BIOE - Biology-Ecological

BIOE 103CS. Environmental Science and Society. 3 Credits. (3 Lec) F,S
Annually The relationship between people and the environment using the earth as an ecosystem to show the effects of people's activities on natural ecosystems. Environmental issues such as wilderness, wolf reintroduction, global warming, fire ecology, whirling disease, and grizzlies are covered.

BIOE 290R. Undergraduate Research. 1-3 Credits. (1-3 Ind; max 6) On Demand PREREQUISITE: Consent of instructor and approval of department head. Directed research and study on an individual basis.

BIOE 291. Special Topics. 1-4 Credits. (1-4 Lec; 12 cr max) On Demand PREREQUISITE: Course prerequisites as determined for each offering. Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand.

BIOE 292. Independent Study. 1-3 Credits. (1-3 Ind; 6 cr max) On Demand PREREQUISITE: Consent of instructor and approval of department head. Directed research and study on an individual basis.

BIOE 298. Internship. 1-4 Credits. (1-4 Ind. Study. Max 8 credits) F,S,Su On Demand PREREQUISITES: Approval of intern program by consent of instructor and approval of department head. An individualized assignment arranged with an agency, business, or other organization to provide guided experience. May be repeated.

BIOE 370. General Ecology. 3 Credits. (3 Lec) F,S
PREREQUISITE: BIOB 170IN; Recommended: STAT 216Q or BIOB 318. Relation of organisms to their environment. The composition, structure, function and distribution of populations, communities, and ecosystems. Emphasis on population ecology, including demography, population dynamics and evolutionary ecology.

BIOE 375. Ecological Responses to Climate Change. 3 Credits. (3 Lec) S
PREREQUISITE: BIOE 160, and BIOE 170IN, and BIOE 370 or NRSM 240. Students explore how ecosystems are responding to climate changes at a range of spatial and temporal scales. Case studies include changes in vegetation and soils, plant and animal phenology, and disease outbreaks.

BIOE 405. Behavioral and Evolutionary Ecology. 3 Credits. (3 Lec) S
PREREQUISITE: BIOE 370 and at least Junior standing. Abundance and distribution of organisms in relation to their evolution, behavior, population biology and interactions with other organisms.

BIOE 408. Rocky Mountain Vegetation. 3 Credits. (2 Lec, 1 Lab)
PREREQUISITE: BIOE 370 and in Biological Sciences major, or consent of instructor, recommended senior class standing. Rocky Mountain Vegetation is an integrative, place-based course in vegetation ecology. Topics include: Geographic distribution and geological characteristics of the component ranges of the Rockies, interaction of geology and soils with climate to produce the extreme environmental gradients typical of the Rockies, the basic autecology of dominant and widespread species that characterize the vegetation of the Rockies, the principles of disturbance and succession and how the vegetation of the Rockies exhibits those principles, the distribution and dynamics of the common plant communities of the Rockies in response to the variable environment.

BIOE 416. Alpine Ecology. 3 Credits. (1 Lec, 2 Lab)
PREREQUISITE: Junior standing, BIOE 170IN. The ecology characteristics of alpine areas. A three-day field trip will confirm and reinforce material presented in class and is a course requirement.

BIOE 420. Field Ornithology. 3 Credits. (2 Lec, 1 Lab) F,S
PREREQUISITE: Junior standing, and either BIOE 100IN or BIOE 170IN. Field identification, habitat affinities and life histories of birds of the northern Rockies. Includes early morning field trips.

BIOE 421. Yellowstone Wildlife Ecology. 3 Credits. (2 Lec, 1 Lab)
PREREQUISITE: Junior standing, and BIOE 100IN or BIOE 170IN, and BIOE 370. Basic ecology of the major animal species of the Yellowstone area and the ecological controversies surrounding their management.

BIOE 422. Insect Ecology. 3 Credits. (3 Lec) S

BIOE 424. Ecology of Fungi. 3 Credits. (2 Lec, 1 Lab) F Alternate years, to be offered odd years.
PREREQUISITE: BIOE 170IN, BIOE 256, a comparable course in introductory biology, or consent of instructor. COREQUISITE: None, but an upper division biology course is recommended. This course emphasizes the important and varied roles of the higher fungi in natural and managed systems, focusing on forest habitats. Fungi are the ecological backbone of many terrestrial systems, yet their ecological roles as saprophytes, symbionts, and mycorrhizal mutualists are often minimized. Both traditional techniques and more recent molecular methods will be presented at the individual, population, community, landscape, and biome levels, along with topics on fungal conservation and global change. This course consists of twice weekly sessions of two hours each for lecture, discussions, and demonstrations. One or two afternoon or morning field trips to nearby forests are required to initiate a final project.

BIOE 427RN. Research in Freshwater Ecology. 3 Credits. (1 Lec, 2 Lab)
PREREQUISITE: Junior standing; BIOE 370; Prior or concurrent registration in BIOE 428. This course is designed to expose students to the full process of designing and conducting research in freshwater ecosystems. Students will develop a research question, propose a study design, conduct field and laboratory research, and present their research in oral and written form. This course will also include a stream invertebrate collection and identification assignment.

BIOE 428. Freshwater Ecology. 3 Credits. (3 Lec) F,S
PREREQUISITE: BIOE 370 and Junior standing; or consent of instructor. This course examines relationships between freshwater organisms and their environment. Students learn about the ecology of rivers, lakes, reservoirs, and wetlands, with exposure to a wide diversity of organisms and processes. Emphasis is placed on linking basic concepts and real-world applications.

BIOE 435. A Study of Local Ecosystems for Teachers. 1 Credit. (1 Lec) F
PREREQUISITE: The course is designed for practicing or pre-service teachers. A Study of Local Ecosystems for Teachers investigates ecological principles of students perform field studies of their local ecosystem. Students will also create lessons based on their findings for the respective K-12 teaching assignments or future assignments if not currently in the classroom.

BIOE 436. Symbiosis for Teachers: Eat, Prey, Love. 3 Credits. (3 Lec) S
PREREQUISITE: Graduate standing and 2 years successful classroom teaching experience. This course is intended for pre-service (BIOE 436) and in-service (BIOE 526) teachers. Graduate standing and teaching experience will be waived for pre-service teachers taking BIOE 436. “Symbiosis for Teachers: Eat, Prey, and Love” is a thought provoking course designed for elementary, middle school, high school, and pre-service teachers. Students will participate in the process of science and develop creative and critical reasoning skills. The course provides an effective way to integrate instructional scientific strategies for teachers. Students will share cross-level instruction and constructive ideas. The goal of this course is to promote the study of symbioses and applications of symbiotic relationships.

BIOE 439. Stream Ecology. 3 Credits. (2 Lec, 1 Lab)
PREREQUISITE: BIOB 170IN, CHMY 121IN or CHMY 141, and PHSX 205. Examination of the structure and function of stream ecosystems emphasizing connections among stream organisms, the aquatic chemical and physical environment, and the surrounding terrestrial landscape.

BIOE 440R. Conservation Biology. 3 Credits. (3 Lec)
PREREQUISITE: BIOE 370 and STAT 216Q or STAT 217Q, or equivalents, and Junior standing. Recommended: STAT 411. Examines issues relevant to conservation of wild populations, focusing primarily on animals. Emphasis is on approaches that use demography, population biology and genetics to address conservation questions. Approaches include empirical field studies, mathematical models, and the use of R programming for modeling and empirical analysis. Readings are from the primary literature and a textbook, including case studies. Co-convened with BIOE 521.

BIOE 445. Macrosystems Ecology: Linking Plants, Animals, and Ecosystems Across Scales. 3 Credits. (3 Lec) S
PREREQUISITE: BIOE 370 and Junior standing. Advanced ecology designed to help students “put the pieces together” and understand how plants, animals, and ecosystems interact. These interactions are examined across biomes of the world to better understand general principles and to derive effective local management strategies.

BIOE 455. Plant Ecology. 3 Credits. (3 Lec) S
PREREQUISITE: BIOE 170IN, and BIOE 370 or NRSM 240, and Junior standing. Principles of plant ecology, covering plant-environment relations, plant life histories, plant species interactions, plant community concepts, succession, and the role of plants in ecosystem processes.
Possible strategies for maintaining biodiversity in the Greater Yellowstone Ecosystem's meaning, importance & determinants; key ecological features of native plants and animals that is a unique feature of our planet plays an important role in regulating ecosystem functions and services. In this course, we explore the various ways that the diversity of living organisms influences community structure, productivity, geomorphological and hydrological regimes, and nutrient cycling.

Using a variety of research approaches, from primary literature to podcasts, we investigate the foundations of the biodiversity ecosystem function and services for biodiversity

as well as the current state of knowledge across terrestrial, marine, and freshwater ecosystems.
BIOE 536. A Study of Local Ecosystems for Teachers. 1 Credit. (1 Lec) F
PREREQUISITES: Graduate standing. The course is designed for practicing or pre-service teachers. A Study of Local Ecosystems for Teachers investigates ecological principles as students perform field studies of their local ecosystem. Students will also create lessons based on their findings for the respective K-12 teaching assignments or future assignments if not currently in the classroom.

BIOE 540. Analysis of Ecological Communities. 3 Credits. (1 Lec, 2 Lab) S alternate even years. Multivariate statistical analysis of data from terrestrial or aquatic, plant or animal communities. Classification, ordination, and predictive modeling of species and communities, emphasizing a hands-on approach and practical problem solving in community ecology.

BIOE 542. Community Ecology. 3 Credits. (3 Lec) F PREREQUISITE: At least one upper division or graduate course in each of the following: ecology and statistics, or consent of instructor. Focuses on the origin, maintenance, and consequences of biological diversity within local communities by examining studies of natural patterns, explorations of mathematical models and direct experimentation. The complexities of species interactions are explored in multi species assemblages.

BIOE 548. Conservation Genetics. 3 Credits. (3 Lec) F PREREQUISITE: BIOB 375 or BIOB 377 or BIOH 320 and BIOB 420, and STAT 216Q. Introduction to the application of genetics for the conservation of plant and animal populations. Emphasis will be placed on case studies from the primary literature and analyzing genetic data using mathematical models developed in class. Co-convened with BIOB 480.

BIOE 554. Foundations of Ecology & Mgmt. 1 Credit. (1 Rct) F This course explores the origin, maturation, and application of core principles in ecology. Students gain an appreciation for the scope of ecology, how theory and application are linked, and how big ideas in ecology have matured (or not) over time.

BIOE 555. Communication in Ecol Sciences. 1 Credit. (1 Sem) S PREREQUISITES: Graduate standing - consent of instructor. This course will require students to gain experience presenting scientific information in a variety of communication methods.

BIOE 590. Master’s Thesis. 1-10 Credits. (1-10 Ind; max unlimited) F,S,Su PREREQUISITE: Master's standing.

BIOE 591. Special Topics. 1-4 Credits. (1-4 Lec; 12 cr max) On Demand PREREQUISITE: Upper division courses and others as determined for each offering. Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number.

BIOE 592. Independent Study. 1-3 Credits. (1 Ind; 6 cr max) On Demand PREREQUISITE: Graduate standing, consent of instructor, approval of department head and Dean of Graduate Studies. Directed research and study on an individual basis.

BIOE 593. Alpine Ecology for Teachers. 2 Credits. (1 Lec, 1 Lab) Su PREREQUISITES: A minimum of two years science teaching experience. The primary goals in this course will be to understand how altitude affects the structure, function and evolution of alpine and sub-alpine plants and animals, and to create ways to bring this understanding into the grade 6-12 classroom. We will explore and gather data describing the biotic (living) and abiotic (non-living) constraints of sub-alpine and alpine environments to infer how these factors affect the form, abundance and niches of a variety of plants and animals.

BIOE 594. Seminar. 1 Credit. (1 Sem; 4 cr max) On Demand PREREQUISITE: Graduate standing or seniors by petition and course prerequisites as determined for each offering. Topics offered at the graduate level which are not covered in regular courses. Students participate in preparing and presenting discussion material.

BIOE 595. Ecology and Conservation of the World’s Marine Ecosystems for Teachers. 3 Credits. (1 Lec, 1 Lab, 1 Rec) F PREREQUISITES: A minimum of two years science teaching experience. This course is designed for students to gain a broad understanding of structure and function of the world's marine ecosystems and a broad knowledge of the major conservation issues in the oceans including climate change, overfishing, coral reef loss, and ocean acidification. The course will integrate in-depth study of each of the major marine ecosystems with reading and discussion of major conservation issues.
Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

Times was used instead of Adobe Garamond Pro.

The editor may contact Leepfrog for a draft with the correct fonts in place.