

ECOLOGY (BIOL)

BIOL 606. Ecological Research Methods. (3 Credits)

A field- and lab-based course that builds on the capacity for students to conceptualize and complete ecological research projects. Students identify ecological questions and develop research to address them. Scientific communication to varied stakeholders is emphasized throughout. Prerequisite: acceptance to the MS or MEM program.

BIOL 613. Advanced Ecological Analysis. (3 Credits)

Students gain knowledge and experience in advanced statistical analysis and simulation modeling using ecological data. Specific topics include linear and generalized linear models, mixed-effects models, general additive models, multivariate analysis, spatial analysis, and simulation models. Emphasis is placed on working with data, writing and commenting scripts, and use of a wide range of internet resources for the R language and environment. Prerequisites: admission to the MEM or MS programs.

BIOL 620. Ornithology. (4 Credits)

A graduate-level survey of bird evolution, ecology, and conservation. This course has a strong field component providing frequent opportunities to identify, observe, and conduct research on birds in their native environments. Prerequisite: acceptance to MS or MEM program.

BIOL 622. Mammalogy. (4 Credits)

An advanced overview of the current science of mammal taxonomy, evolution, ecology and conservation. Prerequisite: acceptance to MS or MEM program.

BIOL 625. Invertebrate Zoology with laboratory. (4 Credits)

Invertebrate Zoology is a comprehensive overview of invertebrate organisms that comprise over 98% of all animals on Earth. This course delves into various aspects of the anatomy, biodiversity, ecology, evolutionary adaptations, physiology, systematics and taxonomy of invertebrate organisms. The laboratory portion of this course has a strong field component providing ample opportunity for students to observe invertebrates in their natural habitats and gain an appreciation for the ecological roles invertebrates play in local ecosystems. Prerequisite: Graduate Student Status.

BIOL 627. Field Entomology. (4 Credits)

A detailed examination of the most diverse and abundant form of animal life on Earth through field and laboratory research. The course emphasizes field study, collection and preservation, identification, ecology, and natural history. Students develop familiarity with current scientific literature and complete a written research paper following peer-reviewed journal formatting. Prerequisite: acceptance to MS or MEM program.

BIOL 630. Wildlife Ecology and Management. (4 Credits)

Principles of ecology are applied to population and habitat management towards wildlife conservation. Tools used by wildlife biologists to restore endangered species, harvest sustainable populations, reduce overpopulated species, and to monitor and study populations are emphasized. Habitat management approaches are examined, along with human dimensions in wildlife conservation. Students will conduct field study to investigate populations and habitat issues, and develop best management practices for wildlife in the Gunnison Basin. Prerequisite: Admission to MS or MEM program. Co-requisite: BIOL 631.

BIOL 631. WILDLIFE TECHNIQUES WORKSHOP. (1 Credit)

A one week intensive field course focuses on wildlife conservation issues and wildlife management techniques such as trapping and marking wildlife, radio telemetry, population monitoring, GPS and GIS, and wildlife conflict resolution. The course includes a trip outside the basin; a field trip course fee is required. This course meets the week prior to the start of the fall semester. Prerequisite: Admission to MS or MEM program, instructor permission. Co-requisite: BIOL 630.

BIOL 633. WILDLIFE POPULATION ANALYSIS. (3 Credits)

Students learn about tools and techniques used by wildlife managers for analysis of populations, such as distance sampling, mark-recapture methods, survival analysis, home range analysis, and population modeling. Students are introduced to quantitative techniques and learn to use computer software that allows them to analyze wildlife populations. Prerequisites: admission to the MEM or MS programs.

BIOL 640. Conservation Biology. (3 Credits)

Conservation Biology is an applied science that addresses the reduction in biological diversity of the planet and suggests solutions to prevent further reduction. Conservation biology serves as an integrating link in biology drawing from scientific disciplines such as population genetics, ecology, evolutionary biology, botany, zoology, molecular biology, biochemistry and wildlife management. Prerequisite: acceptance to MS or MEM program.

BIOL 652. Botany. (4 Credits)

Using field and laboratory experiences this graduate level course explores the diversity within the plant kingdom using a comparative approach to examine evolutionary trends and relationships. Students are introduced to the structure and function of plants through an investigation of plant cells, tissues, organs, and basic physiological processes. Economic importance, human uses, and significance of plants to society are emphasized. Prerequisite: acceptance to MS or MEM program.

BIOL 653. Rocky Mountain Flora. (3 Credits)

A graduate level field and laboratory course focusing on identification of flowering plants common to the Western Slope of the Colorado Rocky Mountains. This course covers methods of plant collection and preservation, field identification, natural history, and ecology as well as local plants of particular human interest, including those that are medically important, edible, or which are poisonous. Prerequisite: acceptance to MS or MEM programs.

BIOL 662. Evolution. (3 Credits)

This graduate level course provides a comprehensive overview of evolutionary processes, mechanisms, and analytical techniques. Topics include population genetics, conservation genetics, phylogenetic analysis, adaptation, behavioral evolution, sexual selection, and speciation. Evolutionary perspectives in human health and medicine, conservation biology, agriculture, natural resource management, biotechnology, global change, and emerging diseases are considered. Prerequisite: acceptance to MEM or MS program.

BIOL 667. Biology of Fishes. (3 Credits)

This course provides a comprehensive overview of the biology and diversity of fishes. Topics that are covered include fish anatomy, behavior, biodiversity, conservation, ecology, evolution, morphology, physiology, and zoogeography. Additional topics include experimental design, data analysis and interpretation, and verbal and written professional communication. Colorado fishes will be emphasized but other freshwater and marine fishes will also be covered. Prerequisite: Graduate Student Status.

BIOL 668. Ichthyology Laboratory. (1 Credit)

This laboratory course focuses on several aspects of the biology and diversity of fishes. Laboratory and field activities include a phylogenetic overview of fishes, as well as examining the unique morphological characteristics, ecological roles, evolutionary histories, physiological adaptations, and zoogeography of major taxonomic groups (e.g., jawless fishes, cartilaginous fishes, bony fishes, and common fish families). Laboratory and field exercises focus heavily on the local fauna, although marine and other freshwater fishes are also included. Prerequisite or corequisite: BIOL 667.

BIOL 670. FISHERIES MANAGEMENT. (4 Credits)

This course includes a lecture and laboratory and focuses on theory and methods associated with exploited populations of fish and other aquatic organisms. Covered topics include population growth, sustainable yields, conservation, community interactions, human impacts, and policy. Management techniques including sampling methods, monitoring, habitat assessment, and regulations will also be taught. Local fisheries will be highlighted in laboratory/field activities, and nationwide/global examples will be discussed in class. Prerequisite: Graduate Student Status.

BIOL 676. Aquatic Ecology with lab. (4 Credits)

A study of physical, chemical, and biological parameters of lakes and streams in the functioning of freshwater ecosystems. Prerequisite: acceptance to MEM or MS program.

BIOL 681. Forest Ecology. (4 Credits)

Ecology of forest species, communities, landscapes, and ecosystems, with a focus on the southern Rocky Mountains. Topics include tree physiology, species interactions, fire and disturbance, succession, forest types, climate, forest management, and restoration. Labs and field trips provide hands-on experience and practical skills in tree identification, forest mensuration, vegetation sampling, statistics and GIS. Students gain broad familiarity with the scientific literature, develop and conduct a sophisticated independent research project, and communicate findings. Prerequisite: admission to MS or MEM program.

BIOL 690. Ecology MS Proposal Development. (3 Credits)

Students are required to develop a proposed research project in consultation with their academic advisor and present it in written and oral form to their thesis committee (composed of their advisor, another faculty member or PhD-level researcher, and an external project sponsor or reviewer). This course should be completed by the end of the spring semester of the first year to prepare students for summer research. Prerequisite: instructor permission.

BIOL 692. Independent Study. (1-6 Credits)

Independent research in ecology. Prerequisite: instructor permission.

BIOL 693. Comprehensive Study in Ecology. (3 Credits)

This course builds on previous coursework, independent study, and internship experiences to culminate the master's degree via the completion of project deliverable(s) developed in consultation with the student's advisor and committee, a written exam, and final presentation. Students complete project deliverables (e.g., a report, database, webpage or other media) required by their committee. Students independently review concepts from previous ecological coursework and take a comprehensive exam on those topics. Exam questions are provided by the instructors of the ecological courses and tailored for each individual student respective to the courses they completed. The exam consists of short essay-style questions that will prompt demonstration of mastery of ecological concepts, the ability to synthesize information, and the ability to succinctly explain ecological concepts. Additionally, students will present the findings of their independent study or internship at the departmental Community Forum.

BIOL 695. Ecology/ Conservation Thesis Research. (1-9 Credits)

Students conduct research adhering to their thesis proposal, complete a written thesis, and defend their thesis. Students must also explicitly connect the research project with relevant and real-world efforts to achieve the broader impacts of ecology and conservation science in society. This is a repeatable course. Prerequisite: BIOL 690.

BIOL 696. Fisheries/ Wildlife Thesis Research. (1-9 Credits)

Students conduct research adhering to their thesis proposal, complete a written thesis, and defend their thesis. Students must also explicitly connect the research project with relevant and real-world efforts to achieve the broader impacts of fisheries and wildlife science in society. This is a repeatable course. Prerequisite: BIOL 690.

BIOL 697. SPECIAL TOPICS IN ECOLOGY. (1-4 Credits)**BIOL 699. Graduate Internship in Ecology. (1-6 Credits)**

Students may take a single internship from 1 to 6 credits. In addition, no more than 6 total credits can be taken in BIOL 699.