DEPARTMENT OF BIOLOGY

From cells to the biosphere, the Department of Biology makes discoveries about fundamental questions in our living world, and we use this new knowledge to make Earth a better place. The Department of Biology is a place where everyone is welcome to indulge their curiosity about the living world.

Office in the Biology Building, Room 111
(970) 491-7011
biology.colostate.edu (http://www.biology.colostate.edu)

Professor Deborah M. Garrity, Chair

Undergraduate Majors

- Biological Science (https://catalog.colostate.edu/general-catalog/colleges/natural-sciences/biology/biological-science-major/)
  - Biological Science Concentration (https://catalog.colostate.edu/general-catalog/colleges/natural-sciences/biology/biological-science-major-biological-science-concentration/)
  - Botany Concentration (https://catalog.colostate.edu/general-catalog/colleges/natural-sciences/biology/biological-science-major-botany-concentration/)
- Zoology (https://catalog.colostate.edu/general-catalog/colleges/natural-sciences/biology/zoology-major/)

Minors

- Botany (https://catalog.colostate.edu/general-catalog/colleges/natural-sciences/biology/botany-minor/)
- Zoology (https://catalog.colostate.edu/general-catalog/colleges/natural-sciences/biology/zoology-minor/)

Graduate

Graduate Programs in Biology

The department offers graduate programs leading to Master of Science and Doctor of Philosophy degrees in Biological Science. Students interested in graduate work should refer to the Graduate and Professional Bulletin (https://catalog.colostate.edu/general-catalog/graduate-bulletin/) (https://catalog.colostate.edu/general-catalog/graduate-bulletin/)and the Department of Biology (http://www.biology.colostate.edu).

Master's Programs

- Master of Science in Biological Science, Plan A and Plan B (https://catalog.colostate.edu/general-catalog/colleges/natural-sciences/biology/biological-science-ms/)
- Professional Science Master's in Natural Sciences – Zoo, Aquarium, and Animal Shelter Management Specialization (https://catalog.colostate.edu/general-catalog/colleges/natural-sciences/psm-zoo-aquarium-animal-shelter-management-specialization/)

Ph.D. Programs

- Ph.D. in Biological Science (https://catalog.colostate.edu/general-catalog/colleges/natural-sciences/biology/biological-science-phd/)

Courses

BZ 101 Humans and Other Animals (GT-SC2) Credits: 3 (3-0-0)
Course Description: Intended for non-science majors, exploring the genetic basis of common life processes, including form and function of the human body, evolution, and biodiversity. A number of current and controversial socio-scientific issues are addressed.
Prerequisite: None.
Registration Information: Credit not allowed for students who have already taken BZ 110 or LIFE 102 or LIFE 103. Sections may be offered: Online.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.
Additional Information: Biological & Physical Sciences 3A, Natural & Physical Sciences w/o lab (GT-SC2).

BZ 110 Principles of Animal Biology (GT-SC2) Credits: 3 (3-0-0)
Course Description: General features (body form, physiology, life history, ecology) and evolutionary relationships of major phyla of animals.
Prerequisite: None.
Registration Information: Sections may be offered: Online.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.
Additional Information: Biological & Physical Sciences 3A, Natural & Physical Sciences w/o lab (GT-SC2).

BZ 111 Animal Biology Laboratory (GT-SC1) Credit: 1 (0-3-0)
Course Description: Laboratory exercises demonstrating major features of animal biology and major phyla of animals.
Prerequisite: BZ 110, may be taken concurrently.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: Yes.
Additional Information: Biological & Physical Sciences 3A, Natural & Physical Sciences w/ lab (GT-SC1).

BZ 120 Principles of Plant Biology (GT-SC1) Credits: 4 (3-3-0)
Course Description: Diversity of relationships of plants and their structural and functional characteristics.
Prerequisite: None.
Registration Information: Must register for lecture and laboratory. Sections may be offered: Online.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: Yes.
Additional Information: Biological & Physical Sciences 3A, Natural & Physical Sciences w/ lab (GT-SC1).

BZ 145 Study Abroad--Australia: First-Year Seminar Credits: 3 (0-0-0)
Course Description: Freshman immersion study abroad course for biology students that focuses on endemic biodiversity of Australia and careers in biology.
Prerequisite: None.
Restrictions: Must not be a: Sophomore, Junior, Senior. Must be a: Undergraduate.
Registration Information: Written consent of instructor. Credit allowed for only one of the following: BZ 145, BZ 182A, or BZ 192.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 182B Study Abroad--Latin America: International Fieldwork in Biology Credits: 3 (0-0-3)
Course Description: Introductory fieldwork within the biological sciences through exposure to biodiversity, global culture, and field research. Skills and tools for conducting fieldwork and communicating findings are explored in the context of a social-ecological framework.
Prerequisite: None.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 192 First Year Seminar–Biology/Zoology Credit: 1 (1-0-0)
Course Description: Introduction to the biological science and zoology majors through development of academic skills necessary for success within the sciences, exposure to academic resources, science career pathways, research, and relevant topics like globalization and diversity in science fields.
Prerequisite: None.
Restrictions: Must not be a: Sophomore, Junior, Senior. Must be a: Undergraduate.
Registration Information: Freshman only. This is a partial semester course. Credit allowed for only one of the following: BZ 145, BZ 182A, or BZ 192.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 212 Animal Biology-Invertebrates Credits: 4 (3-3-0)
Course Description: General biology of invertebrates; their characteristics, classification, and adaptations.
Prerequisite: BZ 110 and BZ 111 or LIFE 103.
Registration Information: Must register for lecture and laboratory.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: Yes.

BZ 214 Animal Biology-Vertebrates Credits: 4 (3-3-0)
Course Description: Evolution of the anatomical, morphological, physiological and ecological characteristics of vertebrate animals. Provides foundation for advanced training in ichthyology, herpetology, ornithology and mammalogy. Includes a dissection-based lab to provide in-depth exploration of the external and internal anatomy of the nine extant classes of vertebrates.
Prerequisite: BZ 111 and BZ 110 or LIFE 103.
Registration Information: Must register for lecture and laboratory.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: Yes.

BZ 220 Introduction to Evolution Credits: 3 (3-0-0)
Course Description: Fundamental concepts in evolutionary biology.
Prerequisite: (BZ 110 and BZ 111 or BZ 120 or LIFE 103 and LIFE 102) and (MATH 118 or MATH 120 or MATH 124 or MATH 125 or MATH 127 or MATH 155 or MATH 160).
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 223 Plant Identification Credits: 3 (2-2-0)
Course Description: Relationships and identification of flowering plants.
Prerequisite: BZ 120 or LIFE 103.
Registration Information: Must register for lecture and laboratory. Sections may be offered: Online.
Terms Offered: Fall, Summer.
Grade Mode: Traditional.
Special Course Fee: Yes.

BZ 240 Synthetic Biology-Principles and Applications Credits: 3 (3-0-0)
Course Description: Biological principles underlying the contemporary practice of synthetic biology, along with relevant concepts from a wide range of disciplines. Diverse applications are explored at an introductory level.
Prerequisite: LIFE 102.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 296 Group Study-Biology Credits: Var[1-3] (0-0-0)
Course Description: Faculty-directed group investigation of areas of special interest in biology.
Prerequisite: None.
Registration Information: Written consent of instructor.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 300 Animal Behavior Credits: 3 (3-0-0)
Course Description: Evolutionary and mechanistic approaches to understanding why and how animals behave the way they do. Integrative approach linking behavior to brain, genes and hormones at the mechanistic level and to ecology to explain its functional and evolutionary basis.
Prerequisite: BZ 220.
Terms Offered: Fall, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 310 Cell Biology Credits: 4 (3-3-0)
Course Description: Structure and function of cells emphasizing molecular mechanisms. Communication, metabolism, motility, genetics, growth, and reproduction.
Prerequisite: (BZ 110 and BZ 111 or LIFE 102) and (CHEM 113).
Registration Information: Must register for lecture and laboratory.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: Yes.

BZ 311 Developmental Biology Credits: 4 (3-2-0)
Course Description: Developmental aspects of growth and differentiation in plants and animals.
Prerequisite: BZ 310.
Registration Information: Must register for lecture and laboratory.
Terms Offered: Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: Yes.

BZ 320 Biogeographic Approaches to Conservation Credits: 3 (3-0-0)
Course Description: How conservation is informed by biogeographic and phylogeographic studies, including studies of the dynamic earth, evolutionary history, ecology, climatology, paleontology, and anthropogenic change.
Prerequisite: BZ 110 and BZ 111 or BZ 120 or LIFE 102 and LIFE 103.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 325 Plant Systematics Credits: 4 (3-2-0)
Course Description: Principles and contemporary methods of classification of plants and the application of modern phylogenetic theory in comparative biology.
Prerequisite: BZ 220.
Registration Information: Must register for lecture and laboratory.
Term Offered: Spring (even years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 329 Herpetology Credits: 4 (3-2-0)
Course Description: Integrates knowledge and competencies spanning all scales of biology--molecules to ecosystems--using amphibians and reptiles as focal taxa.
Prerequisite: BZ 110 and BZ 111 or LIFE 102 and LIFE 103.
Restriction: Must not be a: Freshman.
Registration Information: Sophomore standing. Must register for lecture and laboratory. Credit not allowed for both BZ 329 and BZ 329A. Credit not allowed for both BZ 329 and BZ 329B.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: Yes.

BZ 330 Mammalogy Credits: 4 (3-2-0)
Course Description: Integrates knowledge and competencies spanning all scales of biology -- molecules and evolutionary history to management and ecosystems -- using mammals as a focal taxon.
Prerequisite: BZ 111 and BZ 110 or LIFE 103.
Restriction: Must not be a: Freshman.
Registration Information: Must register for lecture and laboratory. Credit not allowed for both BZ 330 and BZ 330A. Credit not allowed for both BZ 330 and BZ 330B.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: Yes.

BZ 331 Developmental Plant Anatomy Credits: 4 (2-4-0)
Course Description: Structure of plant cells, tissues, and organs as they develop.
Prerequisite: BZ 120 or LIFE 103.
Registration Information: Must register for lecture and laboratory.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: Yes.

BZ 333 Introductory Mycology Credits: 4 (2-4-0)
Course Description: Introduction to the biology and evolutionary history of groups of fungi including classification, structure, morphogenesis, phylogeny, genetics, and reproduction.
Prerequisite: BZ 120 or LIFE 103.
Registration Information: Must register for lecture and laboratory. Required field trips.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: Yes.

BZ 335 Ornithology Credits: 4 (3-3-0)
Course Description: Biology of birds, especially behavior, ecology, and identification in the laboratory and field.
Prerequisite: BZ 111 and BZ 110 or LIFE 103.
Registration Information: Must register for lecture and laboratory. Required field trips.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: Yes.

BZ 338 Comparative Morphology of Vascular Plants Credits: 4 (2-4-0)
Course Description: Origin, evolution, structure, and reproduction of the vascular plants, including comparative study of organs occurring in each group.
Prerequisite: BZ 120 or LIFE 103.
Registration Information: Must register for lecture and laboratory.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 339 Biology Field Practicum Credits: 3 (1-4-0)
Course Description: This course provides students with opportunities to explore a variety of field techniques, research approaches, and scientific problems that scientists in a fundamental biology program study. By accompanying graduate students into the field in local settings and getting to know their research, they explore what their own opportunities in science might look like.
Prerequisite: (LIFE 102 or LIFE 103) and (BZ 220).
Registration Information: Must register for lecture and laboratory. This is a partial semester course. Required field trips.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: Yes.

BZ 340 Field Mammalogy Credits: 4 (1-6-0)
Course Description: An intensive field course that introduces field wildlife techniques through the lens of studying the evolutionary relationships, ecology, and conservation of Colorado mammals. Opportunities to learn about wildlife handling and study techniques and apply them in independent research projects. A significant portion of the course is spent in the field, primarily at the CSU Mountain Campus in the mountains northwest of Fort Collins.
Prerequisite: BZ 110 or LIFE 103.
Restriction: Must not be a: Freshman.
Registration Information: Sophomore standing. Must register for lecture and laboratory. Required field trips. Credit not allowed for both BZ 340 and BZ 380A3.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 342 Exploring Range Shifts in a Changing World Credits: 3 (3-0-0)
Course Description: A structured, team-based research project that guides students through learning the skills needed to search for, obtain, clean, and analyze distributional data from publicly available sources, including iNaturalist and global museum databases. The data is used to explore a question of how distributions are changing over time, including correlating those changes with abiotic and anthropogenic changes, such as climate change, urbanization, or the introduction of nonnative species.

Prerequisite: BZ 110 or BZ 111 or BZ 120 or LIFE 102 or LIFE 103.
Restriction: Must not be a: Freshman.
Registration Information: Sophomore standing. Credit not allowed for both BZ 342 and BZ 381A2.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 348 Theory of Population and Evolutionary Ecology Credits: 4 (3-3-0)
Also Offered As: MATH 348.
Course Description: Principles and methods for building, analyzing, and interpreting mathematical models of ecological and evolutionary problems in biology.
Prerequisite: MATH 155 or MATH 160.
Registration Information: Must register for lecture and laboratory. Credit allowed for only one of the following: BZ 348, BZ 548, MATH 348.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 349 Tropical Ecology and Evolution Credits: 3 (3-0-0)
Course Description: Broad introduction to terrestrial and aquatic tropical biodiversity and the ecological and evolutionary processes that generate and maintain this diversity.
Prerequisite: BZ 220.
Restriction: Must not be a: Freshman.
Term Offered: Fall (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 350 Molecular and General Genetics Credits: 4 (3-0-1)
Course Description: Mendelian, molecular, and population genetics emphasizing the molecular basis of genetics.
Prerequisite: (BZ 110 or BZ 120 or LIFE 102) and (ERHS 307, may be taken concurrently or STAT 201, may be taken concurrently or STAT 301, may be taken concurrently or STAT 307, may be taken concurrently or STAT 315, may be taken concurrently).
Registration Information: Must register for lecture and recitation. Enrollment in biological sciences program. Sections may be offered: Online.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 360 Bioinformatics and Genomics Credits: 4 (3-0-1)
Course Description: Introductory genomics, bioinformatics, and computer programming concepts for biologists.
Prerequisite: BZ 110 or BZ 120 or LIFE 102.
Registration Information: Must register for lecture and recitation.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 384 Supervised College Teaching Credits: Var[1-5] (0-0-0)
Course Description:
Prerequisite: None.
Registration Information: 3.0 overall GPA; written consent of instructor; grade of A in course with which student assists. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 390 Biology of Sex Credits: 3 (3-0-0)
Course Description: Introduction to the origins and consequences of biological sex. Explore the biology of sex through evolutionary, physiological, and behavioral lenses. Topics include origins and diversity of sexual reproduction and sex chromosomes, mechanisms of sex determination and differentiation, sex differences and physiology, and sexual behaviors. Focus on sex in animals, though plants and other non-animals are discussed.
Prerequisite: BZ 220.
Registration Information: Credit not allowed for both BZ 380A4 and BZ 390.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 401 Comparative Animal Physiology Credits: 3 (3-0-0)
Course Description: Physiological mechanisms of digestion, metabolism, osmoregulation, excretion, circulation, and respiration in vertebrates and invertebrates that allow them to function and survive in varied environments.
Prerequisite: BZ 220.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 414 Vertebrate Climate Change Responses Credits: 3 (3-0-0)
Course Description: Vertebrate behavioral, physiological, ecological, and evolutionary responses to climate change.
Prerequisite: BZ 110 and BZ 111 or LIFE 102 and LIFE 103.
Restriction: Must not be a: Freshman.
Registration Information: Sophomore standing.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 415 Marine Biology Credits: 4 (3-0-1)
Course Description: Marine organisms, habitats, and communities.
Prerequisite: LIFE 320.
Registration Information: Must register for lecture and recitation.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 418 Ecology of Infectious Diseases Credits: 4 (3-0-1)
Course Description: Ecological perspectives of infectious disease outbreaks in wildlife and human populations.
Prerequisite: LIFE 320.
Registration Information: Must register for lecture and recitation. Sections may be offered: Online.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 420 Evolutionary Medicine Credits: 3 (3-0-0)
Course Description: Integration of evolutionary biology with behavior, genetics, and ecology to understand health and disease. Exploration of insights into medical research and practice (diagnosis and therapy) and human health from an evolutionary standpoint. Fundamentals of evolution, and the importance of evolutionary biology in understanding the ultimate and proximate causes of human disease. Engage in scientific discourse.
Prerequisite: BZ 110 and BZ 111 or LIFE 102.
Registration Information: Sophomore standing.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 424 Principles of Systematic Science Credits: 3 (3-0-0)
Also Offered As: BSPM 424.
Course Description: Introduction to the core principles of systematic science and exploration of issues including speciation, taxonomy and classification, constructing and evaluating hypotheses of evolutionary relationships, characters used in taxonomy, species descriptions, the taxonomic literature, museums and museum science, and careers in systematic science.
Prerequisite: BZ 220.
Registration Information: Credit not allowed for both BSPM 424 and BZ 424.
Term Offered: Spring (even years).
Grade Mode: Traditional.
Special Course Fee: Yes.

BZ 425 Conservation and Population Genomics Credits: 3 (3-0-0)
Course Description: Introduction to molecular genetic markers for questions in ecology, evolution, behavior, and conservation.
Prerequisite: BZ 220.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 430 Animal Behavior and Conservation Credits: 3 (3-0-0)
Course Description: The interface between animal behavior and conservation biology, exploring how behavioral tools can be applied to conservation problems.
Prerequisite: (BZ 110 and BZ 111 or LIFE 103) and (BZ 300).
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 433 Behavioral Genetics Credits: 3 (3-0-0)
Course Description: An integrative view of genetic basis of animal behavior, with emphasis on complex behaviors and societal implications of genetics research.
Prerequisite: LIFE 102 or LIFE 103.
Restriction: Must not be a: Freshman, Sophomore.
Registration Information: Junior standing.
Term Offered: Fall (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 435A Study Abroad--Honduras: Field Course--Dolphin Behavior and Physiology Credits: 2 (0-0-2)
Course Description: Field program offers an 8–day research experience to Roatan, Honduras. Study animal behavior, animal physiology, and conservation methods at the Roatan Institute for Marine Science (RIMS). Classroom lectures and discussions provide the framework to develop an understanding of the subject matter. Develop the skills necessary to conduct preliminary research.
Prerequisite: BZ 110 and BZ 111 or BZ 120 or LIFE 102.
Registration Information: Sophomore standing. This is a partial semester course.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 435B Study Abroad--Mexico: Practices in Marine Biology and Ecology Credits: 3 (0-0-3)
Course Description: Exposure to two of the most productive and biologically diverse marine areas in North America. Living in a landlocked state makes it hard to bring marine biology to life. However, studying the organisms/ecosystems in Baja California Sur is an opportunity to experience first-hand the subject matter that is normally only read about in textbooks. Venture into the field and gain practical knowledge from fieldwork that strengthens research skills.
Prerequisite: LIFE 320.
Restriction: Must not be a: Freshman.
Registration Information: Sophomore Standing. Written consent of instructor. This is a partial semester course. Students apply through Office of International Programs.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 435C Study Abroad--Kenya: Biology and Behavior of African Mammals Credits: 3 (0-0-3)
Course Description: An immersive field course in the techniques relevant to research on African mammals and conservation management.
Prerequisite: BZ 110 or BZ 111 or BZ 120 or LIFE 102 or LIFE 103.
Restriction: Must not be a: Freshman, Sophomore.
Registration Information: Junior standing. This is a partial semester course. Sections offered as Mixed Face-to-Face.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 435D Study Abroad--Madagascar: Biology and Behavior of Primates Credits: 3 (0-0-3)
Course Description: A unique opportunity to gain experience in field techniques and the cultural/community context for the conservation of a critically endangered group of endemic primates including their physiology, ecological niches, behavior, and evolutionary history.
Prerequisite: BZ 110 or BZ 111 or BZ 120 or LIFE 102 or LIFE 103.
Restriction: Must not be a: Freshman, Sophomore.
Registration Information: Junior standing. Credit not allowed for both BZ 435D and BZ 482E.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 440 Plant Physiology Credits: 3 (3-0-0)
Course Description: Functions and activities of plants.
Prerequisite: BZ 120 or LIFE 103.
Registration Information: Sections may be offered: Online.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 441 Plant Physiology Laboratory Credits: 2 (0-2-1)
Course Description: Laboratory applications of plant physiology principles.
Prerequisite: BZ 440, may be taken concurrently.
Registration Information: Must register for laboratory and recitation.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: Yes.

BZ 449A Study Abroad--Ecuador: Ecology/Conservation–Ecuadorian Biodiversity Credits: 4 (0-0-4)
Course Description: Winter (January) study abroad experience in Ecuador. First-hand exposure to the unparalleled biodiversity of Ecuador. Ecuador is an ideal location to learn about tropical biodiversity, because it houses an enormous diversity of tropical ecosystems in a relatively small geographic area, all of which are very accessible. Students will visit these ecosystems—including cloud forest, páramo, and lowland Amazonian rainforest.
Prerequisite: BZ 110 or BZ 111 or BZ 120 or LIFE 102 or LIFE 103.
Restrictions: Must not be a: Freshman, Sophomore. Must be a: Undergraduate.
Registration Information: Junior standing. Written consent of instructor.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 450 Plant Ecology Credits: 4 (3-2-0)
Course Description: Relation of plants to their environment.
Prerequisite: LIFE 103 or BZ 120.
Registration Information: Must register for lecture and laboratory.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: Yes.

BZ 455 Human Heredity and Birth Defects Credits: 3 (3-0-0)
Course Description: Human heredity and its individual and social implications; causes of congenital defects.
Prerequisite: BZ 110 and BZ 111 or LIFE 103.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 460 Genome Evolution Credits: 4 (3-0-1)
Course Description: Evolution of DNA, RNA, and proteins; use of genomic data to infer evolutionary history and processes.
Prerequisite: (BZ 220) and (BZ 310 or BZ 350).
Registration Information: Must register for lecture and recitation.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 462 Parasitology and Vector Biology Credits: 5 (3-4-0)
Also Offered As: BSPM 462 and MIP 462.
Course Description: Protozoa, helminths, and insects and related anthropods of medical importance; systematics, epidemiology, host damage and control.
Prerequisite: (BZ 110 or LIFE 103) and (BZ 212 or LIFE 206 or MIP 302).
Registration Information: Must register for lecture and laboratory. Credit allowed for only one of the following: BZ 462, BSPM 462, MIP 462.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 471 Stream Biology and Ecology Credits: 3 (3-0-0)
Course Description: Biology and ecology of running waters.
Prerequisite: LAND 220 or LIFE 220 or LIFE 320.
Restriction: Must not be a: Freshman.
Registration Information: Sections may be offered: Mixed Face-to-Face.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 472 Stream Biology and Ecology Laboratory Credit: 1 (0-3-0)
Course Description: Field sampling and laboratory analysis of habitats, biota, and ecological relationships in running waters.
Prerequisite: BZ 471, may be taken concurrently.
Registration Information: Required field trips.
Term Offered: Fall (odd years).
Grade Mode: Traditional.
Special Course Fee: Yes.

BZ 475 Marine Mammalogy Credits: 3 (3-0-0)
Course Description: Taxonomy, evolution, morphology, physiological adaptations, behavior, and ecology of marine animals.
Prerequisite: BZ 214.
Registration Information: Junior standing. Credit not allowed for both BZ 475 and BZ 481A3.
Term Offered: Fall (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 476 Genetics of Model Organisms Credits: 3 (3-0-0)
Also Offered As: BZ 576.
Course Description: Advanced topics in model genetic systems including molecular and developmental genetics.
Prerequisite: BZ 350 or LIFE 201A or LIFE 201B or SOCR 330.
Registration Information: Junior standing. Credit not allowed for both BZ 476 and BZ 576.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 477 Genome Editing Laboratory Credits: 2 (1-3-0)
Course Description: Learn theory and application of CRISPR/Cas genome editing. Design and create genome editing constructs to induce genetic modifications that lead to visible phenotypes using the model plant Arabidopsis. By sequencing the DNA of modified plants, students are able to link genotypic changes to their phenotypic consequences.
Prerequisite: BZ 310 or BZ 350 or LIFE 201 or SOCR 330.
Registration Information: Must register for lecture and laboratory. Credit allowed for only one of the following: BZ 477, BZ 480A7, or SOCR 480A7.
Term Offered: Spring.
Grade Mode: Traditional.
Special Course Fee: Yes.

BZ 478 Biology and Behavior of Cats Credits: 3 (3-0-0)
Also Offered As: VS 478.
Course Description: Comprehensive inquiry into how aspects of physiology, neurobiology, development and genetics influence the behavior of domestic cats. Evolution and domestication are explored as contextual reference for some behavior problems, and differentiated from true abnormal behavior. Emphasis is on interpreting scientific experiments in feline biology.
Prerequisite: BZ 220.
Restriction: Must not be a: Freshman, Sophomore.
Registration Information: Junior standing. Sections may be offered: Online. Credit not allowed for both BZ 478 and VS 478.
Terms Offered: Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 479 Biology and Behavior of Dogs Credits: 3 (3-0-0)
Also Offered As: VS 479.
Course Description: Interactions of physiology, neurobiology, and genetics on behavior of domestic dogs, and how evolution and domestication influence behavioral traits.
Prerequisite: BZ 220.
Restriction: Must not be a: Freshman, Sophomore.
Registration Information: Junior standing. Sections may be offered: Online. Credit not allowed for both BZ 479 and VS 479.
Terms Offered: Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 482A Study Abroad: Field Marine Biology Credits: 4 (0-0-4)
Course Description: Exposure to two of the most productive and biologically diverse marine areas in North America. Field sampling and exploration of marine ecosystems from levels of primary production to the top level predators. Students will learn a wide variety of hands on sampling techniques and data analyses with the goal of comparing the marine ecology of the Baja peninsula.
Prerequisite: BZ 415 and BZ 496.
Registration Information: Junior Standing. Written consent of instructor. Students to apply through Office of International Programs.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 482F Study Abroad--French Polynesia: Environmental and Cultural Studies Credits: 3 (0-0-3)
Course Description: Exposes students to the richness of tropical marine and terrestrial biodiversity, with an emphasis on sustainability and the effects of climate change. Island natural history; human history and society; human use and management of natural resources; and arts, food, and culture.
Prerequisite: None.
Restrictions: Must not be a: Freshman. Must be a: Undergraduate.
Registration Information: Sophomore standing. Completion of 3 credits each from AUCC categories 3A and 3B.
Term Offered: Summer.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 487 Internship Credits: Var[1-12] (0-0-0)
Course Description: Supervised work-related research experience in laboratory or field setting with consultation and approval of a regular faculty member.
Prerequisite: None.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 492A Seminar: Behavior Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 492B Seminar: Ecology Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 492C Seminar: Genetics Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 492D Seminar: Ornithology Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 492E Seminar: Herpetology Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 492F Seminar: Evolution Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 492G Seminar: Departmental Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 495 Independent Study Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Registration Information: Maximum of 7 credits allowed in course.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 496 Group Study Biology Credits: Var[1-3] (0-0-0)
Course Description: Faculty-directed group investigation of areas of special interest in biology.
Prerequisite: None.
Registration Information: Written consent of instructor.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 498 Laboratory or Field Research Credits: Var[1-6] (0-0-0)
Course Description: Supervised laboratory or field research in biology, botany, or zoology.
Prerequisite: None.
Registration Information: Written consent of research mentor.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 505 Cognitive Ecology Credits: 3 (3-0-0)
Course Description: The evolutionary ecology of mechanisms related to information processing and decision-making in animals.
Prerequisite: BZ 300.
Term Offered: Fall (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 510 Zoophysiological Ecology Credits: 3 (3-0-0)
Course Description: Concepts, principles, and examples of adaptive physiological strategies used by animals.
Prerequisite: (BMS 300 or BMS 360 or BZ 401) and (LIFE 320 or LAND 220 or LIFE 220).
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 515 Physiological Ecology of Marine Vertebrates Credits: 3 (3-0-0)
Course Description: Physiological adaptations of vertebrates to different marine environments.
Prerequisite: (BZ 214 and BZ 330) and (BC 351 or BC 401 or BMS 300 or BZ 401).
Term Offered: Spring (even years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 520 Advanced Systematics Credits: 3 (3-0-0)
Also Offered As: BSPM 520.
Course Description: Theory and practice of modern systematics.
Prerequisite: BZ 325 or BZ 424 or BSPM 424.
Registration Information: Credit not allowed for both BZ 520 and BSPM 520.
Term Offered: Spring (even years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 525 Advanced Conservation & Evolutionary Genomics Credits: 4 (3-0-1)
Course Description: Population genetic theory and application of genomic methods to conservation.
Prerequisite: (BZ 220 and BZ 350) and (STAT 301 or STAT 307).
Registration Information: Junior standing. Must register for lecture and recitation.
Term Offered: Fall (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 526 Evolutionary Ecology Credits: 3 (3-0-0)
Also Offered As: BSPM 526.
Course Description: Adaptation to abiotic and biotic environments; how current ecological processes interact with evolutionary history.
Prerequisite: LIFE 320 or LAND 220 or LIFE 220.
Registration Information: Credit not allowed for both BZ 526 and BSPM 526.
Term Offered: Fall (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 535 Behavioral and Cognitive Ecology Credits: 3 (3-0-0)
Course Description: Evolutionary and theoretical perspectives in animal behavior using examples from model empirical systems. Emphasis on decision rules and social behavior.
Prerequisite: BZ 300 with a minimum grade of B.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 540 Translocation in Plants Credits: 2 (2-0-0)
Course Description: Transport of sugars, organic and inorganic ions, water, and hormones across membranes and through vascular systems of plants.
Prerequisite: BZ 331 and BZ 440.
Term Offered: Spring (even years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 541 Hemp Biology Credits: 3 (3-0-0)
Course Description: Comprehensive treatment of cannabis plants, including their evolution, anatomy, physiology, cultivation, secondary metabolite synthesis, genetics, breeding and use by humans, with an emphasis on critical analysis of the contemporary scientific literature in the area of cannabis biology.
Prerequisite: BZ 120 or LIFE 103.
Restriction: Must not be a: Freshman.
Registration Information: Offered as an online course only. Sophomore standing. Credit not allowed for both BZ 541 and BZ 581A1.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 544 Presenting Research in Biology Credits: 2 (2-0-0)
Course Description: Procedures for preparing and presenting results of biological research in scientific journals and at professional meetings.
Prerequisite: None.
Registration Information: Written consent of instructor.
Term Offered: Fall.
Grade Mode: S/U Sat/Unsat Only.
Special Course Fee: No.

BZ 548 Theory of Population and Evolutionary Ecology Credits: 4 (3-3-0)
Course Description: Principles and methods for building, analyzing, and interpreting mathematical models of ecological and evolutionary problems in biology; research module.
Prerequisite: MATH 155 or MATH 160.
Registration Information: Must register for lecture and laboratory. Credit allowed for only one of the following: BZ 548, BZ 348, MATH 348.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 560 Teaching and Communicating Science Credits: 3 (3-0-0)
Course Description: Nature of science, scientific reasoning, scientific argumentation, communication theories, and instructional strategies are explored. Develop science argumentation and communication skills in undergraduate courses and in informal settings. Create materials for a professional portfolio.
Prerequisite: (STAT 201 or STAT 204 or STAT 301 or STAT 307 or STAT 315) and (BZ 220 or LIFE 320) and (BZ 350 or LIFE 203 or SOCR 330).
Registration Information: Intended for students in a life science program. Credit allowed for only one of the following: BZ 560, BZ 670 or BZ 680A1.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 562 Computational Approaches in Molecular Ecology Credits: 2 (1-2-0)
Course Description: Explore current analysis methods for working with genome-wide sequencing data from non-model organisms. Analysis methods focus on ecological, evolution, and conservation related topics.
Prerequisite: (BZ 220) and (STAT 301 or STAT 307).
Restriction: Must not be a: Freshman, Sophomore.
Registration Information: Must register for lecture and laboratory. Credit not allowed for both BZ 562 and BZ 581A2.
Term Offered: Spring (even years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 565 Next Generation Sequencing Platform/Libraries Credit: 1 (0-2-0)
Also Offered As: MIP 565.
Course Description: Theoretical and experimental aspects of next generation sequencing experiments with a focus on the Illumina platform. Students will create and sequence metagenomic and 16S rDNA libraries from soil samples and unknown bacterial cultures.
Prerequisite: None.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing. This is a partial semester course. Credit allowed for only one of the following: BZ 565, CM 581A2, or MIP 565.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 568 Sustaining River Ecosystems in Changing World Credits: 3 (3-0-0)
Also Offered As: FW 568.
Course Description: Applying the concepts and principles of freshwater ecosystem structure and function to develop a multidisciplinary and integrated understanding of the approaches and methods for restoring and sustainably managing these systems in the face of increasing human demands and rapid climate change.
Prerequisite: None.
Restriction: Must not be a: Freshman, Sophomore, Junior.
Registration Information: Senior standing. Credit allowed for only one of the following: BZ 568, BZ 680A2, FW 568, and FW 680A2.
Term Offered: Spring (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 570 Molecular Aspects of Plant Development Credits: 3 (3-0-0)
Course Description: Molecular mechanisms that regulate diverse vegetative and reproductive developmental processes in plants.
Prerequisite: BC 463 or BZ 350 or MIP 450 or SOCR 330.
Restriction: Must be a: Graduate.
Registration Information: Graduate standing.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 572 Phytoremediation Credits: 3 (3-0-0)
Course Description: Environmental cleanup using plants.
Prerequisite: BZ 120 or LIFE 103.
Term Offered: Fall (odd years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 576 Genetics of Model Organisms Credits: 4 (3-0-1)
Also Offered As: BZ 476.
Course Description: Advanced topics in model genetic systems including molecular and developmental genetics.
Prerequisite: BZ 350 or LIFE 201A or LIFE 201B or SOCR 330.
Registration Information: Junior standing. Credit not allowed for both BZ 576 and BZ 476.
Term Offered: Fall.
Grade Mode: Traditional.
Special Course Fee: No.

BZ 584 Supervised College Teaching Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Registration Information: Maximum of 6 credits allowed in course.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 587A Internship: General Credits: Var[1-6] (0-0-0)
Course Description:
Prerequisite: None.
Registration Information: Written consent of instructor.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 587B Internship: Herbarium Credits: Var[1-6] (0-0-0)
Course Description:
Prerequisite: None.
Registration Information: Written consent of instructor.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 594 Independent Study Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 642 Plant Metabolism Credits: 3 (3-0-0)
Course Description: Biosyntheses and transformations of important plant metabolites.
Prerequisite: BC 351 and BZ 440.
Restriction: Must be a: Graduate, Professional.
Term Offered: Fall (even years).
Grade Mode: Traditional.
Special Course Fee: No.

BZ 692A Seminar: Behavior Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 692C Seminar: Ecology Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 692D Seminar: Genetics Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 692E Seminar: Ornithology Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 692G Seminar: Evolution Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 692H Seminar: Departmental Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 695 Independent Study Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 698 Research Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 699 Thesis Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 784 Supervised College Teaching Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Registration Information: Maximum of 6 credits allowed in course.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 792 Seminar Credit: 1 (0-0-1)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 795 Independent Study Credits: Var[1-3] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 798 Research Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.

BZ 799 Dissertation Credits: Var[1-18] (0-0-0)
Course Description:
Prerequisite: None.
Restriction: Must be a: Graduate, Professional.
Terms Offered: Fall, Spring, Summer.
Grade Mode: Instructor Option.
Special Course Fee: No.