

Animal Ecology (A ECL)

Courses primarily for undergraduates:

A ECL 312. Ecology.

(Cross-listed with BIOL, ENSCI). (3-3) Cr. 4. F.SS. *Prereq: BIOL 211L and BIOL 212L*

Fundamental concepts and principles of ecology dealing with organisms, populations, communities and ecosystems. Laboratory and field exercises examine ecological principles and methods as well as illustrate habitats.

A ECL 312I. Ecology.

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

An introduction to the principles of ecology at the population, community and ecosystem level. Field studies of local lakes, wetlands and prairies are used to examine factors controlling distributions, interactions, and roles of plants and animals in native ecosystems.

A ECL 321. Fish Biology.

(2-3) Cr. 3. S. *Prereq: A ECL 365*

Biology, ecology, and evolution of fishes. Emphasis on structure, physiology, and behavior, including a focus on the conservation and management of fishes and their habitats. Laboratory focus on fish morphology, survey methods, identification, distribution, habits, and habitats of fishes.

A ECL 326I. Ornithology.

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

The biology, ecology, and behavior of birds with emphasis on field studies of local avifauna. Group projects stress techniques of population analysis and methodology for population studies.

A ECL 365. Vertebrate Biology.

(Cross-listed with BIOL). (3-2) Cr. 4. F. *Prereq: BIOL 212, BIOL 212L*

Evolution, biology, and classification of fish, amphibians, reptiles, birds, and mammals. Emphasis on a comparative analysis of the structure and function of organ systems. Laboratory exercises concentrate on morphology and identification of orders of vertebrates.

A ECL 366. Natural History of Iowa Vertebrates.

(2-3) Cr. 3. S. *Prereq: BIOL 211, BIOL 211L, BIOL 212, BIOL 212L*

Vertebrate fauna of Iowa, including fishes, amphibians, reptiles, birds, and mammals. Species identification, habitat requirements, community structure and assessment, conservation issues that include historical population changes and value of wild animals to the region's ecological and economic health.

A ECL 371. Ecological Methods.

(Cross-listed with BIOL). (2-3) Cr. 3. F. *Prereq: A ECL 312; STAT 101 or STAT 104*

Quantitative techniques used in management of natural resources with emphasis on inventory and manipulation of habitat and animal populations. Nonmajor graduate credit.

A ECL 401. Intro to Aquatic Animal Medicine.

(Cross-listed with B M S). (1-2) Cr. 1. S.

8 week course. Introductory course with focus on fin fish production, health and medicine. Course content will help define future roles for veterinarians, producers, and service providers. Emphasis will be placed on anatomy, pathology, infectious diseases, nutrition, regulatory constraints in production, food safety, and current research. Field trip to aquaculture facility.

A ECL 404I. Behavioral Ecology.

(Cross-listed with IA LL). Cr. 4. Alt. SS., offered 2012. *Prereq: Two semesters of biology*

Animal coloniality, courtship, territoriality, predator defense, habitat selection, foraging, mating systems, and parental care will be examined in the field in order to evaluate various ecological and evolutionary theories of animal behavior.

A ECL 415. Ecology of Freshwater Invertebrates, Plants, and Algae.

(Dual-listed with A ECL 515). (2-3) Cr. 3. Alt. F., offered 2012. *Prereq: A ECL 312*

Identification, biology, and ecological requirements of freshwater invertebrates, plants and algae. Additional emphases on community sampling methods and analysis, and use of organisms as tools for aquatic ecosystem health assessment.

A ECL 418. Stream Ecology.

(Dual-listed with A ECL 518). (Cross-listed with ENSCI). (2-3) Cr. 3. Alt. F., offered 2011. *Prereq: 486*

Biological, chemical, physical, and geological processes that determine the structure and function of flowing water ecosystems. Current ecological theories as well as applications to stream management for water quality and fisheries.

A ECL 419I. Vertebrate Ecology and Evolution.

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

Field and laboratory study of representative vertebrates of northwestern Iowa. Observations and experimentation emphasize ecological histories by integrating concepts of functional morphology, behavioral ecology, and evolutionary biology. Nonmajor graduate credit.

A ECL 420I. Amphibians and Reptiles.

(Cross-listed with IA LL). Cr. 4. Alt. SS., offered 2012. *Prereq: Two semesters of biology*

Ecology, behavior, and conservation biology of amphibians and reptiles with emphasis on their anatomy and morphology; temperature and water regulation; locomotion; life history; reproduction; population and community ecology; and conservation.

A ECL 425. Aquatic Insects.

(Dual-listed with A ECL 525). (Cross-listed with ENT). (2-3) Cr. 3. Alt. S., offered 2013. *Prereq: BIOL 312 or equivalent*

Courtney. Morphology, ecology, diversity, and significance of aquatic insects, with emphasis on the collection, curation and identification of taxa in local streams and lakes.

A ECL 440. Fishery Management.

(Dual-listed with A ECL 540). (2-3) Cr. 3. F. *Prereq: A ECL 312, A ECL 321, STAT 101 or STAT 104; credit or enrollment in A ECL 486*

Biological basis of fishery management, fishery problems, and management practices for freshwater, anadromous, and marine fisheries.

A ECL 442. Aquaculture.

(Dual-listed with A ECL 542). (3-0) Cr. 3. Alt. S., offered 2012. *Prereq: credit or enrollment in A ECL 321*

Concepts related to the culture of aquatic organisms including culture systems, water quality, nutrition, genetics, diseases, and marketing.

A ECL 451. Wildlife Ecology and Management.

(2-3) Cr. 3. F. *Prereq: A ECL 371*

Ecological theory and practice of wildlife management, including, population ecology, habitat management, and current issues in the field. Course involves a series of case studies addressing actual wildlife issues using field and quantitative methods. Nonmajor graduate credit.

A ECL 454. Principles of Wildlife Disease.

(Dual-listed with A ECL 554). (3-0) Cr. 3. S. *Prereq: Junior standing and at least 10 credits in biological sciences at the 300+ level*

Ecological and epidemiological aspects of diseases as they relate to wildlife populations. Topics to be covered include: major classes of disease; detection, description, monitoring, and management of disease; characteristics and interactions between disease agents and wildlife hosts; relationships among wildlife, domestic animal, and human health.

A ECL 455. International Wildlife Issues.

(3-0) Cr. 3. Alt. F., offered 2012. *Prereq: A ECL 365, A ECL 312 or graduate standing; NREM 120*

Biological, political, social, and economic factors affecting the management of international wildlife resources. Nonmajor graduate credit. Meets International Perspectives Requirement.

A ECL 457. Herpetology.

(Dual-listed with A ECL 557). (Cross-listed with BIOL). (2-3) Cr. 3. F. *Prereq: BIOL 351 or BIOL 365*

Dual listed with EEOB 557. 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.

A ECL 458. Ornithology.

(Dual-listed with A ECL 558). (Cross-listed with BIOL). (2-3) Cr. 3. S. *Prereq: A ECL 365 or BIOL 351*

Biology, evolution, ecology 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.

A ECL 459. Mammalogy.

(Dual-listed with A ECL 559). (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.

A ECL 480. Studies in Marine Biology.

Cr. 1-8. Repeatable. SS.

Courses taken at Gulf Coast Research Laboratory and other marine biological stations are transferred to Iowa State University under this number.

A ECL 486. Aquatic Ecology.

(Dual-listed with A ECL 586). (Cross-listed with ENSCI). (3-0) Cr. 3. F. *Prereq: Biol 312 or EnSci 381 or EnSci 402 or NREM 301*

Dual-listed with EEOB 586. Structure and function of aquatic ecosystems with application to fishery and pollution problems. Emphasis on lacustrine, riverine, and wetland ecology. Nonmajor graduate credit.

A ECL 486L. Aquatic Ecology Laboratory.

(Cross-listed with ENSCI, BIOL). (0-3) Cr. 1. F. *Prereq: Concurrent enrollment in BIOL 486*

Dual-listed with EEOB 586L. Field trips and laboratory exercises to accompany 486. Hands-on experience with aquatic research and monitoring techniques and concepts. Nonmajor graduate credit.

Courses primarily for graduate students, open to qualified undergraduates:**A ECL 515. Ecology of Freshwater Invertebrates, Plants, and Algae.**

(Dual-listed with A ECL 415). (2-3) Cr. 3. Alt. F., offered 2012. *Prereq: A ECL 312*

Identification, biology, and ecological requirements of freshwater invertebrates, plants and algae. Additional emphases on community sampling methods and analysis, and use of organisms as tools for aquatic ecosystem health assessment.

A ECL 516. Avian Ecology.

(3-0) Cr. 3. Alt. S., offered 2012. *Prereq: A ECL 365, A ECL 312, or graduate standing*

Current topics and theories including avian breeding and foraging ecology, population biology, community structure, habitat selection, field methodologies, and data interpretation.

A ECL 518. Stream Ecology.

(Dual-listed with A ECL 418). (Cross-listed with ENSCI). (2-3) Cr. 3. Alt. F., offered 2011. *Prereq: A ECL 486*

Biological, chemical, physical, and geological processes that determine the structure and function of flowing water ecosystems. Current ecological theories as well as applications to stream management for water quality and fisheries.

A ECL 520. Fisheries Science.

(3-0) Cr. 3. Alt. S., offered 2013. *Prereq: A ECL 312, A ECL 321*

Concepts, approaches, and techniques for assessment of recreational and commercial fisheries. Scope will range from individual fish to entire ecosystems, both freshwater and marine.

A ECL 523I. Fish Ecology.

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

Basic principles of fish interaction with the biotic and abiotic environment. Field methods, taxonomy, and biology of fish with emphasis on the fish fauna of northwestern Iowa.

A ECL 525. Aquatic Insects.

(Dual-listed with A ECL 425). (Cross-listed with ENT). (2-3) Cr. 3. Alt. S., offered 2013. *Prereq: BIOL 312 or equivalent*

Courtney. Morphology, ecology, diversity and significance of aquatic insects, with emphasis on the collection, curation and identification of taxa in local streams and lakes.

A ECL 526I. Advanced Field Ornithology.

(Cross-listed with IA LL). Cr. 2. SS. *Prereq: Concurrent registration in IA LL 326I*

Field study of birds of the upper Midwest; extended field trip to Minnesota and Wisconsin; individual or group project.

A ECL 531. Conservation Biology.

(Cross-listed with EEOB). (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.

A ECL 531I. Conservation Biology.

(Cross-listed with EEOB, IA LL). 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.

A ECL 535I. Restoration Ecology.

(Cross-listed with IA LL, ENSCI, EEOB). 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.

A ECL 540. Fishery Management.

(Dual-listed with A ECL 440). (2-3) Cr. 3. F. *Prereq: A ECL 312, A ECL 321, STAT 101 or STAT 104; credit or enrollment in A ECL 486*

Biological basis of fishery management, fishery problems, and management practices for freshwater, anadromous, and marine fisheries.

A ECL 542. Aquaculture.

(Dual-listed with A ECL 442). (3-0) Cr. 3. Alt. S., offered 2012. *Prereq: credit or enrollment in A ECL 321*

Concepts related to the culture of aquatic organisms including culture systems, water quality, nutrition, genetics, diseases, and marketing.

A ECL 551. Behavioral Ecology.

(2-2) Cr. 3. Alt. S., offered 2012. *Prereq: a course in ecology or animal behavior*

The study of how an animal's behavior affects its ability to survive and reproduce in its environment. Course topics, such as foraging behavior, sexual selection, parental care, etc., represent the interface of ecology, evolution, and behavior.

A ECL 554. Principles of Wildlife Disease.

(Dual-listed with A ECL 454). (3-0) Cr. 3. S. *Prereq: Graduate classification*

Ecological and epidemiological aspects of disease as they relate to wildlife populations. Topics to be covered include: major classes of disease; detection, description, monitoring, and management of disease; characteristics and interactions between disease agents and wildlife hosts; relationship among wildlife, domestic animal, and human health.

A ECL 557. Herpetology.

(Dual-listed with A ECL 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.

A ECL 558. Ornithology.

(Dual-listed with A ECL 458). (Cross-listed with EEOB). (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.

A ECL 559. Mammalogy.

(Dual-listed with A ECL 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.

A ECL 570. Landscape Ecology.

(Cross-listed with EEOB). (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.

A ECL 573. Techniques for Biology Teaching.

(Cross-listed with EEOB, 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.

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

(Cross-listed with EEOB, 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.

A ECL 573G. Techniques for Biology Teaching: Limnology.

(Cross-listed with EEOB, 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.

A ECL 573H. Animal Behavior (Same as Ia LL 573H).

(Cross-listed with IA LL, EEOB). 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.

A ECL 573I. Techniques for Biology Teaching: Insect Ecology.

(Cross-listed with EEOB, 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.

A ECL 573W. Techniques for Biology Teaching: Project WET.

(Cross-listed with EEOB, 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.

A ECL 589. Population Ecology.

(Cross-listed with EEOB). (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.

A ECL 590. Graduate Independent Study.

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

A ECL 590I. Special Topics: Graduate Independent Study.

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

A ECL 599. Creative Component.

Cr. arr. *Prereq: Nonthesis M.S. option only*

Courses for graduate students:**A ECL 611. Analysis of Populations.**

(Cross-listed with EEOB). (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.

A ECL 698. Animal Ecology Teaching Practicum.

Cr. 1-3. Repeatable. F.S.SS. *Prereq: Graduate classification in animal ecology and permission of instructor*

Graduate student teaching experience in the animal ecology teaching program. Offered on a satisfactory-fail basis only.

A ECL 699. Research.

Cr. arr. Repeatable.

A ECL 699I. Research.

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