DEPARTMENT OF ECOLOGY, EVOLUTION, AND ORGANISMAL BIOLOGY

Undergraduate Study

Within the Biological Sciences, studies of ecology, evolution, and organismal biology are essential in understanding the complex relationships of life on Planet Earth. Ecology focuses on the interactions among organisms as well as the interactions between organisms and their physical environments. Evolutionary theory addresses the origins and interrelationships of species. Organismal biology studies both the diversity of biological organisms and the structure and function of individual organisms.

The EEOB Department offers several undergraduate majors with other departments. Students interested in the areas of ecology, evolution, and organismal biology should major in Biology, Environmental Science, or Genetics. The Biology Major is administered and offered jointly by the EEOB and GDCB departments. The faculty of EEOB, together with those in GDCB and BBMB, administer and offer the Genetics Major. Faculty in EEOB, in cooperation with faculty from other departments on campus, administer and offer the Environmental Science Major. Each of these majors is available through the College of Liberal Arts and Sciences or through the College of Agriculture and Life Sciences. Faculty in the EEOB Department also teach undergraduate courses at Iowa Lakeside Laboratory (see the Iowa Lakeside Laboratory listing).

The Biology Major, the Environmental Science Major, and the Genetics Major prepare students for a wide range of careers in biological sciences. Some of these careers include conservation of natural resources and biodiversity, human and veterinary medicine, and life science education. These majors are also excellent preparation for graduate study in systematics, ecology, biological diversity, physiology, and related fields. Faculty members in EEOB contribute to the undergraduate courses listed below. The titles and descriptions of these courses are in the Biology section of the catalog.

BIOL 101	Introductory Biology	3
BIOL 110	Biology Major Orientation	1
BIOL 111	Opportunities in Biology	0.5
BIOL 155	Human Biology	3
BIOL 173	Environmental Biology	3
BIOL 204	Biodiversity	2
BIOL 211	Principles of Biology I	3
BIOL 211L	Principles of Biology Laboratory I	1
BIOL 212	Principles of Biology II	3
BIOL 212L	Principles of Biology Laboratory II	1
BIOL 255	Fundamentals of Human Anatomy	3
BIOL 255L	Fundamentals of Human Anatomy Laboratory	1
BIOL 256	Fundamentals of Human Physiology	3
BIOL 256L	Fundamentals of Human Physiology Laboratory	1
BIOL 307	Women in Science and Engineering	3
BIOL 312	Ecology	4
BIOL 313	Principles of Genetics	3
BIOL 313L	Genetics Laboratory	1
BIOL 315	Biological Evolution	3
BIOL 322	Introduction to Bioinformatics and Computational Biology	3
BIOL 335	Principles of Human and Other Animal Physiology	3
BIOL 336	Ecological and Evolutionary Animal Physiology	3
BIOL 349	The Genome Perspective in Biology	3
BIOL 351	Comparative Chordate Anatomy	5
BIOL 352	Vertebrate Histology	4
BIOL 353	Introductory Parasitology	3
BIOL 354	Animal Behavior	3
BIOL 355	Plants and People	3
BIOL 356	Dendrology	3
BIOL 357	Biology of Plants	3
BIOL 364	Invertebrate Biology	3-4
BIOL 365	Vertebrate Biology	4
BIOL 366	Plant Systematics	4
BIOL 370	GIS for Ecology and Environmental Science	1-6
BIOL 371	Ecological Methods	3
BIOL 381	Environmental Systems I: Introduction to Environmental Systems	3-4
BIOL 382	Environmental Systems II: Analysis of Environmental Systems	3
BIOL 393	North American Field Trips in Biology	1-4
BIOL 394	International Field Trips in Biology	1-4
BIOL 402	Introduction to Pathology	3
BIOL 414	Life History and Reproductive Strategies	3
BIOL 430	Principles of Plant Physiology	3
BIOL 434	Endocrinology	3
BIOL 451	Plant Evolution and Phylogeny	4
BIOL 454	Plant Anatomy	4
BIOL 455	Bryophyte and Lichen Biodiversity	3
BIOL 456	Principles of Mycology	3
BIOL 457	Herpetology	2
BIOL 458	Ornithology	2

BIOL 459	Mammalogy	2
BIOL 462	Evolutionary Genetics	3
BIOL 465	Macroevolution	3
BIOL 471	Introductory Conservation Biology	3
BIOL 472	Community Ecology	3
BIOL 474	Plant Ecology	3
BIOL 476	Functional Ecology	3
BIOL 486	Aquatic Ecology	3
BIOL 486L	Aquatic Ecology Laboratory	1
BIOL 487	Microbial Ecology	3
BIOL 488	Identification of Aquatic Organisms	1
BIOL 489	Population Ecology	3
BIOL 490	Independent Study	1
BIOL 491	Undergraduate Teaching Experience	1-2
BIOL 494	Biology Internship	1-3
BIOL 495	Undergraduate Seminar	1-3
BIOL 498	Cooperative Education	R
BIOL 499	Undergraduate Research Experience	1-3

Graduate Study

The department offers graduate work leading to both Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees. EEOB graduate students major in one of several interdepartmental majors including Bioinformatics and Computational Biology, Ecology and Evolutionary Biology, Environmental Science, Genetics, Interdisciplinary Graduate Studies, Neuroscience, and Toxicology. The EEOB faculty members are active in the interdepartmental graduate majors and teach a wide range of graduate courses. Faculty research programs cover a wide range of specializations including physiology and physiological ecology; Microbiology; animal behavior; evolutionary genetics of plants and animals; modeling of evolutionary and ecological processes; plant and animal systematics; neurobiology; developmental biology; aquatic and wetland ecology; functional, population, community, landscape, and ecosystem ecology; and conservation biology. For further information on faculty research interests check the EEOB web site (www.eeob.iastate.edu (http://www.eeob.iastate.edu)). Some EEOB faculty teach graduate courses at Iowa Lakeside Laboratory. Field Station courses are also available through the Gulf Coast Marine Laboratory and the Organization for Tropical Studies (see the Biology listing).

Prospective graduate students need a sound background in the physical and biological sciences, as well as in mathematics and English. Interested students should check the Graduate Program link from the EEOB web site for specific admission procedures and updates. The department and majors require submission of Graduate Record Examination (GRE) aptitude test scores. Subject area GRE scores are recommended. International students whose native language is other than English must also submit TOEFL or IELTS scores with their application.

Students who are enrolled in the interdepartmental graduate majors with EEOB affiliation are required to participate in departmental seminars, to participate in research activities, and to show adequate progress and professional development while pursuing their degree. For both the M.S. and Ph.D. degrees, it is expected that research conducted by the student will culminate in the writing and presentation of a thesis or dissertation. Requirements and guidelines for study are provided by the Graduate College, the EEOB faculty, and the individual student's major professor and Program of Study Committee. General information about graduate study requirements can be found at the web site for the Graduate College and requirements for the interdepartmental majors can be found by following the links from the EEOB web site above. Although not a formal requirement, the EEOB faculty recommends that students pursuing the Ph.D. include teaching experience in their graduate training.

Courses primarily for graduate students, open to qualified undergraduates:

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: Life History and Reproductive Strategies
(Dual-listed with BIOL 414). (3-0) Cr. 3. Alt. F., offered odd-numbered years.
Prereq: BIOL 315 or equivalent recommended.
Evolution of ecological adaptations at the individual, population, and species level. Emphasis is on evolutionary mechanisms and adaptive strategies related to life histories and reproduction; age and size at maturity; lifespan and senescense; offspring size/number trade-offs; sex and mating systems; sex determination and sex ratios.

EEOB 521: Biological Principles of Aging
(Dual-listed with BIOL 421). (Cross-listed with GERON). (3-0) Cr. 3. SS.
Prereq: BIOL 211 and BIOL 212
Basic biological principles of aging. Course modules include an introduction to the aging process, body systems and normal aging, and environment and the biology of aging. In addition, disorders and diseases of aging, prevention and treatment and exercise and aging topics will be covered.

EEOB 531: Conservation Biology
(Cross-listed with A ECL). (3-0) Cr. 3. Alt. S., offered even-numbered years.
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 A ECL, IA LL). Cr. 4. Alt. SS., offered even-numbered years.
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
(Dual-listed with BIOL 434). (3-0) Cr. 3. S.
Prereq: BIOL 211, BIOL 212
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. Alt. F., offered even-numbered years.
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. 2. Alt. SS., offered even-numbered years.
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 542: Introduction to Molecular Biology Techniques
(Cross-listed with B M S, FS HN, GDCB, HORT, NREM, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. F.S.SS.
Sessions in basic molecular biology techniques and related procedures. Offered on a satisfactory-fail basis only.

EEOB 542A: Introduction to Molecular Biology Techniques: DNA Techniques
(Cross-listed with B M S, BBMB, FS HN, GDCB, HORT, NREM, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. F.S.
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, BBMB, FS HN, GDCB, HORT, NREM, NUTRS, VDPAM). 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 Techniques
(Cross-listed with B M S, BBMB, FS HN, GDCB, HORT, NREM, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. F.S.
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, BBMB, FS HN, GDCB, HORT, NREM, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. S.
Includes: Agrobacterium and particle gun-mediated transformation of tobacco, Arabidopsis, and maize, and analysis of tranformants. Offered on a satisfactory-fail basis only.

EEOB 542E: Introduction to Molecular Biology Techniques: Proteomics
(Cross-listed with B M S, BBMB, FS HN, GDCB, HORT, NREM, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. F.
Includes: two-dimensional electrophoresis, laser scanning, mass spectrometry, and database searching. Offered on a satisfactory-fail basis only.

EEOB 542F: Introduction to Molecular Biology Techniques: Metabolomics
(Cross-listed with B M S, BBMB, FS HN, GDCB, HORT, NREM, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. F.
Includes: metabolomics and the techniques involved in metabolite profiling. For non-chemistry majoring students who are seeking analytical aspects into their biological research projects. Offered on a satisfactory-fail basis only.

EEOB 542G: Introduction to Molecular Biology Techniques: Genomic
(Cross-listed with B M S, BBMB, FS HN, GDCB, HORT, NREM, NUTRS, V MPM, VDPAM). Cr. 1. Repeatable. S.
Offered on a satisfactory-fail basis only.

EEOB 546: Computational Skills for Biological Data
(Cross-listed with BCB). Cr. 3. F.
Prereq: Graduate student status or permission of the instructor
Computational skills necessary for biologists working with big data sets. UNIX commands, scripting in R and Python, version control using Git and GitHub, and use of high performance computing clusters. Combination of lectures and computational exercises.

EEOB 551: Plant Evolution and Phylogeny
(Dual-listed with BIOL 451). (3-3) Cr. 4. Alt. F., offered even-numbered years.
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 even-numbered years.
Prereq: BIOL 366 or equivalent.
Structure, identification, classification, phylogeny, and economic aspects of grasses and related families.

EEOB 555: Bryophyte and Lichen Biodiversity
(Dual-listed with BIOL 455). (2-3) Cr. 3. S.
Prereq: BIOL 211, BIOL 211L
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 559: Mammalogy
(Dual-listed with BIOL 459). (2-0) Cr. 2. 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.

EEOB 561: Evolutionary and Ecological Genomics
(3-0) Cr. 3. Alt. S., offered even-numbered years.
Prereq: Permission of instructor; BCBIO 444 recommended.
Use of genomic and other "omic" data in evolution and ecology. Review of data-generation platforms, computational methods, and examples of how phylogenomics, metagenomics, epigenomics, and population genomics are transforming the disciplines of evolution and ecology.

EEOB 562: Evolutionary Genetics
(3-0) Cr. 3. Alt. S., offered even-numbered years.
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. S.
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
(Dual-listed with BIOL 464). (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, creation, restoration, 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: Macroevolution
(Dual-listed with BIOL 465). Cr. 3. Alt. S., offered even-numbered years.
Prereq: BIOL 315
The history and diversity of life on earth; evolutionary patterns and processes above the species level. Diversity from a phylogenetic perspective. Empirical exercises include: phylogeny estimation, ancestral states, estimating diversification rates, evaluating the tempo and mode of evolution, biogeographic patterns, and trait associations across the tree of life.

EEOB 566: Molecular Evolution
(3-0) Cr. 3. Alt. F., offered even-numbered years.
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. Alt. F., offered irregularly.
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, hierarchial population models, and phylogeography.

EEOB 568: Advanced Systematics
(Cross-listed with ENT). (2-3) Cr. 3. Alt. S., offered irregularly.
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 irregularly.
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 573: Techniques for Biology Teaching
(Cross-listed with A ECL, 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 573A: Techniques for Biology Teaching : Animal Biology
(Cross-listed with A ECL, 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 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 A ECL, 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 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 A ECL, 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 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 A ECL, 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 575I: Field Mycology
(Cross-listed with IA LL). Cr. 4. Alt. SS., offered even-numbered years.
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
(Dual-listed with BIOL 476). (3-0) Cr. 3. Alt. S., offered odd-numbered years.
Prereq: BIOL 312
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 even-numbered years.
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 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 ENSCI). 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 582: Environmental Systems II: Analysis of Environmental Systems
(Dual-listed with BIOL 382). (Cross-listed with ENSCI). (2-2) Cr. 3. S.
Prereq: ENSCI 381
Continuation of EnSci 381. Systems approach to the analysis of material and energy flows in natural environmental systems and the primary environmental factors controlling these systems.

EEOB 584: Ecosystem Science
(Cross-listed with ENSCI). (3-0) Cr. 3. Alt. S., offered even-numbered years.
Prereq: Combined 12 credits in biology, chemistry, and physics.
Advanced studies of ecosystems and the biological and physical factors that influence their properties and dynamics. Conceptual foundations and modern approaches to ecosystem studies. Interactions among organisms, biological diversity, and ecosystem attributes. Quantitative analyses of accumulations, transformations, and fluxes of nutrients, water, and energy within and among ecosystems. Global change issues.

EEOB 585: Advanced Community Ecology
(2-2) Cr. 3. Alt. F., offered odd-numbered years.
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 BIOL 486). (Cross-listed with A ECL, ENSCI). (3-0) Cr. 3. F.
Prereq: Biol 312 or EnSci 381 or EnSci 402 or NREM 301
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
(Dual-listed with BIOL 486L). (Cross-listed with A ECL, ENSCI). (0-3) Cr. 1. F.
Prereq: Concurrent enrollment in BIOL 486
Field trips and laboratory exercises to accompany 486. Hands-on experience with aquatic research and monitoring techniques and concepts.

EEOB 587: Microbial Ecology
(Dual-listed with BIOL 487). (Cross-listed with ENSCI, GEOL, MICRO). (3-0) Cr. 3. F.
Prereq: Six credits in biology and 6 credits in chemistry
Introduction to major functional groups of autotrophic and heterotrophic microorganisms and their roles in natural and environmental systems. Consequences of microbial activity on water chemistry, weathering, and precipitation/dissolution reactions will be emphasized.

EEOB 589: Population Ecology
(Dual-listed with BIOL 489). (Cross-listed with A ECL). (2-2) Cr. 3. Alt. F., offered even-numbered years.
Prereq: BIOL 312, STAT 101 or STAT 104, a course in calculus, or graduate standing
Concepts and theories of population dynamics with emphasis on models of growth, predation, competition, and regulation.

EEOB 590: Special Topics
Cr. 1-3. Repeatable.
Prereq: 10 credits in biology, 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
(Cross-listed with PHIL). (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 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: Iowa Lakeside Laboratory. (Cross-listed with Ia LL 699I)
(Cross-listed with A ECL, ANTHR, GDCB, IA LL). Cr. arr. Repeatable.
Research for thesis or dissertation. Offered on a satisfactory-fail basis only.