

Ecology, Evolution, and Behavior (EEB)

EEB 380C Advanced Conservation Biology 3 Hours

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.

EEB 380E Advanced Microbial Ecology 3 Hours

Examine microbial population, community, and ecosystem ecology.

EEB 380F Biology of Birds 3 Hours

Discuss the anatomy, physiology, classification, and ecology of birds.

EEB 380G Methods in Ecological Genomics 3 Hours

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.

EEB 380L Advanced Systematics 3 Hours

Explore biodiversity, phylogeny, species concepts, historical biogeography, phylogeography, molecular clocks, phylogenomics, comparative methods, fossils, morphometrics, taxonomy, ontogeny, homology, computational methods, and phylogenetic statistics.

EEB 380P Population Genetics 3 Hours

Introduction to population genetics. Develop a quantitative understanding of evolutionary change caused by selection, drift, mutation, and migration. Focus on phenotypic and molecular evolution.

EEB 180R, 280R, 380R Advanced Readings in the Biological Sciences 1-3 Hours

EEB 380T Topics in Current Biology Concepts 3 Hours

Designed for beginning graduate students seeking a review of modern biological concepts.

EEB 381E Ecology Seminar 3 Hours

Listen to and discuss presentations ranging from research progress reports to practice conference talks and well-versed presentations of long term research programs.

EEB 182, 282, 382, 682, 982 Advanced Study and Research 1,2,3,6,9 Hours

EEB 382K Topics in Computational and Statistical Biology 3 Hours

EEB 382K.4 Numerical Ecology in R 3 Hours

Explore basic concepts and methods of laboratory and field analysis in various fields of biology; systematics and ecology of natural populations.

EEB 382K.5 Meta Analysis 3 Hours

Explore a quantitative approach for synthesizing results from diverse research studies that address a similar hypothesis.

EEB 382K.6 Programming for Biology 3 Hours

Explore programming skills that are relevant to research in the biological sciences, including but not limited to programming in Python, R, Perl, C++.

EEB 382K.7 Ecological Theory and Modeling 3 Hours

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.

EEB 382K.8 Introduction to Biology for Data Science 3 Hours

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.

EEB 382K.9 Mathematical Modeling for Biology 3 Hours

Translate between qualitative hypotheses regarding biological processes and their more exact expression in the form of mathematical models. Analyze these models to determine predicted biological behavior under those hypotheses.

EEB 384K Topics in Ecology, Evolution, and Behavior 3 Hours

Explore basic concepts and methods of laboratory and field analysis in various fields of biology; systematics and ecology of natural populations.

EEB 384K.1 Chemical Ecology 3 Hours

Explore the breadth of chemical ecology, from its historical focus on phomonal 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.

EEB 384K.2 Quantitative and Population Genetics 3 Hours

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.

EEB 384K.3 Diversity, Equity, and Inclusion in STEM: The Science Behind Bias 3 Hours

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.

EEB 384K.4 Recent Advances in Ecosystem Ecology 3 Hours

Explore recent advances in ecosystem ecology through lectures and discussions.

EEB 384K.5 Recent Advances in Ecological and Evolutionary Genetics 3 Hours

Discuss and analyze current and classic literature related to ecological and evolutionary genetics.

EEB 384K.6 Phylogenetic Perspectives in Ecology, Evolution, and Behavior 3 Hours

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.

EEB 384K.7 Ancient and Environmental DNA 3 Hours

Explore the prospects and challenges of ancient/environmental DNA research, and considers the applications in evolutionary biology, paleontology, and anthropology.

EEB 384K.8 Seminars in Brain Behavior and Evolution 3 Hours

Explore how to give a seminar and/or writing a grant proposal. Prepare for job talks, paper presentations, or writing grants.

EEB 384K.9 Integrative Omics in the Evolution of Development and Behavior 3 Hours

Discuss the conceptual foundations and historical roots of research programs in evo-devo and evolutionary neuroscience including recent discoveries and limitations in these fields. Explore how -omics approaches and comparative methods enable novel insights into the diversification, convergence, and constraint of complex traits.

EEB 384L Issues in Population Biology 3 Hours

Analyze at an advanced level currently active areas of research in population biology.

EEB 389D Subjects and Skills for Graduate Students in Ecology, Evolution and Behavior 3 Hours

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.

EEB 390C Fundamentals of Evolution 3 Hours

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.

EEB 390D Fundamentals of Integrative Animal Behavior 3 Hours

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.

EEB 390E Fundamentals of Ecology 3 Hours

Explore the fundamentals of ecology, ranging from organism physiology to population, species, community, and ecosystem-level processes across landscapes and biomes.

EEB 698 Thesis 6 Hours

EEB 398R Master's Report 3 Hours

Prepare a report to fulfill the requirement for the master's degree under the report option.

EEB 399W, 699W, 999W Dissertation 3,6,9 Hours