) in developing legal and business strategies.
(new course—eff. fall 17)

220A. State and Local Taxation (3)
Seminar—2 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 related trusts.
(change in existing course—eff. fall 16)

221A. Practical Skills in Will & Trust Drafting and Administration (2)
Seminar—2 hours. Provides the skills to practice law in the area of estate planning and probate/trust administration. Follow an estate planning client and draft actual estate plan documents. A series of related topics will be explored.
(new course—eff. spring 18)

221AT. Practical Skills in Will and Trust Drafting and Administration (2)
cancelled course—eff. spring 18

222. Asian Pacific Americans and Law (3)
(new course—eff. fall 17)

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)
cancelled course—eff. fall 17

226. Disability Rights Law (3)
Discussion—3 hours. Examines disability law and theory. Devoted to the Americans with Disabilities Act (particularly Titles I, II, and III) as 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)

227. Topics in California Criminal Practice (2)
Seminar. Advanced criminal law and procedure class aimed at students planning to practice criminal law in California. Includes extern or summer clerk, or after graduation.
(new course—eff. fall 17)

227CT. Topics in California Criminal Practice (2)
cancelled course—eff. fall 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. Introduction 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)

230A. Wine and the Law (2)
Seminar—2 hours. Surveys the legal landscape of this multi-billion dollar industry, focusing on contemporary debates and developments in judicial, legislative, and administrative arenas.
(new course—eff. spring 18)

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)

235B. Counseling and Legal Strategy in the Digital Age (2)
Lecture. Explores the complex challenges that entrepreneurs, businesses, and other organizations face when trying to address legal issues relating to technology. Seminar’s approach is both practical and multidisciplinary, and it encourages students to develop the roles of a wide range of stakeholders (including lawyers, policy advocates, and policymakers, businesspersons, and technologists) in developing legal and business strategies.
(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. fall 16)

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)

241T. Voting Rights Seminar (2)
cancelled course—eff. spring 17

243A. Secured Transactions (2)
Discussion—3 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)
243B. Bankruptcy (3)
Seminar. Introduction to essentials of U.S. law governing bankruptcy of consumers and businesses. The course will address bankruptcy under Chapter 7, Chapter 13, and Chapter 11. (new course—eff. fall 17)

243BT. Introduction to Bankruptcy Law (2)
(canceled course—eff. fall 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 partners; including entities classified as partnerships. (change in existing course—eff. spring 17)

248BT. Human Rights in the Former Soviet Union: Legal Tools for Repression and Redress: Part II (2)
(canceled course—eff. fall 17)

248C. Business and Human Rights (2)
Seminar—2 hours. Explores the human rights responsibilities of businesses from legal, ethical, historical, and comparative perspectives. Equips students with the tools to be sensitive to human rights considerations as a legal practitioners or in other fields of endeavor. (new course—eff. spring 18)

248CA. United Nations Human Rights Practicum I (2-3)
Seminar—2 hours. Prerequisite: consent of instructor. Opportunity to work in support of the mandate of the United Nations Special Rapporteur in the field of cultural rights. (new course—eff. fall 17)

248CB. United Nations Human Rights Practicum II (2-3)
Seminar—2 hours. Prerequisite: consent of instructor. Build on the knowledge of the workings of the United Nations human rights system they gained in Practicum I, and gain further advanced experience working with UN documents, with individual cases in the field and with thematic reports. (new course—eff. fall 17)

248CT. United Nations Human Rights Practicum I (3)
(canceled course—eff. fall 17)

248DT. United Nations Human Rights Practicum II (2-3)
(canceled course—eff. fall 17)

250A. Aoki Legal Scholarship Seminar (3)
Seminar. For students participating in the Aoki Center for Race and Nation Studies’ Immigration Law Journal, Research, and write a note on a topic related to immigration. Expectation is production of papers of publishable quality. (new course—eff. fall 17)

250AT. Aoki Legal Scholarship Seminar (3)
(canceled course—eff. fall 17)

250B. Writing Requirement Workshop (2)
Seminar—2 hours. Second- and third-year students produce a piece of academic writing that satisfies the King Hall writing requirement and is of publishable quality. Receive feedback both from the instructor and from one another in a workshop setting. 251B and/or 251C credit. (new course—eff. spring 18)

250BT. Writing Requirement Workshop (2)
(canceled course—eff. spring 18)

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)

253. Policy Advocacy (2)
Lecture. In-depth examination of the legislative process both within the California Legislature and from the advocates’ perspective. Train in key policy advocacy skills by legislative leaders and social justice advocates. (change in existing course—eff. spring 18)

253T. Policy Advocacy (2)
(canceled course—eff. fall 17)

254A. Law and Rural Livelihoods Seminar (2)
Seminar—2 hours. Provides an 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 tested on 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 258A 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)

258D. Financial Regulation and Consumer Protection (3)
Lecture. Introduction to the basic concepts of public finance, the underlying law governing public finance: in particular state law, federal tax law and federal securities law. (change in existing course—eff. fall 17)

261A. Labor Law (2)
Discussion—2 hours; laboratory—1 hour. Prerequisite: course 219 (can be concurrent). Limited enrollment. Introduction to the preparation and trial of labor and employment cases, featuring lectures, videotapes, demonstrations, assigned readings and forensic drills. 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. Students receive 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)

267. Civil Rights Law (2)
Discussion—2 hours. Civil remedies for civil rights violations under the primary United States civil rights statute. Specifically, covers actions for constitutional and statutory violations under 42 USC §1983, affirmative defenses, and abstention doctrines. (change in existing course—eff. fall 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 for understanding other business-related law school courses. (change in existing course—eff. spring 17)

270. International Business Transactions (2)
Lecture/discussion—2 hours. Select legal problems arising from international business transactions. (change in existing course—eff. fall 17)

273BT. Special Education Law and Policy (2)
Lecture. 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)

274A. International Intellectual Property and Development (3)
Discussion—3 hours. Examines international trade law, national customs law, intermediary liability rules, claims for rights in traditional knowledge and genetic resources, protections for geographical indications, technology transfer, and intellectual property piracy. (change in existing course—eff. fall 17)
274H. Theory and History of Intellectual Property (2)
Seminar. Seminar traces development of intellectual property law in the U.S. and Europe because it is not possible to understand the logic and shape of current Intellectual Property concepts outside of their messy history. (new course—eff. fall 17)

274T. Theory and History of Intellectual Property (2)
(cancelling 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—3 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)

279. Legal Analysis (2)
Seminar—2 hours. Prerequisite: consent of instructor. Limited enrollment; for 2Ls only. Focuses on skills critical to law school success, and ultimately, bar exam success. (S/U grading only) (change in existing course—eff. spring 18)

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 (and other states), and, by extension, to success in the practice of law. (S/U grading only) (change in existing course—eff. spring 18)

280BT. Problem Solving and Analysis (2)
(cancelling 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)

282A. Renewable Energy Seminar (2)
Seminar. Provides a broad overview of renewable energy law and policy with a particular focus on the California policy context. Topics include renewable electricity, California’s renewable portfolio standard, and project development. (new course—eff. fall 17)

282AT. Renewable Energy Seminar (2)
(cancelling 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)
Discussion—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)

285D. Farmworkers and the Law (2)
(cancelling course—eff. fall 17)

285E. Utility of Law School and Careers in the Law (1)
Discussion—1 hour. Discussion on the role of the junior attorney within a law firm/legal department, professional goal-setting, strategies for effective communication and work within teams, delegation and resource management, organization and time management, an introduction to common junior-level assignments and how to complete them efficiently and effectively, building a professional network, and an introduction to business development, among other topics. (new course—eff. fall 17)

285F. Practice Ready Seminar (2)
Seminar. Includes a discussion and review of the role of the junior attorney within a law firm/legal department, professional goal-setting, strategies for effective communication and work within teams, delegation and resource management, organization and time management, an introduction to common junior-level assignments and how to complete them efficiently and effectively, building a professional network, and an introduction to business development, among other topics. (new course—eff. fall 17)

285G. Environmental Law Seminar: Emerging Technologies and the Environment (2)
Seminar. Examines legal regimes that might apply to various emerging technologies and consider governance mechanisms and reforms that might enable more foresighted and participatory development and management of technology. (new course—eff. fall 17)

285T. Wine and the Law (2)
(cancelling course—eff. spring 18)

285U. Wine Law (2)
Seminar—2 hours. Legal aspects of federal land management, including the history of public land law, the scope of federal and state authority over the federal lands, and the allocation of public land resources among competing uses. (new course—eff. fall 17)

288B. Supreme Court Simulation Seminar (3)
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)

290C. Information Privacy Law (2)
Seminar—2 hours. Prerequisite: Criminal Procedure strongly recommended. 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 18)

290CT. Information Privacy Law (2)
(cancelling course—eff. spring 18)

290T. International Trade Law (2)
Discussion—2 hours. Introduction to existing landscape of trade regulation from the World Trade Organization, to regional organizations such as NAFTA, ASEAN, and the European Union. (change in existing course—eff. fall 17)

291T. 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)

292A. Advanced Topics in Immigration and Citizenship Law Seminar (2)
Lecture. Prerequisite: course 292 may be waived by the professor. Conducts a closer examination of various topics and subject matters that relate to immigration and citizenship law. (new course—eff. fall 17)

292T. Advanced Topics in Immigration and Citizenship Law Seminar (2)
(cancelling 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

400E. Study Abroad—Comillas Pontifical University Madrid, Spain (12)
Independent study. Semester-away study abroad at the Comillas Pontifical University in Madrid, Spain. Enhance knowledge of international legal regimes and obtain a global legal educational experience. (S/U grading only) (new course—eff. fall 17)

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 pertinent 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 Juvenile Law & Policy is a biannual publication of the UC Davis School of Law that addresses the unique concerns 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 Business Law Journal is run by dedicated law students who are committed to providing current and valuable 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)

411D. Immigration and Nationality Law Review (1-2)
Independent study. Prerequisite: consent of instructor. The Immigration and Nationality Law Review (INLR) is in part a reprint journal and serves as an anthology of seminal articles in immigration, nationality, and citizenship law. INLR has republished a number of articles authored by King Hall faculty. INLR also creates space for student Notes. The INLR also hosts a symposium or other immigration-related project each year and publishes materials from that enterprise in the year’s volume. May be repeated for credit up to five times; students are allowed to participate in the journal for more than one term. (new course—eff. fall 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) Lower Division
3. Language and the Body (4)
Lecture—2 hours; discussion—2 hours. Perspectives on the role of language in issues about bodies. Language-related disabilities. Social implications of language use in discussing body-related conditions. GE credit: OL, SS—S. (S.) Barreda, Ramanathan, Zel- lou
(new course—eff. winter 18)

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 morphological phenomena. Emphasizes development of analytical skills and appreciation of structural regularities and differences among languages. Not open for credit to students who have completed course 139. GE credit: ArtHum/AH—F. (F.) Barreda, Zel-lou
(change in existing course—eff. winter 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. (W.) Aranovich, Farrel
(change in existing course—eff. winter 17)

106. English Grammar (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or course 1Y or English 3 or University Writing Program 1 or consent of instructor. Survey of present-day English grammar as informed by contemporary linguistic theories. The major syntactic structures of English; their variation across dialects, styles, and registers; their development; and their usefulness in describing the conventions of English. (Same course as English 106 and University Writing Program 106.) GE credit: ArtHum/AH.
(change in existing course—eff. winter 18)

112. Phonetics (4)
Lecture—3 hours; term paper. Prerequisite: course 1 recommended. Detailed examination of articulatory and acoustic phonetics. GE credit: ScEng/SE—F. (F.) Barreda, Zel-lou
(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 lexic and other grammatical components. GE credit: ArtHum/AH—S. (S.) Aranovich
(change in existing course—eff. winter 17)

127. Text Processing and Corpus Linguistics (4)
Lecture—3 hours; extensive problem solving. Prerequisite: course 1, course 5, course 6, or Anthropo- logy 4 recommended. Investigation of the lexical organization of human languages through corpus linguistics. Application of principles of linguistic analysis, automatic text processing, and statistical research to solving problems of textual evaluation and classification, as well as information retrieval and extraction. Offered in alternate years. GE credit: ArtHum or SocSci/AH or SS, QL—S. (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 theory, primarily through the examination of a major theory of syntax, emphasizing theoretical reasoning, argumentation, and problems of theory building in syntax. GE credit: ArtHum/AH—F. (F.) Aranovich, Farrel
(change in existing course—eff. winter 17)

141. Semantics (4)
Lecture—3 hours; term paper. Prerequisite: course 103B recommended. The linguistic study of meanings 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, W1/AH—F. (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 distri- bution and classification, both genetic and typologi- cal. Illustrative descriptions of several major languages from different geographical areas, pid- gins and creoles, lingua francas and other lan- guages of widespread use. Not open for credit to students who have completed course 50. GE credit: ArtHum or SocSci, W1/AH or SS, WC—S. (S.) Haw- kins
(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—Hawkins, Farrel
(change in existing course—eff. winter 17)

152. Language Universals and Typology (4)
Lecture—3 hours; term paper. Prerequisite: course 103B recommended. Investigation into the common fea- tures of all human languages and the classification of languages in terms of their structural features. Theories of universal grammar. Detailed discussion of non Indo-European languages and comparison with English. Offered in alternate years. GE credit: ArtHum, W1/AH—S. (S.) Farrel, Hawkins
(change in existing course—eff. winter 17)
Management

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

Lower Division
11A. Elementary Accounting (4) (cANCELLED course—Fall 2017)
11B. Elementary Accounting (4) (cANCELLED course—Fall 2017)

12Y. Navigating Life's Financial Decisions (3)
Lecture—2 hours; web virtual lecture—1 hour. Survey of major life financial decisions (e.g., career choice, consumption vs. saving, investments, mortgages, insurance) and how decision-making biases (e.g., overconfidence, present bias, limited attention) can lead to suboptimal choice. The course draws from research in economics, psychology, and sociology. GE credit: SS, QL. —S. (S.)

Upper Division
100. Introduction to Financial Accounting (3) (cANCELLED course—Fall 2017)
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 of and demand for accounting information. Topics include the generation 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.)

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.)

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)

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

120. Managing and Using Information Technology (4) (cANCELLED course—Fall 2017)
140. Marketing for the Technology-Based Enterprise (4) (cANCELLED course—Fall 2017)
150. Technology Management (4) (cANCELLED course—Fall 2017)
160. Financing New Business Ventures (4) (cANCELLED course—Fall 2017)
170. Managing Costs and Quality (4) (cANCELLED course—Fall 2017)
180. Supply Chain Planning and Management (4) (cANCELLED course—Fall 2017)

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.)

Graduate
200B. Managerial Accounting (3)
Lecture—3 hours. 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. (W.)

202B. Business, Government, and the International Economy (3)
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 business. Topics include distribution of income, business cycles, inflation and interest rates, the federal debt, monetary policy and international trade and finance.—W. (W.)

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

223. Power and Influence in Management (3)
Seminar—3 hours. Prerequisite: Management 223A or Management Working Professional Bay Area 223A or Management Working Professional 203A; consent of instructor. Investigation of the bases of power in organizations and the tactics used to translate power into influence. Topics include the control of resources (including information), power impacts on decision making, and power relationships (including commitment), the construction of meaning, and ethics.—F. (F.)

General Education (GE): AH—Arts and Humanities; SE—Science and Engineering; SS—Social Sciences; ACHG—American Cultures; DD—Domestic Diversity; OL—Oral Skills; QL—Quantitative; SL—Scientific; VL—Visual; WC—World Cultures; WE—Writing Experience
Courses & Programs are subject to change without notice.
224. Managing People in High-Performance Organizations (3)
Lecture/discussion—3 hours. Prerequisite: Management 204A or Management Working Professional Bay Area 204A or Management Working Professional 204A. Restricted to students in the MBA program. Strategic 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

234. Pricing (3)
Lecture—3 hours. Prerequisite: Management 202A or Management Working Professional Bay Area 202A or Management Working Professional 202A; Management 203B or Management Working Professional Bay Area 203B or Management Working Professional 203B; Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Required to students in the MBA Program. Combines lectures, cases and homework to teach students tools and skills necessary to analyze pricing situations, make pricing decisions, and implement them in a systematic manner.—S. (S.) Peters

239. Digital Marketing (3)
Lecture—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 mktg, online privacy issues, e-commerce, social influence, social network theory, measurement of social influence, integrating social and traditional media.—S. (S.) Peters

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 enhance the effectiveness of new product development activities. Focuses on the underlying systematic managerial issues and acquiring the ability to solve problems.—W. Su. (W. Su.) Aravin-dakashan

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 management approach under which marketing activities are organized and measured around customers (rather than around brands.) This approach is appealing because customers, not brands, are those who make buying decisions.—F. (F.) Aravindakshan

244. New and Small Business Ventures (3)
Lecture—3 hours. Prerequisite: Management 204 or Management Working Professional Bay Area 204 or Management Working Professional 204. Student teams develop complete business plans for their own start-up ventures. Process includes: elevator pitch, business strategy, competition, bottoms-up financial projections, capital requirements, product differentiation, competitive, alliance, and go-to-market strategy development, investor presentation, and comprehensive written business plan.—F. (F.) Low

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 strategic marketing plans. Includes definition of activities and products, marketing audits, new product development, design of new activities and products, and organizing marketing planning function. Applications to problems in private and public sector marketing.—F. (F.) Ruble

249. Marketing Research (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 systematic gathering and analyzing information for making private and public marketing decisions. Covers the cost and value of information, research design, primary and secondary data, and analysis, and marketing research applications.—W. (W.) Bunch

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. Restricted to students in the MBA program. Why is software typically so defective? Why do many firms in the IT industry give away their best products free? This course helps you analyze questions like these by modeling competition and strategy in the network, technology and information industries.—W. (W.) Bhargava

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

252. Managing for Operational Excellence (3)
Lecture—3 hours. Prerequisite: course 203A. Open to students in the Graduate School of Management. Explores the management of operations as applied to manufacturing as well as services provided both inside and outside the organization. Develop an understanding of how uncertainty affects planning and delivery by looking at fundamental models of operations.

260. Corporate Finance (3)
Lecture—3 hours. Prerequisite: Management 200A or Management Working Professional Bay Area 200A or Management Working Professional 200A; 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. Focuses on planning, acquiring, and managing a company's financial resources. Includes discussion of financial aspects of mergers and other forms of reorganization, analysis of investment, financial, and dividend policy, and theories of optimal capital structure.—S. (S.) Scherbina
process design for low cost, total cost of ownership, cost of customers, implementing structural change, and incentives.—W. (W) Anderson (change in existing course—eff. fall 17)

272. Evaluation of Financial Information (3)
Lecture—1 hour. Prerequisite: Management 200A or Management Working Professional Bay Area 200A or Management Working Professional 200A. Studies how investors, creditors, others use accounting information in making rational investment, lending decisions. Emphasis is placed on the analysis of financial information in a variety of contexts. Where applicable, recent research in finance and accounting is discussed.—W. (W) Skaille (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 development. Course will consider financial aspects involved in land acquisition, land development, construction, and project lending.—Su. (Su.)

282. Supply Chain Management (3)
Lecture—2 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)

Professional

401. Crisis Management (1)
Laboratory/discussion—1 hour. Establishes and explores the defining characteristics of crises. Will learn to anchor crisis management firmly within overall strategic management and also acquire a set of useful tools and techniques for planning for and handling actual crises.—W. (W) (change in existing course—eff. winter 17)

404. Organizational Change Management (1)
Laboratory/discussion—1 hour. Challenges in getting significant changes made in organizations. Learn Organization Change Management (OCM) techniques and discuss case situations where OCM techniques play a role.—F. (F.) Mathur (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 and stories that educate, influence, motivate, inspire, persuade and connect.—Su. (Su.) Chansupharind (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, discusses how corporate directors can better operate in the interests of shareholders, and the public 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.) (change in existing course—eff. winter 17)

412. International Marketing (1)
Lecture/discussion—1 hour. Basic concepts of international marketing. Understanding and managing heterogeneous, culture-dependent environments across countries. How to develop and implement an international marketing strategy: where and how to compete, how to adapt your marketing mix.—W. (W) (change in existing course—eff. fall 16)

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) Rubel (change in existing course—eff. winter 17)

416. 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 finance principles related to the risk and return of the private equity (PE) industry, valuation of PE target companies, the structuring of leveraged buyouts (LBOs), and the management of portfolio companies.—F. (F.) Yasuda (change in existing course—eff. fall 17)

417. Incentives and Controls (1)
Lecture/discussion—1 hour. Understand how organizations use financial and nonfinancial performance management and incentive systems to motivate people and manage the performance.—S. (S.) (change in existing course—eff. winter 17)

418. Scientific Discovery and Business Innovation at Scale in the Food and Agriculture Sector (1)
Lecture—3 hours. Restricted to students in the MBA program. Scientific discovery and business innovation within the food and agriculture sector profoundly influences the sustainability of society and enterprise competitiveness. Students will learn how business innovation models co-exist antagonistically and synergistically with scientific discovery and its influence on enterprise competitiveness.—F. (F.) W. Schmitz (change in existing course—eff. winter 17)

419. Business Strategy Consulting Skills (1)
Lecture—5 hours. Restricted to students enrolled in the MBA program. Students will learn practical business consulting skills which will help apply strategy theories in the workplace. Students will learn and practice tools to frame and analyze problems, conduct research, communicate findings and navigate client relationships.—F. (F.) Bethoux (change in existing course—eff. winter 17)

420. Advanced Optimization in a Python-based Modeling Language (1)
Web virtual lecture—1 hour. Prerequisite: Management Working Professional 252 or Management Working Professional Bay Area 252 or Management Working Professional 252; Management Working Professional Bay Area 261 or Management Working Professional 261. Restricted to students enrolled in the MBA program. Covers advanced optimization modeling techniques and practical application of modern, scalable modeling language. Techniques will be developed using examples from production planning in a supply chain, but students may explore other areas of application of optimization for their final project.—W. (W) Woodruff (change in existing course—eff. winter 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: Management 260 or Management Working Professional 260 or Management Working Professional Bay Area 260; Management 261 or Management Working Professional 261 or Management Working Professional Bay Area 261. Restricted to students enrolled in the MBA program. Investor psychology and market frictions can cause asset prices to deviate from fundamental values, creating profit opportunities for sophisticated investors. The course will cover techniques of financial analysis with the goal of learning how to value assets and identify mispricing.—S. (S.) Scherbinska (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 team and colleagues in order to build trust, overcome challenges and help others discover their own full potential.—S. (S.) Chansupharind (change in existing course—eff. winter 17)

425. Digital Marketing Technologies (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 organizations use digital channels to effectively communicate their value propositions to the target customers.—S. (S.) Blanchard (change in existing course—eff. winter 17)

426. The Business of Healthcare (1)
Lecture—1 hour. Restricted to students enrolled in the MBA program (Business Administration—Working Professional, Business Administration—Bay Area, Business Administration—Full-Time). Course is intended to provide students with an overall understanding of the unique business aspects of the healthcare industry.—S. (S.) (change in existing course—eff. winter 17)

427. Implementing International Strategy (1)
Lecture—1 hour. Restricted to students enrolled in the MBA program (Business Administration—Working Professional, Business Administration—Bay Area, Business Administration—Full-Time). Course looks at the pitfalls of implementing international strategies, and suggest several accessible, yet powerful frameworks to help international managers implement strategies successfully and completely.—S. (S.) Katzenstein (change in existing course—eff. winter 17)
Maternal and Child Nutrition

New and changed courses in Maternal and Child Nutrition (MCN)

Graduate

260. Nutrition During Pregnancy (6)
Lecture—5 hours; term paper. Prerequisite: acceptance to the Master of Advanced Studies in Maternal and Child Nutrition; other students by consent of instructor. Open to Graduate standing. Overview of the anatomical, physiological and biochemical changes that occur during pregnancy and early development. Nutrition and evaluation of nutritional/lifestyle factors associated with pregnancy outcomes and nutrition programs/interventions for pregnant women. Offered in alternate years.—F, W, S. (F, W, S.)

261. Lactation and Infant Nutrition (6)
Lecture—5 hours; term paper. Prerequisite: course 260; graduate standing. Restricted to students enrolled in the MAS program; other graduate students by consent of instructor. Overview of the physiological and biochemical processes underlying human lactation and nutritional needs of both mother and infant. Development of skills in assessment, nutrition counseling, education and support of new mothers and their families. Offered in alternate years.—W, W, S. (F, W, S.)

262. Child and Adolescent Nutrition (6)
Lecture—5 hours; term paper. Prerequisite: course 261; graduate standing. Restricted to students enrolled in the MAS program; other graduate students by consent of instructor. Relationships among nutrition, growth, and development during childhood and adolescence. Nutritional assessment for normal and high risk groups; psychological, social, and economic factors contributing to nutritional status. Nutritional needs and interventions for special groups, including obese children/adolescents, athletes, and eating disordered. Offered in alternate years.—F, W, S. (new course—fall 17)

Lecture/discussion—4 hours. Prerequisite: graduate standing. Restricted to students enrolled in the MAS program; other graduate students by consent of instructor. Application of epidemiological principles to the study of maternal and child nutrition. Topics include quantitative and qualitative study procedures, including study design, data collection, and related analytical techniques. Offered in alternate years.—F, W, S. (new course—fall 16)

264A. Current Topics in Maternal and Child Nutrition: Principles of Adult Education (2)
Seminar—2 hours. Prerequisite: graduate standing. Restricted to students enrolled in the MAS program; other graduate students by consent of instructor. Current scientific literature related to Maternal and Child Nutrition in adult education settings. Topics include methods and theories of adult education and critical thinking skills related to research evaluation. Offered in alternate years.—W, W, S. (new course—fall 17)

264B. Current Topics in Maternal and Child Nutrition: Epidemiology and Evidence-Based Practice (2)
Seminar—2 hours. Prerequisite: graduate standing. Restricted to students enrolled in the MAS program; other graduate students by consent of instructor. Current scientific literature related to Maternal and Child Nutrition. Topics include nutrition surveillance and monitoring, as well as public policy development and implementation. Offered in alternate years.—F, W, S. (new course—spring 17)

264C. Current Topics in Maternal and Child Nutrition: Public Policy Development and Implementation (2)
Seminar—2 hours. Prerequisite: graduate standing. Restricted to students enrolled in the MAS program; other graduate students by consent of instructor. Current scientific literature related to Maternal and Child Nutrition. Topics include nutrition surveillance and monitoring, as well as public policy development and implementation. Offered in alternate years.—S. (new course—fall 17)

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 21AH C- or better; integration; calculus for trigonometric, exponential, and logarithmic functions; applications. Not open for credit to students who have completed courses 17C, 21B, or 21C. Only 2 units of credit to students who have completed course 17B. GE credit: Sci/Eng/QL, SE, SL.—F, W, S. (F, W, S.) (change in existing course—fall 17)

16C. Short Calculus (3)
Lecture—3 hours. Prerequisite: course 06B C- or better or course 17A C- or better or course 21AH C- or better. Differential equations; partial derivatives; double integrals; applications, series. Not open for credit to students who have completed course 21C. Only 2 units of credit to students who have completed course 17C. GE credit: Sci/Eng/QL, SE, SL.—F, W, S. (F, W, S.) (change in existing course—fall 17)

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 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 first order differential equations, applications in biology and medicine. Not open for credit to students who have completed course 216C, 21B, or 21C, only 2 units of credit for students who have completed course 16B. GE credit: Sci/Eng/QL, SE, SL.—F, W, S. (F, W, S.) (change in existing course—fall 17)

21B. Calculus (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 21A or 21AH with C- or better; or 17A with B or better. Definite integral, fundamental theorem of calculus, techniques of integration; Application to area, volume, arc length, average of a function, improper integral, surface of revolution. Only 2 units of credit to students who have completed course 21B, 16C, 17C. GE credit: Sci/Eng/QL, SE, SL.—F, W, S. (F, W, S.) (change in existing course—fall 17)

21C. Calculus (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 16C, 17C, 21B, or 21BH with C- or better; or 17B with grade of B or above. Sequences, series, tests for convergence, Taylor expansions. Vector algebra, vector calculus, scalar and vector fields. Partial derivatives, total differentials. Applications to maximum and minimum problems in two or more variables. Applications to business and social systems. GE credit: Sci/Eng/QL, SE, SL.—F, W, S. (F, W, S.) (change in existing course—fall 17)

21D. Vector Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 21C or 21CH with C- or better; or 17B with grade of B or above. Continuation of course 21C. Definite integrals over plane and solid regions in various coordinate systems. Line and surface integrals. Green’s theorem, Stokes theorem, divergence theorem. GE credit: Sci/Eng/QL, SE, SL.—F, W, S. (F, W, S.) (change in existing course—fall 17)

22A. Linear Algebra (3)
Lecture—3 hours. Prerequisite: course 16C C- or better or course 17C C- or better or course 21AG C- or better; or course 21CH C- or better; or Mechanical Engineering 5 or course 22AL, can be concurrent. Matrices and linear transformations, determinants, eigenvalues, eigenvectors, diagonalization, factorization. GE credit: Sci/Eng/QL, SE, SL.—F, W, S. (F, W, S.) (change in existing course—fall 17)

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

25. Advanced Calculus (4)
Lecture/discussion—4 hours. Prerequisite: course 21C C- or better or course 21CH C- or better. Introduction to the rigorous treatment of abstract mathematical analysis. Proofs in mathematics, induction, sets, cardinality; real number system; convergence of sequences. Not open for credit to students who have completed former course 127A. GE credit: Sci/Eng/SE.—F, W, S. (F, W, S.) (change in existing course—spring 17)
Medical Sciences

67. Modern Linear Algebra (4)
Lecture/discussion—4 hours. Prerequisite: course 21C or better or course 21CH C- 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 students who have completed course 22A. Only one unit of credit to students who have completed course 22A. GE credit: SciEng/SE. —F, W, (F, W, S) (change in existing course—eff. winter 17)

Upper Division

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)

127A. Real Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 21C or course 21CH; course 67 or course 22A and course 108. Real numbers, sequences, series, and continuous functions. —F, W, (F, W) (new course—eff. fall 17)

127B. Real Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 127A. Real, complex, sequences of functions, and power series. —W, S, (W, S) (new course—eff. fall 17)

127C. Real Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 127B. Metric spaces and multi-variable calculus. —F, S, (F, S) (new course—eff. fall 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)

41A. Doctoring 1 (4)
(canceled course—eff. winter 18)

41B. Doctoring 1 (5)
(canceled course—eff. summer 17)

415. Population Health and Evidence-Based Medicine (2)
Lecture—36 hours; discussion—12 hours. Prerequisite: consent of instructor. 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.) Romano (change in existing course—eff. summer 17)

445. Race and Health in the United States (3-6)
Discussion—4 hours. Interprofessional course facilitates the professional and personal development 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-García (change in existing course—eff. fall 17)

490A. Community Health Scholars Seminar A (1.5)
Lecture—1 hour. Longitudinal year-long course starting on July 1 and concluding at the end of Block 2. Focuses on immersing students in their respective communities to understand the strengths and challenges they face in relation to health. May be repeated for credit. (P/F grading only; deferred grading only, pending completion of sequence) —Su. (Su) Fancker (change in existing course—eff. winter 18)

490B. Community Health Scholars Seminar B (0.5)
Lecture—1 hour. Longitudinal year-long course starting on July 1 and concluding at the end of Block 2. Focuses on immersing students in their respective communities to understand the strengths and challenges they face in relation to health. May be repeated for credit. (P/F grading only; deferred grading only, pending completion of sequence) —F. (F) Fancker (change in existing course—eff. winter 18)

490C. Community Health Scholars Seminar C (0.5)
Lecture—1 hour. Longitudinal year-long course starting on July 1 and concluding at the end of Block 2. Focuses on immersing students in their respective communities to understand the strengths and challenges they face in relation to health. May be repeated for credit. (P/F grading only; deferred grading only, pending completion of sequence) —W, (W) Fancker (change in existing course—eff. winter 18)

490D. Community Health Scholars Seminar D (1)
Lecture—1 hour. Longitudinal year-long course starting on July 1 and concluding at the end of Block 2. Focuses on immersing students in their respective communities to understand the strengths and challenges they face in relation to health. May be repeated for credit. (P/F grading only; deferred grading only, pending completion of sequence) —F, W, S, Su. (F, W, S, Su) Fancker (change in existing course—eff. winter 18)

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 medicine students an overview of the scope of Pain Medicine. May be repeated for credit. (H/P/F grading only) —F, W, S, Su. (F, W, S) Sheth (new course—eff. fall 16)

455. Externship in Anesthesiology (3-6)
Clinical Activity. Prerequisite: consent of instructor. Away clinical rotation in Anesthesiology or Pain Medicine. (H/P/F grading only) —F, W, S, Su. (F, W, S, Su) (new course—eff. summer 17)

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) ) Schoemaker, Tirado (new course—eff. winter 17)

Medicine: Biological Chemistry

New and changed courses in Biological Chemistry (BCM)

Graduate

230. Practical NMR Spectroscopy and Imaging (1)
Lecture—1 hour. Prerequisite: Chemistry 107A; Chemistry 107B; Physics 9A-9C or Physics 5A-C; or consent of instructor. Basic theory, experimental methods, and instrumentation of NMR. Enables students to understand NMR spectroscopy and imaging experiments. (S/U grading only) —F. (F) (change in existing course—eff. winter 17)

Professional

499. Research (1-12)
Prerequisite: medical students with consent of instructor. Research with Department of Biological Chemistry. May be repeated for credit. (H/P/F grading only) —F, W, S, Su. (F, W, S, Su) (change in existing course—eff. winter 18)
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. (P/NP grading only.)—Rose (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. (SL grading only.) (new course—eff. spring 17)

Professional

450. Ambulatory Elective in Emergency Medicine (3-18)
Restricted to MS4 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 experience 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 (change in existing course—eff. fall 16)

455A. Focus on POCUS A (6)
Clinical activity—30 hours. Prerequisite: consent of instructor. Directed towards gaining a greater proficiency of point-of-care ultrasound. Particularly useful for those pursuing careers that use this modality heavily in clinical practice such as primary care, pediatrics, emergency medicine, critical care, physical medicine and rehabilitation, etc. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.) Schick, Medeiros (new course—eff. summer 17)

455B. Focus on POCUS B (6)
Clinical activity—30 hours. Prerequisite: consent of instructor. Directed towards gaining a greater proficiency of point-of-care ultrasound. Particularly useful for those pursuing careers that use this modality heavily in clinical practice such as primary care, pediatrics, emergency medicine, critical care, physical medicine and rehabilitation, etc. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.) Schick, Medeiros (new course—eff. summer 17)

465. Externship in Emergency Medicine (3-9)
Clinical activity—36 hours; lecture/discussion—4 hours. Prerequisite: satisfactory completion of Medicine, Surgery and Pediatrics. Students complete clinical shifts in the Emergency Department, functioning as Acting Intern. Treat a wide variety of patients and problems under the supervision of the EM Attending. Students are expected to take focused histories and present in clear, concise fashion. May be repeated for credit. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.) Jones (change in existing course—eff. fall 17)

470. Pediatric Emergency Medicine Clerkship (3-6)
Clinical activity—36 hours; lecture/discussion—4 hours. Prerequisite: satisfactory completion of Medicine, Surgery, and Pediatrics. Restricted to fourth-year medical student in good standing only. See patients in the Pediatric area of the Emergency Department under the supervision of an Emergency Medicine Attending. Emphasis on recognition and management of the acutely ill pediatric patient and treatment of common pediatric complaints. (H/P/F grading only.)—F, W, S, Su. (F, W, S, Su.) Vance (change in existing course—eff. summer 17)

New and changed courses in Medicine—Family and Community Medicine (FAP)

Professional

405. The Healer's Art (1)
Lecture—0.6 hours; workshop—3 hours. Prerequisite: consent of instructor. Limited to first-year medical students. Learning to strengthen your humanity and remain open-hearted can make the difference between burnout and a fulfilling life. Learn tools for selfcare, healing, finding meaning, strengthening commitment and becoming a true physician. May be repeated for credit. (P/NP grading only.)—W (W.) Eidson-Ton (change in existing course—eff. fall 16)

430FA. 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 existing course—eff. spring 17)

430FB. SJVP Longitudinal Family Medicine Clerkship 2 (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.)—F (F.) Eidson-Ton, Srinivasan (change in existing course—eff. spring 17)

430FC. SJVP Longitudinal Family Medicine Clerkship 1.5 (1.5)
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.)—F (F.) Eidson-Ton, Srinivasan (change in existing course—eff. spring 17)

430FD. SJVP Longitudinal Family Medicine Clerkship 2.5 (1.5)
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 existing course—eff. spring 17)

430FE. SJVP Longitudinal Primary Care Clerkship at UCSF Track 2 (4)
(cancelled course—eff. summer 17)

430FF. SJVP Longitudinal Primary Care Clerkship at UCSF Track 1 (4)
(cancelled course—eff. summer 17)

430K. ACE-PC Family Medicine Clerkship A (1.5)
(cancelled course—eff. fall 17)

430KB. ACE-PC Family Medicine Clerkship B (1.5)
(cancelled course—eff. winter 18)

430KC. ACE-PC Family Medicine Clerkship C (1.5)
(cancelled course—eff. summer 17)

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

430R. Rural PRIME Family Medicine Longitudinal Clerkship (2)
Clinical activity—45 hours; lecture—2 hours; workshop—2 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. Family Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only.)—S (S.) Eidson-Ton, Srinivasan (change in existing course—eff. spring 17)

430RA. 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.)—F (F.) Eidson-Ton (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.)—F (F.) Eidson-Ton (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.)—F (F.) Eidson-Ton (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 (new course—eff. spring 17)

431. Introduction to Primary Care Continuity Clinic (1)
Clinical activity—4 sessions; project—1 session. Prerequisite: completion of the Clinical Curriculum; consent of instructor. Longitudinal component of the third-year primary care curriculum. Student attends their clinic roughly 18 half-days over the course of
the year, working one-on-one with a primary care preceptor. (H/P/F grading only)—S. (S.) Eidson-Ton, Schwartz, Srinivasan. (change in existing course—eff. fall 16)

431KA. ACE-PC Continuity Clinic (6)
Clinical Activity—40 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)

431KB. 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)

431KC. 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.)—W. (W.) 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.)—Su. (Su.) Eidson-Ton, Srinivasan (new course—eff. spring 17)

Medicine: Human Physiology

New and changed courses in Human Physiology (HPH)

Upper Division
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, physiological, behavioral, pharmacological, social and therapeutic aspects of cannabinoids, with emphasis on the physiological/sensory major organ systems in humans and animals, and the potential medicinal uses. GE credit: SciEng/SE, SL.—S. (S.) Lin (change in existing 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 or better; consent of instructor. Limited to 35 students initially. Centers on fundamental mechanistic 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. Core course as Neurobiology, Physiology, and Behavior 157.—S. (S.) Horvitz, Payne. (new course—eff. spring 17)

Medical: 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. (P/NP grading only)—F. (F.) Yarbrough (new course—eff. winter 17)

Graduate
290C. Controversies in Clinical Research (1)
(cancelled course—eff. spring 16)

Professional
430FA. SJVU 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, Johl (change in existing course—eff. spring 17)

430FB. SJVU 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, Johl (change in existing course—eff. spring 17)

430FC. SJVU 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, Johl (change in existing course—eff. spring 17)

430FD. SJVU Longitudinal Medicine Clerkship at UCSF Track 2 (4)
(cancelled course—eff. summer 17)

430FE. SJVU Longitudinal Medicine Clerkship at UCSF Track 2 (4)
(cancelled course—eff. summer 17)

430FF. SJVU Longitudinal Medicine Clerkship at UCSF Track 2 (4)
(cancelled course—eff. summer 17)

430R. Rural PRIME Internal Medicine Longitudinal Clerkship (2)
Clinical activity—45 hours. Prerequisite: consent of instructor; Internal Medicine Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only)—W. (W.) Aronowitz (change in existing 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.)—F. (F.) 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.)—W. (W.) 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.)—F. (F.) Aronowitz (new 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 (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, Su.—F. (F., W, S, Su.) Hale, Holtzman, Kashiouli (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 focuses on the evaluation of treatment of HIV and Hepatitis C patients in the correctional environment. (H/P/F grading only)—F, W, S, Su.—F. (F., W, S, Su.) Hale, Holtzman, Kashiouli (change in existing course—eff. fall 16)

General Education (GD): AH=Arts and Humanities; SS=Science and Engineering; SS=Social Sciences; AC=American Cultures; DC=Diverse Domains, OL=Oral Skills; QQ=Quantitative; SL=Scientific; WLV=Visual; WC=World Cultures; WE=Writing Experience

Courses & Programs are subject to change without notice.
Medical: Internal Medicine—Nephrology

New and changed courses in Internal Medicine—Nephrology (NEP)

Professional

499. Research in Nephrology (3-18)
Prerequisite: consent of instructor; individual arrangement. Independent laboratory research on a specific problem related to biochemical or immunologic causes of renal disease and/or uremic disorders in humans or animals. May be repeated for credit. (H/P/F grading only) — F, W, S, Su. (F, W, S, Su.)
(change in existing course—eff. fall 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. (F, W, S, Su.)
(change in existing course—eff. summer 16)

Medicine: Obstetrics and Gynecology

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

430F. 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. (F, W, S, Su.)
Hou (change in existing course—eff. spring 17)

430R. 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)

430RA. 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) — S. (S.)
Hou (new 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) — F. (F.)
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)

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. May be repeated for credit. (H/P/F grading only) — F, W, S, Su. (F, W, S, Su.)
(change in existing course—eff. fall 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.)
Cerdeño, Noctor (new course—eff. summer 17)

296. Neurodevelopment Group Study (1-6)
Explore mechanisms that impact perinatal development of the cerebral cortex, and other cortical structures, under normal and pathological conditions. — F, W, S, Su. (F, W, S, Su.)
Cerdeño, Noctor (new course—eff. summer 17)

298. Advanced Group Study (1-5)
Prerequisite: consent of instructor. Group Study provides the opportunity for a faculty member to work with students in a focused manner. (change in existing course—eff. summer 17)
Professional

499. Research (1-18)
Prerequisite: medical student with consent of instructor. Limited enrollment. Research in experimental, molecular, comparative, and applied pathology. May be repeated for credit. (H/P/F grading only)—F, W, S, Su. (F, W, S, Su) (change in existing course—eff. fall 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.)—Su. (Su.) 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.)—F. (F.) Plant (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. Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only)—S. (S.) 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.)—Su. (Su.) 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.)—F. (F.) 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.)—W. (W.) Plant (new course—eff. spring 17)

430RD. Rural PRIME Pediatrics Longitudinal Clerkship (1)
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)

430TA. TeachMS Longitudinal Pediatrics Clerkship (A) (4)
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. fall 16)

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 B or better; consent of instructor; letter of recommendation from Pediatrics faculty member. Limited enrollment. The Ward Acting Intern functions in a manner similar to that of a pediatric intern. The Acting Intern takes 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)

499. Research Topics in Pediatrics (1-18)
Prerequisite: student in Medical School with consent of instructor. Individual research project in pediatric subspecialty areas (cardiology, endocrinology, hematology, metabolism, newborn physiology and others) may be arranged with faculty member. Independent research by student will be emphasized and long-term projects are possible. May be repeated for credit. (H/P/F grading only)—F, W, S, Su. (F, W, S, Su) (change in existing course—eff. fall 17)

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. fall 17)

499. Directed Research for Medical Students (1-12)
Laboratory—3-36 hours. Prerequisite: consent of instructor. Directed research in pharmacology for medical students. May be repeated for credit. (H/P/F grading only)—F, W, S, Su. (F, W, S, Su) (change in existing course—eff. fall 17)

Medicine: Physical Medicine and Rehabilitation

New and changed courses in Medicine: Physical Medicine and Rehabilitation (PMR)

Professional

499. Research for Medical Students (1-12)
Prerequisite: consent of instructor. Research on any of a variety of topics in physical medicine and rehabilitation. May be repeated for credit. (H/P/F grading only)—F, W, S, Su. (F, W, S, Su) (change in existing course—eff. fall 17)

Medicine: Psychiatry

New and changed courses in Medicine: Psychiatry (PSY)

Professional

419. Combined Family Medicine-Psychiatry Clerkship (3-6)
Clinical activity—32 hours; discussion—8 hours. Students rotate through the county Primary Care Clinic under the supervision of dual-boarded Psychiatry and Family Practice Faculty to provide medical care of indigent and uninsured patients as well as pri-
420. Acting Internship in Psychiatry (3-6)
Clinical activity—40 hours. Prerequisite: course 420 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, S, Su. (F, W, S, Su) Scher
(change in existing course—eff. summer 16)

421. Combined Internal Medicine-Psychiatry Clerkship (3-6)
Clinical activity—32 hours; discussion—8 hours. Prerequisite: Psychiatry Clerkship or consent of instructor; medical students only. Rotates through the county Primary Care Clinic under the supervision of dual-boarded Psychiatry and Internal Medicine Faculty to provide medical care of indigent and uninsured patients as well as primary care for psychiatry patients. May be repeated for credit. (H/P/F grading only)—F, W, S, Su. (F, W, S, Su) Scher
(change in existing course—eff. winter 18)

420A. 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)—Su. (Su) Scher
(change in existing course—eff. spring 17)

420B. 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)—F. (F) Scher
(change in existing course—eff. spring 17)

420C. 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)—W. (W) Scher
(change in existing course—eff. spring 17)

420D. 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)—W. (W) Scher
(change in existing course—eff. spring 17)

420E. 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)—W. (W) Scher
(change in existing course—eff. spring 17)

420F. SJVP Longitudinal Psychiatry Clerkship at UCSF Track 2 (4)
(cancelled course—eff. summer 17)

420G. SJVP Longitudinal Psychiatry Clerkship at UCSF Track 2 (4)
(cancelled course—eff. summer 17)

430. 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)—Su. (Su) 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)

499. Research (1-2)
Prerequisite: consent of instructor. Approved for graduate degree credit. Individual research on selected topics or research projects. May be repeated for credit. (H/P/F grading only)—F, W, S, Su. (F, W, S, Su)
(change in existing course—eff. fall 17)

500. 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 Clinical Research 244.)—Su. (Su) Yang
(change in existing course—eff. winter 17)

227. Net Benefit Regression (3)
Lecture/discussion—2 hours. Prerequisite: Statistics 100 or course 244 or Preventive Veterinary Medicine 202, or consent of instructor; graduate student standing. Open to graduate students only. Uses regression methods for cost-effectiveness analysis. Focus on methods that create and explain economic information in personal-level data.—Hod
(new course—eff. fall 17)

280. Introduction to SAS Programming (3)
Lecture—2 hours; discussion—1 hour. Prerequisite: introductory statistics course (e.g., Preventive Veterinary Medicine 402, Statistics 102). Introduction to SAS, an integrated software system for data retrieval and management, data manipulation and programming. (Same course as Epidemiology (Graduate Group) 280.)—Qi
(new course—eff. fall 16)
New and changed courses in Medicine: Radiology—Nuclear Medicine (RNU)

499. Research in Diagnostic Radiology (1-12)
Prerequisite: consent of instructor. Approved for graduate degree credit. May be repeated for credit. (H/P/F grading only)—F, W, S, Su, (F, W, S, Su) Cole
man, Fragoso, Li, Mayadev, Monjaezeb, Vaughan (change in existing course—eff. fall 17)

Medicine: Radiology—Nuclear Medicine

New and changed courses in Medicine: Radiology—Nuclear Medicine (RNU)

Professional

430. Introduction to Clinical Radiology (3-6)
Prerequisite: consent of instructor. Introduces students to common radiology tests, including limitations and risks by using ACR Appropriateness Criteria and incorporate patient specific clinical data into ordering and interpreting appropriate imaging tests. (H/P/F grading only)—F, W, S, Su, (F, W, S, Su) Aminolalmaha-Shakeri (change in existing course—eff. fall 17)

430A. SJVP Surgery Clerkship at UCSF (6-12)
Clinical activity—45 hours. Prerequisite: approval by School of Medicine Committee on Student Progress. General surgery clerkship includes GI, Burn, Oncology, Plastics, Vascular Cardiothoracic, consult, transplant and trauma. Clerkship assignments are at UCSF Fresno. Student involvement includes work-up and care of surgical patients. (H/P/F grading only)—F, W, S, Su, (F, W, S, Su) Can, Phan (change in existing course—eff. winter 17)

430B. Rural PRIME Surgery Longitudinal Clerkship (3)
Clinical activity—45 hours. Prerequisite: consent of instructor. Surgery Longitudinal Integrated Clerkship for the Rural PRIME Program. (H/P/F grading only; deferred grading only, pending completion of sequence)—F, W, S, Su, (F, W, S, Su) McGahan (change in existing course—eff. summer 16)

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

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

493. Clinically-Oriented Anatomy Special Study Module (6)
(canceled course—eff. fall 16)

499. Laboratory Research (1-12)
Laboratory—3-36 hours. Prerequisite: consent of instructor; completion of second year of medical school. Laboratory research on surgically related problems. Participation in projects to include the following: burn, nutrition, oncology, transplant and others. May be repeated for credit. (H/P/F grading only)—F, W, S, Su, (F, W, S, Su) Ghosh, Kurzrock (change in existing course—eff. fall 17)

Medieval 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)

199A. 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)
199FB. Student Facilitated Teaching (1-4)
Prerequisite: consent of instructor. Student facilitated. 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)

**Microbiology**

New and changed courses in Microbiology (MIC)

**Upper Division**

172. Host-Parasite Interactions (3)
Lecture—3 hours. Prerequisite: course 102 or course 101 or course 104; Biological Sciences 101; Biological Sciences 102 or 105 strongly recommended. Exploration of host-parasite interactions at multiple levels, with an emphasis on global health and medically important human parasites. Offered in alternate years. GE credit: SciEng
(new course—eff. fall 17)

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
(new course—eff. winter 18)

182. Principles of Genomics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101. Fundamentals of genomics, including structural genomics, functional genomics, proteomics, and bioinformatics, focusing on the impact of these disciplines on research in the biological sciences. Social impacts of genomic research. GE credit: SciEng
(new course—eff. winter 17)

**Graduate**

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

263. Biotechnology Fundamentals and Applications (2)
(canceled course—eff. fall 17)

294. Current Progress in Biotechnology (1)
(canceled course—eff. spring 18)

**Music**

New and changed courses in Music (MUS)

**Lower Division**

178. Intermediate Musicanship, 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
(new 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
(new 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 Well-Tempered Klavier by J. S. Bach. Composition of exercises and short pieces using contrapuntal techniques. Intended for music majors. GE credit: ArtHum
(new course—eff. winter 17)

**Microbiology**

New and changed courses in Microbiology (MIC)

**Upper Division**

172. Host-Parasite Interactions (3)
Lecture—3 hours. Prerequisite: course 102 or course 101 or course 104; Biological Sciences 101; Biological Sciences 102 or 105 strongly recommended. Exploration of host-parasite interactions at multiple levels, with an emphasis on global health and medically important human parasites. Offered in alternate years. GE credit: SciEng
(new course—eff. fall 17)

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
(new course—eff. winter 18)

182. Principles of Genomics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101. Fundamentals of genomics, including structural genomics, functional genomics, proteomics, and bioinformatics, focusing on the impact of these disciplines on research in the biological sciences. Social impacts of genomic research. GE credit: SciEng
(new course—eff. winter 17)

**Graduate**

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

263. Biotechnology Fundamentals and Applications (2)
(canceled course—eff. fall 17)

294. Current Progress in Biotechnology (1)
(canceled course—eff. spring 18)

**Music**

New and changed courses in Music (MUS)

**Lower Division**

178. Intermediate Musicanship, 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
(new 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
(new 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 Well-Tempered Klavier by J. S. Bach. Composition of exercises and short pieces using contrapuntal techniques. Intended for music majors. GE credit: ArtHum
(new 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 mosena, musica andina) as well as its implications in other musical genres. Taught in English or Spanish depending on instructor. Not open to students who taken Spanish 171S or Music 127S. May be repeated for credit up to one time when topic differs. (Same course as Spanish 171S.) Offered in alternate years. GE credit: ArtHum or SocSci, DivIAH or SS, VL, WC, WE. (change in existing course—eff. winter 17)

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 mosena, 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 Spanish 171 or Music 127. May be repeated for credit up to one time when content differs. (Same course as Spanish 171S.) Offered in alternate years. GE credit: ArtHum, WrtIAH, VL, WC, WE—F. (F.) Hess, Irwin, Ortiz (new course—eff. winter 18)

140. University Jazz Band (2)
Rehearsal—4 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, W, S. (F, W, S.) Griffith (change in existing course—eff. spring 17)

Neurobiology, Physiology, and Behavior

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

Lower Division

18. Biological Science for Social Justice (3)
Lecture—3 hours. Broad survey of the many ways one can use the biological sciences to better the lives of others and break down barriers that have restricted social mobility. GE credit: SE, SS, D.D., SL—S. (S.) Calisi (new course—eff. spring 18)

100L. Neurobiology Laboratory (3)
Lecture—1 hour; laboratory—3 hours, extensive writing or discussion or prerequisite. Course 100 can (be taken concurrently) or course 100B (can be concurrent). 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.) Hawkins (new course—eff. spring 18)

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 structure of those systems described as a basis for understanding the functions. Not open for credit to students who have completed course 110B, 112, 160, 161 or 162, or Neuroscience 221 or equivalent; W. S. Carstens, Cheng, Miller, Sutter, Zito (change in existing course—eff. spring 18)

101D. Systemic Physiology Discussion (1.5)
Discussion—1.5 hours. 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. Su, F. (F, W, S.) Duran, S. (S.) Hedrick (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.) Baustista, Liets (change in existing course—eff. winter 17)

104L. Cellular Physiology/Neurobiology Laboratory (4)
Lecture—1 hour; laboratory—3 hours; discussion—1 hour; term paper or discussion. Prerequisite: course 101L. Biological Sciences 103 or Biological Sciences 105. Experiments in the physical and chemical processes of cells and tissues. Offered irregularly. GE credit: Wrt—Liets (change in existing course—eff. spring 18)

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: SE.—S. (S.) Hedrick (new course—eff. summer 16)

109. Kinesiology - Analysis and Control of Human Movement (4)
Lecture—4 hours. Prerequisite: Physics 7A; Physics 7B; course 101 or course 110C recommended; Cell Biology and Human Anatomy 101 and Cell Biology and Human Anatomy 101L (same as Exercise Biology 106 and Exercise Biology 106L) or equivalent recommended. Functional anatomy, motor control, and biomechanics of human movement understood in the context of body structures, basic principles of physics, and functional characteristics of muscle. GE credit: SE—S. (S.) Hawkins (new course—eff. spring 18)

110. Computing, Data, & Law in the United States (4)
Lecture/discussion—3 hours; term paper. Introduction to the problems in American law and policy born out of the creation and use of information technologies. Topics include intellectual property, corporate law, privacy, and emerging problems surrounding big data. GE: AGCH, SS, WE. —Con Diaz (new course—eff. winter 18)

110A. Foundations 1: From Molecules to Individuals (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: Biological Sciences 2A, Biological Sciences 2B; Chemistry 2B or Chemistry 3A; course 7A and prerequisite course 110C recommended; Biological Sciences 2C recommended. Pass One restricted to majors in Neuroscience, Physiology and Behavior. Major concepts in cell biology with special emphasis on connections between cell biology and behavior.
Includes: cellular metabolism, cellular sensing and signaling, membrane structure-function, molecular switches, nuclear and chemical signaling, endocrine signaling, cell cycle and differentiation, cytosome, and integrative examples. Credit limited to 3 units for students who have taken Biological Sciences 101. GE credit: SciEng/SE—F. (F, S, F.)
Gomes, Hahn (change in existing course—eff. winter 18)

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 transmitters, neural development, motor systems, central pattern generation, neuronal circuits, intracellular signal transduction, sensory processing, multisensory integraton, autonomic nervous system, neuromodulation, learning and memory, and higher cognition and disease. Credit limited to 2 units for students who have taken course 103. GE credit: SciEng/SE—F. W. (W, F) Britten, Sutter (change in existing course—eff. winter 17)

110C. Foundations 3: Physiology (5)
Lecture—4 hours; discussion—1 hour. Prerequisite: course 110A C- or better; Physics 7A; Physics 7B and Physics 7C recommended. Open to declared NPB majors only. Core concepts of physiology including single-neuron biophysics, synapses and transmitters, neural development, motor systems, central pattern generation, neuronal circuits, intracellular signal transduction, sensory processing, multisensory integration, autonomic nervous system, neuromodulation, learning and memory, and higher cognition and disease. Credit limited to 2 units for students who have taken course 103. GE credit: SciEng/SE—F. W. (W, F) Britten, Sutter (change in existing course—eff. winter 17)

111C. Advanced Systemic Physiology Laboratory (3)
(canceled course—eff. winter 18)

111L. Advanced Systemic Physiology Laboratory (4)
Lecture—1 hour; discussion—2 hours; laboratory—6 hours; term paper. Prerequisite: course 110L. Selected comprehensive experiments in the autonomic nervous system and the cardiovascular, respiratory, and neuromuscular systems. Emphasis on conceptual and methodological approaches in demonstrating the physiology of organ systems. Offered irregularly. GE credit: Writ.—Liets (change in existing course—eff. winter 18)

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

113. Cardiovascular, Respiratory, and Renal Physiology (4)
Lecture—4 hours. Prerequisite: course 110C or course 101; Chemistry 8B, course 207B and course 207C recommended. An intense and advanced presentation of concepts in cardiovascular, respiratory, and renal physiology including discussion of acid-base balance. (change in existing course—eff. winter 18)

114. Gastrointestinal Physiology (3)
Lecture—3 hours. Prerequisite: course 110C or course 101; Biological Sciences 105 or Biological Sciences 103 recommended. Biological Sciences 105 preferred. Gastrointestinal anatomy and physiology. Digestion, secretion, absorption, motility, comparative physiology and pathology. Strong emphasis on neural and hormonal regulation and on cellular mechanisms of secretion and absorption. —F. (F.) Bautista, Horwitz (change in existing course—eff. winter 18)

117. Avian Physiology (3)
Lecture—3 hours. Prerequisite: Biological Sciences 2A, Biological Sciences 2B, Chemistry 202B, course 101 or course 110C, strongly recommended. Physiology of the various systems of birds with emphasis on digestion, respiration, excretion, and endocrine systems. —S. (J.) Hahn, Klassing (change in existing course—eff. winter 18)

121. Physiology of Reproduction (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: course 110C; Biological Sciences 102 recommended. Physiological mechanisms related to reproduction, breeding efficiency and fertility, with special reference to domestic animals. GE credit: QL, SL—W. (W, F.) Berger (change in existing course—eff. winter 18)

121L. Physiology of Reproduction Laboratory (1)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 121 can be concurrent. Experiments on the reproductive systems of domestic animals including male and female gametes. (P/NP grading only)—W. (W.) Berger (change in existing course—eff. spring 17)

123. Comparative Vertebrate Organology (4)
Laboratory—3 hours; laboratory—3 hours. Prerequisite: Biological Science 1A and 1B or 2A and 2B. Functional anatomy of major animal organs in vertebrates. Each system examined from cellular to gross level in fish, birds, and mammals. Emphasis on how differentiated tissues are integrated into tissues and organs to perform diverse physiological functions. (Same course as Anatomy, Physiology and Cell Biology 100.) Offered in alternate years.—F. Genetos (change in existing course—eff. winter 18)

125. Comparative Physiology: Neurointegrative Mechanisms (3)
canceled course—eff. winter 17)

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

130. Physiology of the Endocrine Glands (4)
Lecture—4 hours. Prerequisite: course 110C or course 101. Advanced presentation of concepts in endocrinology with emphasis on the role of hormones in reproduction, metabolism, and disease. GE credit: VL—F. (F.) (change in existing course—eff. winter 18)

134. General Immunology for Physiologists (3)
Lecture—2 hours; lecture/discussion—1 hour. Prerequisite: course 101 C- or better or course 110C C- or better; 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 Zika and Ebola. Offered in alternate years. GE credit: SC—W. (W.) Fuller, Zito (new course—change in existing course—eff. winter 18)

136. Neural Mechanisms of Behavior (3)
Lecture—3 hours. Prerequisite: course 100 or course 101 or course 110B. Relationship between brain and behavior. Identification and analysis of the relevant neural circuits involved. Examples of systems to be considered are birdsong, locomotion, echolocation.—S. (S.) Britten (change in existing course—eff. winter 18)

137. Systems Neuroscience (3)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or course 110B. Basic neuroscience training with consent of instructor. Topics include cortical and postnatal differentiation of neurons, and plasticity in the mature and aging brain. Integration of neurochemical, structural, physiological and behavioral perspectives. GE credit: SciEng/SE—W. (W.) McMullin, Zito (change in existing course—eff. winter 18)

152. Endocrinology with an emphasis on the principles of behavior. Fundamental relationships between hormones and various behaviors engaged in by the organism during its lifetime. Role of hormones in behavioral homeostasis, social behavior, reproductive behavior, parental behavior, adaptation to stress. (Same course as Psychology 123.)—S. (S.) Bales, Furlow, Hahn, Trainer, Wingfield (change in existing course—eff. winter 18)

157. Advanced Physiology of Animal/Human Disease (3)
Lecture—1 hour; lecture/discussion—2 hours. Prerequisite: course 101 B+ or better or course 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 Human Physiology 157)—S. (S.) Horvitz, Payne (new course—eff. spring 17)

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

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

161. Developmental Neurobiology (3)
Lecture—3 hours. Prerequisite: course 100 or course 101 or course 110B. Issues, theoretical concepts, and methodologies in developmental neurobiology. Topics include prenatal and postnatal differentiation of neurons, and plasticity in the mature and aging brain. Integration of neurochemical, structural, physiological and behavioral perspectives. GE credit: SciEng/SE—W. (W.) McMullin, Zito (change in existing course—eff. winter 18)

162. Neural Mechanisms of Behavior (3)
Lecture—3 hours. Prerequisite: course 100 or course 101 or course 110B. Relationship between brain and behavior. Identification and analysis of the relevant neural circuits involved. Examples of systems to be considered are birdsong, locomotion, echolocation.—S. (S.) Britten (change in existing course—eff. winter 18)

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

165. Neurobiology of Speech Perception (3)
Lecture—3 hours. Prerequisite: course 110B or course 100 or course 101, or consent of instructor. Interdisciplinary approach to speech perception with emphasis on functional neuroanatomy and behavior. Topics include auditory processing in time and space, intelligibility in noisy environments, Neuroscience, Physiology, and Behavior 59
166. Math Tools for Neuroscience (4) Lecture/discussion—4 hours. Prerequisite: course 100 or course 110B; Mathematics 16A, Mathematics 16B, Mathematics 16C or Mathematics 17A, Mathematics 17B, Mathematics 17C or Mathematics 21A, Mathematics 21B, Mathematics 21C; or consent of instructor. Introduction to mathematics techniques used in neuroscience. Applications to neuroscience of differential equations, lineair algebra. Fourier transforms, correlation and convolution, and probability theory. Offered irregularly. GE credit: QL.—Goldman (change in existing course—fall 17)

167. Computational Neuroscience (5) Lecture—4 hours; lecture/laboratory—3 hours. Prerequisite: course 100 or course 110B; Mathematics 16A, Mathematics 16B, Mathematics 16C or Mathematics 17A, Mathematics 17B, Mathematics 17C or Mathematics 21A, Mathematics 21B, Mathematics 21C; or consent of instructor; Physics 7A, Physics 7B or equivalent recommended. Mathematical models and data analysis used to describe computations performed by nervous systems. Lecture topics include single neuron biophysics, neural coding, network dynamics, memory, plasticity, and learning. Lab topics include programming mathematical models and data analysis techniques in MATLAB. Offered irregularly. GE credit: SciEng 15E; QL.—Goldman (change in existing course—fall 17)

168. Neurobiology of Addictive Drugs (4) Lecture/discussion—4 hours. Prerequisite: course 100 or course 110B or course 110C or course 101; or equivalents. Neurobiological basis for the effects and mechanisms of action of drugs with addictive potential, including opiates (morphine, heroin, methadone), amphetamines, cocaine, nicotine, marijuana (cannabinoids), alcohol, caffeine, and mind-altering drugs such as LSD and antidepressants. GE credit: SL—S. (S.) Liets (change in existing course—fall 17)

171. Physiology of Neuroimmune Interactions (4) Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: course 100 or course 110B or course 110C or course 101; or equivalents. Neurobiological basis for the effects and mechanisms of action of drugs with addictive potential, including opiates (morphine, heroin, methadone), amphetamines, cocaine, nicotine, marijuana (cannabinoids), alcohol, caffeine, and mind-altering drugs such as LSD and antidepressants. GE credit: SL—S. (S.) Liets (change in existing course—fall 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 representation 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—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 advances 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 Psychology 21T.) (S/U grading only) Offered in alternate years.—(S.) Miller (change in existing course—fall 17)

212. Light and Fluorescence Microscopy (3) Lecture—2 hours; laboratory—1 hour. Prerequisite: consent of instructor. Restricted to maximum 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—fall 17)

267. Computational Neuroscience (5) Lecture—4 hours; lecture/laboratory—3 hours. Prerequisite: one course in general Neuroscience at the level of course 100 or course 110B, one year college-level Calculus at the level of Mathematics 16A, Mathematics 16B, Mathematics 16C or higher; one year Physics at the level of Physics 7A, Physics 7B, Physics 7C recommended; or consent of instructor. Mathematical models and data analysis techniques used to describe computations performed by nervous systems. Lecture topics include single-neuron biophysics, neural coding, network dynamics, memory, plasticity, and learning. Lab topics include programming mathematical models and data analysis techniques in MATLAB. Offered in alternate years. (Same course as Neuroscience 267T.)—F. Goldman (change in existing course—fall 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 287T.)—S. (S.) Fomina (change in existing course—fall 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 287T.)—S. (S.) Fomina (change in existing course—fall 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. Multidisciplinary approach to stimulate new thinking in the practice, process, and delivery of health care. Focus on improving overall health outcomes.—W. (W) (new course—fall 17)

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 safety, quality and research to clinical practice. Accessing and analyzing reliable sources of evidence for integration in care-plan.—S. (S.) Vu (new course—fall 17)

223. Quality and Safety Education in Health Care (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.—F. (F.) (new course—fall 17)

New and changed courses in Nursing (NRS) Graduate

212. Technology & Innovations in Health Care (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. Multidisciplinary approach to stimulate new thinking in the practice, process, and delivery of health care. Focus on improving overall health outcomes.—W. (W) (new course—fall 17)
Nutrition

New and changed courses in Nutrition (NUT)

Lower Division

10. Discoveries and Concepts in Nutrition (3)
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 10Y or course 10V or an upper division nutrition course. GE credit: SciEng(1SE), SL—F, W, S, Su. (F, W, S, Su.) Applegate; change in existing course—eff. winter 18

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 course 10Y or an upper-division nutrition course. GE credit: SciEng(1SE), SL—F, W, S, Su. (F, W, S, Su.) Applegate; (new course—eff. winter 18)

10V. 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 course 10Y or an upper-division nutrition course. GE credit: SciEng(1SE), SL—F, W, S, Su. (F, W, S, Su.) Applegate; (new course—eff. winter 18)

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 organs in an individual's regulation of metabolic transformations, major regulatory functions, principles of pharmacology/toxicology important to understanding nutrient/toxicant metabolism. (Same course as Environmental Toxicology 104.) GE credit: SciEng.(OL, SE, SL—F, F.) Haji, Oleaza; (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.(QL, SE—S.) Satre, Stew- art; (change in existing course—eff. spring 17)

Graduate

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

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

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

(canceled course—eff. winter 18)

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

264B. Current Topics in Maternal and Child Nutrition: Epidemiology and Evidence-Based Practice (2)
(canceled course—eff. spring 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. Continuation of course 1. Introduction to listening, speaking, reading and writing skills in Persian and to Persian culture. GE credit: ArtHum, Div/WC—F. (W.) Sharlet; (new course—eff. winter 17)

3. Elementary Persian (5)
Lecture/discussion—5 hours. Prerequisite: course 1; or consent of instructor. Continuation of course 2. Introduction to listening, speaking, reading and writing skills in Persian and to Persian culture. GE credit: ArtHum, Div/WC—F. (F.) Sharlet; (new course—eff. spring 17)

21. 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, Wt/AH, WC—F. (F.) Sharlet; (new course—eff. fall 16)

22. 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, Wt/AH, WC—F. (W.) Sharlet; (new course—eff. winter 17)

23. Intermediate Persian (5)
Lecture/discussion—5 hours. Prerequisite: course 23; or the equivalent. Integrated presentation of listening, speaking, reading and writing skills as well as cultural topics in Intermediate Persian. GE credit: ArtHum, Div, Wt/AH, WC—F. (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, Wt/AH, WC, WE—F. (F.) Sharlet; (new course—eff. fall 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 scientific cognitive 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 Survey of ancient Western philosophy with special attention to the Pre-Socratics, Plato, Aristotle, and the Sceptics. GE credit: Arthum, Writ/1AH, WE.—W. (W.) Szaif (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, Writ/1AH, WC.—W. (W.) Matthey, Szaif (change in existing course—eff. spring 17)

Upper Division
112. Intermediate Symbolic Logic (4)
Lecture—1 hour; discussion—3 hours. Prerequisite: course 12 C- or better, or consent of instructor. Predicate logic syntax and semantics. Translation between predicate logic and English, Models, truths, and derivations. Identity, functions, and definite descriptions. Introduction to concepts of meta-theory. GE credit: Arthum/IAH.—W. (W.) Landy (change in existing course—eff. winter 18)

118. Political Philosophy (4)
Lecture—2 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: SocSci, Div, Writ/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 obligations, the relation of law and morals. Problems for law involving liberty and justice: freedom of expression, privacy, rights, discrimination and fairness, responsibility, and punishment. GE credit: SocSci, Div, Writ/AH, 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/IAH, WC.—S. (S.) Szaif (change in existing course—eff. spring 17)

190. The Philosophy of Science (4)
Lecture—3 hours; laboratory—2 hours. Prerequisite: course 12 C- or better, or consent of instructor. Macrosociology of science. Models, truth and falsification, Popper. GE credit: SciEng/SE, SL.—F. (F.) Friedman (change in existing course—eff. winter 18)

199. Science and Society (3)
Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor. Survey of interaction of science and society. GE credit: SciEng/SE, SL.—F. (F.) Friedman (change in existing course—eff. fall 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 2B; Mathematics 21M. Introduction to general principles and analytical methods used in physics for physical science and engineering majors. Classical mechanics. Only 2 units of credit for students who have completed 1A or 7B. Not open for credit to students who have completed course 9H4A. GE credit: SciEng/SE.—F., S. (F., S.) (change in existing course—eff. winter 18)

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, 9H4A, 9H8C, 9HD, 9HE, or any upper division physics course. GE credit: SciEng/SE, SL, VL.—F. (F.) Bra-dac (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, VL.—S. (S.) Teming (change in existing course—eff. winter 17)

80. Experimental Techniques (4)
Lecture—2 hours; laboratory—5 hours. Prerequisite: course 9D or course 9H4D. Open to Physics and Applied Physics majors only. Experimental techniques. Design of circuits. Data analysis, sources of noise, statistical and systematic uncertainties. Light sources, detection, and measurement in basic optics systems.—W. Cebra, Chertok, Chiang, Mulhearn. Panicl, Taufour, Vishik (new course—eff. fall 17)

Upper Division
110A. Electricity and Magnetism (4)
Lecture—3 hours. Prerequisite: course 9B C- or better; course 9C C- or better; Mathematics 21D C- or better; Mathematics 22A C- or better; Mathematics 22B C- or better; course 104A; course 105A; or consent of department. Theory of electrostatics, electromagnetism, Maxwell’s equations, electromagnetic waves. GE credit: SciEng/SE.—W. (W.) Yu (change in existing course—eff. winter 18)

122A. Advanced Laboratory in Condensed Matter Physics (4)
Laboratory—3 hours; discussion—1 hour. Prerequisite: course 104A; course 105A; course 110A; 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 condensed matter. GE credit: SciEng/SE, WE.—W. (W.) Mantic, Tyson, Zhu (change in existing course—eff. winter 18)

157. Astronomy Instrumentation and Data Analysis (4)
Lecture—3 hours; 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 and measurement analysis and acquisition involving laboratory astrophysics plus stellar, solar, and galaxy digital imaging, photometry, and/or spectroscopy. Students perform three experiments. Individual work stressed. Minimum 70-15 page journal style articles of two experiments are required. Offered in alternate years. GE credit: SciEng/SE, WE.—S. (S.) Boe-shaar, Tyson (change in existing course—eff. winter 18)

Graduate
Lecture—3 hours; 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 and measurement analysis and acquisition involving laboratory astrophysics plus stellar, solar, and galaxy digital imaging, photometry, and/or spectroscopy. Students perform three experiments. Individual work stressed. Minimum 70-15 page journal style articles of two experiments are required. Offered in alternate years. GE credit: SciEng/SE, WE.—S. (S.) Boe-shaar, Tyson (change in existing course—eff. winter 18)

256A. 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., Mathematics 119A/B or 207A, 167 or 226A, and 135A/B or 235A, respectively. GE credit: 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.) Crutchfield (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., Mathematics 119A/B or 207A, 167 or 226A, and 135A/B or 235A, respectively. GE credit: 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.) Crutchfield (change in existing course—eff. spring 17)

280. Seminar in Ethics for Scientists (2)
Lecture—3 hours; laboratory—8 hours. Prerequisite: course 104A; course 105A; course 110A; 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 condensed matter-Physics. Students perform three experiments depending on difficulty. Individual work is stressed. Thorough write-ups of the experiments are required. GE credit: SciEng/SE, WE.—W. (W.) Mantic, Tyson, Zhu (change in existing course—eff. winter 18)
Plant Biology

New and changed courses in Plant Biology (PLB)

Lower Division

102. California Floristics (S)
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. Phytogeographic relationships among families. Principles of systematic and taxonomy. Two Saturday field trips. (Same course as Plant Sciences 102.) GE credit: SciEngSE, VL.—S. (S.) Potter (change in existing course—eff. fall 17)

104. Principles of the Cellular Environment (W)
Lecture—3 hours. Prerequisite: course 100A. Principles of cell function 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: SE, SS, WE.—W. (W.) Bradford, Melotto (new course—eff. fall 17)

105. Concepts in Pest Management (W)
Lecture—2 hours; laboratory/discussion—3 hours. Prerequisite: Chemistry 8B, Plant Sciences 2 or Biological Sciences 2C. Introduction to the ecological principles of integrated pest management, biology of different classes of pests and the types of losses they cause, population assessment, evaluation and control of pest problems and disadvantages of different techniques used for pest management, IPM programs. Not open for credit to students who have completed Agricultural Management and Rangeland Resources 105. (Former course Agricultural Management and Rangeland Resources 105.) GE credit: SciEngSE.—F.—F. (F.) Al-Khatib (change in existing course—eff. winter 17)

110. Crop Management Systems for Vegetable Production (4)
Lecture—2 hours; discussion—1 hour; laboratory—3 hours. Prerequisite: course 2 or Biological Sciences 2A, Biological Sciences 2B, Biological Sciences 2C. Horticultural principles applied to production and management systems for vegetable crops. Laboratory and discussion of pest problems in vegetable crops and resource use practices. Not open for credit to students who have completed Plant Sciences 101C. (Former course Plant Sciences 110C.) Offered in alternate years.—F. Mitchell (new course—fall 17)

110A. Principles of Agronomic Crop Production in Temperate and Tropical Systems (3)
(change in existing course—eff. spring 17)

110C. Crop Management Systems for Vegetable Production (4)
(change in existing course—eff. winter 17)

110L. Principles of Agronomy Laboratory (1)
(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, agronomy, ecology, equipment, and management. Cropping 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 110A. (Former course Plant Sciences 110A.) Offered in alternate years. GE credit: SciEngSE.—F.—F. Mitchell (new course—eff. spring 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. Offered in alternate years. GE credit: SciEngSE.—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 147 recommended. Multivariate linear and nonlinear models.
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.) Boydstun
(new course—eff. fall 16)

11B. Citizen Lawmaking: Direct Democracy, Public Policy & Political Representation in America (4)
(new course—eff. fall 16)

11C. Politics and Film (4)
Lecture—3 hours; term 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 highlighted in Hollywood movies, television, and/or documentary films. Offered irregularly. GE credit: ACGH, VL, WE.—F, W, S. (F, W, S.) Boydstun
(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 American civil rights movement, 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 political institutions’ response and adaptation to climate change. Offered irregularly. GE credit: SS, WE.—F, W, S. (F, W, S.) Shugart
(new course—eff. fall 16)

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.—F, W, S. (F, W, S.) Simonton, Thompson, Traxler
(new course—eff. spring 18)

1Y. 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 1GE credit: SS.—F, W, S. (F, W, S.) Ferreira, Henderson, Luck, Simonton, Thompson, Traxler
(change in existing course—eff. winter 17)

41. Research Methods in Psychology (4)
Lecture—3 hours; extensive writing. Prerequisite: course 1 or course 1Y; course 41; Statistics 13 or Statistics 13Y or Statistics 102. Introduction to human information processing, mental representation and transformation, imagery, attention, memory, language processing, concept formation, problem solving, and computer simulation. Not open for credit to students who have completed former course 136.—F, W, S. (F, W, S.) Ekstrom, Ferreira, Henderson, Long, Luck
(change in existing course—eff. winter 18)

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)
131. Perception (4) Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 1 or course 1Y; course 41; course 100 or course 135. Cognitive organizations related to measurable physical changes mediated through sensory channels. Perception of sensory receptor. Events. —F, W, S (F, W, S.) Geng, Henderson (change in existing course—eff. winter 18)

132. Language and Cognition (4) Lecture—3 hours; term paper. Prerequisite: course 1 or course 1Y; course 41; course 100 or course 135); or consent of instructor. Introduction to the cognitive processes involved in language comprehension and production. Topics include the biological foundations of language, speech perception, word recognition, syntax, reading ability, and pragmatics. GE credit: WE.—F, W, S (F, W, S.) Ferreira, Long, Swaab, Traylor (change in existing course—eff. winter 18)

135. Cognitive Neuroscience: The Biological Foundations of the Mind (4) Lecture—4 hours; Prerequisite: course 1 or course 1Y; course 41; or consent of instructor; course 101, course 123, or course 129 recommended. Neuroscientific foundations of higher mental processes including attention, memory, language, higher-level perceptual and motor processes, and consciousness. Emphasis on the neural mechanisms which form the substrates of human cognition and the relationship of mind to brain.—F, W, S (F, W, S.) Ekstrom, Geng, Janata, Mangun, Ranganath (change in existing course—eff. winter 18)

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 and communicating statistical presentation skills. GE credit: SL—S. (S.) Ekstrom, Geng, Schepeler, Zane (change in existing course—eff. spring 17)

140. Developmental Psychology (4) Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 41. Pass One open to Psychology majors. Ontogenetic account of human behavior through adolescence with emphasis on motor skills, mental abilities, motivation, and social interaction. Two units of credit allowed to students who have completed Human Development 100A or 100B. Not open for credit to students who have completed course 112. —F, W, S (F, W, S.) Cross, Ghetti, Goodman, Graf, Estes, Lagattuta, Oakes (change in existing course—eff. winter 18)

143. Infant Development (4) Lecture—3 hours; extensive writing. Prerequisite: course 1 or course 1Y; course 41; course 140 or Human Development 100A. Psychological development in infancy. Topics include physical and motor development, sensory and nervous system development, and memory and cognitive development. Emphasis will be on integrating theories; empirical research, and experimental methods for understanding infant development. GE credit: WE.—F. (F.) Oakes (change in existing course—eff. winter 18)

146. The Development of Memory (4) Lecture—3 hours; term paper. Prerequisite: courses 1 or course 1Y; 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 or course 1Y; course 41. Pass One open to Psychology majors. Behavior of the individual in the group. Examination of basic 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. winter 18)

154. Psychology of Emotion (4) Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 41. Pass One open to Psychology majors. Introduction to the theories and research on emotion and bodily feelings with special reference to self-knowledge. Not open for credit to students who have completed course 143. Offered in alternate years.—S. Goodman (change in existing course—eff. winter 18)

157. Stereotyping, Prejudice, and Stigma (4) Lecture/discussion—4 hours. Prerequisite: course 1 or course 1Y; course 41. Social psychological understandings of stereotypes, prejudice, and stigma from sociocultural, methodological, and cognitive perspectives. Topics include: origins, maintenance, change, effects on person perception and memory, and the automaticity/controlility of stereotyping and prejudice. GE credit. DD.—W. (W.) Sherman (change in existing course—eff. winter 18)

162. Introduction to Personality Psychology (4) Lecture—3 hours; term paper. Prerequisite: course 1 or course 1Y; course 41. Pass One open to Psychology majors. Scientific study of personality. Methods of personality research. Overview of current research and theory in the field of personality psychology. Not open for credit to students who have completed former course 147. GE credit; SocSci, Writ SS.—F. (F, S.) Robins (change in existing course—eff. winter 18)

168. Abnormal Psychology (4) Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 41. Descriptive and functional account of behavioral disorders with primary consideration given to neurotic and psychotic behavior. GE credit: SocSci, Writ SS.—F. W, S (F, W, S.) Schepley, Zane (change in existing course—eff. winter 18)

170. Psychology of Religion (4) Lecture—4 hours. Prerequisite: course 1 or course 1Y; course 41. Major theories, issues, data, and research methodologies of the psychology of religion. Religious experience and expression; religious development in childhood, adolescence, and adulthood; conversion; religious influences on physical and mental health; cross-cultural perspectives. GE credit: Div, Writ WE.—S. (S.) Emmons (change in existing course—eff. winter 18)

180D. Research in Developmental Psychology (4) Lecture—2 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.) Grohol (new course—eff. winter 17)

185. History of Psychology (4) Lecture—3 hours; term paper. Prerequisite: course 1 or course 1Y; course 41; upper division standing or consent of instructor. Pass One open to Psychology majors. Development of psychological thought and research in context of history of philosophy and science. Not open for credit to students who have completed course 120. (Former course 120) GE credit: SS, WE. (change in existing course—eff. winter 18)

192. Fieldwork in Psychology (1-6) Fieldwork—16 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 a maximum time period per internship site. (P/NP grading only) (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.) Ferris (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) (SU grading only) Offered in alternate years.—J. Miller (change in existing course—eff. spring 17)

242. Attraction and Close Relationships (4) Seminar—10 hours; term paper—1 hour. Prerequisite: graduate standing in Psychology, Sociology, Human Development, a related social science, or consent of instructor. Social psychological theory and research on attraction and close relationships, with a particular emphasis on romantic relationships. Covers attachment theory, interdependence theory, and evolutionary psychological perspectives. Offered irregularly.—new course—eff. winter 18)

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 teaching undergraduate psychology. Integration of learning outcomes with effective evaluation. Practical experience in the application of pedagogical principles. (SU grading only)—W. (W.) Cross (new course—eff. winter 17)

391. Teaching of Psychology Practicum (4) Seminar—1 hour; fieldwork—10 hours. Prerequisite: course 390; or consent of instructor. Supervised teaching in undergraduate classrooms. Techniques for delivering content through lectures, discussions, or labs; course administration; communications;
Religious Studies

New and changed courses in Religious Studies (RST)

Lower Division
1E. 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, Writ/AH or SS, DD, OL, WE.—Miller, Watenaugh (change in existing course—eff. fall 17)

Religious Studies

New and changed courses in Religious Studies (RST)

Lower Division
1E. 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, Writ/AH or SS, DD, OL, WE.—Miller, Watenaugh (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, Writ/AH, WE.—S. (S.) (new course—eff. winter 18)

Upper Division
123. Sex and Gender in the Bible (4)
Lecture—3 hours; term paper—3 hours. Gender and sexuality in the Bible and its interpretation in Judaism and Christianity. Femininity and masculinity; gender roles; homosexuality; sexual violence. Historical origins in the ancient world; influence on contemporary views. GE credit: ACGH, SE or SS, OL, WE.—F, W, S. (F, W, S.) Mroczek (new course—eff. fall 17)

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 poetry. Exploration of issues such as family dynamics/motherhood, sexuality, work, and women’s relationship to the state. Offered in English. GE credit: ArtHum/SAH, 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 wars). Students may not take both course 7V and course 7 for credit. GE credit: SocSci, Writ/SS, WE, WC.—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)
(canceled course—eff. fall 17)

35. The Good, the Bad, and the Ugly (3)
Lecture—2 hours; discussion—1 hour. Class size restricted to 60 students. Impact of microorganisms on Earth, Humans and Society. Historical, scientific, and contemporary issues dealing with microbes on natural and built environments. GE credit: SciEng, SocSci/SE, SS, WE.—S. (S.) Rodrigues (new course—eff. spring 17)

70A. Genetic Engineering in Medicine, Agriculture, and Law (5)
Lecture—5 hours. Not open to students who have completed Biological Sciences 2A and Biological Sciences 2B and Biological Sciences 2C. Historical and scientific study of the impact of genetic engineering in medicine, agriculture, and law, including examination of social, ethical, and legal issues raised. Offered in a distance-learning format. GE credit: SE or SS, SL. (change in existing course—eff. winter 18)

90C. Herbal Medicine: Relevance for the 21st Century (2)
(canceled course—eff. fall 17)

90D. Saving Endangered Plant Species: Problems and Prospects (2)
(canceled course—eff. fall 17)

91A. Explorations in Science and Society: Cultures and Identities (2)
(canceled course—eff. fall 17)

91B. Explorations in Science and Society: Leadership and Collaboration (2)
(canceled course—eff. fall 17)

91C. Explorations in Science and Society: Engagement (2)
(canceled 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, SE, SS, SL, WE.—F. (F.) Davis (new course—eff. fall 16)

135S. Biodiversity and Society in South Africa (4)
(canceled course—eff. winter 17)

140. Genetics and Social Issues (4)
(canceled 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 long-term 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)

112. Visualizing Society with Data (4)
Lecture/lab—3 hours; term paper—3 hours. Analysis and visualization of historical and contemporary data about populations and societies using R. Critical exploration of visual communication of information about people over time and critical assessment of role of data collection and analysis in societies. GE credit: DD, OL, SS.—Merchant (new course—eff. winter 18)

122. Health and Medical Technologies (4)
Lecture/discussion—3 hours; term paper—3 hours. Critical/historical examination of medical technologies: imaging, pharmaceuticals, genetics, implants/devices. Exploration of mutually constitutive relationships between health, medical technologies, social difference (race/gender/class/sexuality). GE credit: DD, SS.—Merchant (new course—eff. spring 18)

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. Hearistic 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/health disparities, social construction of health, the

General Education (GEd): AH=Arts and Humanities, SS=Social Sciences, ACGH=American Cultures, DD=Domestic Diversity, OL=Oral Skills, QL=Quantitative, SL=Scientific, VL=Visual, WC=World Cultures, WE=Writ/Experience Courses & Programs are subject to change without notice.
Organization of health care, and the politics of health care reform. GE credit: SS, DD.—S. (S.) Halfmann, Hamilton (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.) 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, S. (F, S.) Halfmann (new course—eff. fall 16)

178. Punishment and Corrections (4) Lecture—3 hours; term paper. Prerequisite: course 1, 2, 3, or 6 recommended. Origins, characteristics, and consequences of various sanctions and punishment regimes including fines, banishment, incarceration, deportation, and execution. GE credit: SS.—S. (S.) McCarthy (new course—eff. spring 17)

192. Internship and Research Practicum (2-6) Internship—6–18 hours. Prerequisite: consent of instructor; must have 84 units complete; faculty approval for proposed internship. Supervised internship and study in an agency, organization, or institution; application of sociological concepts to the work experience. Maximum of four units may be counted toward the major. May be repeated for credit with consent of instructor. (P/NP grading only)—F, W, S. (F, W, S.) (change in existing course—eff. winter 18)

199. Special Study for Advanced Undergraduates (1-5) Prerequisite: consent of instructor; must have 84 units complete and faculty approval. Special study. (P/NP grading only) (change in existing course—eff. winter 18)

Graduate

224. Sociology of Education (4) Seminar—9 hours; term paper—3 hours. Prerequisite: course 206 or equivalent recommended. Restricted to graduate students or consent of instructor. Overview of sociological theories accounting for student role, and evaluation of educational systems. Emphasis on empirical research on education and social stratification and application to educational policy. Offered irregularly. (change in existing course—eff. winter 18)

254. Sociology of Health and Illness (4) Seminar—9 hours; term paper—3 hours. Open to graduate or professional students. Sociological perspectives and methods on the study of health and illness. Students select topics for supervised research. Research paper required. Offered irregularly. (change in existing course—eff. winter 18)

Soil Science

New and changed courses in Soil Science (SSC)

Upper Division


102. Environmental Soil Chemistry (3) Lecture—3 hours. Prerequisite: General Chemistry course 100 or equivalent recommended. Soil chemistry processes related to the fate and transport of contaminants in soil. Soil minerals, natural organic matter, surface charge, soil solution chemistry, redox reactions in soil, and sorption of inorganic and organic contaminants. GE credit: SciEng/QL, SE, SL.—W (W) Parikh (change in existing course—eff. winter 18)

111. Soil Microbiology (4) Lecture—3 hours; laboratory—3 hours. Prerequisite: Biological Sciences course 2C recommended. Major groups of microorganisms in soil, their interrelations, and their responses to environmental variables. Role of microorganisms in cycling of nutrients. Plant-microbe interactions. Soil microbial transformations of organic and inorganic pollutants. GE credit: SciEng/QL, SE, SL, WE.—W (W) Scow (change in existing course—eff. winter 18)

112. Soil Ecology (3) Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or equivalent recommended. 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. winter 18)

118. Soils in Land Use and the Environment (4) Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor; course 100 or equivalent recommended. Soils are considered as elements in land use planning and environmental quality. Topics include: soil survey reports, remote sensing, land capability classification, soil erosion/conservation, waste disposal on soils and soil reclamation. One one-day field trip. GE credit: SciEng/SE, SL.—S. (S.) O’Gren (change in existing course—eff. winter 18)

Graduate

202. Topics in Advanced Soil Chemistry (4) Lecture—3 hours; discussion—1 hour. Prerequisite: consent of instructor; course 100 or equivalent recommended. Restricted to 18 students. Reviews of current research in soil chemistry. Topics include double layer theory; clay mineral and oxide surface chemistry; adsorption on soil surfaces; speciation and modeling of solution ions; solubility and mineral stability diagrams. May be repeated 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 3 or 3S. Review and development of the grammar, vocabulary, and composition acquired in the first year through exercises and reading of modern texts. Students transferring from other institutions are recommended to start the second year program at this point. Not open for credit to students who have completed course 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 21V. 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)

31. Intermediate Spanish for Native Speakers I (5) Lecture/discussion—3 hours; tutorial—1 hour; extensive writing. Prerequisite: course 3 or course 3V or course 3Y; or equivalent course or consent of instructor. First course of a three-quarter series designed to provide bilingual students whose native language is Spanish with the linguistic and learning skills required for successful completion of upper division courses in Spanish. Intensive review of grammar and composition. GE credit: AH, OL, WC, FE.—F, (F.) (change in existing course—eff. winter 18)

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)—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 popular, musica indigena) 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 1715 or Music 127S. May be repeated for credit up to one time when the topic differs. (Same course as Music 127) Offered in alternate years. GE credit: ArtHum, Wrt/1AH, VL, WC, WE.—F, (F.) Hess, 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 popular, musica indigena) as well as its implications in other musical genres. Taught in Spanish or English depending on instructor. Not open to students who have taken Spanish 171 or Music 127. May be repeated for credit up to one time when content differs. (Same course as Music 127S) Offered in alternate years. GE credit: ArtHum, Wrt/1AH, VL, WC, WE.—F, (F.) Hess, Ortiz (new course—eff. winter 18)

151N. Survey of Spanish-American Literature 1900 to Present (4) (cancelled course—eff. fall 16)
Statistics

New and changed courses in Statistics (STA)

Lower Division

32. Gateway to Statistical Data Science (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: Mathematics 16B or Mathematics 21B or Mathematics 17B. Probability concepts; programming in R; exploratory data analysis; sampling distribution; estimation and inference; linear regression; simulations; resampling methods. Alternative to Statistics 13 for students with a background in calculus and programming. Only two units of credit allowed to students who have taken course 13; not open for credit to students who have taken course 100. GE credit: SciEngQL, SE—W, S. (W, S.)

100. Applied Statistics for Biological Sciences (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: Mathematics 16B or Mathematics 17B or Mathematics 21B. 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; not open for credit to students who have taken course 102. GE credit: SciEngQL, SE—W, S. (W, S.)

103. Applied Statistics for Business and Economics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 13 or course 13Y or course 32 or course 100; Mathematics 16B or Mathematics 17B or Mathematics 21B. Descriptive statistics, probability, random variables; expectation; binomial, normal, Poisson, other discrete distributions; joint distributions; sampling distributions, central limit theorem; proper-
ties of estimators; linear combinations of random variables; testing and estimation; Minitab computer packages. Two samples, ANOVA. GE credit: SciEngQL, SE—W, S. (W, S.)

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—fall 07)

Statistics

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

199FA. Student Facilitated Course Development (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 98F/198F. (P/NP grading only)—F, W, S. (F, W, S.)
(new course—eff. spring 17)

199FB. Student Facilitated Teaching (1-4)
Prerequisite: course 199FA; consent of instructor. Must have completed course 199FA, and be teaching a course 98F or 98FB; open to upper division Spanish majors only. Student-facilitated course under the supervision of a faculty member, an undergraduate student teaches a course under 98F/198F. (P/NP grading only)—F, W, S. (F, W, S.)
(new course—eff. spring 17)

104. Applied Statistical Methods: Nonparametric Statistics (4)
Lecture—3 hours; laboratory—1 hour. Prerequisite: course 13 or course 13Y or course 32 or course 100. Sign and Wilcoxon tests. Walsh averages. Two-sample procedures. Inferences concerning scale. Kruskal-Wallis test. Measures of association. Chi square and Kolmogorov-Smirnov tests. Offered in alternate years. GE credit: SciEngQL, SE—S (S)

106. Applied Statistical Methods: Analysis of Variance (4)
Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 13 or course 13Y or course 32 or course 100. Basics of experimental design. One-way and two-way fixed effects analysis of variance models. Randomized complete and incomplete block design. Multiple comparisons procedures. One-way random effects model. GE credit: SciEngQL, SE—W, S. (W, S.)

108. Applied Statistical Methods: Regression Analysis (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 13 or course 13Y or course 32 or course 100. Simple linear regression; variable selection techniques, stepwise regression, analysis of covariance, influence measures, computing packages. GE credit: SciEngQL, SE, SL—W, S. (W, S.)

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, mean, variance, covariance, Chebyshes’ 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 130A. GE credit: SciEngQL, SE—F, F (F)

131A. Introduction to Probability Theory (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: Mathematics 21B; Mathematics 21C; Mathematics 22A or Mathematics 67. Fundamental concepts of probability theory; discrete and continuous random variables, standard distributions, moments and moment-generating functions, laws of large numbers and the central limit theorem. Not open for credit to students who have completed Mathematics 135A. GE credit: SciEngQL, SE—F, F (F, S.)

131B. Introduction to Mathematical Statistics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 131A or Mathematics 135A; 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: SciEngQL, SE—W, W (W)

141A. Fundamentals of Statistical Data Science (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 108 or course 106; course 32 or course 100 or course 113. 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)

141B. Data & Web Technologies for Data Analysis (4)

141C. Big Data & High Performance Statistical Computing (4)
Lecture—3 hours; discussion—1 hour. Prerequisite: course 141B or course 141A and Engineering Computer Science 10. High-performance computing in high-level data analysis languages; different computational approaches and paradigms for efficient analysis of big data; interfaces to compiled languages; R and Python programming languages; high-level parallel computing; MapReduce; parallel algorithms and reasoning.—S (S)

194HA. Special Studies for Honors Students (4)
Independent study—12 hours. Prerequisite: senior qualification 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: SciEngSE.

194HA. Special Studies for Honors Students (4)
Independent study—12 hours. Prerequisite: senior qualification 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: SciEngSE.
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
Articul 12 or course 7B; course 170B; or equiv-
alent with consent of instructor. Class size limited to
20 students. Experimental approaches to the mak-
ing of film and video in the age of digital technolo-
gies. Builds upon foundation provided by course 20.
Introduction to technical, conceptual, creative, and
critical skills for taking a project from idea to fruition.
GE credit: AH, OL, VL.—Wyman

(new 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.—Ostertag

(new 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 continued and com-
pleted in course 180B. (Deferred grading only, pend-
ing completion of sequence.) GE credit: SocSci/SS,
WE.—F, W, S. (F, W, S.)

(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 continued and com-
pleted in course 180B. (Deferred grading only, pend-
ing completion of sequence.) GE credit: SocSci/SS,
WE.—F, W, S. (F, W, S.)

(change in existing course—eff. fall 16)

University Writing Program

New and changed courses in University Writing Program (UWP)

Lower Division

13. Video Game Rhetorics (4)
Lecture—3 hours; discussion—1 hour. Prerequisite:
course 1 C- or better or course 4 C- or better or
course 7 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. Examina-
tion of video games as rhetorical texts whose mean-
ing is produced through complex interplay of
procedures, narratives, rules, and context. Writing
about video games using critical perspectives and
analytic methods. GE credit: AH, VL, WE.—S. (S.)

Ching

(new course—eff. spring 18)

18. Style in the Essay (4)
Lecture/discussion—4 hours. Prerequisite: course 1
C- or better or course 4 C- or better or course 7
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. Style, language,
and structure in the essay. Analyzing style, develop-
ing a voice in writing, revising sentences, de velv-
ing effective paragraphs and arguments, and writing
with force and clarity. GE credit: ArtHum, Writ/AH,
WE.—F, W, S. (F, W, S.)

(change in existing course—eff. winter 18)

19. Writing Research Papers (4)
Lecture/discussion—4 hours. Prerequisite: course 1
C- or better or course 4 C- or better or course 7
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. Critical reading,
analysis, documentation, and writing research-
based assignments. Formulation of research topics
and development of effective arguments. Reading
and writing assignments may focus on a single
theme. GE credit: ArtHum, Writ/AH, WE.—F, W, (F, W)

(change in existing course—eff. winter 18)

23. Advanced Academic Reading and Writing for Multilingual Students (4)
Lecture/discussion—3 hours. Prerequisite: course
22. Pass one passed course 22 with a C- or better
OR a score of 80-89 on the English Language Place-
ment Examination (ELPE) offered by the UWP. Read-
ing and writing research-based texts for
academic purposes. Suitable for students whose pri-
mary home language was not English.—F, W, S. (F, W, S.)

(cancelled course—eff. fall 16)

28. Persuasive Writing for Multilingual Students (4)
Lecture/discussion—4 hours. Prerequisite: course 1
C- or better or course 4 C- or better or course 7
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 ana-
lyzing style of persuasive texts, using appropriate
vocabulary, and applying English grammatical struc-
tures in argumentation. Suitable for multilingual stu-
dents desiring additional instruction in persuasive

(new course—eff. fall 17)

29. Research Writing for Multilingual Students (4)
Lecture/discussion—4 hours. Prerequisite: course 1
C- or better or course 4 C- or better or course 7
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. Reading and writ-
ing effectively in various research genres across the
disciplines. Suitable for multilingual students desir-
ing additional instruction in the linguistic and rhetori-
cal features of research writing in English for
academic purposes. GE credit: AH, WE.—F, W, S. (F, W, S.)

(new course—eff. fall 17)

92. Internship in Writing (1-12)
Internship—3-36 hours. Prerequisite: course 4 or
course 12 or course 4 or course 12 or English 3. Inter-
shhips in fields where students can practice their skills. May
be repeated for credit for a total of 12 units. (P/NP
grading only.)

(change in existing course—eff. winter 18)

98. Directed Group Study (1-5)
Prerequisite: course 1 or course 12 or course 4 or
English 3; or equivalent course; consent of instruc-
tor. May be repeated two times for credit. (P/NP
grading only.) GE credit: AH, WE.

(change in existing course—eff. winter 18)

99. Special Study for Undergraduates (1-5)
Prerequisite: course 1 or course 12 or course 4 or
English 3; or equivalent course; consent of instruc-
tor. (P/NP grading only.) GE credit: AH, WE.

(change in existing course—eff. winter 18)

Upper Division

101. Advanced Composition (4)
Lecture/discussion—3 hours; extensive writing. Prere-
quisite: course 1 C- or better or course 4 C- or better
or course 7 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; and upper divi-
sion standing. Instruction in advanced principles of
expository writing. Writing tasks within and beyond the
University. Different writing modes, including narrative, analysis, explo-
ation, argument, critique. GE credit: ArtHum,

(change in existing course—eff. winter 18)

102A. Writing in the Disciplines: Special Topics (4)
Lecture/discussion—3 hours; extensive writing. Prere-
quisite: course 1 C- or better or course 4 C- or better
or course 7 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; and upper divi-
sion standing. Open to majors or to students concurrently enrolled in an
upper division course in a specific academic disci-
pline or interdisciplinary field. Advanced instruction in
writing in that discipline and practice in effective
styles of communication. May be repeated one time
for credit if taken in conjunction with a different sub-
ject-matter course. GE credit: ArtHum, Writ/AH,
WE.—F, W, S. (F, W, S.)

(change in existing course—eff. winter 18)

102B. Writing in the Disciplines: Biology (4)
Lecture/discussion—3 hours; extensive writing. Prere-
quisite: course 1 C- or better or course 4 C- or better
or course 7 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; and upper divi-
sion standing. Open to majors in a biological science or to students concur-

UC Davis Washington Center

New and changed courses in UC Davis Washington Center (WAS)

Upper Division

175. Health Policy and Health Politics (4)
Lecture—3 hours; extended writing. Prerequisite:
course 1 C- or better or course 4 C- or better or course 7
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; and upper division
standing. Open to majors in a biological science or to students concur-

Technocultural Studies 69

General Education [EQ]: AH—Arts and Humanities; SL—Science and Engineering; SS—Social Sciences, AGCH—American Cultures; DD—Domestic Diversity; SL—Oral Skills; SL—Quantitative; SL—Scientific; VL—Visual; WC—World Cultures; WE—Writing Experience

Courses & Programs are subject to change without notice.
rently enrolled in an upper division biological science course. Advanced instruction in writing in biology. Not open to students who have completed English 102B. GE credit: ArtHum, Wrt1AH, WE—F, W, S. (F, W, S) (change in existing course—eff. winter 18)

102C. Writing in the Disciplines: History (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course IV C- or better or course YC 1C- 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; and upper division standing. Open to majors in history or to students concurrently enrolled in an upper division course accepted for the history major. Advanced instruction in writing in history. GE credit: ArtHum, Wrt1AH, WE—W (W) (change in existing course—eff. winter 18)

102D. Writing in the Disciplines: International Relations (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course IV C- or better or course YC 1C- or better or English 3 C- or better or 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; and upper division standing. Open to majors in international relations or to students concurrently enrolled in an upper division course accepted for the international relations major. Advanced instruction in writing in international relations. GE credit: ArtHum, Wrt1AH, WE—W (W) (change in existing course—eff. winter 18)

102E. Writing in the Disciplines: Engineering (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course IV C- or better or course YC 1C- 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; and upper division standing. Open to upper division students in the College of Engineering and to students enrolled in an upper division engineering or computer science course for the major. Advanced instruction in writing in engineering. GE credit: ArtHum, Wrt1AH, WE—F, W, S. (F, W, S) (change in existing course—eff. winter 18)

102F. Writing in the Disciplines: Food Science and Technology (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course IV C- or better or course YC 1C- 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; and upper division standing. Open to majors in food science and technology and to students concurrently enrolled in an upper division course in food science and technology. Advanced instruction in writing in food science and technology. GE credit: ArtHum, Wrt1AH, WE—S. (S) (change in existing course—eff. winter 18)

102G. Writing in the Disciplines: Environmental Writing (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course IV C- or better or course YC 1C- 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; and upper division standing. Open to majors in environmental studies and to students concurrently enrolled in an upper division course in environmental studies. Advanced instruction in writing in and for organizations, including businesses (corporations), government agencies, and non-profit organizations. Suitable for students entering careers that require substantial communication, such as management, public relations, and grant writing. GE credit: ArtHum/AH, WE—F, W, S. (F, W, S) (change in existing course—eff. winter 18)

102H. Writing in the Disciplines: Human Development and Psychology (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course IV C- or better or course YC 1C- 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; and upper division standing. Open to majors in human development and psychology. GE credit: ArtHum, Wrt1AH, WE—S. (S) (change in existing course—eff. winter 18)

102I. Writing in the Disciplines: Ethnic Studies (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course IV C- or better or course YC 1C- 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; and upper division standing. Open to majors and minors or to students concurrently enrolled in an upper division course in Human Development and Psychology. Advanced instruction in writing and practice in effective styles of communication in Human Development and Psychology. Not open for credit to students who have completed course 102A in the same academic field. GE credit: ArtHum, Wrt1AH, WE—W (W) (change in existing course—eff. winter 18)

102J. Writing in the Disciplines: Fine Arts (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course IV C- or better or course YC 1C- 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; and upper division standing. Open to majors in art history and to students concurrently enrolled in an upper division course in art history. GE credit: ArtHum, Wrt1AH, WE—S. (S) (change in existing course—eff. winter 18)

102K. Writing in the Disciplines: Sociology (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course IV C- or better or course YC 1C- 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; and upper division standing. Open to majors and minors in sociology or to students concurrently enrolled in an upper division sociology course. Advanced instruction in writing and practice in effective styles of communication in sociology and related academic and professional fields. Not open for credit to students who have completed course 102A in the same academic field. GE credit: ArtHum, Wrt1AH, WE—S. (S) (change in existing course—eff. winter 18)

102L. Writing in the Disciplines: Film Studies (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course IV C- or better or course YC 1C- 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; and upper division standing. Open to majors and minors or to students concurrently enrolled in an upper division course in Film Studies, Technocultural Studies, English, American Studies, or any other upper division course that includes the analysis and understanding of film as a medium. Advanced instruction in writing about film and practice in effective styles of communication. Not open for credit to students who have completed course 102A in the same academic field. GE credit: ArtHum, Wrt1AH, WE—W (W) (change in existing course—eff. winter 18)

102M. Writing in the Disciplines: Community and Regional Development (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course IV C- or better or course YC 1C- 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; and upper division standing. Open to majors and minors or to students concurrently enrolled in an upper division course in Community and Regional Development. Advanced instruction in writing in the Community and Regional Development discipline and practice in effective styles of communication. GE credit: ArtHum/AH, AH, WE—S. (S) (change in existing course—eff. winter 18)

102N. Writing in the Disciplines: Anthropology (4)
Lecture—3 hours; term paper. Prerequisite: course 1C- or better or course IV C- or better or course YC 1C- 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; and upper division standing. Open to majors and minors in anthropology or to students concurrently enrolled in an upper division course in Anthropology. GE credit: AH, WE—W (W) (new course—eff. winter 18)

104A. Writing in the Professions: Business Writing (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course IV C- or better or course YC 1C- 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; and upper division standing. Effective communication in and for organizations, including businesses (corporations), government agencies, and non-profit organizations. Suitable for students entering careers that require substantial communication, such as management, public relations, and grant writing. GE credit: ArtHum/AH, WE—F, W, S. (F, W, S) (change in existing course—eff. winter 18)

104B. Writing in the Professions: Law (4)
Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course IV C- or better or course YC 1C- 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; and upper division standing. Effective communication in and for organizations, including businesses (corporations), government agencies, and non-profit organizations. Suitable for students entering careers that require substantial communication, such as management, public relations, and grant writing. GE credit: ArtHum/AH, WE—F, W, S. (F, W, S) (change in existing course—eff. winter 18)
style, with special emphasis on their application in the legal profession. Suitable for students planning careers in law or in corporate, government, or other management. GE credit: ArtHum, WtlAH, WE.—F, W, S. (F, W, S.) (change in existing course—eff. winter 18)

104C. Writing in the Professions: Journalism (4) Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course 1V 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; and upper division standing. Non-fiction for magazines and newspapers, with attention to style and language. Emphasis on research, interviewing, market analysis, and query letters. GE credit: ArtHum, WtlAH, WE.—F, W, S. (F, W, S.) (change in existing course—eff. winter 18)

104D. Writing in the Professions: Elementary and Secondary Education (4) Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course 1V 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; and upper division standing. Advanced expository writing in the contemporary American classroom. Strongly recommended for teaching credential candidates. GE credit. ArtHum, WtlAH, WE.—F, W, S. (F, W, S.) (change in existing course—eff. winter 18)

104E. Writing in the Professions: Science (4) Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course 1V 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; and upper division standing or enrollment in a graduate science curriculum. Writing abstracts, research proposals, scientific papers, other forms of scientific communication. Presenting data graphically. Primarily for students engaged in or planning careers in basic or applied research. GE credit: ArtHum, WtlAH, WE.—F, W, S. (F, W, S.) (change in existing course—eff. winter 18)

104F. Writing in the Professions: Health (4) Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course 1V 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; and upper division standing. Advanced expository writing common in the health professions, emphasizing effective communication between the writer and different audiences. Topics relate to health, disability, and disease. Suitable for students planning careers in professions such as medicine, dentistry, physical therapy, optometry. Not open for credit to students who have taken course 104FY. GE credit: ArtHum, WtlAH, WE.—F, W, S. (F, W, S.) (change in existing course—eff. winter 18)

104FY. Writing in the Professions: Health (4) Lecture/discussion—1.5 hours; web electronic discussion—1.5 hours; web electronic writing. Prerequisite: course 1C- or better or course 1V 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; and upper division standing. Not open to students who have taken course 104FY. May be repeated for credit common in the health professions, emphasizing effective communication between the writer and different audiences. Topics relate to health, disability, and disease. Suitable for students planning careers in professions such as medicine, dentistry, physical therapy, optometry. Not open for credit to students who have taken course 104FY. GE credit: ArtHum, WtlAH, WE.—F, W, S. (F, W, S.) (change in existing course—eff. winter 18)

104I. Writing in the Professions: Internships (4) Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course 1V 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; and upper division standing. Open to students concurrently enrolled in an internship and to students planning careers in professions such as medicine, dentistry, physical therapy, optometry. GE credit: ArtHum, WtlAH, WE.—F, W, S. (F, W, S.) (change in existing course—eff. winter 18)

104J. Writing in the Professions: Writing for Social Justice (4) Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course 1V 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; and upper division standing. Advanced expository writing common in the health professions, emphasizing effective communication between the writer and different audiences. Topics relate to health, disability, and disease. Suitable for students planning careers in professions such as medicine, dentistry, physical therapy, optometry. Not open for credit to students who have taken course 104JO. GE credit: ArtHum, WtlAH, WE.—F, W, S. (F, W, S.) (change in existing course—eff. winter 18)

104T. Writing in the Professions: Technical Writing (4) Lecture/discussion—3 hours; extensive writing. Prerequisite: course 1C- or better or course 1V 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; and upper division standing. Advanced expository writing common in the health professions, emphasizing effective communication between the writer and different audiences. Topics relate to health, disability, and disease. Suitable for students planning careers in professions such as medicine, dentistry, physical therapy, optometry. GE credit: ArtHum, WtlAH, WE.—F, W, S. (F, W, S.) (change in existing course—eff. winter 18)

106. English Grammar (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or course 1V or course 1Y or English 3 or Linguistics 1 or Linguistics 1Y, or consent of instructor. Survey of present-day English grammar as informed by contemporary linguistic theories. The major syntactic structures of English; their variation informed by contemporary linguistic theories. The major syntactic structures of English; their variation informed by contemporary linguistic theories. GE credit: ArtHum, WtlAH, WE.—F, W, S. (F, W, S.) (change in existing course—eff. winter 18)

107. English Literature: Plots and Genres (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or course 1V or course 1Y or English 3 or Linguistics 1 or Linguistics 1Y, or consent of instructor. Survey of present-day English grammar as informed by contemporary linguistic theories. The major syntactic structures of English; their variation informed by contemporary linguistic theories. GE credit: ArtHum, WtlAH, WE.—F, W, S. (F, W, S.) (change in existing course—eff. winter 18)

108. English Literature: Themes and Genres (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or course 1V or course 1Y or English 3 or Linguistics 1 or Linguistics 1Y, or consent of instructor. Survey of present-day English grammar as informed by contemporary linguistic theories. The major syntactic structures of English; their variation informed by contemporary linguistic theories. GE credit: ArtHum, WtlAH, WE.—F, W, S. (F, W, S.) (change in existing course—eff. winter 18)

109. English Literature: Issues and Genres (4) Lecture—3 hours; discussion—1 hour. Prerequisite: course 1 or course 1V or course 1Y or English 3 or Linguistics 1 or Linguistics 1Y, or consent of instructor. Survey of present-day English grammar as informed by contemporary linguistic theories. The major syntactic structures of English; their variation informed by contemporary linguistic theories. GE credit: ArtHum, WtlAH, WE.—F, W, S. (F, W, S.) (change in existing course—eff. winter 18)

Veterinary Medicine: Medicine and Epidemiology

New and changed courses in Veterinary Medicine: Medicine and Epidemiology (VME)

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, including zoonotic diseases and those threatening endangered species. Basic epidemiological methods and application to field data. Scientists’ role in developing disease control policies.—W. (W.) Foley (change in existing course—eff. winter 17)

Graduate

225. Viral Pathogenesis Seminar/Journal Club (1) Discussion—1 hour. Prerequisite: consent of instructor; graduate student status in the Comparative Pathology, Microbiology or Immunology graduate groups. Participatory seminar addressing the mechanisms of retroviral pathogenesis in a journal club format. Focus on the review of current scientific journal papers concerning viral pathogenesis, immunology and virology with a special focus on retroviruses. May be repeated for credit up to 12 times. (SU grading only)—F, W, S. (F, W, S.) Murphy, Sparger (change in existing course—eff. winter 17)
Veterinary Medicine: Molecular Biosciences

New and changed courses in Veterinary Medicine: Molecular Biosciences (VMB)

Upper Division

101V. Principles of Pharmacology and Toxicology (3)
Lecture—1.5 hours; lab—1.5 hours; discussion/lab—1 hour; prerequisite: consent of instructor; open to upper division students majoring in a health science major. Prerequisite: consent of instructor; open to upper division students majoring in a health science major. GE credit: SE, OL, SL—F. (F.) Pushchner

101Y. Principles of Pharmacology and Toxicology (3)
Lecture—1.5 hours; web virtual lecture—0.5 hour; prerequisite: consent of instructor; open to upper division students majoring in a health science major. GE credit: SE, OL, SL—F. (F.) Pushchner

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. GE credit: SE, OL, SL, VL, WE—F. (F.) Christopher

Veterinary Medicine: Population Health and Reproduction

New and changed courses in Veterinary Medicine: Population Health and Reproduction (PHR)

Graduate

Lecture/discussion—1 hour; prerequisite: consent of instructor; open to upper division students majoring in a health science major. GE credit: ScEng/SE—F. (F.) Waterhouse

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—1 hour; prerequisite: consent of instructor; open to upper division students majoring in a health science major. GE credit: SE, OL, SL, VL, WE—F. (F.) Pushchner

209. Research Planning and Reporting II (1)
Lecture—0.5 hours. Prerequisite: course 208; consent of instructor; open to upper division students majoring in a health science major. GE credit: SE, OL, SL, VL, WE—F. (F.) Pushchner

210. Advanced Health Leadership (1.5)
Lecture—1 hour. Prerequisite: consent of instructor; open to upper division students majoring in a health science major. GE credit: SE, OL, SL, VL, WE—F. (F.) Pushchner

212. Concepts and Methods in Infectious Disease Surveillance and Control (3)
Lecture—1 hour; prerequisite: consent of instructor; open to upper division students majoring in a health science major. GE credit: SE, OL, SL, VL, WE—F. (F.) Pushchner

Professional

410. Animal Health Policy and Risk Communication (1)
Lecture—1 hour. Prerequisite: consent of instructor; open to upper division students majoring in a health science major. GE credit: SE, OL, SL, VL, WE—F. (F.) Pushchner

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; consent of instructor; open to upper division students majoring in a health science major. GE credit: ScEng/SE—F. (F.) Waterhouse

125. Wine Types and Sensory Evaluation (2)
Lecture—1 hour. Prerequisite: consent of instructor; open to upper division students majoring in a health science major. GE credit: ScEng/SE—F. (F.) Waterhouse

127L. Post-Fermentation Wine Processing Lab (3)
Laboratory—1 hour. Prerequisite: consent of instructor; open to upper division students majoring in a health science major. GE credit: ScEng/SE—F. (F.) Waterhouse

212. Wine Microbiology (2)
Lecture—1 hour. Prerequisite: consent of instructor; open to upper division students majoring in a health science major. GE credit: ScEng/SE—F. (F.) Waterhouse

218. Wine Microbiology Laboratory (2)
Laboratory—1 hour. Prerequisite: consent of instructor; open to upper division students majoring in a health science major. GE credit: ScEng/SE—F. (F.) Waterhouse

Courses & Programs are subject to change without notice.
consideration of climate-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 and lower 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, bio-geographic 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) Edie  
(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. An introduction to the conflicts that result from human activities that impact wildlife, with emphasis on overt conflicts that involve human-wildlife interactions and wildlife regulations. GE credit: SciEng/SE — W (W) 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 plans. GE credit: SciEng/SE, WRT — 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, provocative coloration; warning coloration, mimicry, sexual dichromatism and color change. Offered in alternate years.—(W) Caro  
(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

Women’s Studies

New and changed courses in Women’s Studies (WMS)  

Upper Division  

102. Gender and Post Colonialism (4)  
Lecture/discussion—4 hours; term paper. Explores changing configurations of race, gender, sexuality, class and implications for the political and cultural positioning of women in more than one or more countries of the world. GE credit: ArtHum or SocSci, Div. WRT/AHG or SS, DD, OL, WE.  
(change in existing course—eff. winter 18)

104. Feminist Research (4)  
Lecture/discussion—4 hours. Prerequisite: required for Women’s Studies major. Introduction to feminist applications and transformations of traditional disciplinary research practices; initial training in methodologies for feminist interdisciplinary work. GE credit: ArtHum or SocSci, Div. WRT/AHG or SS, DD, OL, WE.  
(change in existing course—eff. winter 18)

130. Feminism and the Politics of Family Change (4)  
Lecture/discussion—4 hours. Political/cultural changes, conflicts, and economic disparities that have led to greater mobility and dispersal of families. Transnationalism on gender relations, sexualities, and the meaning of family. Offered in alternate years. GE credit: ArtHum or SocSci, Div. WRT/AHG or SS, OL, WC, WE — W (W) Joseph  
(change in existing course—eff. spring 18)

136. Critical Food Studies (4)  
Lecture/discussion—4 hours. Production and consumption of food at the intersections of gender, race, ethnicity, nation, and body. Individual and familial experiences as part of larger economic and political structures in the U.S. and globally. Offered in alternate years. GE credit: ArtHum or SocSci, Div. WRT/AHG, AH or SS, DD, OL, WE — Nettel-Barcelón  
(change in existing course—eff. spring 18)

137. Contemporary Debates in Western Feminist Theory (4)  
Lecture/discussion—4 hours. Prerequisite: course 60, or consent of instructor. Interpretations of poststructuralist, postmodern, and postcolonial thought from a critical feminist perspective; includes methods of applying theory to concrete social/cultural problems of gender, race, sexuality, class. Offered irregularly. GE credit: ArtHum or SocSci, Div. WRT/AHG, AH or SS, DD, WE.  
(change in existing course—eff. spring 18)

146. Gender, War and Peace (4)  
Lecture/discussion—4 hours. Prerequisite: consent of instructor. Applies a critical gender perspective to conflicts in terms of military intervention, war, conflict, peacebuilding and security post-conflict. Addresses the changing configurations of gender and sexuality in military institutions and militarized economies and cultures from an interdisciplinary perspective. Offered irregularly. GE credit: ArtHum or SocSci, Div. WRT/AHG, AH or SS, OL, WE.  
(change in existing course—eff. winter 18)

158. Masculinities (4)  
Lecture/discussion—3 hours; term paper. Cultural, economic, and political forces which shape historical and contemporary masculinities. Impact of race, class, ability, nation and sexuality on experiences and cultural representations of masculinity. Offered in alternate years. GE credit: ArtHum or SocSci, Div. WRT/AHG, AH or SS, DD, WE.  
(change in existing course—eff. spring 18)
Women’s Studies

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, SocSci, Div/AH, SS, ACGH, DD, VL.—Wyman.
(change in existing course—eff. winter 17)

174. Body Politics (4)
Lecture/discussion—4 hours. The body as a site where status inequalities are formed and resisted. Self-making through bodywork, history of gendered and racial meanings of the body, and analysis of normalizing discourses and practices. Offered in alternate years. GE credit: ArtHum or SocSci, Writ/AH or SS, DD, WC, WE.—F, W, S. (F, W, S.) Craig
(new course—eff. winter 18)

187. Gender and Social Policy (4)
Lecture/discussion—3 hours; term paper—3 hours. Role of gender in the creation of social policies, especially with respect to issues brought into the policy arena by contemporary feminism. Offered in alternate years. GE credit: ArtHum or SocSci, Div, Writ/ACGH, DD, SS, WE.
(change in existing course—eff. winter 18)
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 76.

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 campus of the university
- Present evidence that the requirement has been satisfied through courses in the area of American History and Institutions at another collegiate institution whose credits are acceptable for transfer to UC Davis.
- Successful completion of the Advanced Placement (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 350 or higher

International students, regardless of the type of visa they hold, must meet the university's American History and Institutions requirement for graduation.

General Education Requirement

Changes to General Education; Domestic Diversity under Civic and Cultural Literacy (change—eff. fall 17)

2. Civic and Cultural Literacy at least 9 units

The objective of this core literacy is to prepare students for thoughtful, active participation in civic society. Students will learn to think analytically about American institutions and social relations, understand the diversity of American cultures, and see the relationships between national and local cultures and the world.

a. American Cultures, Governance, and History at least 3 units

Courses in American Cultures, Governance, and History provide students with an understanding and appreciation of the social and cultural diversity of the United States and of the relationships between these diverse cultures and larger patterns of national history and institutions.

b. Domestic Diversity at least 3 units

Courses in Domestic Diversity provide students with an understanding of issues such as race, ethnicity, social class, gender, sexuality, and religion within the United States, and develop the students' ability to think critically about diverse sociocultural perspectives.

c. World Cultures at least 3 units

Courses in World Cultures provide students with a global perspective in a world where communication technologies, economic relationships, and the flow of people across national borders increasingly challenge national identities and create transnational cultures. Students can satisfy this requirement through coursework or through certified study abroad.
### College Board Advanced Placement (AP) Examination Credit

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<th>Examination 1</th>
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<th>UC Davis Course Equivalences</th>
<th>Duplicate Credit Allowance 4</th>
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<tr>
<td>French Language</td>
<td>3</td>
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<td>Japanese Language and Culture</td>
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<td>UC-M</td>
<td>2A</td>
<td>Mathematics 12, 16A, 17A or 21A</td>
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<td>Economics 1A</td>
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<td>Music Theory</td>
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<td>Physics 1</td>
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<td>5A and SC</td>
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<td>8 *</td>
<td>UC-S</td>
<td>5A and SC</td>
<td>–</td>
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<tr>
<td>Physics 2</td>
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<td>5A and SC</td>
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<td>Physics 2</td>
<td>3</td>
<td>8 *</td>
<td>UC-S</td>
<td>5A and SC</td>
<td>–</td>
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<tr>
<td>Physics B</td>
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<td>UC-S</td>
<td>5A and SC</td>
<td>Physics 1A, 1B</td>
<td>No</td>
</tr>
<tr>
<td>Physics B</td>
<td>3</td>
<td>8 *</td>
<td>UC-S</td>
<td>5A and SC</td>
<td>–</td>
<td>–</td>
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<tr>
<td>Physics C1 — Mechanics</td>
<td>5, 4</td>
<td>4 *</td>
<td>UC-S</td>
<td>5A and SC</td>
<td>Physics 1A</td>
<td>No</td>
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<tr>
<td>Physics C1 — Mechanics</td>
<td>3</td>
<td>4 *</td>
<td>UC-S</td>
<td>5A and SC</td>
<td>–</td>
<td>–</td>
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<tr>
<td>Physics C1 — Electricity/Magnetism</td>
<td>5, 4</td>
<td>4 *</td>
<td>UC-S</td>
<td>5A and SC</td>
<td>–</td>
<td>–</td>
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<tr>
<td>Physiology</td>
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<td>Psychology</td>
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<td>UC-B</td>
<td>4</td>
<td>–</td>
<td>–</td>
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<tr>
<td>Spanish Language</td>
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<td>8 *</td>
<td>UC-H</td>
<td>3B and 6A</td>
<td>Spanish 23</td>
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<tr>
<td>Spanish Language</td>
<td>4</td>
<td>8 *</td>
<td>UC-H</td>
<td>3B and 6A</td>
<td>Spanish 22</td>
<td>No</td>
</tr>
<tr>
<td>Spanish Language and Culture</td>
<td>3</td>
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<td>UC-H</td>
<td>3B and 6A</td>
<td>Spanish 21</td>
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<td>Spanish Language and Culture</td>
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<td>8 *</td>
<td>UC-H</td>
<td>3B and 6A</td>
<td>Spanish 23</td>
<td>No</td>
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<tr>
<td>Spanish Language and Culture</td>
<td>4</td>
<td>8 *</td>
<td>UC-H</td>
<td>3B and 6A</td>
<td>Spanish 22</td>
<td>No</td>
</tr>
</tbody>
</table>

Comments:
- * 8 transferable unit maximum for all mathematics-calculus exams.
- 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.
- **Physics 1B replaced by Physics 1A and 2A in 2014-15.**
- **Physics 1B replaced by Physics 1A and 2A in 2018-19.**
- **Physics C1—Mechanics replaced by Physics 1 and 2 in 2014-15.**
- **Physics C1—Mechanics replaced by Physics 1 and 2 in 2018-19.**
- **Spanish Language and Culture replaced by Spanish 23 and 24 in 2014-15.**
- **Spanish Language and Culture replaced by Spanish 23 and 24 in 2018-19.**
- **8 transferable unit maximum for all physics exams.**
### College Board Advanced Placement (AP) Examination Credit

<table>
<thead>
<tr>
<th>Examination 1</th>
<th>Score</th>
<th>UC Transfer Admission Eligibility Area 2</th>
<th>UC Davis Course Equivalencies</th>
<th>Duplicate Credit Allowance 4</th>
<th>Continuing UC Davis Course</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Spanish Language and Culture</td>
<td>3</td>
<td>UCH 3B and 6A</td>
<td>Spanish 21</td>
<td>No</td>
<td>Spanish 22 or calculus with adviser</td>
<td>–</td>
</tr>
<tr>
<td>Spanish Literature</td>
<td>5, 4</td>
<td>UCH 3B and 6A</td>
<td>Spanish 24</td>
<td>No</td>
<td>Spanish 100 or calculus with adviser</td>
<td>–</td>
</tr>
<tr>
<td>Spanish Literature</td>
<td>3</td>
<td>UCH 3B and 6A</td>
<td>Spanish 23</td>
<td>No</td>
<td>Spanish 24 or calculus with adviser</td>
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<tr>
<td>Spanish Literature and Culture</td>
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<td>UCH 3B and 6A</td>
<td>Spanish 23</td>
<td>No</td>
<td>Spanish 100 or calculus with adviser</td>
<td>–</td>
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<tr>
<td>Statistics</td>
<td>5, 4</td>
<td>UCM 2A</td>
<td>Statistics 1 3</td>
<td>Yes</td>
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<tr>
<td>Studio Art (Drawing Portfolio)</td>
<td>5, 4</td>
<td>–</td>
<td>–</td>
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<tr>
<td>Studio Art (Drawing Portfolio)</td>
<td>3</td>
<td>–</td>
<td>–</td>
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<tr>
<td>United States Government and Politics</td>
<td>5, 3</td>
<td>UCB 4</td>
<td>–</td>
<td>–</td>
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<tr>
<td>United States History</td>
<td>5, 4, 3</td>
<td>UCB/H 3B or 4</td>
<td>History 17A, 17B</td>
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<td>World History</td>
<td>5, 4, 3</td>
<td>UCB/H 3B or 4</td>
<td>–</td>
<td>–</td>
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</tbody>
</table>

#### Note
This is not a comprehensive list. If your exam is not listed, credit will be determined in consultation with an adviser.

**Examination**
- Students who take the Calculus BC exam and earn a subscore of 3 or higher on the Calculus AB portion 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 IGETC Area 2A.

**UC Transfer Admission Eligibility Area**
- UC: If English AP test score of 3, 4, 5 was achieved prior to completing any transferable English composition coursework, 8 units of transfer credit are awarded for the AP exam, and one of two English Composition requirements (UCEC) satisfied. UC Davis articulates AP English Language and Composition, and English Literature and Composition, with scores of 4 or 5 as UWP 1 and English 3. Therefore we will not allow transfer credit for any duplicated English courses.
- For details regarding IGETC certification, see your California community college adviser and Help Topics: IGETC at www.assist.org. Students with partial IGETC certification should contact their dean’s office.

**IGETC Area**
- Each AP exam may be applied to one IGETC 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.
- For details regarding IGETC certification, see your California community college adviser and Help Topics: IGETC at www.assist.org. Students with partial IGETC certification should contact their dean’s office.

**Duplicate Credit Allowance for Coursework/Exams**
- AP Exams completed prior to May 2015 with scores of 3, 4, and 5 should receive course credit for Political Science 1 and be exempt from the American History and Institutions requirement. Effective with the May 2015 AP exam, course credit for Political Science 1 will no longer be awarded and the university American History and Institutions requirement will no longer be satisfied.

**UC Davis College Area Requirements**
- Partially satisfies area (breadth) requirements for the A.B. degree.
- 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 B exams.
- Satisfies 4 lower-division units of the English Composition requirement.
- Satisfies first course toward English Composition requirement.
- Satisfies first course toward English Composition requirement.
- Satisfies first course toward English Composition requirement.
- Satisfies first course toward English Composition requirement.
- Satisfies first course toward English Composition requirement.
- 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.
Graduation Honors

Update Grade Point Average by College table
(change—eff. fall 17)

<table>
<thead>
<tr>
<th>Percent</th>
<th>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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<tr>
<td>2%</td>
<td>3.918</td>
<td>3.970</td>
<td>3.951</td>
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<tr>
<td>3%</td>
<td>3.878</td>
<td>3.950</td>
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<td>4%</td>
<td>3.843</td>
<td>3.922</td>
<td>3.890</td>
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<tr>
<td>6%</td>
<td>3.790</td>
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<td>8%</td>
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<td>12%</td>
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<td>3.763</td>
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<td>16%</td>
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<td>3.689</td>
<td>3.600</td>
<td>3.624</td>
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</table>

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 2.000 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 2.000 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.

Nonmajors in the College of Letters and Science, African Studies, African diaspora studies, or African studies.

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.

**Anthropology**

Changes to Anthropology A.B. & B.S. Major, & Anthropology Minor Requirements

(change—eff. fall 17)

**A.B. Major Requirements:**

- **UNITS**
- **Evolutionary Emphasis:**
- **Preparatory Subject Matter**
  - Anthropology 1, 2, 3: 12
  - Choose one: Anthropology 105, 109-139BN: 4-5
- **Depth Subject Matter**
  - Select 20 additional units from any upper division evolutionary track Anthropology courses (see list below) chosen in consultation with an evolutionary track undergraduate advisor. Up to 4 units of Anthropology 1901, 192, 194H, 198, or 199 can be used towards this requirement. 20
- **Total Units for the Major**

Note: Evolutionary track courses at the upper division level are those with numbers from 100 to 149B, with the exception of 101, 103, 105, 128A, and 141B. Area-focus sociocultural track courses are those that refer in their titles to one or more peoples or regions of the world.

**B.S. Major Requirements:**

- **UNITS**
- **Preparatory Subject Matter**
  - Anthropology 1, 2, 3: 12
  - Biological Sciences 2A, 2B, 2C: 14
  - Chemistry 2A, 2B, and 8A, 8B, or 118A, 118B: 16-18
  - Mathematics 16A-16B-16C or 17A-17B-17C or 21A-21B-21C: 9-12
- **Depth Subject Matter**
  - Choose one: Anthropology 151, 152: 4-5
  - Choose one: Anthropology 153, 157, 159: 3-5
  - Choose one: Anthropology 154, 155, 156A, 156B, 157, 157B, 158, 159, 180, 182, 183, 184 or 185
- **Total Units for the Major**

Note: Sociocultural track courses at the upper division level are those with numbers from 100 to 149B, with the exception of 101, 103, 105, 128A, and 141B. Area-focus sociocultural track courses are those that refer in their titles to one or more peoples or regions of the world.

**Minor Program Requirements:**

- **UNITS**
- **Anthropology**
  - Choose one: Anthropology 103, 105, 122A, 128A, 151, 152, 153, 154A, 155, 156A, 156B, 157, 158, 159
  - Choose one: Anthropology 170, 172, 173, 174, 176, 177, 179, 180, 182, 183, 184, 185
- **Archaeology emphasis**
  - Archaeology 100 through 139BN, excluding 101, 103, and 128A
  - Choose two: Anthropology 156A, 156B, 180, 181, 182, 183, 184, or 185
- **Evolutionary emphasis**
  - Any five upper division Evolutionary Anthropology courses chosen in consultation with an evolutionary track advisor.

**Sociocultural emphasis**

- Anthropology 100: 4
- One upper division area-focus sociocultural track course; area-focus sociocultural track courses are those that refer in their titles to one or more peoples or regions of the world.
- Choose two: Anthropology 109-139BN, excluding 128A
- One additional upper division Anthropology course chosen in consultation with sociocultural track undergraduate advisor: 3-5

**Minor Advisor.** Consult Department office in 1282 Social Sciences & Humanities.

**Biological Sciences**

Changes to B.S. Major Requirements

(change—eff. fall 15)

**B.S. Major Requirements:**

- **UNITS**
- **Preparatory Subject Matter**
  - Biological Sciences 2A-2B-2C: 15
  - Chemistry 2A-2B-2C: 15
  - Chemistry 8A-8B or 118A-118B-118C: 6-12
  - Mathematics 17A-17B-17C or 21A-21B-21C: (21C recommended): 8-12
  - Physics 7A-7B-7C: 12
- **Depth Subject Matter**
  - Choose one: Biological Sciences 101: 4
  - Choose one: Biological Sciences 105 or 102 + 103: 3-6
  - Choose one: Biological Sciences 104: 3
  - Statistics 100: 4
  - Evolution and Ecology 100: 4
  - Select one course from each topic:

---

**General Education (dg):** AH: Arts and Humanities; SS: Science and Engineering; LS: Social Sciences; ACGH: American Cultures; DD: Domestic Diversity; OL: Oral Skills; QL: Quantitative; SL: Scientific; VL: Visual; WC: World Cultures; WE: Writing Experience

Courses & Programs are subject to change without notice.
Cinema and Digital Media

Change from Program to Department
(change—eff. fall 17)

Michael Neff, Ph.D., Department Chair
Department Office, 101 Art Building
530-752-0890; http://cdcs.ucdavis.edu

Classics

New Arabic Minor
(change—eff. fall 17)

The Department offers minors in Arabic, Classical Civilization, Greek and Latin for those wishing to follow a shorter but formally recognized program of study in Classics.

Arabic

Choose one upper division course in Arabic language or literature ........................................ 4
Choose one upper division course in Arabic language or literature, or one humanities or social science course ........................................ 4
Middle East/South Asia 111A, 121A/ARB 140, 122A, 150; Women’s Studies 185, 181C, 182C; Anthropology 142; Arabic 11A, 2, 3, 21, 22, 23, 121, 122, 123, 198; Art History 155; Comparative Literature 53C, 155, 166; History 6, 102R, 112, 115F, 190A, 190B, 190C, 193A, 193B; Political Science 135, 136; Religious Studies 60, 65C, 160, 161, 162, 163, 167; Women’s Studies 178A, 184

Community and Regional Development

Changes to B.S. Major Requirements
(change—eff. fall 16)

B.S. Major Requirements:

Preparatory Subject Matter ........................................ 22-26
Community and Regional Development 1, 2, 8

Choose five: ......................................................... 20

Total Units for the Major ........................................ 69-70
Grading recommendation. Although not required, it is recommended that all courses offered in satisfaction of the major, except variable-unit courses, be taken for a letter grade.

Major Advisor. Faculty, contact department.
Advising Office. 466 Kerr Hall

Minor Program Requirements:

Units

Communication .................................................. 24

Choose one: ......................................................... 4
Communication 1, 3

At least five upper division courses in communication .................................................. 20

Graduate Study. The Department of Communication offers programs of study and research leading to M.A. and Ph.D. degrees in Communication.
Detailed information may be obtained from the Graduate Advisor, Department of Communication.

Graduate Advisor. B. Feng

Community and Regional Development

Changes to A.B. Major Requirements
(change—eff. fall 14)

A.B. Major Requirements:

Preparatory Subject Matter ........................................ 29-30
Anthropology 4 or Linguistics 1 ................................. 4
Communication 10Y ............................................. 4
Choose one: ......................................................... 4
Communication 1, 3, or 5/Linguistics 5
Comparative 15 or Philosophy 12 ............................. 4
Psychology 1 ...................................................... 4
Sociology 1 ....................................................... 5
Statistics 13 or Sociology 46B .................................... 4-5

Depth Subject Matter ........................................... 40-43

Core Issues in Community Development: Three courses from: Community and Regional Development 142, 152, 153A or 153B or 153C, 164, 172, 176, or 180 ........................................ 12-13
Economics of Community Change: Two courses from: Community and Regional Development 118, 140, 141, 162, or International Agricultural Development 103 ........................................ 8

Policy Processes and Community Change: Two courses from: Community and Regional Development 147, 149, 154, 157, 158, or 171 ........................................ 8


*Note on substitutions: supplementary list of pre-approved substitutions available in Advising Office.
Internship. Community and Regional Development 192

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-unit course work may be counted toward this requirement; e.g., Community and Regional Development 192.

Global Communities Option .................................. 40

Students must consult with a faculty advisor to identify an emphasis within the option and to select suitable courses.


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.
Up to 12 credits for foreign language.

Organization and Management Option .................................. 40

Students must consult with a faculty advisor to identify an emphasis within the option and to select suitable courses.


Communication: Communication 134, 136, 140, 152, Community and Regional Development 147, 176, Education 120

Human Resources: 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.


Community Health and Counseling: Communication 120, 122, 165, Community and Regional Development 164, Education 160A.
160B, Public Health Sciences 101, Human Development 120, 130, Psychology 123, 126, 151, 154, 162, 168, Sociology 154
Education and Community: Agricultural Education 100, 160, Communication 101, 146, Education 100, 110, 120, 151, 152, 153, Psychology 100, 132, Sociology 124
Environmental Policy and Regional Planning: Community and Regional Development 140, 141, 149, 152, 158, 171, Economics 115A, Environmental Science and Management 121, Environmental Science and Policy 110, 160, 161, 164, 166N, 185A, 185B, 171, 172, 173, 179, Political Science 102, 107, 175, Sociology 102, 118, 131, 143A, 143B, 170
Family and Community: American Studies 152, Community and Regional Development 147, Human Development 100A, 100B, 100C, 101, 102, 103, 110, 130, 140, 141, 143, 160, 161, 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, 102C, 102D, 102E, 102F, 102G, 102H, 102J, 102K, 102L, 104A, 104B, 104C, 104D, 104E, 104F, 104G, 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, mfkenney@ucdavis.edu

## Computer Science

### Changes to Major Preparatory Requirements & Minor Program Requirements

*change—eff. fall 17*

### 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 Computational Biology, in the College of Engineering. For information on the Computer Science and Engineering curriculum and the minor in Computational Biology, see Engineering: Computer Science, on page 275.

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 its hardware components. The CS major teaches some hardware, at the digital-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 postgraduate 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 3.00. All five courses must be completed with a grade of C- or better:

- Mathematics 21A, 21B
- Engineering: Computer Science 20, 30, 40

#### B.S. Major Requirements:

### Preparatory Subject Matter

#### Mathematics

- 21A-21B-21C; 22A or 67

#### Computer Science Engineering

- 20, 30, 40

#### Engineering

- Electrical and Computer Engineering 70

#### Choose one:

- (a) Chemistry 2A-2B-2C
- (b) Chemistry 2A-2B and Biological Sciences 2A
- (c) Mathematics 2A-2B-2CH
- (d) Physics 9A-9B-9C and Mathematics 21D

### Depth Subject Matter

- Computer Science Engineering 122A, 120 or 122B, 140A, 150, 154A

#### Computer Science Engineering 132 or Mathematics 135A or Statistics 135A

#### Computer Science electives

- Choose a minimum of seven courses, including at least one mathematics or statistics course from:

  - Computer Science Engineering 120-189, inclusive; Computer Science and Engineering 193AB (counts as one; one approved 3–5 units course from Computer Science and Engineering 192 or 199; Economics 122; Electrical and Computer Engineering 100, 171, 172, 180A, 180B; Linguistics 127, 127F, Mathematics courses numbered between 100 and 189, excluding Mathematics 111; Statistics 131A, 131B, Psychology 120. No course can count as both a required course and a Computer Science elective.

### Total Units for the Major


### Minor Program Requirements:

#### Computer Science

- 23-26

- Computer Science Engineering 60

- Choose any three upper-division Computer Science Engineering courses; a single approved course of three or four units from Computer Science and Engineering 192 or 199 is allowed.

- Choose any two Upper Division courses including any Upper Division Computer Science Engineering courses or any upper division course in Math (excluding Math 111), Electrical and Computer Engineering 100, 171, 192, 180A, 180B; Economics 122; Statistics 131A, 131B; Psychology 120, or Linguistics 77, 127

- Note: Computer Science and Engineering 60 has a prerequisite chain of 30, 40, and Mathematics 16A, 17A, or 21A.

### Graduation Study

- See: Graduate Studies, on page 121.

### Design

#### Changes to Design A.B. Major Program

*change—eff. fall 17*

### A.B. Major Requirements:

#### Preparatory Subject Matter

- 32

#### Design

- 1

#### Design 14 or 21

- 4

#### Design 15

- 4

#### Design 16

- 4

#### Choose one:

- 4

#### University Writing Program 11, 12 (preferred) or 19

#### Choose two:

- 8

#### Design 40A, 40B, 40C

#### Choose two:

- 8

#### Design 40A*, 40B*, 40C*, 50, 51, 70, 77, 12 Art

* 40A, 40B, 40C can only be used for this requirement if not counted above.

### Depth Subject Matter

- 40

#### Choose three, at least two must be Design courses from list A:

- 12

#### List A:

- Art History 168, 184, 187, 188A, 188B, 189

#### Design 127A, 138, 142A, 142B, 143, 144, 145, 149, Dramatic Art 140, 150, 155

#### Technocultural Studies 150, 152, 153, 155, 159

#### Choose five from lists B and C; one may be a non-Design course:

- 20

#### List B:


#### One from the following approved list may count:


#### Technocultural Studies 100, 104, 130, 131, Textiles and Clothing 163, 163L, Landscape Architecture 141

#### List C:

- Capstone Course Option; these courses are the most advanced in the major and prerequisites are strictly enforced:

- Design 154, 157, 159, 179, 180B, 187

#### Choose two from list A, B, or C that have not been previously counted

#### Note: Substitutions for the listed courses may be allowed under certain circumstances with prior departmental approval.

### Earth and Planetary Sciences

#### Changes to Natural Sciences Major Program

*change—eff. fall 17*

### Natural Sciences Major Program

Admission consideration to the Natural Sciences major is closed to freshman and transfer applicants as the major has been discontinued effective fall 2018. The Natural Sciences major is also closed to on-campus transfers beginning 2017-2018. Students interested in exploring a career in math or science education are encouraged to consider General Education (GE): AH=Arts and Humanities; SE=Science and Engineering; SS=Social Sciences; AC=American Cultures; DD=Domestic Diversity; OL=Oral Skills; SL=Scientific; VL=Visual; WC=World Cultures; WE=Writing Experience

Courses & Programs are subject to change without notice.
coursework in the CalTech/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.

### Ecological Management and Restoration

#### Changes to B.S. Major Requirements

**B.S. Major Requirements:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Choose one:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Biology 150</td>
<td>Horticulture</td>
<td>3-4</td>
</tr>
<tr>
<td>Plant Science 120</td>
<td>Soil Science</td>
<td>4</td>
</tr>
<tr>
<td>Plant Science 100</td>
<td>Plant Science 101</td>
<td>5</td>
</tr>
<tr>
<td>Plant Science 152 or Environmental Science and Policy 1</td>
<td>Additional courses</td>
<td>4-5</td>
</tr>
<tr>
<td>Plant Biology 117, Plant Science 131, 144, 147 Wildlife, Fish, and Conservation Biology 156, 157</td>
<td>Choose one:</td>
<td></td>
</tr>
<tr>
<td>Evolution and Ecology 100, Plant Biology 108, Plant Science 102, 116</td>
<td>Choose four restoration/conservation courses:</td>
<td></td>
</tr>
<tr>
<td>Plant Science 130, 135, 150, Environmental Science and Management 141, Environmental Science and Policy 127, 155L, Wildlife, Fish, and Conservation Biology 154, 155L</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Plant Science 130, 135, 150, Environmental Science and Management 141, Environmental Science and Policy 127, 155L, Wildlife, Fish, and Conservation Biology 154, 155L</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Plant Biology 117, Environmental Horticulture 120</td>
<td>Choose one:</td>
<td></td>
</tr>
<tr>
<td>Plant Science 100C, Landscape Architecture 180F, Plant Sciences 163</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Plant Biology 111, Plant Sciences 100A</td>
<td>Choose one:</td>
<td></td>
</tr>
<tr>
<td>Plant Biology 111, Plant Sciences 100A</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Environmental Science and Management 100, Hydrology 143, 147</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Plant Science 117, Environmental Horticulture 120</td>
<td>Total Units for the Major: 103-127</td>
<td></td>
</tr>
<tr>
<td>Plant Science 100C, Landscape Architecture 180F, Plant Sciences 163</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Environmental Science and Management 100, Hydrology 143, 147</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Plant Science 117, Environmental Horticulture 120</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Plant Science 100C, Landscape Architecture 180F, Plant Sciences 163</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Environmental Science and Management 100, Hydrology 143, 147</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Plant Science 117, Environmental Horticulture 120</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Introduction</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Plant Science 192 or 164</td>
<td>must be selected in consultation with master advisor</td>
<td>4-5</td>
</tr>
<tr>
<td>Environmental Science and Management 100, Hydrology 143, 147</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Plant Science 117, Environmental Horticulture 120</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Plant Science 100C, Landscape Architecture 180F, Plant Sciences 163</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Environmental Science and Management 100, Hydrology 143, 147</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Plant Science 117, Environmental Horticulture 120</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Introduction</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Plant Science 192 or 164</td>
<td>must be selected in consultation with master advisor</td>
<td>4-5</td>
</tr>
<tr>
<td>Environmental Science and Management 100, Hydrology 143, 147</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>Plant Science 117, Environmental Horticulture 120</td>
<td>3-4</td>
<td></td>
</tr>
</tbody>
</table>

#### Economics

**Changes to Major Requirements & Minor Program Requirements**

**A.B. Major Requirements:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economics 1A-1B</td>
<td>3-4</td>
</tr>
<tr>
<td>Mathematics 13, 32, 102</td>
<td>Statistics 16A-16B or 21A-21B</td>
</tr>
<tr>
<td>Economics 100A, 100B, 101</td>
<td>12</td>
</tr>
<tr>
<td>Economics 104</td>
<td>4</td>
</tr>
<tr>
<td>Choose one specialization below:</td>
<td></td>
</tr>
<tr>
<td>Specialization: General</td>
<td>Choose one:</td>
</tr>
<tr>
<td>Economics 110A, 110B, 111A, 111B</td>
<td>Choose 12 units from:</td>
</tr>
<tr>
<td>Economics 103, 106, 121A, 121B, 122, 125, 130, 131, 132, 134 (or Agricultural and Resource Economics 171A)</td>
<td>3-4</td>
</tr>
<tr>
<td>Economics 135, 136, 137, 140 (or Agricultural and Resource Economics 106)</td>
<td>4</td>
</tr>
<tr>
<td>Economics 171, Agricultural and Resource Economics 139, 156, 175, 176</td>
<td>Additional upper division Economics courses</td>
</tr>
<tr>
<td>Specialization: Behavior and Strategy</td>
<td>Choose one:</td>
</tr>
<tr>
<td>Economics 121A or 122</td>
<td>4</td>
</tr>
<tr>
<td>Economics 110A, 110B, 111A, 111B</td>
<td>4</td>
</tr>
<tr>
<td>Economics 103, 106, 121A, 121B, 122</td>
<td>3-4</td>
</tr>
<tr>
<td>Economics 103, 106, 121A, 121B, 122, 125, 130, 131, 132, 134 (or Agricultural and Resource Economics 171A)</td>
<td>3-4</td>
</tr>
<tr>
<td>Economics 135, 136, 137, 140 (or Agricultural and Resource Economics 106)</td>
<td>4</td>
</tr>
<tr>
<td>Specialization: Data Analytics and Economics Analysis</td>
<td>Choose one:</td>
</tr>
<tr>
<td>Economics 110A, 101B</td>
<td>12</td>
</tr>
<tr>
<td>Economics 125, 130, 151B</td>
<td>6</td>
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<tr>
<td>Economics 103, 106, 112A, 121A, 121B</td>
<td>12</td>
</tr>
<tr>
<td>Economics 103, 106, 121A, 121B, 122, 125, 130, 131, 132, 134 (or Agricultural and Resource Economics 171A)</td>
<td>12</td>
</tr>
<tr>
<td>Economics 135, 136, 137, 140 (or Agricultural and Resource Economics 106)</td>
<td>12</td>
</tr>
</tbody>
</table>

**Economics**

**Minor Program Requirements:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Choose four:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economics 100A, 101B</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Economics 103, 106, 112A, 121A, 121B</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Economics 103, 106, 121A, 121B, 122, 125, 130, 131, 132, 134 (or Agricultural and Resource Economics 171A)</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Economics 135, 136, 137, 140 (or Agricultural and Resource Economics 106)</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

**General Education (GE):**

- AN: Arts and Humanities
- SC: Science and Engineering
- SS: Social Sciences
- AC: American Cultures
- DD: Diversity and Difference
- QL: Quantitative
- VL: Visual Literacy
- WC: World Cultures
- WE: Writing Experience

**Courses & Programs are subject to change without notice.**
Energy (A Graduate Group)

Alissa Kendall, Ph.D., Chairperson of the Group
Annemarie Schaaf, Graduate Program Coordinator

Group Office. West Village, 1605 Tilia, Suite 100, Davis, CA 95616; 530-752-0247; https://eec.ucdavis.edu/energy-graduate-group/

Faculty. http://eec.ucdavis.edu/energy-graduate-group/egg-faculty/

Graduate Study. The Energy Graduate Group offers the M.S. (Plan 1—Thesis, and Plan II—Examinations) and Ph.D. degrees in two tracks of study: Energy Science & Technology, and Energy Policy & Management. The program is designed to meet the world’s growing needs for highly qualified, thoughtful and dedicated leaders in sustainable energy systems. Both tracks are aimed at a wide range of students, though Energy Science and technology students are expected to come from disciplinary backgrounds in engineering or the physical sciences, while Energy Management and Policy students are expected to come from a wider range of disciplines interested in economic, policy, business and social aspects of energy systems.

Graduate Advisors. Adam Moule (Energy Science & Technology), Katrina Jessoe (Energy Policy & Management), Julia Fan (Admissions)

English

Changes to A.B. Major Requirements

A.B. Major Requirements:

Preparatory Subject Matter ....................................................... 20
- English 3 or University Writing Program 1.......................... 4
- English 10A, 10B, 10C ..................................................... 12
- Choose one: English 40, 43, 44, 45

Depth Subject Matter ........................................................... 44
- English 110A or 110B ....................................................... 4
- Historical Distribution Requirements ............................. 20
- Three courses focusing on literature written in English before 1800, at least one of which must be on literature written primarily before 1500:
  - Before 1500:
    - English 111, 113A, 113B
    - 1500-1800:
      - English 115, 117, 122, 123, 142, 150A, 151A, 151B
      - One course focusing on literature written in English between 1800 and 1900:
        - English 530, 133, 143, 144, 155B, 158A, 181A, 181B, 182B
      - One course focusing on literature written in English between 1900 and present:
        - English 87N, 136, 146N, 147, 150B, 155C, 156, 158B, 166, 167, 168, 181B, 185C
      - Non-Historical Distribution Requirements ........................... 8
        - One course on literature and ethnicity, literature and gender, or literature and sexuality:
        - English 125, 139, 140, 141, 166, 167, 178, 179, 181A, 181B, 185A, 185B, 185C, 186
        - One course in film and media studies, language studies, cultural studies and contexts, literature and science/technology, or literature and the environment:
        - English 105, 106, 107, 120, 160, 161A, 161B, 162, 164/Science and Technology Studies

Engineering

Changes to Engineering Majors

The Major Programs

Twelve majors, leading to the B.S. degree, are open to students.
- Aerospace Science & Engineering
- Biochemical Engineering
- Biomedical Engineering
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Computer Science and Engineering
- Electrical Engineering
- Environmental Engineering
- Materials Science and Engineering
- Mechanical Engineering

Engineering: Chemical Engineering

Changes to Chemical Engineering Undergraduate Program

English

Changes to A.B. Major Requirements

A.B. Major Requirements:

Preparatory Subject Matter ....................................................... 20
- English 3 or University Writing Program 1.......................... 4
- English 10A, 10B, 10C ..................................................... 12
- Choose one: English 40, 43, 44, 45

Depth Subject Matter ........................................................... 44
- English 110A or 110B ....................................................... 4
- Historical Distribution Requirements ............................. 20
- Three courses focusing on literature written in English before 1800, at least one of which must be on literature written primarily before 1500:
  - Before 1500:
    - English 111, 113A, 113B
    - 1500-1800:
      - English 115, 117, 122, 123, 142, 150A, 151A, 151B
      - One course focusing on literature written in English between 1800 and 1900:
        - English 530, 133, 143, 144, 155B, 158A, 181A, 181B, 182B
      - One course focusing on literature written in English between 1900 and present:
        - English 87N, 136, 146N, 147, 150B, 155C, 156, 158B, 166, 167, 168, 181B, 185C
      - Non-Historical Distribution Requirements ........................... 8
        - One course on literature and ethnicity, literature and gender, or literature and sexuality:
        - English 125, 139, 140, 141, 166, 167, 178, 179, 181A, 181B, 185A, 185B, 185C, 186
        - One course in film and media studies, language studies, cultural studies and contexts, literature and science/technology, or literature and the environment:
        - English 105, 106, 107, 120, 160, 161A, 161B, 162, 164/Science and Technology Studies

Engineering

Changes to Engineering Majors

The Major Programs

Twelve majors, leading to the B.S. degree, are open to students.
- Aerospace Science & Engineering
- Biochemical Engineering
- Biomedical Engineering
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Computer Science and Engineering
- Electrical Engineering
- Environmental Engineering
- Materials Science and Engineering
- Mechanical Engineering

Energy (A Graduate Group)

Chemistry 110A, 110B, 128A, 128B, 129A .................................. 16
Chemical Engineering and Materials Science Electives ............................. 8
Choose any upper division courses in the areas of Chemistry (CHE), Chemical Engineering (CHE) or Materials Science and Engineering (EMS). You may receive elective credit up to a maximum of four units for any combination of engineering courses numbered 190C, 192, 198, and 199. Courses may also be selected from the following: Biological Sciences 102; Food Science and Technology 100A, 102A, 102B; Fiber and Polymer Science 150.

Upper Division Composition Requirement .............................................. 0 or 4
Choose one; a 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

Lower Division Required Courses .................................. 73
- Mathematics 21A-21B-21C-21D .................................... 16
- Mathematics 22A-22B .................................................. 6
- Physics 94-95-96 ......................................................... 15
- Chemistry 2A, 2B, 2C or Chemistry 2AH, 2B1H, 2CH .............................................. 15
- Biological Sciences 2A .................................................. 5
- Chemical Engineering 5, 51, 60, 80 ................................ 12
- Choose one; a grade of C- or better is required:
  - English 3 or University Writing Program 1, 4V or 4Y, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 (grade of C- or better is required)

Upper Division Required Courses .................................. 92-96
- Biological Sciences 102 .................................................. 3
- Microbiology 102, 103L .................................................. 5
- Chemistry 110A, 128A, 128B, 129A .................................. 12
- 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 (152A-152B) or independent study (199), or Biochemistry 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, or method. Research does not replace the required lab elective.

Laboratory elective list: Biochemical Engineering 161L; Biotechnology 161A, 161B; Food Science and Technology 102B, 104L, 123L; Molecular and Cellular Biology 120L, 160L; Neurobiology, Physiology, and Behavior 101L, 104L; Viticulture and Enology 123L, 124L.

Lecture elective list: Biological Sciences 2B, 2C, 101, 103, 104; Biological Systems Engineering 165; Biomedical Engineering 102, 107, 109, 117, 140, 161A, 161B, 161C, 162;
- Biotechnology 160, 16B, 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, 152,
Areas of Specialization

Environmental Engineering.

This area focuses on understanding and management 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, transport and transformation of natural and anthropogenic pollutants; and modeling of air pollutant emissions.

Suggested Advisors:

Geotechnical Engineering.

This area deals with civil infrastructure and environmental problems that require quantifying the behavior of geologic materials (such as soils and rocks). Examples of geotechnical engineering problems include foundations for buildings and bridges, earthwork (such as dams, tunnels, highways), earthquake hazards (such as ground motions, liquefaction, soil-structure interaction), and geo-environmental problems (ground water flow, subsurface contaminant transport and remediation).

Suggested Advisors:
R.W. Boulanger, Y.F. Dafalias, J.T. DeJong, J.T. Harvey, B. Jeremic, B.L. Kutter, P.C. Lucia, A. Martinez, K. Ziotopoulos

Structural Engineering and Structural Mechanics.

Structural Engineering addresses the conception, sustainable design, analysis, construction, and life-cycle modeling of all types of civil infrastructure, including buildings, bridges, dams, ports, highways, and industrial facilities subject to sources of loadings ranging from gravity, to earthquakes, to extreme environmental events. Structural Mechanics encompasses the theory of solid structures, and the associated methods of analysis and computation used in the practice of Structural Engineering. For both disciplines, materials of particular interest include steel, reinforced concrete, timber, advanced composites and particulate media.

Suggested Advisors:

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 programs, 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).

Suggested Advisors:
Y. Fan, J.T. Harvey, M.A. Jaller, A. Kendall, M.P. Modera, D.A. Niemeier, D. Sperling, H.M. Zhang

Water Resources Engineering.

This area includes hydrology, hydraulics, fluid mechanics, and water resources systems planning and design. Hydrology deals with quantifying and understanding all aspects of the hydrologic cycle, including the relationships between precipitation, runoff, groundwater, and surface water. Water quality and contaminant transport issues are linked to hydrologic conditions. Hydraulic 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.

Suggested Advisors:

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 General Education units, the minimum number of units required for the Civil Engineering major is 152 (77 units in lower division and 75 units in upper division).

### Lower Division Required Courses

#### UNITS

| Mathematics 21A-21B-21C-21D | 16 |
| Mathematics 21A-21B |  8 |
| Physics 9A-9B-9C | 15 |
| Physics 9D, Chemistry 2C, Biological Science 2A, Geology 50-50L | 10 |
| Chemistry 2A-2B or ZAH-2BH | 10 |
| Civil and Environmental Engineering 3, 16, 6 |  |
| 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 coursework. |  |
| Choose one: |  |
| Civil and Environmental Engineering 19, Engineering 6, Computer Science Engineering 30 |  |
| Engineering 35 |  4 |
| Engineering 45 or 45V |  4 |
| Choose one: a grade of C- or better is required: |  |
| English 3 or University Writing Program 1, 4V, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 (grade of C- or better) |  |
| Communication 1, 3, Engineering 3 |  |
| Upper Division Required Courses | 75 |
| Engineering 103, 104, 106, 107, 109 | 12 |
| Engineering 102 or 105 |  4 |

### Upper Division Required Courses

#### UNITS

| Mathematics 21A-21B-21C-21D | 16 |
| Mathematics 21A-21B |  8 |
| Physics 9A-9B-9C | 15 |
| Physics 9D, Chemistry 2C, Biological Science 2A, Geology 50-50L | 10 |
| Chemistry 2A-2B or ZAH-2BH | 10 |
| Civil and Environmental Engineering 3, 16, 6 |  |
| 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 coursework. |  |
| Choose one: |  |
| Civil and Environmental Engineering 19, Engineering 6, Computer Science Engineering 30 |  |
| Engineering 35 |  4 |
| Engineering 45 or 45V |  4 |
| Choose one: a grade of C- or better is required: |  |
| English 3 or University Writing Program 1, 4V, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 (grade of C- or better) |  |
| Communication 1, 3, Engineering 3 |  |
| Upper Division Required Courses | 75 |
| Engineering 103, 104, 106, 107, 109 | 12 |
| Engineering 102 or 105 |  4 |

Environmental Engineering Undergraduate Program

#### UNITS

| Mathematics 21A-21B-21C-21D | 16 |
| Mathematics 21A-21B |  8 |
| Chemistry 2A-2B-2C | 15 |
| Physics 9A-9B | 10 |
| Geology 50 or Atmospheric Science 60 | 3 |
| Engineering 6 |  4 |
| Engineering 35 |  4 |
| Civil and Environmental Engineering 3, 16, 40 |  |
| Choose one: a grade of C- or better is required: |  |
| English 3 or University Writing Program 1, 4V, or Comparative Literature 1, 2, 3, or 4, or Native American Studies 5 | 4 |
Upper Division Required Courses...............66-70
Engineering 103, 105, 106.......................11
Civil and Environmental Engineering 114, 123, 140, 140L, 141, 141L, 143, 143A, 147A-B, 148A-B, 149, 150, 171, 17L, 190..................................................55
Upper Division Composition Requirement............................................. 0-4
Choose one; a grade of C- or better is required:
University Writing Program 101, 102E, 102G, 104A, 104E, 104T or passing the Upper Division Composition Exam.

Suggested Electives
Atmospheric Science 116
Engineering: Biological Systems 75, 130, 147
Civil and Environmental Engineering 125, 140B, 142, 144, 146, 153, 155, 162, 163, 198, 199
Geology 50L, 139, 140, 156
Hydrologic Sciences 134, 142, 150, 182

Total Units for the Major...............................138-143

Construction Engineering and Management 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. Minor pre-requisite: C- or better in Engineering 104.

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 2.0 or better.

Research Highlights:
- Alternative fuel transportation infrastructure
- Earthquake engineering
- Environmental engineering
- Environmental planning and management
- Geotechnical engineering
- Hydraulics and fluid mechanics
- Hydrology
- Structural engineering
- Structural health monitoring
- Structural mechanics
- Systems planning and design
- Transportation engineering
- Transportation planning and design
- Water resources engineering

Research Facilities and Partnerships:
- Advanced Transportation Infrastructure Research Center
- Center for Geotechnical Modeling
- Center for Watershed Sciences
- Center for Water-Energy Efficiency
- Institute of Transportation Studies
- J. Amorocho Hydraulics Laboratory (JAHL)
- John Muir Institute of the Environment
- Nano-Engineering and Smart Structures Technologies
- Tahoe Environmental Research Center
- Western Cooling Efficiency Center

Complete Information on our website.

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.
Upper Division Required Courses .......................... 75-83
Engineering: 190 .................................................. 3

Choose one: .................................................. 4
Engineering 180, Mathematics 135A, Statistics 120, 131A, Civil and Environmental Engineering 114, Chemical Engineering 140, Mechanical Engineering 115, Physics 104A

Choose one: .................................................. 3-4

Choose one: .................................................. 3-4
Chemical Engineering 158A, Materials Science and Engineering 170, Engineering 106, 160, 188, Civil Engineering 123, 125, 143

A minimum of 14 units from one of the following focus areas: .................................................. 14

Biomedical Engineering:
- Biology 2A, Biomedical Engineering 20, 106*, 109

Biological Systems Engineering:
- Biology 2A, Engineering 100, Biological Systems Engineering 75, 165

Chemical Engineering:
- Chemical Engineering 51, 140, 141, 142

Civil Engineering:
- Engineering 35, 104, Civil Engineering 130, 132

Electrical Engineering:
- Engineering 100, Electrical Engineering 140A, 140B, 146A

Mechanical Engineering:
- Engineering 35, 102, 103, 104

Depending on area of focus, 6-9 units of upper division electives .......................... 6-9

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. To receive credit, 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.

*Students would need to take Neurobiology, Physiology, and Behavior 101 as an elective to enroll in Biomedical Engineering 106

Upper Division Composition Requirement .................................................. 0 or 4

Choose one; grade of C- or better is required:
- University Writing Program 102E, 102F, 104A, 104E, 104T or passing the Upper Division Composition Exam.

Minor Requirements

Materials Science ............................................... 20

Materials Science and Engineering 160, 162, 164 .................................................. 12

Science and Engineering 172 or 174* .................................................. 4

Choose an additional four units from the following, if not used above: ................. 4

Materials Science and Engineering 147, 162L, 172, 172L, 174, 174L, 180, 181, 182

Engineering: Mechanical and Aerospace Engineering

Changes to Mechanical and Aerospace Engineering & Aerospace Science and Engineering Undergraduate Programs

The Department of Mechanical and Aerospace Engineering administers two undergraduate programs in the College of Engineering: (1) Mechanical Engineering. (2) Aerospace Science and Engineering. For more information about our programs, please see http://me.ucdavis.edu/ug.php.

Mission. The Department of Mechanical and Aerospace Engineering is committed to educating future engineers so that they may contribute to the economic growth and well-being of the state, the nation, and the world, and to the advancement of knowledge in the mechanical and aerospace sciences.

Objectives. The objectives of the programs offered in Mechanical and Aerospace Engineering include the following: to prepare its graduates to work in the broad range of industries, to be prepared to assume roles as leaders in engineering and as researchers in the various engineering specialties.

The program requires students to: pursue a major in an area of engineering with a minimum of 150 units, be able to design, analyze, and solve engineering problems in a variety of areas, and to apply knowledge of mathematics, physics, chemistry, material science, applied mechanics, thermodynamics, heat transfer, mass transfer, and electrical manufacturing processes, and economics.

The Mechanical Engineering program is designed to provide a broad educational experience in the basic principles of engineering and associated applied sciences so that graduates may practice in a broad range of industries, pursue graduate studies, participate in research and development, and/or pursue entrepreneurial endeavors.

Mechanical Engineering Undergraduate Program

The Mechanical Engineering program is accredited by the Engineering Accreditation Commission of ABET; http://www.abet.org.

The mechanical engineering program prepares students 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 knowledge of both the basic sciences and engineering sciences and has the ability to synthesize the information from such a background in creative problem solving. In addition to having technical competence, the engineer must be able to consider the socioeconomic consequences of a design and its possible impact on the environment, product safety, reliability, and economics are other considerations.

Suggested technical electives:
- Aerospace Science and Engineering 133, 139
- Biological Systems Engineering 114, 120, 165
- Chemical Engineering 118/118E
- Computer Engineering 147

Electrical Engineering 122, 160 (only one unit of credit towards Technical Electives requirement)

Materials Science and Engineering 180, 181, 182

Electrical Engineering 121, 134, 150B, 151, 152, 154, 161, 163

Suggested Advisors.


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; ground water and atmospheric pollution and their implications for pollutant transport and environmental concerns; aerodynamic flow around transportation vehicles and its impact on vehicle performance; and the 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
- Chemical Engineering 144, 149

Suggested Advisor. R.C. Aldredge, M. Hafez, S.K. Robinson, B.D. Shaw, C.P. van Damm, A.S. Weiler

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 increasing 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 current 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 fundamen-
tals 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, refining, and chemical processing. This area of specialization is important to many industries—aerospace, defense, automotive—where it relates to the thermal design of electronic and computer packages.

Suggested technical electives:
Aerospace Science and Engineering 138
Mechanical Engineering 161, 163

Suggested Advisors.
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, controls, statistical methods, 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 150B, 151, 154

Suggested Advisors.
H.H. Cheng, R.T. Farouki, B.S. Linke, D.A. Horsley, V. La Saponara, M. Soshi, B. Ravani

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 flight-control systems with humans in the loop.

Suggested technical electives:
Aerospace Science and Engineering 129, 139, 141
Electrical and Computer Engineering 160
Engineering 122
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, and 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)
Mechanical Engineering 121, 134, 152

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 systems.

Suggested technical electives:
Aerospace Science and Engineering 127, 129
Biological Systems Engineering 114, 120
Civil and Environmental Engineering 131, 149
Engineering 122, 160 (only one unit of credit towards Technical Electives requirement)
Mechanical Engineering 134, 150B, 161, 163

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.

Exclusive of General Education units, the minimum number of units required for the Mechanical Engineering major is 148.

UNITS

Lower Division Required Courses ....................... 78
Mathematics 21A-21B-21C-21D ........................... 16
Mathematics 22A-22B ........................................ 6
Physics 9A-9B-9C ............................................. 15
Chemistry 2A-2B or 2AH-2BH ............................. 10
Engineering 4 ................................................. 3
Engineering 6 or Mechanical Engineering 5 ........ 4
Engineering 17, 35, 45 (or 45*) .......................... 12
Choose one: a grade of C- or better is required: .. 4
English 3, University Writing Program 1, 1Y or 1V, Comparative Literature 1, 2, 3, 4, Native American Studies 5

Choose one: .................................................................. 4

Communication 1, 3, Engineering 3

Upper Division Required Courses ........................... 70-74
Engineering 100, 102, 103, 104, 105, 190 ....... 22
Choose one: ......................................................... 4
Engineering 180, Mechanical Engineering 115, Mathematics 12BC

Technical electives. ............................................. 12
Choose one: must be chosen from the following electives:
Aerospace Science and Engineering 140, 141, 142

The remaining units must be taken from:
Mechanical Engineering 139 or Aerospace Science and Engineering 126 or from the above Astronautics Electives list if not used in satisfaction of other degree requirements. Up to four units may be selected from any upper-division engineering course including any engineering 192 or 199 not used in satisfaction of other degree requirements. Courses that cannot be used are Biomedical Engineering 190L, Engineering 160, Computer Science Engineering 188 or any 197T course.

Upper Division Composition Requirement .......... 0 or 4
Choose one: a grade of C- or better is required:
University Writing Program 101, 102E, 104A, 104E, 104T, or passing the Upper-Division Composition Exam.

Courses & Programs are subject to change without notice.
Environmental Horticulture and Urban Forestry

Changes to B.S. Major Requirements
(change—eff. fall 17)

B.S. Major Requirements:

**General Education (GE):**

<table>
<thead>
<tr>
<th>Area</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>=Humanities; at least one course must come from each of the areas of study below.</td>
<td>Environmental Science and Policy 105, 108, 112, 114, 140; Microbiology 105; Nanotechnology 110; Plant Biology 116, 148; Plant Sciences 147; Wildlife, Fish, and Conservation Biology 110, 111, 120, 134.</td>
</tr>
<tr>
<td>=Scientific; note: a maximum of 4 units of variable-unit courses (numbered 192, 198, 199) may be applied to upper division elective unit requirements</td>
<td>Evolution and Ecology 102, 103, 104, 106, 107, 110, 115, 117, 119, 120, 131, 138, 141, 147, 149, 150, 161, 175, 176A and 180B.</td>
</tr>
<tr>
<td>=Social Sciences; 15 upper division elective units to achieve a total of 36 or more</td>
<td>Advising Center for the major is located in 1224 Plant and Environmental Sciences 350-752-7738.</td>
</tr>
<tr>
<td>=Visual; one upper division course from each of the areas of study below</td>
<td>Environmental Horticulture 102 or Plant Science 100A.</td>
</tr>
</tbody>
</table>

**Advising Center:**

<table>
<thead>
<tr>
<th>Area</th>
<th>Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>=Domestic Diversity; at least one course must come from each of the areas of study below.</td>
<td>Environmental Horticulture 102 or Plant Science 100A.</td>
</tr>
<tr>
<td>=Domestic Diversity; at least one course must come from each of the areas of study below.</td>
<td>Environmental Horticulture 102 or Plant Science 100A.</td>
</tr>
<tr>
<td>=Domestic Diversity; at least one course must come from each of the areas of study below.</td>
<td>Environmental Horticulture 102 or Plant Science 100A.</td>
</tr>
</tbody>
</table>

**Evolution and Ecology**

Changes to A.B & B.S. Major Requirements
(change—eff. fall 17)

A.B. Major Requirements:

**Preparatory Subject Matter**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Sciences 2A, 2B</td>
<td>4</td>
</tr>
<tr>
<td>Plant Sciences 2</td>
<td>4</td>
</tr>
<tr>
<td>Chemistry 1A-1B</td>
<td>10</td>
</tr>
<tr>
<td>Entomology 135</td>
<td>4</td>
</tr>
<tr>
<td>Environmental Science and Policy 1, 10, 30</td>
<td>6</td>
</tr>
<tr>
<td>Mathematics 16A or Statistics 13</td>
<td>3-4</td>
</tr>
<tr>
<td>Choose one:</td>
<td>3-4</td>
</tr>
<tr>
<td>University Writing Program 102BG, 102G, 104E</td>
<td>6</td>
</tr>
<tr>
<td>lower division social science</td>
<td>6</td>
</tr>
</tbody>
</table>

**Depth Subject Matter**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Horticulture 102 or Plant Science 100A</td>
<td>3-4</td>
</tr>
<tr>
<td>Environment 102</td>
<td>5</td>
</tr>
<tr>
<td>Plant Biology 117 or Plant Sciences 150</td>
<td>4</td>
</tr>
<tr>
<td>Plant Sciences 171</td>
<td>4</td>
</tr>
<tr>
<td>Soil Science 100</td>
<td>5</td>
</tr>
<tr>
<td>Entomology 110, Nematology 100, Plant Pathology 120, Plant Sciences 150, 176</td>
<td>7-9</td>
</tr>
<tr>
<td>Internship or research; must be approved by major advisor</td>
<td>3</td>
</tr>
</tbody>
</table>

**Lower Division Electives**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evolution and Ecology 100</td>
<td>8</td>
</tr>
<tr>
<td>Evolution and Ecology 101</td>
<td>4</td>
</tr>
</tbody>
</table>

**Upper Division Electives**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evolution and Ecology 100, Geology 107</td>
<td>4</td>
</tr>
<tr>
<td>Evolution and Ecology 101, Environmental Science and Policy 100</td>
<td>4</td>
</tr>
<tr>
<td>Evolution and Ecology 102, 103, 104</td>
<td>8</td>
</tr>
</tbody>
</table>

**Areas of Study**

1. **Biodiversity:**
   - Evolution and Ecology 105, 108, 112, 114, 140; Microbiology 105; Nanotechnology 110; Plant Biology 116, 148; Plant Sciences 147; Wildlife, Fish, and Conservation Biology 110, 111, 120, 134.
   - Evolution and Ecology 100, Geology 107, Anthropology 151.

2. **Advanced Evolution and Ecology:**
   - Evolution and Ecology 102, 103, 104, 106, 107, 110, 115, 117, 119, 120, 131, 138, 141, 147, 149, 150, 161, 175, 176A and 180B.
   - Note: A maximum of four units of variable-unit courses (numbered 192, 198, 199) may be applied to upper division elective unit requirements.

**Total Units for the Major**

| Units | 105-115 |

Geographic Studies

Changes to Geographic Studies Minor Requirements
(change—eff. fall 17)

(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 their 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:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Horticulture 102 or Plant Science 100A</td>
<td>3-4</td>
</tr>
</tbody>
</table>

**Human Geography:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community and Regional Development 140, 147, 149, 150, 151, 156, 157</td>
<td>3</td>
</tr>
<tr>
<td>Microbiology 105; Nanotechnology 110; Plant Biology 116, 148; Plant Sciences 147; Wildlife, Fish, and Conservation Biology 110, 111, 120, 134</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Horticulture 102, 103, 104, 106, 107, 110, 115, 117, 119, 120, 131, 138, 141, 147, 149, 150, 161, 175, 176A and 180B</td>
<td>24-25</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evolution and Ecology 100, Geology 107</td>
<td>4</td>
</tr>
<tr>
<td>Evolution and Ecology 101, Environmental Science and Policy 100</td>
<td>4</td>
</tr>
<tr>
<td>Evolution and Ecology 102</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evolution and Ecology 100, Geology 107, Anthropology 151</td>
<td>4</td>
</tr>
<tr>
<td>Evolution and Ecology 101, Environmental Science and Policy 100</td>
<td>4</td>
</tr>
<tr>
<td>Evolution and Ecology 102, 103, 104</td>
<td>8</td>
</tr>
</tbody>
</table>

**Total Units for the Major**

| Units | 77-81 |

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 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.

The accounting minor courses are open to all undergraduate and graduate majors at UC Davis. All minor courses must be taken at UC Davis.

Requisites for minor courses are required and you should plan accordingly.

Minor Requirements:

<table>
<thead>
<tr>
<th>Course</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management 101</td>
<td>4</td>
</tr>
<tr>
<td>Management 103</td>
<td>4</td>
</tr>
<tr>
<td>Management 105</td>
<td>4</td>
</tr>
<tr>
<td>Management 170</td>
<td>4</td>
</tr>
</tbody>
</table>

To complete the minor, students must complete the 20 units of coursework in the minor with a GPA of 2.0 or better. Students may petition to have the minor noted on their transcript by following the process designated by your 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.

Technology Management Minor

The Graduate School of Management offers a minor in Technology Management to undergraduate students. This minor complements students’ undergraduate studies with courses in the ways in which engineering and science-based industrial enterprises manage and use knowledge from science, engineering and technology. The minor also provides students with business and management skills that should enable them to use their engineering and science education more effectively in a technology environment.

Minor Requirements:

<table>
<thead>
<tr>
<th>Technology Management</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management 120, 140, 150, 160, 170, 180</td>
<td>20</td>
</tr>
</tbody>
</table>

To complete the minor, students must complete a minimum of 20 units of coursework in the minor with a GPA of 2.0 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.

Managerial Economics

Changes to B.S. Major Requirements
(change—eff. fall 17)

Depth Subject Matter ........................................ 52-55

Core.......................................................... 20

Agricultural and Resource Economics 100A, 100B, 101, 150........................................ 16

Restricted Electives ........................................ 32-35

Choose at least one of the emphases below:

Business Economics Emphases

Choose 16 units from: ....................................... 16


Choose the remaining 16 units from the above list or: ........................................ 16


International Business Economics Emphases

Choose 20 units: ........................................... 20


Choose the remaining 12 units from the above list or: ........................................... 12

Agricultural and Resource Economics 130, 171A, 171B, 175, 176, Economics 121A, 121B, Political Science 130, or Environmental Science & Policy 175

Environmental and Resource Economics Emphases

Agricultural and Resource Economics 175 and 176..................................................... 8

Choose 20 units:


Choose the remaining four units from the above list or upper-division courses in

Mathematics

Changes to Major Requirements
(change—eff. fall 16)

A.B. Major Requirements:

<table>
<thead>
<tr>
<th>Preparatory Subject Matter</th>
<th>UNITS</th>
</tr>
</thead>
</table>

Choose one option: ........................................ 4-7

(a) Mathematics 22A and 108

(b) Mathematics 67

Computer Science 30 or Engineering 6 .................. 4

Mathematics 22AL or equivalent MATLAB knowledge .......... 0-1

Additional non-Mathematics courses chosen from natural sciences: ........................................... 12

NOTE: Basic knowledge of MATLAB is required for both Mathematics 22A and 67.

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 150A ........................................ 4

B. Choose one Plan: ........................................ 16

Plan 1: General Mathematics .............................. 16

Choose four: ............................................. 16

Mathematics 111-185B, excluding Mathematics 180, worth at least four units each.

Plan 2: Secondary Teaching ................................. 16

Mathematics 111 ........................................ 4

Mathematics 115A ........................................ 4

Mathematics 141 ........................................ 4

Choose one: ............................................. 16

Mathematics 111-185B, excluding Mathematics 180, worth at least four units each.

NOTE: Students who wish to satisfy the single subject matter waiver for the teaching credential should see an advisor as early as possible.

Capstone Course: ........................................... 3-4

Choose one: ............................................. 3-4

Mathematics 189, 192 (Internship in Applied Mathematics), 194 (Undergraduate Thesis), 180 (Special Topics) or an approved substitute in consultation with the Undergraduate Vice Chair.
Total Units for the Major.................. 78-83

Applied Mathematics

B.S. Major Requirements:

Preparatory Subject Matter.................. 42-49
Choose one option........................................ 4-7
(a) Mathematics 22A and 108.......................... 4
(b) Mathematics 67
Mathematics 22AL or equivalent basic
knowledge of MATLAB............................... 0-1

Computer Science 30, 40.......................... 8
Choose one two-quarter sequence............................................. 7-10
Physics 9A-9B; Biological Sciences 2A-2B;
Chemistry 2A-2B; Economics 1A-1B;
Statistics 32, 100; or other applied
preparatory courses approved by your
advisor.

NOTE: Basic knowledge of MATLAB is
required for both Mathematics 22A and 67.

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.................. 47-48

A. Core......................................................... 32
Mathematics 119A.......................... 4
Mathematics 125A.......................... 4
Mathematics 125B.......................... 4
Mathematics 135A.......................... 4
Mathematics 150A.......................... 4
Mathematics 185A.......................... 4

Choose two:
Mathematics 128A, 128B, 128C.................. 8

B. Enrichment Courses................................. 12
Choose one:
Mathematics 111-185B, excluding Mathematics 180, worth at least
four units each. Up to four units can be approved upper
division courses outside the Department of Mathematics
with extensive use of mathematics.......................... 4

C. Capstone Course:
Choose one:
Mathematics 189, 192 (Internship in
Applied Mathematics), 194
(Undergraduate Thesis), 180 (Special
Topics), or an approved substitute in
consultation with the Undergraduate
Vice Chair.

Plan 1: General Mathematics

A. Core......................................................... 28
Mathematics 150A.......................... 4
Mathematics 150B.......................... 4
Mathematics 150C.......................... 4
Mathematics 135A.......................... 4
Mathematics 125A.......................... 4
Mathematics 125B.......................... 4
Mathematics 185A.......................... 4

B. Enrichment
Choose four:
MAT 111-185B, excluding Mathematics 180, worth at least four units each. Up to
four units can be approved upper division courses outside the Department of
Mathematics with extensive use of mathematics.

C. Capstone Course................................. 3-4
Choose one:
Mathematics 189, 192 (Internship in
Applied Mathematics), 194
(Undergraduate Thesis), 180 (Special
Topics), or an approved substitute in
consultation with the Undergraduate
Vice Chair.

Total Units for the Major.................. 81-87

Mathematical Analytics and
Operations Research

B.S. Major Requirements:

Preparatory Subject Matter.................. 43-47
Choose one option........................................ 4-7
(a) Mathematics 22A and 108.......................... 4
(b) Mathematics 67
Mathematics 22AL or equivalent basic
knowledge of MATLAB............................... 0-1

Computer Science 30.......................... 8
Physics 9A
Plan 2:..................................................... 5
Choose one:
Physics 7A, 9A; Statistics 13, 32, 100

NOTE: Basic knowledge of MATLAB is
required in both Mathematics 22A and 67.

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.................. 47-48

A. Core......................................................... 35
Mathematics 125A, 125B.......................... 8
Choose one:
Mathematics 128A, 128B, 128C.......................... 4
Mathematics 135A, 135B.......................... 8
Mathematics 150A.......................... 4
Mathematics 160A.......................... 4
Mathematics 168.......................... 4

B. Enrichment Courses................................. 16

1. Choose two:............................................. 8
Mathematics 111-185B, excluding 180;
Statistics 131B, 131C, 137

2. Choose two:............................................. 8
Economics 100, 121A, 121B, 122, 134, 140,
145; Agricultural and Resource
Economics 15S, 156, 157

C. Capstone Course................................. 3-4
Choose one:............................................. 3-4
Mathematics 189, 192 (Internship in
Applied Mathematics), 194
(Undergraduate Thesis), 180 (Special
Topics), or an approved substitute in
consultation with the Undergraduate
Vice Chair.

Total Units for the Major.................. 97-102

Mathematical and Scientific
Computation

B.S. Major Requirements:

Preparatory Subject Matter.................. 35-39
Mathematics 21A, 21B, 21C or Mathematics
17A, 17B, 17C; 21D, 22B, 25.......................... 23
Choose one option........................................ 4-7
(a) Mathematics 22A and 108.......................... 4
(b) Mathematics 67
Mathematics 22AL or equivalent basic
knowledge of MATLAB............................... 0-1

Computer Science 30, 40.......................... 8

NOTE: Basic knowledge of MATLAB is
required in both Mathematics 22A and 67.

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.................. 47-48

A. Core......................................................... 28
Mathematics 150A.......................... 4
Mathematics 150B.......................... 4
Mathematics 150C.......................... 4
Mathematics 135A.......................... 4
Mathematics 125A.......................... 4
Mathematics 125B.......................... 4
Mathematics 185A.......................... 4

B. Enrichment
Choose four:
MAT 111-185B, excluding Mathematics 180, worth at least
four units each. Up to four units can be approved upper division courses outside the Department of Mathematics with extensive use of mathematics.

C. Capstone Course................................. 3-4
Choose one:
Mathematics 189, 192 (Internship in
Applied Mathematics), 194
(Undergraduate Thesis), 180 (Special
Topics), or an approved substitute in
consultation with the Undergraduate
Vice Chair.

Total Units for the Major.................. 81-87

Changes to Iran & Persian Studies
Minor Requirements

Middle East/South Asia Studies

Courses & Programs are subject to change without notice.
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 ........................................ (0-6)*
And Music 16A, 16B, 16C ........................................ (0-6)*
Music 7A, 7B, 7C .................................................. 9
Plus Music 17A, 17B, 17C ........................................ (0-6)*
Music 24A, 24B, 24C ............................................. 9
* May be excused by diagnostic examination at the beginning of each quarter.

Depth Subject Matter .................................................. 40-43
Choose one track:
Track 1: Music Composition ........................................ 42
Music 123, 124A, 124B ........................................ 9
Music 121 or 122 .................................................. 4
Music 131 (three quarters) ........................................ 6
Music 195 .......................................................... 2
Choose at least six units: .......................................... 6
Music 140-151
Music 101A, 101B ................................................. 8
Music 103 .......................................................... 3
Choose at least four units: ...................................... 4
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
Choose at least six units: .......................................... 6
Music 140-151
Choose at least 12 units: ......................................... 12
Track 3: Music Performance ........................................ 40
Music 123, 124A, 124B ........................................ 9
Music 121 or 122 .................................................. 4
Music 131 (three quarters) ........................................ 6
Music 195 .......................................................... 2
Choose at least 13 units: ......................................... 13
Music 140-151
Choose at least six units: ...................................... 6

Total Units for the Major .............................................. 64-85

Note: A maximum of 19 units in performance courses (Music 131, Music 140-151) may apply toward the degree; see Unit Credit Guidelines, College of Letters and Science degree requirements section. Facility 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:

Music 101A, 101B ................................................. 8
Music 123, 124A, 124B ........................................ 9
Music 103 .......................................................... 3
Music 121 or 122 .................................................. 4
Music 131 (one year) ............................................ 6
Choose at least six units: ...................................... 6
Music 140-151
Two quarters of Music 194H for a total of at least six units resulting in a Senior thesis ............................................. 6
Choose at least four-eight units: ................................ 4-8
Music History, Theory and Ethnomusicology
Honors Track ...................................................... 47
Music 123, 124A, 124B ........................................ 9
Music 121 and/or 122 ........................................... 8
Music 131 (three quarters) ........................................ 6
Choose at least 6 units from: .................................. 6
Music 140-151
Two quarters of Music 194H for a total of at least six units resulting in a Senior thesis ............................................. 6
Choose at least 12 units 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 3.500 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:

Music ........................................................................ 22
Choose a minimum of 16 units: .............................. 16
Choose a minimum of six units: ............................. 6
Music 140-151

Native American Studies

Changes to Major Program Requirements; Plan III

(change—eff. fall 17)

Plan III—South American Emphasis .............................. 20
Choose two: ..................................................... 8
Native American Studies 107, 110A, 110B, 110C, 102D (Study Abroad)
Choose two: ..................................................... 8
African American and African Studies 107A, 155A, 159A, 160, Anthropology 103, 144, 175, History 150T, 150V, Political Science 143A
Sociology 104, Spanish 170 170S, 171S (Summer Abroad)

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.

UNITs
Native American Studies ............................................. 24
Choose one lower division Native American Studies course ........................................... 4
Choose five upper division Native American Studies courses .................................... 20

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.

Physics

A.B. Major Requirements:

Preparatory Subject Matter ......................................... 45-52
Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE .................................................. 19-25
Mathematics 21A, 21B, 21C, 22A, 22B, 22C .................................................. 22
Physics 80 ........................................................................ 4

Depth Subject Matter .................................................. 35-37
Choose at least one: ................................................. 4
Physics 129A, 130A, 140A, 151, 152, 153
Physics 102 (1 unit) .................................................. 0-1
Physics 102 waved if 104B taken. Choose 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, 9D or 9HA, 9HB, 9HC, 9HD, 9HE..............................................19-25
Mathematics 21A, 21B, 21C, 21D, 22A, 22B.................................................22
Computer Science Engineering 30 (or equivalent programming course)........................................4
Physics 80.................................................................4

Depth Subject Matter..................................................56-64
Physics 102 (1 unit) or 104B..............................................1-4
Laboratory Requirement...................................................4-12
Physics 122A or 122B or 116A, B and C..............................................32
Concentration Courses..................................................12
Two courses from one specialty (General Relativity, Astrophysical 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 Electives...................................................... 4-12
Physics 122A or 122B or 116A, B and C..............................................32

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
Mathematics 21A, 21B, 21C, 21D, 22A, 22B.................................................22
Computer Science Engineering 30 (or equivalent programming course)........................................4
Physics 80.................................................................4

Depth Subject Matter..................................................59-65
Physics 102 or 104B..........................................................1-4
Laboratory Requirement...................................................4
Choose one: Physics 122A and 122B, 157..............................................20
Choose two electives:..............................................6-9
Physics 105B, 110C, 116A, 129A, 130A, 130B, 150 (only with an astrophysics topic and prior departmental approval), 154, 155, Geology 163; May include only one from: Physics 194H, 195, 199..............................................9-9

Total Units for the Major............................................108-120

Recommended
Computer Science Engineering 40; Astronomy 25

Applied Physics—Atmospheric Physics Concentration

B.S. Major Requirements:

Preparatory Subject Matter ........................................45-51
Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE..............................................19-25
Mathematics 21A, 21B, 21C, 21D, 22A, 22B22
Computer Science Engineering 30 (or equivalent programming course)........................................4

Depth Subject Matter..................................................61-65
Physics 102 (1 unit) or 104B..............................................1-4
Laboratory Requirement...................................................4
Choose one: Physics 116C, 122A, 122B

Concentration Courses..................................................20
Physics 105C, Atmospheric Science 120, 121A, 121B; Geology 150A
Additional Electives......................................................4
Choose one:
Physics 104B or 116C, Geology 116N; Atmospheric Science 128, Mathematics 118A or 118B

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.

B.S. Major Requirements:

Physics Concentration

Preparatory Subject Matter ........................................53-59
Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE..............................................19-25
Mathematics 21A, 21B, 21C, 21D, 22A, 22B22
Computer Science Engineering 30 (or equivalent programming course)........................................4
Engineering 17...........................................................4
Physics 80.................................................................4

Depth Subject Matter..................................................61
Physics 102, 104A, 105A, 106A, 110B, 112, 115A or 115B
Laboratory Requirement...................................................4
Choose three:
Physics 116A, 116B; Computer Science Engineering 101A, 110A, 110B, 140A, 140B, 150A, or 150B

Total Units for the Major.............................................114-120

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—Geophysics Concentration

B.S. Major Requirements:

Physics Concentration

Preparatory Subject Matter ........................................45-51
Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE..............................................19-25
Mathematics 21A, 21B, 21C, 21D, 22A, 22B22
Computer Science Engineering 30 (or equivalent programming course)........................................4

Depth Subject Matter..................................................60-61
Laboratory Requirement...................................................4
Choose one:
Physics 122A, 122B, 116C

Concentration Courses..................................................13
Physics 104B; Geology 161, 162 (courses offered in alternating years)
Additional Electives......................................................11-12
Choose three:
Physics 105B or 116C; 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
Mathematics 21A, 21B, 21C, 21D, 22A, 22B22
Computer Science Engineering 30 (or equivalent programming course)........................................4

Depth Subject Matter..................................................57-60
Physics 102 (1 unit) or 104B..............................................1-4
Laboratory Requirement...................................................4
Choose one:
Physics 122A, 122B, 116C

Concentration Courses..................................................20
Physics 115B, 140A, 140B, Material Science and Engineering 174, 180

Total Units for the Major.............................................1102-111

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—Physical Oceanography Concentration

B.S. Major Requirements:

Preparatory Subject Matter ........................................45-51
Physics 9A, 9B, 9C, 9D or 9HA, 9HB, 9HC, 9HD, 9HE..............................................19-25
Mathematics 21A, 21B, 21C, 21D, 22A, 22B22
Computer Science Engineering 30 (or equivalent programming course)........................................4

Depth Subject Matter..................................................63
Laboratory Requirement...................................................4
Choose one:
Physics 122A, 122B, 116C

Concentration Courses..................................................23
Physics 105C, Atmospheric Science 120, 121A, 121B, Geology 116N, 150A
Additional Electives......................................................4
Choose one:
Physics 104B* or 112 or 116C; Mathematics 118A or 118B

* Substitutions: Physics 102 is waived for students who take Physics 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., Public Service A.B., & International Relations A.B. Major Requirements

(change—eff. fall '17)

Political Science

A.B. Major Requirements:

Preparatory Subject Matter ........................................24
Choose three:.......................................................12
Political Science 1, 2, 3, 4
Choose one:.......................................................4
Political Science 1, 2, 3, 4, 5, 7, 11A-11D, 12A, 12B

General Education (GE): AH—Arts and Humanities; SS—Science and Engineering; SC—Social Sciences
ACGH—American Cultures; DD—Domestic Diversity; OL—Oral Skills; QL—Quantitative; SL—Scientific; VL—Visual; WC—World Cultures; WE—Writing Experience
Courses & Programs are subject to change without notice.
Field (B) Policy Analysis Tools:
Economics 102, Political Science 114
Field (C) Political Science 194A, 194HB

Total Units for the Major: 68-70

Major Advisor: Consult Department office.

International Relations

A.B. Major Requirements:

Preparatory Subject Matter: 24-54

Economics 1A or Anthropology 2 ................. 4
History 4C or 10C ........................................ 4
Economics 1B ............................................. 4
Political Science 2, 3, 51 ................................ 12
Choose one:
Political Science 12Y, Statistics 13, Sociology 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 180, 183, 187, 195, Russian 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.

Note: Preparatory Subject Matter does not cover all transfer prerequisite courses for upper division curriculum.

Foreign language: 0-30

One of the following series in a single language, or certified fluency at the highest level required below:
Arabic 1, 2, 21, 22, 23 .................................. 30
Chinese 1, 2, 3, 4, 5, 6 .................................. 30
Chinese 1A, 4, 5, 6 ..................................... 30
Chinese ICN, ICN, 3CN ................................ 15
Chinese 1B, 2B, 3B, 4B ............................... 15
French 1, 2, 3, 21, 22 ................................. 25
German 1, 2, 3, 20, 21 ................................. 23
Hebrew 1, 2, 3, 21, 22, 23 ............................ 30
Hindi/Urdu 1, 2, 3, 21, 22, 23 ..................... 30
Italian 1, 2, 3, 4, 5 ..................................... 21
Italian 1, 2, 3, 4, 5, 6, 7 ............................. 30
Japanese 1A, 4, 5, 6 ................................... 30
Portuguese 1, 2, 3, 21, 22 ........................... 25
Russian 1, 2, 3, 4, 5 ................................... 23
Spanish 1, 2, 3, 21, 22 ............................... 25
Spanish 3, 4, 5, 6 ...................................... 30

Note: The language curricula are subject to change; please check with an advisor for the major. A language not listed above may be substituted only with prior written approval of the International Relations Program Committee.

Depth Subject Matter: 36-48

Tracks I, II and III:

Track I: Nine upper division courses
Choose one track:

Track I: World Trade and Development
Emphasizes contemporary economic relations of industrialized and developing countries.
For Advanced Industrialized Focus: 20
Economics 100A, 101, 160A-160B, Political Science 123
Choose two from Group A ......................... 8
Choose one from Group B ......................... 4
Choose four to fulfill Area Studies Requirement ................................................................. 16

For Developing Countries Focus: 12
Economics 115A-115B, 162
Political Science 123, 124 ........................... 8
Choose one from Group A ......................... 4
Choose two from Group B ......................... 5
Choose four to fulfill Area Studies Requirement ................................................................. 16

Group B: Developing Countries:

Agricultural and Resource Economics 138, Anthropology 127, Community and Regional Development 118, 141, Economics 102, 118B, International Relations 104, Political Science 130, 140A, 140B, 140C, 140D, 140E, Sociology 138, 139, 141, 183

Group B: Developing Countries:


Choose four courses to fulfill Area Studies Requirement ......................................................... 16

Track II: Peace and Security
Focuses on political and security relationships among states and non-state actors, examining questions of war, peace, alliances, and diplomacy.

Choose five courses spanning two disciplines: 20
Economics 162, History 120, 174B, 174C, Political Science 120, 121, 130, 132
Choose three additional courses from at least two departments: 12

For Developing Countries Focus: 16

Women's Studies 102

Choose two courses to fulfill Area Studies Requirement ......................................................... 16

Track III: Global Environment, Health, and Natural Resources
Familiarizes students with new sources of global interdependence such as biodiversity, natural resource conflicts, population growth, and world health.

Note: Some courses shown below have additional prerequisites.
Economics 162 ............................................. 4
Political Science 123 .................................... 4
Environmental Science and Policy 161 or 162 . 4
Choose one: ................................................. 4
Anthropology 101, 131, Environmental Science and Policy 164, Philosophy 120

Choose two: 7-8
Agricultural and Resource Economics 147, 175, 176, Anthropology 103, Applied Biological Systems Technology 182, Economics 115A, 125, Environmental Science and Policy 164, International Agricultural Development 170, Philosophy 120, Physics 160, Political Science 107, 175, Sociology 160

Choose two from one of the following groups: 4-8

Atmospheric and Marine Environments: 4-8
Health and Human Populations: 4-8
Anthropology 102, 121, 129, 131, Environmental Science and Policy 121, Environmental Toxicology 101, Internal Medicine-Infectious Diseases 141, Nutrition 128A, 128B, 118, Sociology 170

Choose four courses to fulfill Area Studies Requirement ......................................................... 16

Track IV: Peoples and Nationalities
Examines social and cultural foundations of national development and international relations.

Choose two: 8
Anthropology 102, 123AN, 130A, Sociology 118, 181

Choose one each from the following four groups: 12
The Mixing of Peoples: Anthropology 130B, 139AN, Community and Regional Development 176, International Relations 104, Political Science 126
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 ................................................. 5 |
| Sociology 3, 4, 11 ........................................... 4 |
| Sociology 46A, 46B .......................................... 9 |
| Choose one: Anthropology 2, 20, Political Science 1, 3, 4, 7 ........................................... 4 |
| History 4A, 4B, 4C, 6, 7A, 7B, 7C, 8, 9A, 9B, 10C, 15, 17A, 17B ........................................... 4 |
| Choose one: Philosophy 5, 14, 24 ........................................... 4 |

Depth Subject Matter ........................................ 43-44

| Sociology 100, 155 ........................................... 8 |

Choose courses from the following categories:

- Individual Culture and Society:
  Sociology 125, 126, 135 ........................................... 4

Stratification and Social Differentiation:

Sociology 130, 132, 140 ........................................... 4

Organizations and Institutions:

Sociology 118, 131, 146, 160, 180A ........................................... 4

Crime and Social Dynamics:

Sociology 120, 150, 151, 152, 171 ........................................... 12

Stratifications and Social Dynamics:


Legal Studies:

Asian American Studies 155, Chicana/o Studies 182, English 107, Environmental Science and Policy 161, Environmental Toxicology 138, Hydrology 150, Philosophy 119, Political Science 122, 150, 151, 152, 154, Psychology 153, University Writing Program 104B, Women's Studies 140 ........................................... 4

Choose one additional elective upper division Sociology course not already used to fulfill other major requirements: 4

Sociology 190X, 191, 192/193, 194H, 195 ........................................... 4

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

| Mathematics 22A ........................................... 3 |
| 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 |
| Choose one: ........................................... 4 |

For a full list of electives, see http://www.ucsd.edu/Undergraduate.html.
Statistics 137, 141, 141A
Choose three: ..................................................12
Statistics 104, 135, 137, 141 or 141A, 141B or 141C, 144, 145, 160; Mathematics 16B; one approved four unit course:
Statistics 194HA, 194HB, 199

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.....................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 Statistics 10.................................................................4

Depth Subject Matter ......................................51-52
Statistics 131A, 131B, 131C............................12
Choose three: ..................................................12
Statistics 104, 135, 137, 141 or 141A, 141B, 141C, 144, 145, 160; Mathematics 16B; one approved four unit course:
Statistics 194HA, 194HB, 199
Mathematics 125A, 108 or 125B, 167..............12

Related elective courses ...................................3-4
One upper division course approved by major advisor; it should be in mathematics, computer science or in quantitative aspects of a substantive discipline.

Total Units for the Major................................82-84

**Applied Statistics Track**

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 141 or 141A........................................4
Statistics 130A, 130B........................................8
Choose three: ..................................................12
Statistics 104, 135, 137, 141B or 141C, 144, 145, 160; Mathematics 16B; one approved four unit course:
Statistics 194HA, 194HB, 199

Four upper division elective courses outside of Statistics.................................................................12-16
Electives are chosen with and 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, 22A..............19
Computer Science Engineering 60...................4
Any one introductory statistics course; except Statistics 10.................................................................4

Depth Subject Matter ......................................52
Statistics 106, 108, 141 or 141A..........................12
Statistics 131A, 131B........................................8
Choose two: ....................................................8
Statistics 104, 135, 137, 138, 144, 145, 160; one approved four unit course:
Statistics 194HA, 194HB, or 199

Programming, Data Management & Data Technologies: .......8
Computer Science Engineering 130 or 145, and 165A
Scientific Computational Algorithm and Visualization; choose two: ..................................................8
Computer Science Engineering 122A, 129, 140A, 158, 163; Statistics 141B, 141C
Choose two: ....................................................8

Total Units for the Major..................................79

**Statistical Data Science Track**

Preparatory Subject Matter ................................27
Mathematics 21A, 21B, 21C, 21D, 22A..............19
Choose one: ....................................................4
Computer Science Engineering 10, 30, 40
One introductory statistics course; except Statistics 10; 30 or 100 preferred...........................................4

Depth Subject Matter ......................................52
Statistics 106, 108.................................12
Computer Science Engineering 171..............11
Mathematics 167 or 168...................................4
Choose one: ....................................................4

Statistics 104, 137, 138, 144, 145;
Mathematics 128A; Computer Science Engineering 122A, 158, 163, 165A; one approved four unit course:
Statistics 194HA, 194HB, 199

Total Units for the Major..................................79

Major Advisor: Debashis 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 program 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.

Statistics .........................................................20
Statistics 106, 108, and 130A-130B or 131A-
131B.................................................................16
Choose one: ....................................................4
Preparation, Statistics 13 or 32 or 100.
Additional preparatory courses will be needed based on the course prerequisites listed in the catalog.

**Sustainable Agriculture and Food Systems**

**Changes to B.S. Major Requirements**

(change—eff. fall 16)

Statistics 106, 108, 141 or 141A..........................12
Statistics 131A, 131B........................................8
Choose two: ....................................................8
Statistics 104, 135, 137, 138, 144, 145, 160; one approved four unit course:
Statistics 194HA, 194HB, or 199

Programming, Data Management & Data Technologies: .......8
Computer Science Engineering 130 or 145, and 165A
Scientific Computational Algorithm and Visualization; choose two: ..................................................8
Computer Science Engineering 122A, 129, 140A, 158, 163; Statistics 141B, 141C
Choose two: ....................................................8

Total Units for the Major..................................79

**S.B. Major Requirements:**

**English Composition Requirement**..........................4-8
See College requirement; must include Communications.........................................................4-8

**Core Courses**..................................................23-26
Plant Sciences 15..............................................4
Community and Regional Development 20.................4
Animal Science 112 or Plant Sciences 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
Choose one: ....................................................2-3
Plant Sciences 49, Plant Pathology 40,
Viticulture and Enology 10A, 10B, 10C,
Environmental Horticulture 120, Plant Science 131
Choose one: ....................................................2-3

Animal Science 49A-J, Animal Science 41L

Choose one: ....................................................2-3
Applied Biological Systems Technology 49,
52, 101, 142, Food Science and Technology 50

**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. Horwath, Ph.D.

Preparatory Subject Matter ................................60-61
Mathematics 16A, 16B .........................................6
Plant Sciences 120 or Statistics 100..........................4
Chemistry 2A, 2B.............................................10
Physics 1A....................................................3
Biological Sciences 2A, 2B................................10
Plant Sciences 2 .............................................4
Animal Sciences 1 or 2.....................................4
Food Science 1................................................3
Economics 1A................................................4
Community and Regional Development 1 ..
Choose one: Philosophy 14, 15, 24........................4

Choose one: Anthropology 2, Political Science 4,
Sociology 1, Sociology 3..................................4-5

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

Animal Science 129, Environmental Horticulture 160,
Environmental Science and Policy 100, Evolution and Ecology 101,
Plant Sciences 105, 142, Wildlife, Fish, and Conservation Biology 154

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
Choose one: Philosophy 14, 15, 24........................4
Sociology 46B or Statistics 13.................................4

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Courses & Programs are subject to change without notice.
Theatre and Dance

Choose at least one:........................................3-6
  Community and Regional Development 151,
  Landscape Architecture 150, Statistics 103,
  Sociology 106

Chemistry 2A ...................................................... 5
Biological Sciences 2A or 10 ............................ 5
Plant Sciences 2 ................................................. 5
Choose one...................................................... 4-5
  Biological Sciences 2B, Environmental Science
  and Policy 1 or 30, Wildlife, Fish, and
  Conservation Biology 10 or 11
Food Science 1 .................................................... 4
  Soil Science 10 .................................................. 4
  Economics 1A .................................................... 4
  Political Science 4 ............................................ 4
  Anthropology 2, Sociology 1, 3 .......................... 4-5
  Community and Regional Development 1, 2 ....... 8

Total units for the major.....................................140-163

Changes to B.S. Major Requirements:

A.B. with Honors Major Requirements:

Preparatory Subject Matter ................................44-51
Choose one from:
  Agricultural and Resource Economics 112 or
  150 ........................................................................4
  American Studies 101G, 156, History 108,
  109A, 172, Native American Studies 162,
  Philosophy 109, Women's Studies 104, 136 ......4
  Additional upper-division restricted electives
  chosen in consultation with the track faculty
  advisor ................................................................. 20

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, 16B ........................................ 6
  Sociology 46B or Statistics 13 ............................ 6
  Choose one ........................................................ 4
  Agricultural and Resource Economics 106,
  Statistics 103, Sociology 106 ............................. 4
  Chemistry 2A ..................................................... 4
  Biological Sciences 2A or 10 .............................. 5
  Plant Sciences 2 .................................................. 4
  Choose one ........................................................ 3-5
  Biological Sciences 2B, Environmental Science
  and Policy 1, 30, Wildlife, Fish, and
  Conservation Biology 10, 11
Food Science 1 .................................................... 3
  Soil Science 10 .................................................... 3
  Economics 1A, 1B .............................................. 8
  Political Science ................................................... 4
  Choose one ........................................................ 4-5
  Anthropology 2, Sociology 1, Sociology 3
  Community and Regional Development 1 ......... 4
  Choose one ........................................................ 4
  Philosophy 14, 15, 24 ........................................ 4

Total units for the major.....................................140-163

Wildlife, Fish, and Conservation Biology

Choose at least one:........................................3-6
  Community and Regional Development 151,
  Landscape Architecture 150, Statistics 103,
  Sociology 106

Changes to B.S. Major Requirements:

B.S. Major Requirements:

Preparatory Subject Matter ................................44-51
Choose one from:
  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-16B ........................................ 6
  Physics 1A, 1B or 7A .......................................... 4-6
  Viticulture and Enology 2, 3, 9, 10 ........................ 5
  Depth Subject Matter ...........................................48-54
  Biological Sciences 102, 103 or 105 .................. 3-6
  Microbiology 102, 103L or 101 .......................... 5-7
  Plant Sciences 120 or Statistics 106 .................... 4
  Viticulture and Enology 101A, 101B, 101C, 110,
  118 ................................................................ 15

Viticulture and Enology

Changes to B.S. Major Requirements:

Changes to A.B. with Honors Major Requirements:

Preparatory Subject Matter ................................24
Choose one:
  Dramatic Art 21A, 40A, 40B, 42A, 42B ........................4
  Dramatic Art 28, 55, 56A, 56B, 56C ...........................20

Depth Subject Matter ............................................56
Choose two:.............................................................8
  Dramatic Art 142, 150, 155A, 156A, 156B, 156C,
  156D, 158, 159 .....................................................4
  Dramatic Art 124A, 124B, 124C, 124D, 124E, 124F .......4
  Dramatic Art 120, 141, 144A, 146A .......................4
  Dramatic Art 127A, 140A, 160A .............................4
  Choose six units from at least two of: ....................6
  Dramatic Art 145, 180A, 180B, 180C .....................4
  Dramatic Art 180D ..............................................4
  Choose one .........................................................2
  Dramatic Art 180E, 180F, 180G ............................4
  Choose 16 units: ..................................................16
  Dramatic Art 114, 115, 116, 120, 121A, 121B,
  121C, 122A, 122B, 122C, 124A, 124B, 124C,
  124D, 124E, 125, 126, 127A, 127B, 130, 135,
  140A, 140B, 140C, 141, 142, 143, 144A, 144B,
  144C, 146A, 146B, 146C, 150, 154, 155A, 155B,
  156A, 156B, 156C, 156D, 158, 159, 160A, 160B,
  170  .........................................................................16

Total units for the Major With Honors...............80

Major Advisor. Consult Department office.

Changes to A.B. with Honors Major Requirements:

Preparatory Subject Matter ................................24
Choose one:
  Dramatic Art 21A, 40A, 40B, 42A, 42B ........................4
  Dramatic Art 28, 55, 56A, 56B, 56C ...........................20

Depth Subject Matter ............................................56
Choose two:.............................................................8
  Dramatic Art 142, 150, 155A, 156A, 156B, 156C,
  156D, 158, 159 .....................................................4
  Dramatic Art 124A, 124B, 124C, 124D, 124E, 124F .......4
  Dramatic Art 120, 141, 144A, 146A .......................4
  Dramatic Art 127A, 140A, 160A .............................4
  Choose six units from at least two of: ....................6
  Dramatic Art 145, 180A, 180B, 180C .....................4
  Dramatic Art 180D ..............................................4
  Choose one .........................................................2
  Dramatic Art 180E, 180F, 180G ............................4
  Choose 16 units: ..................................................16
  Dramatic Art 114, 115, 116, 120, 121A, 121B,
  121C, 122A, 122B, 122C, 124A, 124B, 124C,
  124D, 124E, 125, 126, 127A, 127B, 130, 135,
  140A, 140B, 140C, 141, 142, 143, 144A, 144B,
  144C, 146A, 146B, 146C, 150, 154, 155A, 155B,
  156A, 156B, 156C, 156D, 158, 159, 160A, 160B,
  170  .........................................................................16

Total units for the Major With Honors...............80

Major Advisor. Consult Department office.

Viticulture and Enology

Changes to B.S. Major Requirements:

B.S. Major Requirements:

Preparatory Subject Matter ................................44-51
Choose one from:
  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-16B ........................................ 6
  Physics 1A, 1B or 7A .......................................... 4-6
  Viticulture and Enology 2, 3, 9, 10 ........................ 5
  Depth Subject Matter ...........................................48-54
  Biological Sciences 102, 103 or 105 .................. 3-6
  Microbiology 102, 103L or 101 .......................... 5-7
  Plant Sciences 120 or Statistics 106 .................... 4
  Viticulture and Enology 101A, 101B, 101C, 110,
  118 ................................................................ 15

Wildlife, Fish, and Conservation Biology

Changes to B.S. Major Requirements:

B.S. Major Requirements:

Written/Oral Expression ........................................8
  Completing University Writing Program 1 and
  Communication 1 will simultaneously satisfy the
  College requirements.
  University Writing Program 1 ............................. 4
  Choose one .........................................................4
  Communication 1, 3 or Dramatic Art 10

Preparatory Subject Matter ................................50-51
Choose one from:
  Biological Sciences 2A, 2B, 2C ........................... 15
  Chemistry 2A, 2B, 8A, 8B ................................... 16
  Mathematics 16A, 16B ....................................... 6
  Physics 1A, 1B ................................................... 6
Wildlife, Fish, and Conservation Biology

Depth Subject Matter ........................................... 45-50

Students graduating with this major are required to attain at least a C average (2.000) in all courses taken at the university in depth and area of specialization subject matter.

Areas of Specialization

(1) Wildlife and Conservation Biology:

Wildlife, Fish, and Conservation Biology 151  
Choose one:  
- Plant Sciences 102, 131, 144, 147 & 147L, 178, Plant Biology 102, 108, 117, 119, 148

Choose one:
- Wildlife, Fish, and Conservation Biology 110, 111, 120, 134, 136, 141, 144, 152, 155 & 155L, 156, 157, 160

Choose one:

Note: Students interested in certification as a Wildlife Biologist from The Wildlife Society should consider additional courses in plant sciences.

(2) Fish Biology:

Wildlife, Fish, and Conservation Biology 120 & 120L  
Choose one:
- Entomology 116, Evolution and Ecology 112 & 112L or 114

Choose three courses including at least one course from each of the two groups:
(a) Aquatic Systems  

(3) Wildlife Health:

Wildlife, Fish, and Conservation Biology 151  
Choose one:
- Biological Sciences 102 and 103, and Animal Biology 102 and 103

Choose one:
- Wildlife, Fish, and Conservation Biology 110, 111, 120, 134, 141, 144, 152, 155 & 155L, 160

Choose one:
- 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, Veterinary Medicine and Epidemiology 158

Note: 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