

Ecology, Evolution, and Organismal Biology (EEOB)

Courses primarily for graduate students, open to qualified undergraduates:

EEOB 5011. Freshwater Algae.

(Cross-listed with IA LL). Cr. 4. SS.

Structure and taxonomy of freshwater algae based on field collected material; emphasis on genus-level identifications, habitats visited include lakes, fens, streams, and rivers; algal ecology.

EEOB 507. Advanced Animal Behavior.

(3-0) Cr. 3. S. Prereq: Graduate standing, BIOL 354, or permission of instructor

Analysis of current research in animal behavior. Topics covered may include behavioral ecology, mechanisms of behavior, evolution of behavior, applications of animal behavior to conservation biology, and applications of animal behavior to wild animals in captivity.

EEOB 514. Evolutionary Ecology.

(3-0) Cr. 3. F. Prereq: EEOB 589, BIOL 315; graduate standing

Evolution of ecological adaptations at the individual, population, community and landscape levels. Emphasis is on evolutionary mechanisms and adaptive strategies; units and mechanisms of evolution, life history strategies, species interactions and organization of communities, behavior, and patterns of distribution, speciation and macroevolution.

EEOB 531. Conservation Biology.

(Cross-listed with A ECL). (3-0) Cr. 3. Alt. S., offered 2012. Prereq: BIOL 312; BIOL 313 or graduate standing

Examination of conservation issues from a population and a community perspective. Population-level analysis will focus on the role of genetics, demography, and environment in determining population viability. Community perspectives will focus on topics such as habitat fragmentation, reserve design, biodiversity assessment, and restoration ecology.

EEOB 531I. Conservation Biology.

(Cross-listed with IA LL, A ECL). Cr. 4. Alt. SS., offered 2012. Prereq: IA LL 312I Population-and community-level examination of factors influencing the viability of plant and animal populations from both demographic and genetic perspectives; assessment of biodiversity; design and management of preserves.

EEOB 534. Endocrinology.

(3-0) Cr. 3. S. Prereq: BIOL 211, BIOL 212

Dual-listed with Biol 434. Chemical integration of vertebrate organisms. The structure, development, and evolution of the endocrine glands and the function and structure of their hormones.

EEOB 535. Restoration Ecology.

(Cross-listed with ENSCI, NREM). (2-3) Cr. 3. F. Prereq: BIOL 366 or BIOL 474 or graduate standing

Theory and practice of restoring animal and plant diversity, structure and function of disturbed ecosystems. Restored freshwater wetlands, forests, prairies and reintroduced species populations will be used as case studies.

EEOB 535I. Restoration Ecology.

(Cross-listed with A ECL, ENSCI, IA LL). Cr. 4. Alt. SS., offered 2012. Prereq: A course in ecology

Ecological principles for the restoration of native ecosystems; establishment (site preparation, selection of seed mixes, planting techniques) and management (fire, mowing, weed control) of native vegetation; evaluation of restorations. Emphasis on the restoration of prairie and wetland vegetation.

EEOB 539. Environmental Physiology.

(3-3) Cr. 3-4. Alt. S., offered 2012. Prereq: BIOL 335 or A ECL 311, physics recommended

Dual-listed with Biol 439. Graduate study in conjunction with Biol 439. Physiological adaptations to the environment with emphasis on vertebrates.

EEOB 542. Introduction to Molecular Biology Techniques.

(Cross-listed with B M S, GDCB, FS HN, GDCB, HORT, NREM, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. F.S.SS. Prereq: Graduate classification

Sessions in basic molecular biology techniques and related procedures. Offered on a satisfactory-fail basis only.

EEOB 542A. Introduction to Molecular Biology Techniques: DNA.

(Cross-listed with B M S, GDCB, FS HN, GDCB, HORT, NREM, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. F.S.SS. Prereq: Graduate classification

Includes genetic engineering procedures, sequencing, PCR, and genotyping. Offered on a satisfactory-fail basis only.

EEOB 542B. Introduction to Molecular Biology Techniques: Protein.

(Cross-listed with B M S, GDCB, GDCB, FS HN, HORT, NREM, NUTRS). Cr. 1. Repeatable. S.SS. Prereq: Graduate classification

Techniques. Includes fermentation, protein isolation, protein purification, SDS-PAGE, Western blotting, NMR, confocal microscopy and laser microdissection, Immunophenotyping, and monoclonal antibody production. Sessions in basic molecular biology techniques and related procedures. Offered on a satisfactory-fail basis only.

EEOB 542C. Introduction to Molecular Biology Techniques: Cell.

(Cross-listed with B M S, GDCB, FS HN, GDCB, HORT, NREM, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. F.S. Prereq: Graduate classification

Includes immunophenotyping, ELISA, flow cytometry, microscopic techniques, image analysis, confocal, multiphoton and laser capture microdissection. Offered on a satisfactory-fail basis only.

EEOB 542D. Introduction to Molecular Biology Techniques: Plant Transformation.

(Cross-listed with B M S, GDCB, FS HN, GDCB, HORT, NREM, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. S. Prereq: Graduate classification

Includes Agrobacterium and particle gun-mediated transformation of tobacco, Arabidopsis, and maize, and analysis of transformants. Offered on a satisfactory-fail basis only.

EEOB 542E. Proteomics. Includes two-dimensional electrophoresis, laser scanning, mass spectrometry, and database searching. (F.)

(Cross-listed with B M S, BBMB, FS HN, GDCB, HORT, NREM, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. F.S.SS. Prereq: Graduate classification

Sessions in basic molecular biology techniques and related procedures. Offered on a satisfactory-fail basis only.

EEOB 542F. Techniques in Metabolomics. metabolomics and the techniques involved in metabolite profiling. For non-chemistry majoring students who are seeking analytical aspects into their biological research projects.

(Cross-listed with B M S, BBMB, FS HN, GDCB, HORT, NREM, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. F.S.SS. Prereq: Graduate classification

Sessions in basic molecular biology techniques and related procedures. Offered on a satisfactory-fail basis only.

EEOB 542G. Introduction to Molecular Biology Techniques: Genomic.

(Cross-listed with B M S, GDCB, FS HN, GDCB, HORT, NREM, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. S. Prereq: Graduate classification

Offered on a satisfactory-fail basis only.

EEOB 551. Plant Evolution and Phylogeny.

(Dual-listed with EEOB 451). (Cross-listed with EEOB). (3-3) Cr. 4. F. Prereq: BIOL 315 or equivalent.

Survey of land plant evolution; phylogenetic comparison of anatomical, reproductive, and life history specializations. Relationships among bryophytes, lycophytes, pteridophytes, gymnosperms, and angiosperms emphasizing significant evolutionary changes documented by paleobotanical, morphological, and molecular studies.

EEOB 553. Agrostology.

(2-3) Cr. 3. Alt. F., offered 2012. Prereq: BIOL 366

Structure, identification, classification, phylogeny, and economic aspects of grasses and related families.

EEOB 555. Bryophyte and Lichen Biodiversity.

(Dual-listed with EEOB 455). Cr. 3. Prereq: BIOL 212, BIOL 212L

Introduction to the biology and ecology of mosses, liverworts, and lichens. Emphasis on identification and diversity of local representatives of these three groups of organisms. Required field trips and service-learning.

EEOB 557. Herpetology.

(Dual-listed with EEOB 457). (Cross-listed with A ECL). (2-3) Cr. 3. F. Prereq: A ECL 365 or BIOL 351

Biology, ecology, and evolution of amphibians (salamanders, frogs, caecilians) and reptiles (lizards, snakes, tuatara, turtles, crocodilians). Emphasis on structure, physiological adaptation to different environments, behavior, reproduction, roles of amphibians and reptiles in ecosystems, and conservation. Laboratory focus on survey methods, identification, relationships, distribution, habits, and habitats of amphibians and reptiles.

EEOB 558. Ornithology.

(Dual-listed with BIOL 458). (Cross-listed with A ECL). (2-3) Cr. 3. S. Prereq: A ECL 365 or BIOL 351

Dual-listed with Biol 458. Biology, ecology, evolution, and taxonomy of birds. Emphasis on structure, physiology, behavior, communication, navigation, reproduction, and conservation. Laboratory exercises complement lecture topics, emphasize identification and distribution of Midwest birds, and include field trips.

EEOB 559. Mammalogy.

(Dual-listed with BIOL 459). (Cross-listed with BIOL). (2-3) Cr. 3. S. Prereq: BIOL 351 or A ECL 365

Biology, ecology, and evolution of mammals. Emphasis on structure, physiological adaptation to different environments, behavior, reproduction, roles of mammals in ecosystems, and conservation. Laboratory focus on identification, distribution, habits, and habitats of mammals.

EEOB 560. Resource Ecology.

(2-3) Cr. 3. Alt. S., offered 2012. Prereq: BIOL 212, BIOL 212L, BIOL 312; STAT 101 or STAT 104 or graduate standing

Ecological and economical management of sustainable biological resources. Unifying current management concepts and models in wildlife, fisheries, water quality, forestry, recreation, and agriculture. Research problems.

EEOB 562. Evolutionary Genetics.

(3-0) Cr. 3. Alt. S., offered 2013. Prereq: Permission of instructor

Seminar/discussion course covering the genetic basis of evolutionary processes in multicellular organisms.

EEOB 563. Molecular Phylogenetics.

(2-3) Cr. 3. F. Prereq: BIOL 313 and BIOL 315

An overview of the theory underlying phylogenetic analysis and the application of phylogenetic methods to molecular datasets. The course emphasizes a hands-on approach to molecular phylogenetics and combines lecture presentations with computer exercises and discussion of original scientific literature.

EEOB 564. Wetland Ecology.

(Cross-listed with ENSCI). (3-0) Cr. 3. S. Prereq: 15 credits in biological sciences

Ecology, classification, creation and restoration, and management of wetlands. Emphasis on North American temperate wetlands.

EEOB 564I. Wetland Ecology.

(Cross-listed with ENSCI, IA LL). Cr. 4. SS. Prereq: IA LL 312I

Ecology, classification, and management of wetlands. Field studies will examine the composition, structure and functions of local natural wetlands and restored prairie pothole wetlands. Individual or group projects.

EEOB 565. Morphometric Analysis.

(3-2) Cr. 4. Alt. S., offered 2012. Prereq: STAT 401

Dual-listed with Biol 465. A comprehensive overview of the theory and methods for the analysis of biological shape with emphasis on data acquisition, standardization, statistical analysis, and visualization of results. Methods for both landmark and outline data will be discussed.

EEOB 566. Molecular Evolution.

(3-0) Cr. 3. Alt. F., offered 2012. Prereq: Permission of instructor

Seminar/discussion course covering the fundamentals of molecular evolution. Emphasis is placed on original scientific literature and current topics, including rates and patterns of genetic divergence; nucleotide and allelic diversity; molecular clocks; gene duplications; genome structure; organellar genomes; polyploidy; transposable elements; and modes and mechanisms of gene and genome evolution.

EEOB 567. Empirical Population Genetics.

(3-0) Cr. 3. F. Prereq: Permission of instructor

An overview of fundamental population genetic theory and the ecological and evolutionary factors underlying the distribution of genetic variation within and among natural populations. Emphasis on the analysis of inbreeding, breeding systems, parentage, relatedness, spatial autocorrelation, effective population size, hierarchical population models, and phylogeography.

EEOB 568. Advanced Systematics.

(Cross-listed with ENT). (2-3) Cr. 3. Alt. S., offered 2013. Prereq: Permission of instructor

Principles and practice of systematic biology; taxonomy, nomenclature and classification of plants and animals; sources and interpretation of systematic data; speciation; fundamentals of phylogenetic systematics.

EEOB 569. Biogeography.

(3-0) Cr. 3. Alt. S., offered 2012. Prereq: BIOL 315 or equivalent; permission of instructor

Principles underlying the geographic distribution of organisms throughout the world; biological influences of geological history and tectonic movements; role of climate, migration, dispersal, habitat, and phylogeny on past and present organismal distribution patterns; biogeographic methods.

EEOB 570. Landscape Ecology.

(Cross-listed with A ECL). (2-3) Cr. 3. Alt. F., offered 2012. Prereq: Permission of instructor; EEOB 588; a course in calculus

The study of ecological and evolutionary processes within a spatial context with emphasis on behavior, population, and community dynamics.

EEOB 573. Techniques for Biology Teaching.

(Cross-listed with IA LL, A ECL). Cr. 1-2. Repeatable. SS.

The development and implementation of laboratory exercises suitable for inclusion in elementary, middle, high school, and community college biology and environmental courses. Exercises will be built around common organisms and ecosystems in Iowa. Field trips.

EEOB 573A. Techniques for Biology Teaching : Animal Biology.

(Cross-listed with IA LL, A ECL). Cr. 1-2. Repeatable. SS.

The development and implementation of laboratory exercises suitable for inclusion in elementary, middle, high school, and community college biology and environmental courses. Exercises will be built around common organisms and ecosystems in Iowa. Field trips.

EEOB 573B. Techniques for Biology Teaching: Plant Biology.

(Cross-listed with IA LL). Cr. 1-2. Repeatable. SS.

The development and implementation of laboratory exercises suitable for inclusion in elementary, middle, high school, and community college biology and environmental courses. Exercises will be built around common organisms and ecosystems in Iowa. Field trips.

EEOB 573C. Techniques for Biology Teaching: Fungi and Lichens.

(Cross-listed with IA LL). Cr. 1-2. Repeatable. SS.

The development and implementation of laboratory exercises suitable for inclusion in elementary, middle, high school, and community college biology and environmental courses. Exercises will be built around common organisms and ecosystems in Iowa. Field trips.

EEOB 573D. Techniques for Biology Teaching: Aquatic Ecology.

(Cross-listed with IA LL). Cr. 1-2. Repeatable. SS.

The development and implementation of laboratory exercises suitable for inclusion in elementary, middle, high school, and community college biology and environmental courses. Exercises will be built around common organisms and ecosystems in Iowa. Field trips.

EEOB 573E. Techniques for Biology Teaching: Prairie Ecology.

(Cross-listed with IA LL). Cr. 1-2. Repeatable. SS.

The development and implementation of laboratory exercises suitable for inclusion in elementary, middle, high school, and community college biology and environmental courses. Exercises will be built around common organisms and ecosystems in Iowa. Field trips.

EEOB 573F. Techniques for Biology Teaching: Wetland Ecology.

(Cross-listed with IA LL). Cr. 1-2. Repeatable. SS.

The development and implementation of laboratory exercises suitable for inclusion in elementary, middle, high school, and community college biology and environmental courses. Exercises will be built around common organisms and ecosystems in Iowa. Field trips.

EEOB 573G. Techniques for Biology Teaching: Limnology.

(Cross-listed with IA LL, A ECL). Cr. 1-2. Repeatable. SS.

The development and implementation of laboratory exercises suitable for inclusion in elementary, middle, high school, and community college biology and environmental courses. Exercises will be built around common organisms and ecosystems in Iowa. Field trips.

EEOB 573H. Techniques for Biology Teaching: Animal Behavior.

(Cross-listed with IA LL). Cr. 1-2. Repeatable. SS.

The development and implementation of laboratory exercises suitable for inclusion in elementary, middle, high school, and community college biology and environmental courses. Exercises will be built around common organisms and ecosystems in Iowa. Field trips.

EEOB 573I. Techniques for Biology Teaching: Insect Ecology.

(Cross-listed with IA LL, A ECL). Cr. 1-2. Repeatable. SS.

The development and implementation of laboratory exercises suitable for inclusion in elementary, middle, high school, and community college biology and environmental courses. Exercises will be built around common organisms and ecosystems in Iowa. Field trips.

EEOB 573J. Techniques for Biology Teaching: Biology of Invertebrates.

(Cross-listed with IA LL). Cr. 1-2. Repeatable. SS.

The development and implementation of laboratory exercises suitable for inclusion in elementary, middle, high school, and community college biology and environmental courses. Exercises will be built around common organisms and ecosystems in Iowa. Field trips.

EEOB 573K. Techniques for Biology Teaching: Non-invasive Use of Living Organisms.

(Cross-listed with IA LL). Cr. 1-2. Repeatable. SS.

The development and implementation of laboratory exercises suitable for inclusion in elementary, middle, high school, and community college biology and environmental courses. Exercises will be built around common organisms and ecosystems in Iowa. Field trips.

EEOB 573W. Techniques for Biology Teaching: Project WET.

(Cross-listed with IA LL, A ECL). Cr. 1-2. Repeatable. SS.

The development and implementation of laboratory exercises suitable for inclusion in elementary, middle, high school, and community college biology and environmental courses. Exercises will be built around common organisms and ecosystems in Iowa. Field trips.

EEOB 575I. Field Mycology.

(Cross-listed with IA LL). Cr. 4. Alt. SS., offered 2012.

Identification and classification of the common fungi; techniques for identification, preservation, and culture practiced with members of the various fungi groups.

EEOB 576. Functional Ecology.

(3-0) Cr. 3. Alt. S., offered 2013. *Prereq: BIOL 312*

Dual-listed with Biol 476. The nature of adaptations to physical and biotic environments. Biophysical, biomechanical, and physiological bases of the structure, form, growth, distribution, and abundance of organisms.

EEOB 577. Concepts in Theoretical Ecology and Evolution.

(2-0) Cr. 1. Alt. F., offered 2012.

Readings and discussion of influential ideas in ecological and evolutionary theory, with an emphasis on how models are used as conceptual tools for building synthetic paradigms. Topics are chosen according to student interests; may include spatial ecology, behavioral theory, chaos, community assembly and biodiversity, and others.

EEOB 578. Foundations of Theoretical Ecology and Evolution.

(3-0) Cr. 3. Alt. S., offered 2014. *Prereq: 1 semester of calculus or permission of instructor.*

Quantitative exploration of classic models and results in ecological and evolutionary theory. Introduction to conceptual, mathematical, and programming tools needed to build and analyze models.

EEOB 580I. Ecology and Systematics of Diatoms.

(Cross-listed with IA LL). Cr. 4. SS.

Field and laboratory study of freshwater diatoms; techniques in collection, preparation, and identification of diatom samples; study of environmental factors affecting growth, distribution, taxonomic characters; project design and execution including construction of reference and voucher collections and data organization and analysis.

EEOB 581. Environmental Systems I: Introduction to Environmental Systems.

(Dual-listed with BIOL 381). (Cross-listed with BIOL, ENV S, MICRO). Cr. 3-4. F. *Prereq: 12 credits of natural science including biology and chemistry*

Introduction to the structure and function of natural environmental systems. Emphasis on the analysis of material and energy flows in natural environmental systems and the primary environmental factors controlling these systems.

EEOB 584. Ecosystem Ecology.

(Cross-listed with ENSCI). (3-0) Cr. 3. Alt. S., offered 2012. *Prereq: Combined 12 credits in biology and chemistry*

Introduction to the study of ecosystems and the factors that influence their properties and dynamics. Conceptual foundations for ecosystem studies. Quantitative analyses of accumulations, transformations, and fluxes of nutrients, water, and energy within and among ecosystems.

EEOB 585. Advanced Community Ecology.

(2-3) Cr. 3. Alt. F., offered 2012. *Prereq: BIOL 312*

Factors controlling species diversity, species abundance, and the structure and function of communities in space and time. Relationships between species diversity and ecosystem process rates and community stability.

EEOB 586. Aquatic Ecology.

(Dual-listed with EEOB 486). (Cross-listed with ENSCI). (3-0) Cr. 3. F. *Prereq: ENSCI 301 or ENSCI 312 or ENSCI 381 or ENSCI 402*

(Dual-listed with Biol 486.) Structure and function of aquatic ecosystems with application to fishery and pollution problems. Emphasis on lacustrine, riverine and wetland ecology.

EEOB 586L. Aquatic Ecology Laboratory.

(Cross-listed with EEOB 487). (Cross-listed with ENSCI). (0-3) Cr. 1. F. *Prereq: Concurrent enrollment in EEOB 586*

(Dual-listed with Biol 486L.) Field trips and laboratory exercises to accompany 586. Hands-on experience with aquatic research and monitoring techniques and concepts.

EEOB 587. Microbial Ecology.

(Dual-listed with EEOB 487). (Cross-listed with ENSCI, MICRO). (3-0) Cr. 3. F.

Prereq: Six credits in biology and 6 credits in chemistry

(Dual-listed with Biol 487.) Introduction to major functional groups of autotrophic and heterotrophic microorganisms and their roles in natural systems.

EEOB 589. Population Ecology.

(Cross-listed with A ECL). (2-2) Cr. 3. F. *Prereq: BIOL 312, STAT 101 or STAT 104, a course in calculus, or graduate standing*

(Dual-listed with Biol 489.) Concepts and theories of population dynamics with emphasis on models of growth, predation, competition, and regulation.

EEOB 590. Graduate Independent Study.

(Cross-listed with ANTHR, A ECL, IA LL). Cr. 1-4. Repeatable. SS. *Prereq: Graduate classification and permission of instructor*

EEOB 590A. Special Topics: Current Topics in Ecology.

Cr. 1-3. Repeatable. *Prereq: 10 credits in biology, permission of instructor*

EEOB 590B. Special Topics: Current Topics in Evolutionary Biology.

Cr. 1-3. Repeatable. *Prereq: 10 credits in biology, permission of instructor*

EEOB 590C. Special Topics: Current Topics in Organismal Biology.

Cr. 1-3. Repeatable. *Prereq: 10 credits in biology, permission of instructor*

EEOB 590I. Special Topics: Graduate Independent Study.

(Cross-listed with A ECL, ANTHR, IA LL). Cr. 1-4. Repeatable. SS. *Prereq: Graduate classification and permission of instructor*

EEOB 596. Ecology and Society.

(Dual-listed with BIOL 496). (3-0) Cr. 3. *Prereq: Graduate classification in biological or environmental sciences/studies with at least one course in ecology* Analysis of conceptual and methodological debates in ecology. Historical development of competing research traditions and philosophies. Topics include i) methodological issues in ecological science, ii) conceptual issues in theoretical ecology, iii) conceptual issues in applied ecology, iv) relation of ecology to environmental and social issues.

EEOB 599. Creative Component.

Cr. arr.

Research toward nonthesis master's degree.

Courses for graduate students:**EEOB 611. Analysis of Populations.**

(Cross-listed with A ECL). (2-2) Cr. 3. Alt. F., offered 2011. *Prereq: BIOL 312; STAT 401; a course in calculus*

Quantitative techniques for analyzing vertebrate population data to estimate parameters such as density and survival. Emphasis on statistical inference and computing.

EEOB 679. Light Microscopy.

(Cross-listed with MICRO, GDCB). (2-9) Cr. 5. *Prereq: Permission of instructor*

Current theories encompassing light optics and their applications for specimen preservation, paraffin and resin sectioning, general staining, histochemistry, cytophotometry, immunocytochemistry, autoradiography, image digitization, processing and presentation, and digital macro- and micrography. Limit of 10 students.

EEOB 680. Scanning Electron Microscopy.

(Cross-listed with MICRO, GDCB). (2-9) Cr. 5. *Prereq: Permission of instructor*

Current theories encompassing scanning electron optics and their applications for high and low vacuum microscopy, specimen chemical and cryopreservation methods, x-ray microanalysis, backscattered and topographic imaging, image digitization, processing and presentation. Limit of 10 students.

EEOB 681. Transmission Electron Microscopy.

(Cross-listed with MICRO, GDCB). (2-9) Cr. 5. *Prereq: GDCB 679 and permission of instructor*

Current theories encompassing electron optics and their applications for chemical and physical specimen preservation, ultramicrotomy, general staining and cytochemistry, immunocytochemistry, autoradiography, negative staining and shadowing, x-ray microanalysis, image digitization, processing and presentation.

EEOB 698. Seminar.

Cr. 1. Repeatable.

Meetings of graduate students and faculty to discuss recent literature and problems under investigation.

EEOB 699. Research.

Cr. arr. Repeatable.

Research for thesis or dissertation. Offered on a satisfactory-fail basis only.

EEOB 699I. Research.

(Cross-listed with A ECL, ANTHR, IA LL, GDCB). Cr. 1-4. Repeatable.