BIOLOGY (BIOL)

BIOL 101 General Human Biology-GTSC1 3 Credits
Scientific method, ecology, pollution, drugs, reproduction, cancer, heart disease, nutrition, and selected body structure and function relationships.
Corequisites: BIOL 101L.
Essential Learning Categories: Natural Science with lab - Both the lab and lecture must be completed
Colorado Guaranteed Transfer (GT) Pathways General Education Curriculum
Terms Typically Offered: Fall, Spring, Summer.

BIOL 101L General Human Biology Laboratory-GTSC1 1 Credit
Scientific method, ecology, pollution, drugs, reproduction, cancer, heart disease, nutrition, and selected body structure and function relationships.
Corequisites: BIOL 101.
Essential Learning Categories: Natural Science with lab - Both the lab and lecture must be completed
Colorado Guaranteed Transfer (GT) Pathways General Education Curriculum
Terms Typically Offered: Fall, Spring, Summer.
Fees: Yes.

BIOL 105 Attributes of Living Systems-GTSC1 3 Credits
Cell structure and function, cell energetics, biochemistry, and genetics. High school chemistry recommended.
Corequisites: BIOL 105L.
Essential Learning Categories: Natural Science with lab - Both the lab and lecture must be completed
Colorado Guaranteed Transfer (GT) Pathways General Education Curriculum
Terms Typically Offered: Fall, Spring.

BIOL 105L Attributes of Living Systems Laboratory-GTSC1 1 Credit
Cell structure and function, cell energetics, biochemistry, and genetics. High school chemistry recommended.
Corequisites: BIOL 105.
Essential Learning Categories: Natural Science with lab - Both the lab and lecture must be completed
Colorado Guaranteed Transfer (GT) Pathways General Education Curriculum
Terms Typically Offered: Fall, Spring.
Fees: Yes.

BIOL 106 Principles of Animal Biology 3 Credits
Broad morphological, physiological, and ecological features of principal phyla of animals and relationships between them.
Prerequisites: BIOL 105 or permission of instructor.
Corequisites: BIOL 106L.

BIOL 106L Principles of Animal Biology Laboratory 1 Credit
Lab component required for BIOL 106.
Prerequisites: BIOL 105 or permission of instructor.
Corequisites: BIOL 106.
Fees: Yes.

BIOL 107 Principles of Plant Biology 3 Credits
Reproductive biology, anatomy, physiology, phylogeny, and ecology of the major groups of plants.
Prerequisites: BIOL 105.
Corequisites: BIOL 107L.
Terms Typically Offered: Fall, Spring.

BIOL 107L Principles of Plant Biology Laboratory 1 Credit
Reproductive biology, anatomy, physiology, phylogeny, and ecology of the major groups of plants.
Prerequisites: BIOL 105.
Corequisites: BIOL 107.
Terms Typically Offered: Fall, Spring.
Fees: Yes.

BIOL 108 Diversity of Organisms-GTSC1 3 Credits
Broadly integrated survey of biological diversity with an emphasis on evolutionary relationships, ecology, and functional anatomical features of major groups.
Corequisites: BIOL 108L.
Essential Learning Categories: Natural Science with lab - Both the lab and lecture must be completed
Colorado Guaranteed Transfer (GT) Pathways General Education Curriculum
Terms Typically Offered: Fall, Spring.

BIOL 108L Diversity of Organisms Laboratory-GTSC1 1 Credit
Broadly integrated survey of biological diversity with an emphasis on evolutionary relationships, ecology, and functional anatomical features of major groups.
Corequisites: BIOL 108.
Essential Learning Categories: Natural Science with lab - Both the lab and lecture must be completed
Colorado Guaranteed Transfer (GT) Pathways General Education Curriculum
Terms Typically Offered: Fall, Spring.
Fees: Yes.

BIOL 113 Outdoor Survival 3 Credits
Skills necessary for biologists working in the field, including wilderness survival, wilderness medicine, camping/climbing skills, edible/poisonous plants, and urban survival skills.
Terms Typically Offered: Spring.

BIOL 196 Topics 1-3 Credits
Course may be taken multiple times up to maximum of 15 credit hours.

BIOL 208 Fundamentals of Ecology and Evolution 3 Credits
Introduction to current theory and experimental work in ecology and evolutionary biology. Topics include: biology of populations, species interactions, community structure, evolution by natural selection, population genetics, and speciation.
Prerequisites: BIOL 105/BIOL 105L; and BIOL 106/BIOL 106L or BIOL 107/BIOL 107L or BIOL 108/BIOL 108L (may be taken concurrently).
Corequisites: BIOL 208L.
Terms Typically Offered: Fall, Spring, Summer.

BIOL 208L Fundamentals of Ecology and Evolution Laboratory 1 Credit
Introduction to current theory and experimental work in ecology and evolutionary biology. Topics include: biology of populations, species interactions, community structure, evolution by natural selection, population genetics, and speciation.
Prerequisites: BIOL 105/BIOL 105L; and BIOL 106/BIOL 106L or BIOL 107/BIOL 107L or BIOL 108/BIOL 108L (may be taken concurrently).
Corequisites: BIOL 208.
Terms Typically Offered: Fall, Spring, Summer.
Fees: Yes.

BIOL 209 Human Anatomy and Physiology I 3 Credits
Study of the form and function of several major systems of the human body. For students with an interest in pre-med, nursing, human health, and biology. A background in general biology is recommended.
Corequisites: BIOL 209L.
Terms Typically Offered: Fall, Spring, Summer.

BIOL 209L Human Anatomy and Physiology I Laboratory 1 Credit
Study of the form and function of several major systems of the human body. For students with an interest in pre-med, nursing, human health, and biology. A background in general biology is recommended.
Corequisites: BIOL 209.
Terms Typically Offered: Fall, Spring, Summer.
Fees: Yes.

BIOL 210 Human Anatomy and Physiology II 3 Credits
Continued study of human anatomy and physiology, covering additional body systems and disease processes. For students with an interest in pre-med, nursing, human health, and biology.
Prerequisites: BIOL 209/BIOL 209L.
Corequisites: BIOL 210L.
Terms Typically Offered: Fall, Spring.

BIOL 210L Human Anatomy and Physiology II Laboratory 1 Credit
Continued study of human anatomy and physiology, covering additional body systems and disease processes. For students with an interest in pre-med, nursing, human health, and biology.
Prerequisites: BIOL 209/BIOL 209L.
Corequisites: BIOL 210.
Terms Typically Offered: Fall, Spring.
Fees: Yes.

BIOL 211 Ecosystem Biology 4 Credits
Ecological studies utilizing the concepts of population biology: energetics, dynamics, distribution, and sociology. Overnight and/or weekend field trips may be required. Four lectures and one three-hour laboratory per week.
Corequisites: BIOL 211L.

BIOL 211L Ecosystem Biology Laboratory 1 Credit
Lab component required for BIOL 211.
Corequisites: BIOL 211.
Fees: Yes.

BIOL 217 Forensic Entomology 2 Credits
Basic procedure and considerations in using insect evidence in crime scene investigations and the determination of post mortem interval using insects. Two-hour lecture and one two-hour lab per week.
Corequisites: BIOL 217L.

BIOL 217L Forensic Entomology Laboratory 1 Credit
Lab component required for BIOL 217.
Corequisites: BIOL 217.
Fees: Yes.

BIOL 241 Pathophysiology 4 Credits
Function of the human body with emphasis on interpretation of those functions in relation to disease processes.
Prerequisites: BIOL 209/BIOL 209L.
Terms Typically Offered: Fall, Spring, Summer.

BIOL 250 Introduction to Microbiology-GTSC1 3 Credits
Survey of major types of microorganisms, with an emphasis on bacteria. Microbial taxonomy, structure, metabolism, genetics, and aspects of infectious disease and the immune host response. Labs cover techniques used for growth, quantification, and identification of microorganisms, including aseptic technique, light microscopy, serial dilutions, and use of a variety of media to identify microorganisms.
Corequisites: BIOL 250L.
Essential Learning Categories: Natural Science with lab - Both the lab and lecture must be completed
Colorado Guaranteed Transfer (GT) Pathways General Education Curriculum
Terms Typically Offered: Fall, Spring.

BIOL 250L Introduction to Microbiology Laboratory-GTSC1 1 Credit
Survey of major types of microorganisms, with an emphasis on bacteria. Microbial taxonomy, structure, metabolism, genetics, and aspects of infectious disease and the immune host response. Labs cover techniques used for growth, quantification, and identification of microorganisms, including aseptic technique, light microscopy, serial dilutions, and use of a variety of media to identify microorganisms.
Corequisites: BIOL 250.
Essential Learning Categories: Natural Science with lab - Both the lab and lecture must be completed
Colorado Guaranteed Transfer (GT) Pathways General Education Curriculum
Terms Typically Offered: Fall, Spring.
Fees: Yes.

BIOL 296 Topics 1-3 Credits
Course may be taken multiple times up to maximum of 15 credit hours.

BIOL 301 Principles of Genetics 3 Credits
Principles of genetics at the organismal, cellular, and molecular levels. Includes the unique genetic processes of prokaryotic organisms, eukaryotic organisms, and viruses.
Prerequisites: BIOL 105/BIOL 105L and MATH 113 or higher.
Corequisites: BIOL 301L.
Terms Typically Offered: Fall, Spring.

BIOL 301L Principles of Genetics Laboratory 1 Credit
Principles of genetics at the organismal, cellular, and molecular levels. Includes the unique genetic processes of prokaryotic organisms, eukaryotic organisms, and viruses.
Prerequisites: BIOL 105/BIOL 105L and MATH 113 or higher.
Corequisites: BIOL 301.
Terms Typically Offered: Fall, Spring.
Fees: Yes.

BIOL 302 Cellular Biology 3 Credits
Form, function, and bioenergetics of the cell.
Prerequisites: BIOL 301/BIOL 301L and CHEM 132/CHEM 132L.

BIOL 310 Developmental Biology 3 Credits
Embryonic growth and development of plants and animals. Errors in normal development, cancer, aging, and related topics.
Prerequisites: BIOL 301/BIOL 301L.
Corequisites: BIOL 310L.
Terms Typically Offered: Spring.

BIOL 310L Developmental Biology Laboratory 1 Credit
Embryonic growth and development of plants and animals. Errors in normal development, cancer, aging, and related topics.
Prerequisites: BIOL 301/BIOL 301L.
Corequisites: BIOL 310.
Terms Typically Offered: Spring.
Fees: Yes.

BIOL 315 Epidemiology 3 Credits
Characteristic patterns of communicable disease occurrence as related to individuals, geographic location, and time; factors affecting disease occurrence, the nature of vital statistics, sampling procedures, and study design. An independent project is required.

BIOL 316 Animal Behavior 3 Credits
Mechanisms and evolution of animal behavior. Analysis of a variety of social and individual behaviors across the animal kingdom at both proximate and ultimate levels.
Prerequisites: BIOL 106/BIOL 106L or BIOL 108/BIOL 108L; and BIOL 208/BIOL 208L.
Corequisites: BIOL 316L.
Terms Typically Offered: Spring.

BIOL 316L Animal Behavior Laboratory 1 Credit
Mechanisms and evolution of animal behavior. Analysis of a variety of social and individual behaviors across the animal kingdom at both proximate and ultimate levels.
Prerequisites: BIOL 106/BIOL 106L or BIOL 108/BIOL 108L; and BIOL 208/BIOL 208L.
Corequisites: BIOL 316.
Terms Typically Offered: Spring.
Fees: Yes.

BIOL 320 Plant Systematics 3 Credits
Systematic botany encompassing principles of classification, nomenclature, and evaluation of current classifications of angiosperms.
Prerequisites: BIOL 105/BIOL 105L, BIOL 107/BIOL 107L or BIOL 108/BIOL 108L, and BIOL 208/BIOL 208L.

BIOL 321 Taxonomy of Grasses 2 Credits
A study of the grass family and grass-like plants (sedges and rushes) dealing with the evolution, classification, and identification of these plants. Two lectures and two two-hour laboratories per week.
Prerequisites: BIOL 107/BIOL 107L or BIOL 108/BIOL 108L, or permission of instructor.
Corequisites: BIOL 321L.

BIOL 321L Taxonomy of Grasses Laboratory 2 Credits
Lab component required for BIOL 321.
Prerequisites: BIOL 107/BIOL 107L or BIOL 108/BIOL 108L, or permission of instructor.
Corequisites: BIOL 321.
Fees: Yes.

BIOL 322 Plant Identification 2 Credits
Identification of the local flora. Basic plant anatomy and morphology. Includes evolutionary relationships of major plant groups as well as environmental, ecological, and historical constraints on plant distribution.
Prerequisites: BIOL 107/BIOL 107L or BIOL 108/BIOL 108L.
Corequisites: BIOL 322L.

BIOL 322L Plant Identification Laboratory 2 Credits
Lab component required for BIOL 322.
Prerequisites: BIOL 107/BIOL 107L or BIOL 108/BIOL 108L.
Corequisites: BIOL 322.
Fees: Yes.

BIOL 331 Insect Biology 3 Credits
Insect taxonomy, evolution, ecology, and physiology. Insect collection required. Three lectures and two two-hour laboratories per week.
Prerequisites: BIOL 106/BIOL 106L or BIOL 108/BIOL 108L.
Corequisites: BIOL 331L.

BIOL 331L Insect Biology Laboratory 2 Credits
Lab component required for BIOL 331.
Prerequisites: BIOL 106/BIOL 106L or BIOL 108/BIOL 108L.
Corequisites: BIOL 331.
Fees: Yes.

BIOL 333 Marine Biology 3 Credits
Study of the principles that govern biological systems in the ocean with an emphasis on the natural history, ecology, and evolution of marine organisms. Three one-hour lectures per week.
Prerequisites: BIOL 106/BIOL 106L and BIOL 107/BIOL 107L, or BIOL 108/BIOL 108L, or permission of instructor.

BIOL 335 Invertebrate Zoology 3 Credits
Study of the evolution, morphology, life history, ecology and classification of invertebrates with a focus on non-insect invertebrates. Three one-hour lectures and one two-hour lab per week.
Prerequisites: BIOL 106/BIOL 106L, or permission of instructor.
Corequisites: BIOL 335L.

BIOL 335L Invertebrate Zoology Laboratory 1 Credit
Lab component required for BIOL 335.
Prerequisites: BIOL 106/BIOL 106L, or permission of instructor.
Corequisites: BIOL 335.
Fees: Yes.

BIOL 336 Fish Biology 3 Credits
Study of the anatomy and physiology of fish. Topics include ecology, fish diseases, and marine and freshwater fishery techniques. Field trips may be offered.
Prerequisites: BIOL 106/BIOL 106L or permission of instructor.
Corequisites: BIOL 336L.

BIOL 336L Fish Biology Laboratory 1 Credit
Lab component required for BIOL 336.
Prerequisites: BIOL 106/BIOL 106L or permission of instructor.
Corequisites: BIOL 336.
Fees: Yes.

BIOL 338 Small Mammal Biology 3 Credits
Introduction to the life history and taxonomic classification of small mammals. Focus includes the unique constraints and physiological challenges imposed by small body size (less than 5kg).
Prerequisites: Junior or Senior Standing.
Terms Typically Offered: Fall, Summer.

BIOL 343 Immunology 3 Credits
Immune system of animals with emphasis on human immune response. Includes the immune organs and both cellular and humoral responses. An independent research project is required.
Prerequisites: BIOL 302, or BIOL 301/BIOL 301L.

BIOL 344 Forensic Molecular Biology 3 Credits
Molecular biology and genetics used in forensic investigations, including the genetic basis of diversity and DNA typing techniques.
Prerequisites: BIOL 105/BIOL 105L and CHEM 131/CHEM 131L.
Corequisites: BIOL 344L.

BIOL 344L Forensic Molecular Biology Laboratory 1 Credit
Lab component required for BIOL 344.
Prerequisites: BIOL 105/BIOL 105L and CHEM 131/CHEM 131L.
Corequisites: BIOL 344.
Fees: Yes.

BIOL 350 Microbiology 3 Credits
Growth, morphology, metabolism, genetics and ecology of microorganisms. Includes aspects of industrial microbiology, clinical microbiology, and genetic engineering. Three lectures and one three-hour laboratory per week.
Prerequisites: BIOL 105/BIOL 105L, and CHEM 121/CHEM 121L or CHEM 131/CHEM 131L.
Corequisites: BIOL 350L.

BIOL 350L Microbiology Laboratory 1 Credit
Lab component required for BIOL 350.
Prerequisites: BIOL 105/BIOL 105L, and CHEM 121/CHEM 121L or CHEM 131/CHEM 131L.
Corequisites: BIOL 350.
Fees: Yes.

BIOL 351 Ecological Physiology 3 Credits
Diversity of form and function among vertebrates. Emphasizes the evolution of physiological processes to ecological challenges at the organismal level.
Prerequisites: BIOL 106 or BIOL 108.
Corequisites: BIOL 351L.
Terms Typically Offered: Fall.

BIOL 351L Ecological Physiology Laboratory 1 Credit
Diversity of form and function among vertebrates. Emphasizes the evolution of physiological processes to ecological challenges at the organismal level.
Prerequisites: BIOL 106 or BIOL 108.
Corequisites: BIOL 351.
Terms Typically Offered: Fall.
Fees: Yes.

BIOL 352 Human Physiology 3 Credits
In-depth study of human function. Physiology of major human body systems will be studied at the cellular, tissue, and systemic levels, emphasizing homeostatic mechanisms and integrative function.
Prerequisites: BIOL 105 or BIOL 209.
Corequisites: BIOL 352L.
Terms Typically Offered: Spring.

BIOL 352L Human Physiology Laboratory 1 Credit
In-depth study of human function. Physiology of major human body systems will be studied at the cellular, tissue, and systemic levels, emphasizing homeostatic mechanisms and integrative function.
Prerequisites: BIOL 105 or BIOL 209.
Corequisites: BIOL 352.
Terms Typically Offered: Spring.
Fees: Yes.

BIOL 371L Laboratory Investigations in Cellular and Molecular Biology 3 Credits
Laboratory exercises and experiments that highlight important topics in cellular and molecular biology. The mechanics of laboratory science are introduced with an emphasis on modern techniques, hypothesis development, data analysis and scientific communication. Two three-hour laboratories per week.
Prerequisites: BIOL 301/BIOL 301L and CHEM 132/CHEM 132L or permission of instructor.
Fees: Yes.

BIOL 385 Nature and Philosophy of Science 3 Credits
Central concepts on the nature of scientific knowledge including philosophical tenets that distinguish science from technology as well as distinguish science from pseudoscience. May not be used in the Additional Biology Courses categories for the Biology Concentration.

BIOL 387 Structured Research 1-4 Credits
Independent research beyond the scope of the published curriculum. Designed for advanced sophomore and junior level students to participate in research activities under the direction of a specific faculty member.
Prerequisites: Sophomore or junior standing, or permission of instructor. Course may be taken multiple times up to maximum of 6 credit hours.
Fees: Yes.

BIOL 395 Independent Study 1-3 Credits
Course may be taken multiple times up to maximum of 6 credit hours.

BIOL 396 Topics 1-3 Credits
Course may be taken multiple times up to maximum of 15 credit hours.

BIOL 403 Evolution 3 Credits
Organismal and molecular evolution emphasizing its importance as the unifying theory in biology. Evolution of natural selection on genetic structure of populations.
Prerequisites: BIOL 301/BIOL 301L, with BIOL 208/BIOL 208L strongly recommended.

BIOL 405 Advanced Ecological Methods 3 Credits
Examination of quantitative methods in population, community, and ecosystems ecology. Extensive writing, computer work and field trips are required. Three lectures and two two-hour laboratories per week.
Prerequisites: BIOL 105/BIOL 105L; and BIOL 106/BIOL 106L and BIOL 107/BIOL 107L, or BIOL 108/BIOL 108L; STAT 301 is recommended.
Corequisites: BIOL 405L.

BIOL 405L Advanced Ecological Methods Laboratory 2 Credits
Lab component required for BIOL 405.
Prerequisites: BIOL 105/BIOL 105L; and BIOL 106/BIOL 106L and BIOL 107/BIOL 107L, or BIOL 108/BIOL 108L; STAT 301 is recommended.
Corequisites: BIOL 405.
Fees: Yes.

BIOL 406 Plant-Animal Interactions 3 Credits
Ecological, evolutionary, and applied approaches to the studies of herbivory, ant-plant interactions, pollination, and seed dispersal.
Prerequisites: BIOL 105/BIOL 105L; BIOL 106/BIOL 106L, BIOL 107/BIOL 107L, or BIOL 108/BIOL 108L; and BIOL 208/BIOL 208L; BIOL 331/BIOL 331L is recommended.

BIOL 407 Tropical Field Biology 3-5 Credits
Field research techniques, ecology and natural history in lowland and montane tropical rainforests of Ecuador. Ten nine-hour labs and fifteen two-hour lectures conducted at biological field stations in Ecuador.
Prerequisites: BIOL 105/BIOL 105L; and BIOL 106/BIOL 106L and BIOL 107/BIOL 107L, or BIOL 108/BIOL 108L; and BIOL 208/BIOL 208L; BIOL 331/BIOL 331L is recommended.

BIOL 408 Desert Ecology 3 Credits
Overview of desert ecology in the surrounding area and in the United States. Covers ecology of U.S. deserts including specific plant, animal, and human adaptations. Discussion on world deserts. Field trips may be offered.
Prerequisites: BIOL 208/BIOL 208L, and junior or senior standing or permission of instructor.

BIOL 409 Gross and Developmental Human Anatomy 2 Credits
Gross anatomy, embryology, radiological and cross-sectional anatomy of the human body via lectures, demonstrations, and dissections of the human cadaver. Emphasis on thorax, abdomen, and extremities. Two lectures and two 2-hour laboratories per week.
Prerequisites: BIOL 209/BIOL 209L, or permission of instructor.
Corequisites: BIOL 409L.

BIOL 409L Gross and Developmental Human Anatomy Laboratory 2 Credits
Lab component required for BIOL 409.
Prerequisites: BIOL 209/BIOL 209L, or permission of instructor.
Corequisites: BIOL 409.
Fees: Yes.

BIOL 410 Human Osteology 3 Credits
Study of the human skeleton, including osteology and bone detail, biological variation, animal skeletal comparisons, pathology, forensics, and proper handling of human skeletal material. Laboratory emphasizes analysis and identification of human skeletal material. Three lectures and one two-hour laboratory per week.
Prerequisites: BIOL 209/BIOL 209L.
Corequisites: BIOL 410L.

BIOL 410L Human Osteology Laboratory 1 Credit
Lab component required for BIOL 410.
Prerequisites: BIOL 209/BIOL 209L.
Corequisites: BIOL 410.
Fees: Yes.

BIOL 411 Mammalogy 3 Credits
Evolution, classification, life histories, and ecology of mammals.
Prerequisites: BIOL 106/BIOL 106L or BIOL 108/BIOL 108L; and BIOL 208/BIOL 208L.
Corequisites: BIOL 411L.
Terms Typically Offered: Spring.

BIOL 411L Mammalogy Laboratory 1 Credit
Evolution, classification, life histories, and ecology of mammals.
Prerequisites: BIOL 106/BIOL 106L or BIOL 108/BIOL 108L; and BIOL 208/BIOL 208L.
Corequisites: BIOL 411.
Terms Typically Offered: Spring.
Fees: Yes.

BIOL 412 Ornithology 3 Credits
Classification and life history of birds, including field identification. Overnight and/or weekend field trips may be required. Three lectures and one two-hour laboratory or three-hour field trip per week.
Prerequisites: BIOL 208/BIOL 208L, and upper division standing or permission of instructor.
Corequisites: BIOL 412L.

BIOL 412L Ornithology Laboratory 1 Credit
Lab component required for BIOL 412.
Prerequisites: BIOL 208/BIOL 208L, and upper division standing or permission of instructor.
Corequisites: BIOL 412.
Fees: Yes.

BIOL 413 Herpetology 3 Credits
Classification, evolution, morphology and ecology of amphibians and reptiles. Overnight or weekend field trips may be required. Three lectures and one two-hour laboratory per week.
Prerequisites: BIOL 208/BIOL 208L, and upper division standing or permission of instructor.
Corequisites: BIOL 413L.

BIOL 413L Herpetology Laboratory 1 Credit
Lab component required for BIOL 413.
Prerequisites: BIOL 208/BIOL 208L, and upper division standing or permission of instructor.
Corequisites: BIOL 413.
Fees: Yes.

BIOL 414 Freshwater Ecology 3 Credits
Classification, life history, and ecology of aquatic animals. Overnight and/or weekend field trips may be required. Three lectures and one two-hour laboratory or three-hour field trip per week.
Prerequisites: Upper division standing or permission of instructor.
Corequisites: BIOL 414L.

BIOL 414L Freshwater Ecology Laboratory 1 Credit
Lab component required for BIOL 414.
Prerequisites: Upper division standing or permission of instructor.
Corequisites: BIOL 414.
Fees: Yes.

BIOL 415 Tropical Ecosystems 2 Credits
Ecology of rainforests, grasslands, and desert ecosystems of the world.
Prerequisites: BIOL 105/BIOL 105L, and BIOL 106/BIOL 106L or BIOL 107/BIOL 107L, or BIOL 108/BIOL 108L, and BIOL 208/BIOL 208L, or permission of instructor.

BIOL 418 Wildlife Management 3 Credits
Examination of wildlife biology and management. Topics covered include managing habitat, mammals, birds, fish, and other small animals. Three one-hour lectures per week.
Prerequisites: BIOL 105/BIOL 105L and BIOL 106/BIOL 106L or BIOL 107/BIOL 107L, and BIOL 208/BIOL 208L or permission of instructor.
Corequisites: BIOL 418L.

BIOL 418L Wildlife Field Techniques 2 Credits
Lab component required for BIOL 418.
Prerequisites: BIOL 105/BIOL 105L and BIOL 106/BIOL 106L or BIOL 107/BIOL 107L, and BIOL 208/BIOL 208L or permission of instructor.
Corequisites: BIOL 418
Fees: Yes.

BIOL 419 Fisheries Management 3 Credits
Principles and practices of fisheries science and management. Topics addressed include population dynamics, sport fish management and harvest, native species conservation and management, habitat management, policies and regulations, and socioeconomics.
Prerequisites: Junior or senior standing.
Corequisites: BIOL 419L.
Terms Typically Offered: Spring.

BIOL 419L Fisheries Management Laboratory 1 Credit
Principles and practices of fisheries science and management. Topics addressed include population dynamics, sport fish management and harvest, native species conservation and management, habitat management, policies and regulations, and socioeconomics.
Prerequisites: Junior or senior standing.
Corequisites: BIOL 419.
Terms Typically Offered: Spring.

BIOL 420 Conservation Biology 3 Credits
Study of the biodiversity conservation including ethics, economics, threats, extinction, protected areas and restoration ecology.
Prerequisites: BIOL 208.
Terms Typically Offered: Fall.

BIOL 425 Molecular Genetics 3 Credits
Nature and expression of genetic information at the molecular level in prokaryotic and eukaryotic organisms.
Prerequisites: BIOL 301/BIOL 301L.

BIOL 427 Plant Anatomy and Physiology 3 Credits
Form, variability, and structure of the tissues comprising the body of vascular plants. Plant-water relationships, plant mineral nutrition, photosynthesis, red and blue light responses, plant hormones, and how plant growth and development at the molecular and cellular levels accounts for growth at the organismal level.
Prerequisites: BIOL 107/BIOL 107L; and CHEM 111 or CHEM 131/CHEM 131L.
Corequisites: BIOL 427L.
Terms Typically Offered: Fall.

BIOL 427L Plant Anatomy and Physiology Laboratory 2 Credits
Form, variability, and structure of the tissues comprising the body of vascular plants. Plant-water relationships, plant mineral nutrition, photosynthesis, red and blue light responses, plant hormones, and how plant growth and development at the molecular and cellular levels accounts for growth at the organismal level.
Prerequisites: BIOL 107/BIOL 107L; and CHEM 111 or CHEM 131/CHEM 131L.
Corequisites: BIOL 427.
Terms Typically Offered: Fall.
Fees: Yes.

BIOL 431 Animal Parasitology 3 Credits
Common and important parasites of domestic animals and man. Ecology, epidemiology, diagnosis, and control are discussed with examples from the Protozoa, Trematoda, Cestoda, Nematoda, and Arthropoda. An independent research project is required. Three lectures and one two-hour laboratory per week.
Corequisites: BIOL 431L.

BIOL 431L Animal Parasitology Laboratory 1 Credit
Lab component required for BIOL 431.
Corequisites: BIOL 431.
Fees: Yes.

BIOL 433 Marine Invertebrate Communities 3 Credits
Techniques of collection and laboratory examination of marine invertebrates from intertidal and subtidal habitats. Seven eight-hour labs and seven two-hour lectures will be conducted at a marine biological research station.
Prerequisites: BIOL 106/BIOL 106L, or permission of instructor.

BIOL 441 Endocrinology 3 Credits
Anatomy and physiology of the endocrine system of vertebrates.
Prerequisites: BIOL 105/BIOL 105L, CHEM 132/CHEM 132L, and junior or senior standing.

BIOL 442 Pharmacology 3 Credits
Principles underlying absorption, distribution, metabolism, and excretion of drugs with emphasis on mechanisms of action and physiological responses.
Prerequisites: BIOL 209/BIOL 209L, one year of chemistry, and junior or senior standing.

BIOL 450 Mycology 3 Credits
Fungi, with emphasis on comparative morphology and development, classification, physiology, genetics, and ecological relationships. Importance of fungi in industry, agriculture, and medicine. Three lectures and two two-hour laboratories per week.
Prerequisites: BIOL 107/BIOL 107L or permission of instructor.
Corequisites: BIOL 450L.

BIOL 450L Mycology Laboratory 2 Credits
Lab component required for BIOL 450.
Prerequisites: BIOL 107/BIOL 107L or permission of instructor.
Corequisites: BIOL 450.
Fees: Yes.

BIOL 482 Senior Research 2 Credits
Designed to introduce students to appropriate procedures for conducting literature reviews, designing experiments, collecting and analyzing data, and preparing written and oral presentations of such experiments. Two lectures per week or equivalent.
Prerequisites: Senior standing, 2.80 GPA, and permission of instructor.

BIOL 483 Senior Thesis 2 Credits
Students prepare an in-depth thesis elaborating on a major conceptual issue(s) in biology. The purpose of the thesis is to ascertain the student's ability to collect a broad array of information and integrate this into a logical conceptual framework that traverses organizational levels of living systems. The thesis topic must be approved by the instructor.
Prerequisites: Senior standing and permission of instructor.

BIOL 487 Advanced Research 1-3 Credits
Provides students with an individualized research experience on a topic approved and directed by a specific faculty member. A detailed report in the form of a scientific journal article must be provided to the instructor.
Prerequisites: BIOL 482 or permission of instructor; BIOL 387 is highly recommended.
Course may be taken multiple times up to maximum of 6 credit hours.
Fees: Yes.

BIOL 493 Lab Teaching Practicum 1 Credit
Assist in laboratory teaching to support instruction and enhance student learning.
Prerequisites: Junior or senior standing or permission of instructor. Must have taken the course to be supported or have sufficient experience in other related courses.
Course may be taken multiple times up to maximum of 3 credit hours.

BIOL 494 Seminar 1 Credit
Current problems, topics, and research procedures in biological sciences and medicine. Topics announced each semester.
Prerequisites: Sophomore standing and permission of instructor.
Course may be taken 5 times for credit.

BIOL 495 Independent Study 1-3 Credits
Course may be taken multiple times up to maximum of 6 credit hours.

BIOL 496 Topics 1-3 Credits
Course may be taken multiple times up to maximum of 15 credit hours.

BIOL 498 Honors Thesis 3 Credits

BIOL 499 Internship 1-10 Credits
Work experience obtained on a job where assignments are primarily biological projects. The amount of credit awarded is determined by the school based on the nature of the assignment.
Prerequisites: Biology major, senior standing with either a 2.80 GPA in major courses, completion of BIOL 482, or permission of instructor.
Course may be taken multiple times up to maximum of 15 credit hours.

BIOL 500 Advanced Human Anatomy 3 Credits
Introduction to advanced concepts in gross anatomy, anatomical relationships, and spatial orientation of normal anatomic structures and common anatomic variations. Examines the forms and function of the human body and the relationship of surface and internal structures from different bodily systems.
Prerequisites: Graduate student status.
Corequisites: BIOL 500L.
Terms Typically Offered: Spring.

BIOL 500L Advanced Human Anatomy Laboratory 1 Credit
Laboratory experience accompanying BIOL 500.
Prerequisites: Graduate student status.
Corequisites: BIOL 500.
Terms Typically Offered: Spring.
Fees: Yes.

BIOL 507 Tropical Field Biology 5 Credits
Field research techniques, ecology and natural history in lowland and montane tropical rainforests of Ecuador. Ten nine-hour labs and fifteen two-hour lectures conducted at biological field stations in Ecuador.
Prerequisites: Undergraduate degree in biology or undergraduate degree in another field with primary or secondary teaching experience in science, and permission of instructor.

BIOL 533 Marine Invertebrate Communities 3 Credits
Techniques of collection and laboratory examination of marine invertebrates from intertidal and subtidal habitats. Design and execution of a research project and a written paper are required. Seven eight-hour labs and seven two-hour lectures will be conducted at a marine biological research station.
Prerequisites: Undergraduate degree in biology or a related field and permission of instructor.

BIOL 596 Topics: 1-5 Credits
Course may be taken multiple times up to maximum of 15 credit hours.