EEB - Ecology, Evolution and Behavior

Ecology, Evolution, and Behavior: EEB

Lower-Division Courses

Upper-Division Courses

Graduate Courses

EEB 380C. Advanced Conservation Biology.

Examine the application of principles and concepts of ecology to the preservation of wild plant and animal species and to the preservation, management, and restoration of natural and semi-natural ecosystems. Focus on biological aspects of issues such as endangered species protection, invasive species, preserve design, and forest management, via a set of case studies. Three lecture hours a week for one semester. Only one of the following may be counted: Biology 380C, Ecology, Evolution, and Behavior 380C, Plant Biology 380C. Prerequisite: Graduate standing.

EEB 380E. Advanced Microbial Ecology.

Examine microbial population, community, and ecosystem ecology. Three lecture hours a week for one semester. Only one of the following may be counted: Biology 380E, 384K (Topic 22), 384K (Topic: Advanced Topics in Microbial Ecology), Ecology, Evolution, and Behavior 380E, Plant Biology 380E. Prerequisite: Graduate standing.

EEB 380F. Biology of Birds.

Discuss the anatomy, physiology, classification, and ecology of birds. Three lecture and two laboratory hours a week for one semester. Only one of the following may be counted: Biology 380F, 384K (Topic: Biology of Birds), Ecology, Evolution, and Behavior 380F. Prerequisite: Graduate standing.

EEB 380G. Methods in Ecological Genomics.

Explore state-of-the-art methodologies for: genomics-based demographic and population structure analysis; detection of genomic signatures of natural selection; analyzing gene expression in the ecology, evolution, and behavior context; quantification of complex communities using metabarcoding. Three lecture hours a week for one semester. Only one of the following may be counted: Biology 380G, 384K (Topic: Methods in Ecological Genomics), Ecology, Evolution, and Behavior 380G. Prerequisite: Graduate standing.

EEB 380L. Advanced Systematics.

Explore biodiversity, phylogeny, species concepts, historical biogeography, phylogeography, molecular clocks, phylogenomics, comparative methods, fossils, morphometrics, taxonomy, ontogeny, homology, computational methods, and phylogenetic statistics. Three lecture hours and three laboratory hours a week for one semester. Only one of the following may be counted: Biology 380L, 384K (Topic 14), Ecology, Evolution, and Behavior 380L. Prerequisite: Graduate standing.

EEB 380P. Population Genetics.

Introduction to population genetics. Develop a quantitative understanding of evolutionary change caused by selection, drift, mutation, and migration. Focus on phenotypic and molecular evolution. Three lecture hours a week for one semester. Only one of the following may be counted: Biology 380P, 385K (Topic 4), Ecology, Evolution, and Behavior 380P, Plant Biology 380P. Prerequisite: Graduate standing.

EEB 180R, 280R, 380R. Advanced Readings in the Biological Sciences.

For each semester hour of credit earned, the equivalent of one lecture hour a week for one semester. Prerequisite: Graduate standing, consent of instructor and consent of the graduate advisor.

EEB 380T. Topics in Current Biology Concepts.

Designed for beginning graduate students seeking a review of modern biological concepts. Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing, consent of instructor, and the graduate advisor.

EEB 381E. Ecology Seminar.

Listen to and discuss presentations ranging from research progress reports to practice conference talks and well-versed presentations of long term research programs. Three lecture hours a week for one semester May be repeated for credit. Offered on the credit/no credit basis only. Prerequisite: Graduate standing, consent of the graduate advisor, and consent of instructor

EEB 182, 282, 382, 682, 982. Advanced Study and Research.

For each semester hour of credit earned, the equivalent of one lecture hour a week for one semester. May be repeated for credit. Prerequisite: Graduate standing, consent of instructor, and consent of the graduate advisor.

EEB 382K. Topics in Computational and Statistical Biology.

Three lecture hours a week for one semester. May be repeated for credit when the topics vary.

Topic 4: Numerical Ecology in R. Explore basic concepts and methods of laboratory and field analysis in various fields of biology; systematics and ecology of natural populations. Biology 384K (Topic: Numerical Ecology in R) and Ecology, Evolution, and Behavior 382K (Topic 4) may not both be counted. Additional prerequisite: Graduate standing, and consent of instructor and the graduate advisor.
Topic 5: Meta Analysis. Explore a quantitative approach for synthesizing results from diverse research studies that address a similar hypothesis. Only one of the following may be counted: Biology 382K (Topic: Meta Analysis), 384K (Topic: Meta Analysis), Ecology, Evolution, and Behavior 382K (Topic 5), Plant Biology 382K (Topic 5). Additional prerequisite: Graduate standing, and consent of instructor and the graduate advisor.
Topic 6: Programming for Biology. Explore programming skills that are relevant to research in the biological sciences, including but not limited to programming in Python, R, Perl, C++. Only one of the following may be counted: Biology 382K (Topic 6), Ecology, Evolution, and Behavior 382K (Topic 6), Plant Biology 382K (Topic 6).
Topic 7: Ecological Theory and Modeling. Explore concepts and methods of modeling ecological systems including populations, communities and ecosystems. Focus on the methodology and utility of ecological theory and modeling. Examine the basic techniques and classic insights derived from differential equation, statistical, and individual based models. Learn how to interpret and evaluate models in the literature. Only one of the following may be counted: Biology 382K (Topic 7), Ecology, Evolution, and Behavior 382K (Topic 7), Plant Biology 382K (Topic 7).
Topic 8: Introduction to Biology for Data Science. Explore biological concepts and methods (including its assumptions and limitations), particularly in the areas of systems biology, medical and evolutionary genomics, and neuroscience. Focus on approaches that produce a lot of data but are analysis-challenged. Only one of the following may be counted: Biology 382K (Topic: Intro to Bio for Data Science),

382K (Topic 8), Ecology, Evolution, and Behavior 382K (Topic 8), Plant Biology 382K (Topic 8).

EEB 384K. Topics in Ecology, Evolution, and Behavior.

Explore basic concepts and methods of laboratory and field analysis in various fields of biology; systematics and ecology of natural populations. Three lecture hours a week for one semester. May be repeated for credit when the topics vary. Prerequisite: Graduate standing, and consent of instructor and the graduate advisor; additional prerequisites vary with the topic.

Topic 1: Chemical Ecology. Explore the breadth of chemical ecology, from its historical focus on pheromonal communication, plant-insect interactions, and coevolution to new frontiers, including novel methods in metabolomics and the community and ecosystem effects of chemically mediated species interactions. Only one of the following may be counted: Biology 384K (Topic: Chemical Ecology), Ecology, Evolution, and Behavior 384K (Topic 1), Plant Biology 384K (Topic 1).
Topic 2: Human Population Genetics. Discuss critical reading of primary quantitative literature on the drivers of genetic variation and its mapping to trait variation, focusing on humans. Analyze central ideas in mathematical modeling and statistical analysis of human genetic variation and explore areas from evolutionary genetics and medical genetics including mutation and recombination, genetic drift, natural selection, analyses of gene-expression variation, population structure, genotype-phenotype stratification, and study designs for mapping genotype to phenotype. Biology 384K (Topic: Quantitative/ Pop Genetics) and Ecology, Evolution, and Behavior 384K (Topic 2) may not both be counted.
Topic 3: Diversity, Equity, and Inclusion in STEM: The Science Behind Bias. Discuss the historical context of bias and exclusion in science from the primary literature to understand the science of bias, why it is present, how it continues to persist across the Science, Technology, Engineering, and Mathematics (STEM) fields, and identify actionable items to address and overcome these issues. Biology 384K (Topic: DEI IN STEM: SCI BEHIND BIAS) and Ecology, Evolution, and Behavior 384K (Topic 3) may not both be counted.
Topic 4: Recent Advances in Ecosystem Ecology. Explore recent advances in ecosystem ecology through lectures and discussions. Only one of the following may be counted: Biology 384K (Topic 31), Ecology, Evolution, and Behavior 384K (Topic 4), Plant Biology 384K (Topic 2). Additional prerequisite: Undergraduate upper-division ecology course.
Topic 5: Recent Advances in Ecological and Evolutionary Genetics. Discuss and analyze current and classic literature related to ecological and evolutionary genetics. Only one of the following may be counted: Biology 384K (Topic 38), Ecology, Evolution, and Behavior 384K (Topic 5), Plant Biology 384K (Topic 3).
Topic 6: Phylogenetic Perspectives in Ecology, Evolution, and Behavior. Explore the theory, methods, and applications of phylogenetics in ecology, evolution, and behavior. Examine the development of phylogenetics; the various phylogenetic optimality criteria and their advantages and disadvantages (include non-parametric, semi-parametric, and parametric methods); models of evolution for molecular and morphological data; algorithms and heuristics for searching solution space. Discuss Bayesian Markov chain Monte Carlo approaches; phylogenetic simulation; statistical assessment of phylogenetic results; molecular clocks; and major applications of phylogenetics. Biology 384K (Topic 39) and Ecology, Evolution, and Behavior 384K (Topic 6) may not both be counted.
Topic 7: Ancient and Environmental DNA. Explore the prospects and challenges of ancient/environmental DNA research, and considers the applications in evolutionary biology, paleontology, and anthropology. Only one of the following may be counted: Anthropology 388 (Topic: Ancient DNA) Biology 384K (Topic: Ancient DNA), 384K (Topic 43), Ecology, Evolution, and Behavior 384K (Topic 7).
Topic 8: Seminars in Brain Behavior and Evolution. Explore how to give a seminar and/or writing a grant proposal. Prepare for job talks, paper presentations, or writing grants. Biology 384K (Topic 45) and Ecology, Evolution, and Behavior 384K (Topic 8) may not both be counted.

EEB 384L. Issues in Population Biology.

Analyze at an advanced level currently active areas of research in population biology. Three lecture hours a week for one semester. Only one of the following may be counted: Biology 384L, Ecology, Evolution, and Behavior 384L, Plant Biology 384L. Offered on the credit/no credit basis only. Prerequisite: Graduate standing, and consent of instructor and the graduate advisor.

EEB 389D. Subjects and Skills for Graduate Students in Ecology, Evolution and Behavior.

Designed for first-year graduate students in ecology, evolution, and behavior. Introduction to the writing, presentation and appraisal skills needed to excel in all fields of biological research. Focus on training in many of the skills required of research scientists. Three lecture hours a week for one semester. Only one of the following may be counted: Biology 384C, 389D, Ecology, Evolution, and Behavior 389D, Plant Biology 389D. Prerequisite: Graduate standing, and consent of instructor and graduate advisor.

EEB 390C. Fundamentals of Evolution.

Introduction to major principles and questions in evolutionary biology. Explore population genetics, genetic diversity, adaptation, origin of species, phylogenetics, molecular evolution, and macroevolution. Focus on identifying open questions, analysis, and interpretation of data, and gaining familiarity with the primary scientific literature. Three lecture hours a week for one semester. Only one of the following may be counted: Biology 390C, Ecology, Evolution, and Behavior 390C, Plant Biology 390C. Prerequisite: Graduate standing, and consent of instructor and the graduate advisor.

EEB 390D. Fundamentals of Integrative Animal Behavior.

Introduction to major principles and questions in animal behavior with emphasis on why animals behave the way they do. Examine both the proximate and ultimate issues of animal behavior, how it is acquired and regulated, and how it evolved. Focus on integration of proximate and ultimate analyses in the various domains in which animals behave. Three lecture hours a week for one semester. Biology 390D and Ecology, Evolution, and Behavior 390D may not both be counted. Prerequisite: Graduate standing, and consent of instructor and the graduate advisor.

EEB 390E. Fundamentals of Ecology.

Explore the fundamentals of ecology, ranging from organism physiology to population, species, community, and ecosystem-level processes across landscapes and biomes. Three lecture hours a week for one semester. Only one of the following may be counted: Biology 390E, Ecology, Evolution, and Behavior 390E, Plant Biology 390E. Prerequisite: Graduate standing and consent of instructor.

EEB 698. Thesis.

Three lecture hours a week for two semesters. Offered on the credit/no credit basis only. Prerequisite: For 698A, graduate standing and consent of the graduate advisor; for 698B, Ecology, Evolution, and Behavior 698A or the equivalent.

EEB 398R. Master's Report.

Prepare a report to fulfill the requirement for the master's degree under the report option. Three lecture hours a week for one semester. Only one

of the following may be counted: Biology 398R, Ecology, Evolution, and Behavior 398R, Plant Biology 398R. Prerequisite: Graduate standing and consent of the graduate advisor.

EEB 399W, 699W, 999W. Dissertation.

May be repeated for credit. Offered on the credit/no credit basis only. Prerequisite: Admission to candidacy for the doctoral degree.

Professional Courses