Natural Sciences

be announced at the time of offering. May be repeated for credit when topic differs.—II, III.

207. Leadership Skills and Strategies in California Language Documentation & Revitalization (4)
Seminar—3 hours; term paper. Introduction to the indigenous languages of the Americas, with a focus on California; an examination of how contemporary Native communities document and revitalize their heritage languages. Learn to assist and administer language programs. Offered in alternate years.—Hernández-Villas, Peña

212. Community Development for Sovereignty and Autonomy (4)
Seminar—4 hours. Prerequisite: graduate standing. Examination of "deviance" in Native communities with a focus on Native sovereignty in North America. Analysis of the concept of deviance from several different world views. Readings from a range of theories to incorporate varying theoretical perspectives on deviance and deviance.

217. Public Law 83-280: Colonial Termination (4)
Seminar—4 hours. Prerequisite: graduate standing, including school of law students. Examination of the significance of the termination era. Public Law 83-280. Discussions to include termination, societal conformity, political consent, jurisdiction, self-determination & decolonization, and colonial relationship between Native Peoples and the United States.—Granda

220. Colonialism/Racism and Self-Determination (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Study of imperialism and colonialism systems and their psychosocial impacts upon oppressors and oppressed, of racism as the outgrowth of colonialism, and of nationalism, ethnic conflict and self-determination. Focus on indigenous peoples, but other groups will also be considered. Offered in alternate years.—Granda

224. Performance in the Americas (4)
Seminar—3 hours; term paper. Prerequisite: graduate standing. Ethnomusicological and anthropological approaches to study of public performance in the Americas. New ways of looking at music, dance, rituals and other forms of public expressive forms normally called "popular culture." Not open for credit to students who have completed Music 224. (Former course Music 224.)—Mendoza

233. Visual Sovereignty (4)
Seminar—3 hours; film viewing—2 hours; term paper. Extensive examination of the field of contemporary Native American and Indigenous photography, films and performance through research of artworks, writings by artists, theorists, and material in museum collections. May be repeated two times for credit when topic differs. Offered in alternate years.—Tsinnihdziine

237. Native American Art Collections and Museums (4)
Seminar—3 hours; term paper. Research and examination of regional Native American art held in museums and other public institutions, as well as private-held collections. Includes onsite viewing and research of museum collections. Offered in alternate years.—Tsinnihdziine

240. Native American Public Health: Topics and Issues (4)
Seminar—3 hours; term paper. Introduction to Native American public health issues and contributing causal factors (including environmental justice and historical trauma); the dimensions of cultural competency in diagnosis and service provision; the structure of Native health care institutions; and debates in Native treatment modalities.—II, III.

250. Indigenous Critique of Classic Maya Ethnographies (4)
Seminar—4 hours. Prerequisite: graduate standing or consent of instructor. Construction of the Maya world through ethnographic writing during the present century. Deconstruction of ethnographies about the Mayans considering the modern theories and social/anthropological critiques of modern ethnographies. Offered in alternate years.

280. Ethnohistorical Theory and Method (4)
Seminar—3 hours; term paper. Discussion of the ethnohistorical method; the utilization of diverse types of data, especially documentary sources, to reconstruct socio-cultural history. Particular attention to the applied area of ethnohistory in the solution of contemporary social problems. Offered in alternate years.

298. Group Study for Graduate Students (1-5)
Prerequisite: graduate standing, consent of instructor. (S/U grading only)

299. Special Study for Graduate Students (1-12)
Prerequisite: graduate standing, consent of instructor. (S/U grading only)

Professional

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

Natural Sciences

[College of Letters and Science]

Advising Center. 104 Everson Hall
530-784-1621; http://naturalsciences.ucdavis.edu/

Committee in Charge
Howard W. Day, Ph.D., Chair
[Earth and Planetary Sciences]
Tessa Hill, Ph.D. (Earth and Planetary Sciences)
Susan Keen, Ph.D. (Evolution and Ecology)
J. Richard Pomeroy (Evolution and Ecology)
Neil Schore, Ph.D. (Chemistry)
David Webb, Ph.D. (Physics)

The Major Program
Natural Sciences is an interdisciplinary major that provides significant breadth in biology, chemistry, earth sciences, physics and mathematics while offering additional depth in two of the natural sciences. It is especially designed to meet the needs of prospective science teachers, but also serves students who wish to acquire training in more than one science. The major is sponsored by the Department of Earth and Planetary Sciences.

The Program. The Natural Sciences curriculum offers an unusually broad training in science and mathematics. All students must complete a one year sequence in calculus, a course in statistics and one year sequence in physics, earth science, life science and mathematics. Each student will complete depth courses in two of these sciences. Prospective teachers may use these depth courses as preparation for certification. Students may wish to prepare for a teaching credential program should consult an advisor at their first opportunity to combine the prerequisites with General Education requirements.

Career Alternatives. Students whose goals include business, journalism, law, or medicine may acquire a broad background in science through this curriculum. The study of natural sciences also prepares a student to meet the subject matter requirements for primary and supplementary science teaching credentials in California. Students who might wish to become a teacher should consult an advisor in the Mathematics and Science Teaching Program [MAST, http://mast.ucdavis.edu] at their first opportunity. MAST advisors can help students combine the prerequisites for a science major with General Education requirements. The program also offers seminars that give participants experience in elementary, middle school, and high school classrooms.

B.S. Major Requirements:

Preparatory Subject Matter

UNITS
Preparatory Subject Matter..............48-74
Chemistry 2A, 2B, 2C, 2D..........15
Biological Sciences 2A, 2B, 2C........15
Geology 2, 3, 3I, 50L, 60L............13
Mathematics 1A6, 16B, 17A, 17B, 17C or 21A, 21B, 21C........9-12
Physics 7A, 7B, 7C or 9A, 9B, 9C....12-15
Statistics 100.........................4

Depth Subject Matter

Concentration (chosen from among the four fields of concentration listed below)........27
Supplementary Field; chosen from among the four fields listed below. May not include the same field as the concentration. The same course may not be used to fulfill the requirements for both a Concentration and a Supplementary Field........15

Total Units for the Major............110-116

Fields of Concentration:

Chemistry..................................27-36
Chemistry 105 or 107A or 107B or 110A or 110B......6-12
Chemistry 118A or 118B or 128A or 128B-129A or 129B........................................8-10
Chemistry 124A..........................3
One course from Chemistry 100, 104, 118C, 128C...........3-4
Three units from Chemistry 197, 199 or Education/Geology 181, 183........3

Earth Science............................27
Once course from Geology 107, 108, 131..........................3
Three units from Geology 199 or Education/Geology 181, 183........3

Life Science..............................27-33
Chemistry 8A, 8B or 118A, 118B, 118C..............................6-12
Biological Sciences 101......................4
Evolution and Ecology 100 or approved electives and Biological Sciences 105.............................8
Neurobiology, Physiology, and Behavior 101, 101L, 107A, 280..................5
Four units from Biological Sciences 199, Evolution and Ecology 199, Molecular and Cellular Biology 199, or Neurobiology, Physiology, and Behavior 199 or Education/Geology 181, 183........4

Supplementary Fields:

Chemistry.................................15-17
Chemistry 100............................3
Chemistry 104 or 105...................3
Chemistry 107A...........................3
Chemistry 118A or 128A..............3-4
Chemistry 124A.........................3
Other Chemistry or related science courses may be substituted with the prior approval of the major adviser.

Earth Science............................15
Geology 138 or 140......................4
Approved elective.......................1
Other Geology or related science courses may be substituted with the prior approval of the major adviser.

Life Science..............................15
Biological Sciences 101*..................4

Quarter Offered: I-Fall, II-Winter, III-Spring, IV-Summer, 2015-2016 offering in parentheses

Pre-Fall 2011 General Education (GE): AH=Arts and Humanities; SCI=Science and Engineering; SO=Social Sciences; Div=Domestic Diversity; WRIT=Writting Experience

Fall 2011 and on Revised General Education (GE): AH=Arts and Humanities; SCI=Science and Engineering; SO=Social Sciences; AC=American Cultures; DD=Domestic Diversity; OL=Oral Skills; QL=Quantitative; SL=Scientific; VL=Visual; WC=World Cultures; WE=Writting Experience
Nature and Culture

(See Entomology and Nematology for course numbers in these areas.)

Upper Division

193. Internship in Culture (4)
Internship—3-36 hours. Prerequisite: course 1. Internship in natural sciences, social sciences, or humanities on or off campus in which students use and improve interdisciplinary skills and perspectives gained through the Nature and Culture curriculum. Supervised by a faculty member. May be repeated for credit. [P/NP grading only.]

Nematology

Please see the department of Entomology and Nematology, on page 293, for further information.

Faculty
Edward P. Caswell-Chen, Ph.D., Professor
Howard Ferris, Ph.D., Professor
Edwin E. Lewis, Professor
Steven A. Nadler, Ph.D., Professor
Ruby B. Westerdahl, Ph.D., Professor

Emeriti Faculty
Bruce A. Jaffe, Ph.D., Professor Emeritus
Harry K. Kaya, Ph.D., Professor (Entomology)

Minor Program Requirements:

UNITS
Nematology 100, 110, and Soil Science 100—18-20

Graduate

201. Molecular and Physiological Plant Nematology (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: Biological Sciences 101; Plant Pathology 120, course 100 or 110. Molecular biology and physiology of nematodes using Caenorhabditis elegans as a model, but with emphasis on plant-parasitic species. Plant responses to nematodes. Discussion of current literature emphasized. Offered in alternate years.—(II.) Williamson

203. Ecology of Parasitic Nematodes (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: course 100 or 110 or Entomology 156; Evolution and Ecology 101. Major concepts in population and community ecology of animal- and plant-parasitic nematodes. Current advances in techniques, theory, and basic information about nematode host dynamics, and application to management of nematode disease. Offered in alternate years. —(III.) Caswell-Chen

204. Management of Plant-Parasitic Nematodes (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 100 or 110. Theory, foundation, principles and practices of nematode management. Techniques and equipment used to manage nematodes and methods used to analyze their effectiveness. Offered in alternate years.—(II.) Westerdahl

205. Insect Nematology and Biological Control (2)
Lecture—1 hour; discussion—1 hour. Prerequisite: courses 100 and 110. The biology of insect-parasitic nematodes, their effect on their host, and their potential as biological control agents of insect and other invertebrate pests. Application of ecological theory in classical and augmentative biological control. Offered in alternate years.—(II.) Kaya, Lewis

206. Nematode Systematics and Evolution (2)
Lecture—1 hour; laboratory—3 hours. Prerequisite: course 100 or 110 or Entomology 156; Evolution and Ecology 100 recommended. Nematode diversity as revealed by morphological and molecular evidence. Laboratory experience focuses on structural features used in taxonomy. Phylogenetic relationships based on morphological and molecular data used to consider patterns of character change among taxa. Offered in alternate years.—(II.) Nadler

210. Molecular Phylogenetic Analysis (3)
Lecture—2 hours; laboratory—3 hours. Theory and practice of inferring phylogenetic trees using molecular sequence data. Practical techniques for obtaining sequence data, advantages and disadvantages of common approaches for inferring trees, statistical methods for comparing alternative hypotheses. (Same course as Evolution and Ecology 210.) Offered in alternate years.—(II.) Nadler

245. Field Nematology (1)
Fieldwork—6 days. Prerequisite: course 100. Six-day demonstration and field study in applied nematology including diagnosis and prediction of nematode field problem strategies for control and the establishment of associations with diverse California crops. [S/U grading only.—I. (II.)

290. Seminar (1)
Seminar—1 hour. [S/U grading only.—II. (III.) (IV.)

290. Advanced Research Conference (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Planning and results of research programs, proposals, and experiments. Discussion and critical evaluation of original research being conducted by the individual. Offered by individual research instructors for research group. [S/U grading only.]

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

299. Research (1-12)
[S/U grading only.]

Neurobiology, Physiology, and Behavior

(See Entomology and Nematology for course numbers in these areas.)

Faculty
Keith Baar, Ph.D., Associate Professor
Sue C. Bodine, Ph.D., Professor
Kenneth H. Britten, Ph.D., Professor
Earl E. Carstens, Ph.D., Distinguished Professor
Sue C. Bodine, Ph.D., Professor
Kenneth H. Britten, Ph.D., Professor
Karen M. Doherty, Ph.D., Associate Professor
Thomas P. Coombs-Hahn, Ph.D., Professor
William DeBello, Ph.D., Associate Professor
Jochen Ditterich, Ph.D., Associate Professor

Quarter Offered: I—Fall; II—Winter; III—Spring; IV—Summer; 2015-2016 offering in parentheses.

Pre-Fall 2011 General Education (GE): AH=Arts and Humanities; SE=Science and Engineering; SS=Social Sciences; Div=Dominant Diversity; Wrt=Writing Experience

Fall 2011 and on Revised General Education (GE): AH=Arts and Humanities; SE=Science and Engineering; SS=Social Sciences; Div=Dominant Diversity; Wrt=Writing Experience

AGCH=American Cultures; DD=Dominant Diversity; OL=Oral Skills; QL=Quantitative; SL=Scientific; VL=Visual; WC=World Cultures; WRI=Writing Experience