Graduate Study. The Graduate Group in Population Biology emphasizes programs of study and research leading to the Ph.D. degree. The Group concentrates on population biology as the broad discipline that blends ecology, evolution, population genetics and systematics into a unified field. The course curriculum consists of first-year core courses offered by the Group faculty, seminars, and advanced courses in population biology, and related disciplines, chosen in consultation with a guiding committee.

Graduate Adviser. Consult the Population Biology Graduate Group office or website.

Courses in Population Biology (PBG)

Graduate

200A. Principles of Population Biology (5)
Lecture—3 hours; discussion—2 hours. Prerequisite: course 231 concurrently or consent of instructor. Principles of single-species ecology and evolution. Topics include ecology of individuals, population growth models, structured populations, life history strategies, stochastic populations, basic population genetics theory, deleterious alleles in natural populations, and molecular population genetics. —F. (F.)

200B. Principles of Population Biology (6)
Lecture—5 hours; discussion—1 hour. Prerequisite: course 200A. 231. Principles of multi-species community. Topics include competition, mutualism, metapopulations, food webs and trophic cascades, interactions between simple ecological communities, island biogeography, succession, and large-scale patterns. —W. (W.)

200C. Principles of Population Biology (6)
Lecture—5 hours; discussion—1 hour. Prerequisite: course 200B. Principles of microevolution and macroevolution. Topics include evolutionary quantitative genetics, analysis of hybrid zones, speciation, the fossil record, biogeography, and phylogeny reconstruction. —S. (S.)

203. Advanced Evolution (3)
Lecture—1 hour; discussion—2 hours. Prerequisite: graduate standing. Advanced topics in evolution and speciation, and biochemical and morphological evolution in plants and animals with emphasis on the appropriateness of different methods of analysis. Offered in alternate years.

206. Ecology of Insect Parasitoids (4)
Lecture—3 hours; seminar—1 hour. Prerequisite: introductory animal ecology or behavior. Insect parasitoids will be investigated as model systems to address current topics in behavioral, population, and evolutionary ecology. Theory will be synthesized and critical empirical tests of ecological hypotheses emphasized. Offered in alternate years.

207. Plant Biology (5)
Lecture—2 hours; laboratory/discussion—1 hour. Prerequisite: advanced undergraduate ecology course (e.g., Environmental Science and Policy 100, Evolution and Ecology 101, Entomology 104, Plant Biology 117), and advanced undergraduate course in genetics and/or evolution (e.g., Biological Sciences 101 or Evolution and Ecology 100). Introduction to theoretical and empirical research in plant population biology. Emphasis placed on linking ecological and genetic approaches to plant population biology. (Same course as Ecology 207.) Offered in alternate years. —W. (W.)

212. Topics in Invertebrate Evolution (2)
Seminar—2 hours. Prerequisite: graduate standing or consent of instructor and Evolution and Ecology 112-112L. Courses in evolutionary biology, systematics, and ecology highly recommended. Advanced seminar that critically evaluates problems relevant to evolutionary patterns among the invertebrates. May be repeated for credit when topics differ. (S/U grading only.) —J. (S.) Grosberg

211. Animal Behavior, Ecology and Evolution (3)
Lecture—3 hours. Prerequisite: Neurobiology, Physiology, and Behavior 102, Evolution and Ecology 100, 101 or the equivalent, graduate standing, and consent of instructor. Interface between animal behavior, ecology, and evolution. Development in behavioral ecology and development and testing of hypotheses in this discipline. (Same course as Animal Behavior 221.)

224. Field Reconnaissance for Population Biologists (3)
Fieldwork—6 hours. Prerequisite: graduate student in Population Biology, or consent of instructor. Biweekly field trips to acquaint students with plant and animal communities, biodiversity, and ecological and evolutionary research opportunities in northern and central California. May be repeated for credit. (S/U grading only.)

225. Terrestrial Field Ecology (4)
Seminar—1 hour; field work—12 hours. Prerequisite: introductory ecology and introductory statistics, or consent of instructor. A field course conducted over spring break and four weekends at Bodega Bay emphasizing student projects. Ecological hypothesis testing, data gathering, analysis, and written and oral presentation of results will be stressed. (Same course as Ecology/Entomology 225S.) —J. (S.) Karban

231. Mathematical Methods in Population Biology (3)
Lecture—3 hours. Prerequisite: Mathematics 16C or 21C or the equivalent. Mathematical methods used in population biology. Linear and nonlinear difference equations and differential equation models are introduced, using stability analysis and qualitative methods. Partial differential equation models are introduced. Applications to population biology models are stressed. (Same course as Ecology 231.) —F. (F.) Hastings

233. Computational Methods in Population Biology (3)
Lecture/laboratory—2 hours; discussion/laboratory—1 hour. Prerequisite: a course in theoretical ecology (e.g., Ecology 231 or an equivalent to Environmental Science and Policy 121 from your undergraduate institution) or consent of instructor, no programming experience required. Numerical methods for simulating population dynamics using the computational software package R. Emphasis placed on model formulation and development, theoretical concepts, and computational principles guide simulation efforts, model parameterization, and implementing simulations with R. (Same course as Ecology 233.) (S/U grading only.) Offered in alternate years. —W. (W.) Basket, Schreiber

250A. Interdisciplinary Approaches to Biological Invasions (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing. An integrative consideration of biological invasions, including our understanding of the processes from ecology, ecological theory, evolution, genetics, philosophy, and other areas. Emphasis on potential contributions of each area for interdisciplinary problem solving. —S. (S.)

250B. Interdisciplinary Approaches to Biological Invasions (4)
Lecture/discussion—4 hours. Prerequisite: graduate standing. An integrative consideration of biological invasions, including our understanding of the processes from ecology, ecological theory, evolution, genetics, philosophy, and other areas. Emphasis on potential contributions of each area for interdisciplinary problem solving. —W. (W.)

251. Collaborative Project in Biological Invasions (3)
Project—discussion—1 hour. Prerequisite: course 250A, 250B, or equivalent; and consent of instructor. A year-long collaborative project focusing on biological invasions, resulting in a paper or other suitable product presented at a symposium at the conclusion of the project. May be repeated up to five times. (S/U grading only.)—F, W, F, W, S.

270. Research Conference in Evolutionary Biology (1)
Seminar—1 hour. Prerequisite: consent of instructor. Critical presentation and evaluation of current literature and ongoing research in evolutionary biology. May be repeated for credit. (S/U grading only.)—W, S. (F, W, S.)

271. Research Conference in Ecology (1)
Seminar—1 hour. Prerequisite: consent of instructor. Critical presentation and evaluation of current literature and ongoing research in ecology. Requirements include active participation in weekly discussions and the presentation of a paper or chapter once per quarter. May be repeated for credit. (S/U grading only.)—W, S. (F, W, S.)

287. Advanced Animal Behavior (2)
Seminar—2 hours. Prerequisite: graduate standing and consent of instructor, courses in animal behavior (Neurobiology, Physiology, and Behavior 102 or the equivalent), and either evolution (Evolution and Ecology 100 or the equivalent) or ecology (Ecology and Ecology 101 or the equivalent). Reading, reports and discussion on current topics in animal behavior, with a focus on topics that lie at the interface between animal behavior, ecology and evolution. (Same course as Animal Behavior 287.) May be repeated two times for credit.

290. Seminar (1)
Seminar—1 hour. Prerequisite: graduate standing and consent of instructor. Seminars presented by visiting lecturers, UC Davis graduate students and faculty. May be repeated for credit. (S/U grading only.)—F, W, S. (F, W, S.)

290C. Research Conference in Population Biology (1)
Discussion—1 hour. Prerequisite: graduate standing and consent of instructor. Seminar presented by visiting lecturers, UC Davis faculty and graduate students. May be repeated for credit. (Same course as Ecology 299.) (S/U grading only.)—F, W, S. (F, W, S.)

292. Topics in Ecology and Evolution (1)
Seminar—1 hour. Prerequisite: graduate standing. Seminar presented by visiting lecturers, UC Davis faculty and graduate students. May be repeated for credit. (Same course as Ecology 296.) (S/U grading only.)—F, W, S. (F, W, S.)

296. Seminar in Geographical Ecology (2)
Seminar—2 hours. Prerequisite: Evolution and Ecology 100 or 101 or consent of instructor. Recent developments in theoretical and experimental biogeography, historical biogeography and related themes in systematics, the biology of colonizing species, and related topics. (Same course as Geogra phy 214.) (S/U grading only.)—S. (S.) Shapiro

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

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

Population Health and Reproduction

See Veterinary Medicine, School of, on page 381.

Precision Agriculture

(College of Agricultural and Environmental Sciences)
The Department of Biological and Agricultural Engineering offers a minor in Precision Agriculture, the latest farming concept that optimizes fertilizer, pesti-
Preventive Veterinary Medicine

See Veterinary Medicine, School of, on page 581.

Psychiatry

See Medicine, School of, on page 427.

Psychology

(College of Letters and Science)
Paul Hastings, Ph.D., Chairperson of the Department
Department Office. 135 Young Hall
530-752-1880; http://psychology.ucdavis.edu

Faculty
Karen L. Bales, Ph.D., Professor
Wiebke Bieblendorf, Ph.D., Assistant Professor
Shelley A. Bloise, Ph.D., Associate Professor
Lindsay C. Bowman, Ph.D., Assistant Professor
Cameron S. Carter, M.D., Professor
(Psychiatry and Behavioral Sciences)
David C. Corin, Ph.D., Professor (Linguistics)
Victoria L. Cross, Ph.D., Lecturer, PSOE
Paul W. Eastwick, Assistant Professor
Anne D. Ekstrom, Ph.D., Associate Professor
Robert A. Emmons, Ph.D., Professor
Emilio Ferrer-Caja, Ph.D., Professor
Maria Fernanda Ferreira, Ph.D., Professor
Joy Geng, Ph.D., Associate Professor
Simona Ghetta, Ph.D., Professor
Gail S. Goodman, Ph.D., Professor
Katharine Graf Estes, Ph.D., Assistant Professor
Paul D. Hastings, Ph.D., Professor
John M. Henderson, Ph.D., Professor
Gregory M. Herek, Ph.D., Professor
Camelia E. Hostinar, Ph.D., Assistant Professor
Petra Jansato, Ph.D., Professor
Leah A. Krubitzer, Ph.D., Professor
Kristin H. Lagattuta, Ph.D., Professor
Alison M. Ledgerwood, Ph.D., Associate Professor
Debra L. Long, Ph.D., Professor
Academic Senate Distinguished Teaching Award
Steven J. Luck, Ph.D., Professor
George R. Mangun, Ph.D., Distinguished Professor
Lisa M. Oaks, Ph.D., Professor
Cynthia Pickett, Ph.D., Associate Professor
Charan Ranganath, Ph.D., Professor
Philippe Rast, Ph.D., Associate Professor
Susan M. Rivera, Ph.D., Professor
Richard W. Robins, Ph.D., Professor
Jeffrey C. Schank, Ph.D., Professor
Eva Schepeler, Ph.D., Continuing Lecturer
Jeffrey W. Shipherd, Ph.D., Professor
Danielle S. Stolzenberg, Ph.D., Assistant Professor
Tamara Y. Swaab, Ph.D., Professor
Ross A. Thompson, Ph.D., Professor
Brian T. Trainor, Ph.D., Associate Professor
Matthew J. Traxler, Ph.D., Professor
Simone Vazire, Ph.D., Associate Professor
Brian J. Willgen, Ph.D., Associate Professor
Andrew P. Yonelinas, Ph.D., Professor
Nolan W. Zane, Ph.D., Professor

Emeriti Faculty
Linda P. Adreola, Professor Emerita
Jarvis R. Baxian, Ph.D., Professor Emeritus
Rand D. Conger, Ph.D., Professor Emeritus
(Human Ecology)
Richard G. Coss, Ph.D., Professor Emeritus
Alan C. Elms, Ph.D., Professor Emeritus
Karen P. Erickson, Ph.D., Professor Emerita
Albert A. Harrison, Ph.D., Professor Emeritus
Kenneth R. Hawry, Ph.D., Professor Emeritus
Joel T. Johnson, Ph.D., Professor Emeritus
Neal E. Kroll, Ph.D., Professor Emeritus
William A. Mason, Ph.D., Professor Emeritus
Sally Mendoza, Ph.D., Professor Emerita
G. Mitchell, Ph.D., Professor Emeritus
Robert M. Murphy, Ph.D., Professor Emeritus
Thomas Natsoulas, Ph.D., Professor Emeritus
Theodore E. Parks, Jr., Ph.D., Professor Emeritus
Robert B. Post, Ph.D., Professor Emeritus
Phillip R. Shaver, Ph.D., Professor Emeritus
Dean K. Simonton, Ph.D., Distinguished Professor
Emeritus UC Davis Prize for Teaching and Scholarly Achievement
Robert Sommer, Ph.D., Professor Emeritus
Stanley Sue, Ph.D., Professor Emeritus
Charles T. Tart, Ph.D., Professor Emeritus

Affiliated Faculty
Eve A. Ishida, Ph.D., Assistant Adjunct Professor
Joanna E. Scheib, Ph.D., Associate Adjunct Professor

The Major Programs
The psychology program at UC Davis is broad and includes students and faculty with a variety of interests. The department has developed around five major areas of emphasis:
Perception, Cognition, and Cognitive Neuroscience (PCCN) involves the study of human awareness and thought, and includes such topics as perception, learning, memory, language and cognition.
Biological Psychology covers a broad spectrum of topics including evolutionary, neurobiological, and molecular mechanisms of behavior.
Social-Personality Psychology involves the study of the individual in his or her social environment and includes such topics as personality and individual differences, emotions, stereotyping and prejudice, intergroup relations, the psychology of religion and psychological health and dysfunction.
Developmental Psychology involves the study of changes in behavioral, cognitive, emotional, and social abilities that occur throughout the lifespan.

Quantitative Psychology involves the study of linear and nonlinear models, psychometrics, mixed-effects models, and modeling, including experimental design, analysis of variance, regression, multivariate analysis, latent growth models, time series models, and factor analytic models.

The department offers the Bachelor of Arts (A.B.) program for students interested in the liberal arts and the Bachelor of Science (B.S.) program geared for students with an interest in either biology or mathematics. The main objective of both programs is to broaden the scope of contemporary psychology. In addition to a curriculum of common core courses for their degree, students may take approved elective courses from a wide range of topics including Educational Psychology, Interpersonal Communication, and Psychological Anthropology, to name a few. The department strongly encourages students to become involved in individual research projects under the direction of faculty members and to participate in our internship program to broaden experience and understanding of the field of psychology.

Preparatory Requirements. Before declaring a major in Psychology, students must complete the following two courses with a combined grade point average of at least 2.500. Both courses must be taken for a letter grade.

Psychology 1, 41......................... 8
If a 2.500 GPA is not met in one or both courses, a 2.000 GPA in a minimum of three upper division Psychology courses is also acceptable for major declaration.

Career Alternatives. A degree in psychology provides broad intellectual foundations which are useful to the graduate for the development of careers in a variety of areas, including social work, teaching, business, management and counseling. An undergraduate education in psychology also provides excellent preparation for graduate study. Individuals with degrees in psychology may enter graduate programs to prepare for teaching, research, or clinical/counseling careers in psychology, or may go on to professional schools for training in veterinary and human medicine, law, and many other professions.

A.B. Major Requirements:

Preparatory Subject Matter........... 17-20
Psychology 1 or the equivalent........ 4
Psychology 41............................. 5
Statistics 13 or 100....................... 4

Strongly recommended that Psychology 41 and Statistics 13 or 100 be completed in the first year.

Biological Sciences 2A; or a combination of Biological Sciences 10 and one course from: Anthropology 1, Molecular and Cellular Biology 10, or Neurobiology, Physiology, and Behavior 10...................... 5 or 7-8

Depth Subject Matter.................. 40

Two courses from those of the following four groups and one course from the remaining two groups: .......................... 24-34
Group A: Psychology 100 or 100Y, 130, 131, 132, 135, 136
Group B: Psychology 101, 113, 121, 122
Group C: Psychology 151, 152, 154, 156, 161, 162, 168
Group D: Psychology 140, (or Human Development 100A or 100B); Psychology 141 (same course as Human Development 101)

Approved Electives .......................... 16-18
Additional units chosen among Psychology courses and/or approved electives to achieve a total of 40 upper division units. See list of approved electives below.

Total Units for the Major.................. 57-60

Biological Emphasis

B.S. Major Requirements:

Preparatory Subject Matter............ 53-61
Psychology 1 or the equivalent........ 4

Fall 2011 and on Revised General Education (GE): AH=Arts and Humanities; SC=Science and Engineering; SS=Social Sciences; AC=Asian American Studies; DD=Developmental; OL=On Line Only; QL=Quantitative; SL=Social Sciences; VL=Visual; WC=World Cultures; WR=Writing Experience

Pre-Fall 2011 General Education (GE): ArtHum=Arts and Humanities; SciEng=Science and Engineering; SocSci=Social Sciences; Div=Developmental; Wrt=Writing Experience

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

UNITS