

## Courses in Entomology (ENT)

### Lower Division

#### 1. Art, Science and the World of Insects (3)

Lecture—3 hours; laboratory—3 hours. Fusion of entomology and art to create an appreciation of insect biology, ecology, interactions with humans and importance in human culture. Multidisciplinary approaches in education and career paths in entomology and art. GE credit: ArtHum or SciEng or SocSci | AH or SE or SS, OL, VL, WE.—III. (III.) Ullman

#### 2. Biodiversity (3)

Lecture—2 hours; lecture/discussion—1 hour. Introduction to nature, scope and geographical distribution of biodiversity (the diversity of life, with emphasis on plants and animals, especially insects). Humans and biodiversity—domestication, aesthetics, ethics and valuation. Species richness and “success.” Biodiversity through time; monitoring, evaluation and conservation. Biomes—global, continental and Californian. (Same course as Evolution and Ecology 2.) GE credit: SciEng, Wrt | SE, SL, WE.—I. (I.)

#### 10. Natural History of Insects (3)

Lecture—3 hours. Designed for students not specializing in entomology. Not open for credit to students who have had course 100, but students who have taken this course may take course 100 for credit. An introduction to the insects detailing their great variety, structures and functions, habits, and their significance in relation to plants and animals including man. GE credit: SciEng | SE, SL.—II. (II.) R. Kimsey, Parrella

#### 90X. Special Topics in Entomology (2)

Seminar—2 hours. Freshman seminar course for in-depth examination of a special topic within the subject area. May be repeated two times for credit. (P/NP grading only.)—I, II, III.

#### 92. Internship (1-12)

Internship—3-36 hours. Prerequisite: consent of instructor. Work-learn experience on and off campus in all subject areas offered by the department, supervised by a member of the faculty. May be repeated up to 12 units of credit. (P/NP grading only.)

#### 99. Special Study for Undergraduates (1-5)

(P/NP grading only.)

### Upper Division

#### 100. General Entomology (4)

Lecture—3 hours; term paper. Prerequisite: Biological Sciences 1B. Biology, anatomy, physiology, development, classification, ecology and relation of insects to human welfare. GE credit: SciEng, Wrt | WE.—I, III. (I, III.) L. Kimsey

#### 100L. General Entomology Laboratory (2)

Laboratory—6 hours. Prerequisite: course 100 (may be taken concurrently). Anatomy, development, population ecology, methods of collecting, classification and identification of insects of all orders and of major families. GE credit: Wrt | VL.—I. (I.) Kimsey

#### 101. Functional Insect Morphology (3)

Lecture—2 hours; laboratory—3 hours. Prerequisite: course 100. Study of the basic external and internal structures, organs and tissues of insects, with emphasis on functional systems. Functional anatomy, histology and fine structures of important organs and tissues will be discussed. GE credit: SciEng.—II. (II.)

#### 102. Insect Physiology (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 100 or course in physiology or invertebrate zoology. Processes by which insects maintain themselves, reproduce, and adapt to environment. Insects as models for basic/applied research through detailed analysis of metabolic, physiological, and behavioral processes. Emphasis on analysis of methodology, fact, and theory. GE credit: SciEng | SE, WE.—II. (II.) Chiu

#### 103. Insect Systematics (3)

Lecture—2 hours; discussion—1 hour. Prerequisite: introductory course in zoology or entomology. Principles and methods of systematics, with particular reference to insects. Emphasis on different theories of classification, and analysis of phylogenetic relationships. Offered in alternate years. GE credit: SciEng, Wrt.—III.

#### 104. Behavioral Ecology of Insects (3)

Lecture—3 hours. Prerequisite: introductory biology or zoology. Basic principles and mechanisms of insect behavior and ecology. An evolutionary approach to understanding behavioral ecology of insects. GE credit: SciEng.—II. (II.) Lewis

#### 105. Insect Ecology (4)

Lecture/discussion—3 hours; term paper. Prerequisite: Biological Sciences 2B. 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. Emphasis on the scientific process: observing nature, asking testable questions, and communication. Offered in alternate years. GE credit: SciEng | OL, SE, SL, WE.—I. (I.) Yang

#### 107. California Insect Diversity (5)

Lecture—1 hour; laboratory—6 hours; fieldwork—6 hours. Prerequisite: an introductory course in entomology. Survey of the diversity of insects from selected ecological zones in California with emphasis on collection, identification, and natural history. Offered in alternate years. GE credit: SciEng, Wrt | SE.—III. Ward

#### 109. Field Taxonomy and Ecology (7)

Lecture—2 hours; laboratory—36 hours; five-week course. Prerequisite: an introductory course in entomology or consent of instructor. The study of insects in their natural habitats; their identification and ecology. Offered in alternate years. GE credit: SciEng, Wrt | SE.—(IV.) Ward

#### 110. Arthropod Pest Management (5)

Lecture—3 hours; laboratory—6 hours. Prerequisite: Biological Science 1B. Development of the ecological basis for the integrated pest management paradigm with emphasis on agriculture. Ecological and practical aspects of control tactics. Laboratory emphasizes identification of pests and beneficials of agriculture and urban situations. GE credit: SciEng, Wrt | SE, WE.—II. (II.) Godfrey

#### 116. Freshwater Macroinvertebrates (3)

Lecture—2 hours; laboratory—3 hours. Prerequisite: Biological Sciences 2B or equivalent. Biology, ecology and taxonomy of freshwater macroinvertebrates, including insects, crustaceans, molluscs, worms, leeches, flatworms and others. Adaptations to life in freshwater. Aquatic food webs. Uses of macroinvertebrates in water quality monitoring. Field trips during regular lab hours. Limited enrollment. GE credit: SciEng | SE, SL.—III. (III.) Lawler

#### 116L. Aquatic Insect Collection (2)

Laboratory—4 hours; field work—2 hours. Prerequisite: high school biology recommended. Students will learn to collect aquatic insects and to identify them to Family and Genus levels. Collections will require two, one-day weekend field trips (by arrangement). Collection requirement is 40 Families, with 20 identified to Genus level. Limited enrollment. May not be taken for credit if students have completed the 5-unit option for Entomology 116.—III. (III.) Lawler

#### 117. Longevity (4)

Lecture—3 hours; term paper. Prerequisite: upper division standing or consent of instructor. Nature, origin, determinants, and limits of longevity with particular reference to humans; emphasis on implications of findings from non-human model systems including natural history, ecology and evolution of life span; description of basic demographic techniques including life table methods. (Same course as Human Development 117.) GE credit: SciEng, Wrt | SE, SL, WE.—I. Carey

#### 119. Apiculture (3)

Lecture—3 hours; papers. Prerequisite: Biological Sciences 1C recommended. Biology and behavior of honeybees; communication, orientation, social organization, foraging activities, honey production, pollination activities. GE credit: SciEng, Wrt | OL, VL, WE.—III. (III.) Johnson

#### 123. Plant-Virus-Vector Interaction (3)

Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1C, 101; Plant Biology 105, Plant Pathology 120, and course 100 recommended. Analysis of the interactions necessary for viruses to infect plants. Interactions among insect vectors and host plants involved in the plant-virus life cycle. Evolutionary aspects of the molecular components in viral infection and modern experimental approaches to the interdiction of viral movement. Offered alternate years. (Same course as Plant Biology 123/Plant Pathology 123.)—(I.) Lucas, Gilbertson, Ullman

#### 135. Introduction to Biological Control (4)

Lecture—3 hours; laboratory—3 hours. Prerequisite: course 100 or 110. Principles of biological control of arthropod pests and weeds. Biology of pathogens, entomopathogenic nematodes, parasitoids, and predators. Implementation in classical and augmentative biological control. Role of biological control in pest management. Offered in alternate years.—I. Kaya, Parrella

#### 153. Medical Entomology (3)

Lecture—3 hours. Prerequisite: Biological Sciences 1A, 1B, upper division standing in one of the biological sciences, or consent of instructor. Basic biology and classification of

medically important arthropods with special emphasis on the ecology of arthropod-borne diseases and principles of their control. Relationships of arthropods to human health. GE credit: SciEng, Wrt | SE, SL, WE.—II. (II.) Scott

#### 156. Biology of Parasitism (3)

Lecture—3 hours. Prerequisite: Biological Sciences 1A or consent of instructors. Lectures on the biological and ecological aspects affecting host-parasite relationships using selected examples from protozoan and metazoan fauna. GE credit: SciEng | SE.—III. (III.) R. Kimsey, Nadler

#### 156L. Biology of Parasitism Laboratory (1)

Laboratory—3 hours. Prerequisite: course 156 (concurrently) or consent of instructor. Laboratory demonstrations using selected examples of protozoan and metazoan organisms along with various techniques used in parasitology to exemplify concepts presented in the lecture course. GE credit: SciEng, Wrt | SE.—III. (III.) R. Kimsey, Nadler

#### 158. Forensic Entomology (3)

Lecture—2 hours; laboratory—4 hours. Prerequisite: Biological Sciences 1B or Entomology 100, upper division standing. Arthropods, their general biology, succession, developmental cycles and population biology in matters of criminal prosecution and civil litigation. Emphasis on basic arthropod biology, ecological and developmental concepts and methods, development of reasoning abilities, implication, development of opinions and evidence. GE credit: SciEng or SocSci, Wrt | WE.—III. (III.) R. Kimsey

#### 180A. Experimental Ecology and Evolution in the Field (4)

Lecture/laboratory—3 hours; fieldwork—3 hours. Prerequisite: course 105, or Environmental Science and Policy 100; Evolution and Ecology 100; Evolution and Ecology 101. Experimental design in field ecology. Examination of primary literature, experimental design, independent and collaborative research, analysis of data, development of original research paper based on field experiments. (Same course as Evolution and Ecology 180A.) Offered in alternate years. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | QL, SE, VL.—(II.) Yang

#### 180B. Experimental Ecology and Evolution in the Field (4)

Lecture/laboratory—3 hours; fieldwork—3 hours. Prerequisite: Evolution and Ecology or Entomology 100A; Evolution and Ecology 100, Evolution and Ecology 101, or Environmental Science and Policy 100; course 105. Experimental design in field ecology. Examination of primary literature, experimental design, independent and collaborative research, analysis of data, development of original research paper based on field experiments. (Same course as Evolution and Ecology 180B.) Offered in alternate years. (Deferred grading only, pending completion of sequence.) GE credit: SciEng | QL, SE, VL WE.—(III.) Yang

#### 192. Internship (1-12)

Internship—3-36 hours. Prerequisite: completion of 84 units and consent of instructor. Laboratory experience or fieldwork off and on campus in all subject areas offered in the Department of Entomology. Internships supervised by a member of the faculty. (P/NP grading only.)

#### 197T. Tutoring in Entomology (1-3)

Discussion—1-3 hours. Leading small discussion groups. Preview assignments and prepare guidelines for instruction. (P/NP grading only.)

#### 198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

#### 199. Special Study for Advanced Undergraduates (1-5)

(P/NP grading only.)

## Courses in Nematology (NEM)

### Upper Division

#### 100. General Plant Nematology (4)

Lecture—2 hours; laboratory—6 hours. Prerequisite: Biological Sciences 1B or 10. An introduction to the classification, morphology, biology, and control of the nematodes attacking cultivated crops. GE credit: SciEng | SE.—I. (I.) Ferris

#### 110. Introduction to Nematology (2)

Lecture—2 hours. Prerequisite: Biological Sciences 1B or the equivalent or consent of instructor. The relationship of nematodes to human environment. Classification, morphology, ecology, distribution, and importance of nematodes occurring in water and soil as parasites of plants and animals. GE credit: SciEng | SE.—II. (II.) Caswell-Chen, Nadler

#### 199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)