

Biological Sci (BIOL)

Courses

BIOL 1100 Concepts of Biology: 3 semester hours.

Considers biological issues related to human environment, population, inheritance, and basic concepts of resource conservation. Historical, contemporary and future implications of these issues are discussed. Partially satisfies Objective 5 of the General Education Requirements. F, S, Su

BIOL 1101 Biology I: 4 semester hours.

Major concepts in biology with an emphasis on the acquisition of new knowledge, cell structure and function, principles of inheritance, and evolution. This course is for students majoring in the biological sciences. PREREQ: Student must be able to place into MATH 1108. COREQ: BIOL 1101L. Partially satisfies Objective 5 of the General Education Requirements. F, S, Su

BIOL 1101L Biology I Lab: 0 semester hours.

Assignments to apply principles from BIOL 1101. Partially satisfies Objective 5 of the General Education Requirements. F, S, Su

BIOL 1102 Biology II: 4 semester hours.

Major concepts in biology with an emphasis on the development of diversity, plant and animal structure and function, ecology, and behavior. This course is for students majoring in the biological sciences. PREREQ: BIOL 1101. COREQ: BIOL 1102L. F, S

BIOL 1102L Biology II Lab: 0 semester hours.

Assignments to apply principles from BIOL 1102. F, S

BIOL 1104 Oral Communication in the Sciences: 3 semester hours.

Foundations course in oral communication that emphasizes the theory and practice of modern oral communication in the sciences, engineering, and health professions. Students become proficient in topical research, logical argumentation, persuasion, interviewing, small group discussion, and contemporary oral communication, including podcasting, short videos and other modern media. Designed to explore the scientific nature of human evidence-based communication and improve a student's ability to develop a scientific story with an engaging narrative structure and to orally express themselves persuasively in the physical, life and health sciences. Satisfies Objective 2 of the General Education Requirements.

BIOL 1111 Bacteriophage virus discovery & characterization lab: 2 semester hours.

Provides laboratory experience working on a yearlong bacteriophage genomics research project. Students will isolate and characterize novel bacteriophages from the environment. Topics covered include phage biology, bacteria and phage culturing and amplification, DNA extraction, restriction digest analysis, agarose gel electrophoresis, and electron microscopy. Students may take BIOL 1111 and BIOL 1112 in either order.

BIOL 1112 Bacteriophage virus bioinformatics & genome analysis lab: 2 semester hours.

Provides bioinformatics training and experience working on a bacteriophage isolated during the previous semester. Topics include genome annotation, open reading frame and tRNA identification, BLAST analysis, phylogenetics and submission to a genomic database. Students will also perform follow-up lab experiments and prepare a manuscript for peer-reviewed publication. Students may take BIOL 1111 and BIOL 1112 in either order.

BIOL 1191 Wonder about Biology: 1 semester hour.

Navigating a degree in Biological Science through exposure to strategies for success, developing a plan, identifying mentors and resources, and establishing meaningful connections. F, S

BIOL 1192 Careers in Ecology and Conservation Biology: 1 semester hour.

Designed to acquaint majors or interested students with the field of conservation and to provide opportunities for interaction among students, faculty and professionals. S

BIOL 1199 Experimental Course: 1-6 semester hours.

The content of this course is not described in the catalog. Title and number of credits are announced in the Class Schedule. Experimental courses may be offered no more than three times with the same title and content. May be repeated.

BIOL 2206 Cell Biology: 3 semester hours.

Study of cell structure and function, and experimental techniques used to study cells. Topics include cellular chemistry, expression of genetic information, protein sorting, reproduction, the cytoskeleton, signaling and cancer. PREREQ: BIOL 1101, BIOL 1102, CHEM 1111, and CHEM 1111L. PREREQ or COREQ: CHEM 1112 and CHEM 1112L. COREQ: BIOL 2207 for majors requiring BIOL 2207. F, S

BIOL 2207 Cell Biology Laboratory: 1 semester hour.

Experiments applying selected concepts from BIOL 2206. PRE-or-COREQ: BIOL 2206. F, S

BIOL 2209 General Ecology: 4 semester hours.

Organisms in relation to their environment. Field trips. PREREQ: BIOL 1101 and BIOL 1102. COREQ: BIOL 2209L. F, S

BIOL 2209L General Ecology Laboratory: 0 semester hours.

Assignments to apply principles from BIOL 2209. F, S

BIOL 2213 Fall Flora: 2 semester hours.

For teachers and others who wish to become acquainted with Idaho plants. Common names are emphasized. Common cultivated and native plants are collected and identified. F

BIOL 2214 Spring Flora: 2 semester hours.

For those who wish to become acquainted with the common names and habitat of edible, poisonous, native, and cultivated springtime plants of southeast Idaho. Identification and collection techniques are emphasized. S

BIOL 2227 Human Anatomy and Physiology I: 3 semester hours.

This course is the first semester of an integrated sequence in anatomy and physiology. This course will provide a basic knowledge for students majoring in the health professions. By the end of the two semester sequence, students will have knowledge of the shape and structure of body parts, function of cells, organs and systems of the body. PREREQ: Student must be able to place into MATH 1108. PRE-or-COREQ: BIOL 2227L. Partially satisfies Objective 5 of the General Education Requirements. F, S

BIOL 2227L Human Anatomy and Physiology I Lab: 1 semester hour.

This course is the first semester of an integrated sequence in anatomy and physiology. This course will provide a basic knowledge for students majoring in the health professions. By the end of the two semester sequence, students will have knowledge of the shape and structure of body parts, function of cells, organs and systems of the body. PREREQ: Student must be able to place into MATH 1108. PRE-or-COREQ: BIOL 2227. Partially satisfies Objective 5 of the General Education Requirements. F, S

BIOL 2228 Human Anatomy and Physiology 2: 3 semester hours.

This course is the second semester of an integrated sequence in anatomy and physiology. This course will provide a basic knowledge for students majoring in the health professions. By the end of the two semester sequence, students will have knowledge of the shape and structure of body parts, function of cells, organs and systems of the body. PREREQ: BIOL 2227 or BIOL 3301. PRE-or-COREQ: BIOL 2228L. F, S

BIOL 2228L Human Anatomy and Physiology 2 Lab: 1 semester hour.

This course is the second semester of an integrated sequence in anatomy and physiology. This course will provide a basic knowledge for students majoring in the health professions. By the end of the two semester sequence, students will have knowledge of the shape and structure of body parts, function of cells, organs and systems of the body. PRE-or-COREQ: BIOL 2228. F, S

BIOL 2229 Introduction to Pathobiology: 3 semester hours.

Concepts of pathobiology, to include causes, common mechanisms and manifestations of human disease. Integrating concepts in biology, medicine and public health. Designed for students interested in health professions. PREREQ: BIOL 2228. F, S

BIOL 2233 Principles of Microbiology: 3 semester hours.

Essential principles of microbiology including comparative taxonomy, physiology, genetics, immunology, and ecology of microorganisms, and a survey of important applications. PREREQ: CHEM 1101, or CHEM 1111 and CHEM 1111L; BIOL 1101, or BIOL 2227 and BIOL 2227L. PRE-or-COREQ: BIOL 2233L

BIOL 2233L Principles of Microbiology Lab: 1 semester hour.

Essential principles of microbiology including comparative taxonomy, physiology, genetics, immunology, and ecology of microorganisms, and a survey of important applications. PREREQ: CHEM 1101, or CHEM 1111 and CHEM 1111L; BIOL 1101, or BIOL 2227 and BIOL 2227L. PRE-or-COREQ: BIOL 2233

BIOL 2280 Vertically Integrated Project: 1 semester hour.

Discovery research in life sciences conducted in a cooperative learning community. May be repeated. PREREQ: Permission of instructor. F, S

BIOL 2299 Experimental Course: 1-6 semester hours.

The content of this course is not described in the catalog. Title and number of credits are announced in the Class Schedule. Experimental courses may be offered no more than three times with the same title and content. May be repeated.

BIOL 3301 Advanced Human Anatomy and Physiology 1: 3 semester hours.

Structures and functions of integumentary, skeletal, muscular, and nervous systems. PREREQ: BIOL 1101, or BIOL 2227 and BIOL 2227L. PRE-or-COREQ: BIOL 3301L. F,S

BIOL 3301L Advanced Human Anatomy and Physiology 1 Lab: 1 semester hour.

Assignments to apply principles from BIOL 3301. PRE-or-COREQ: BIOL 3301. F,S

BIOL 3302 Advanced Human Anatomy and Physiology 2: 3 semester hours.

Structures and functions of circulatory, respiratory, urinary, digestive, endocrine, and reproductive systems. PREREQ: BIOL 1101, or BIOL 2227 and BIOL 2227L. PRE-or-COREQ: BIOL 3302L. F,S

BIOL 3302L Advanced Human Anatomy and Physiology 2 Lab: 1 semester hour.

Assignments to apply principles from BIOL 3302. PRE-or-COREQ: BIOL 3302. F,S

BIOL 3303 Principles of Animal Physiology: 4 semester hours.

Compares homeostatic processes including ionic and osmotic regulation, nerve and muscle physiology, circulation, and respiration. PREREQ: BIOL 2206/BIOL 2207. COREQ: BIOL 3303L. S

BIOL 3303L Principles of Animal Physiology Lab: 0 semester hours.

Assignments to apply principles from BIOL 3303. COREQ: BIOL 3303. S

BIOL 3306 Healthspan: 3 semester hours.

An exploration of the pathophysiology by which today's chronic diseases rob us of healthspan and the mechanistic basis behind individual and clinical interventions to extend healthspan closer to lifespan. Prerequisites: BIOL 2227 or BIOL 3301 and BIOL 2228 or BIOL 3302. F, S

BIOL 3307 Radiobiology: 2 semester hours.

Survey of the effects of ionizing radiation on living matter at the subcellular, cellular, and organismal levels. Equivalent to HPHY 3307. PREREQ: BIOL 1101 and one of the following: PHYS 1100, PHYS 1111, PHYS 2211, or HPHY 3321. S

BIOL 3310 Invertebrate Zoology: 4 semester hours.

General study of invertebrate animals with laboratory work on representatives of the invertebrate phyla. Field trips. PREREQ: BIOL 1101 and BIOL 1102. COREQ: BIOL 3310L. S

BIOL 3310L Invertebrate Zoology Lab: 0 semester hours.

Assignments to apply principles from BIOL 3310. S

BIOL 3314 Comparative Vertebrate Anatomy: 4 semester hours.

Descriptive studies of adult morphology of selected vertebrates and examples of other representative chordates are used to illustrate the evolution of structure and function. PREREQ: BIOL 1101 and BIOL 1102. COREQ: BIOL 3314L. OS

BIOL 3314L Comparative Vertebrate Anatomy Lab: 0 semester hours.

Assignments to apply principles from BIOL 3314. COREQ: BIOL 3314. OS

BIOL 3316 Biometry Laboratory: 1 semester hour.

Statistical analysis and presentation of data for the biological sciences. This course, which complements MATH 3350, focuses on manipulation, presentation, and analysis of data sets. PRE-or-COREQ: MATH 3350. F, S

BIOL 3324 Developmental Biology: 4 semester hours.

Fundamental principles and concepts of embryological development. Selected model systems will be studied to illustrate basic concepts in development. PREREQ: BIOL 3358. COREQ: BIOL 3324L. S

BIOL 3324L Developmental Biology Lab: 0 semester hours.

Assignments to apply principles from BIOL 3324. S

BIOL 3337 Conservation Biology: 3 semester hours.

An introduction to the multidisciplinary study of biodiversity patterns and threats to biodiversity from human activities. PREREQ: BIOL 2209 or permission of instructor. ES

BIOL 3358 Genetics: 3 semester hours.

Basic principles of heredity, variation, and gene expression among eukaryotes, prokaryotes, and viruses. PREREQ: BIOL 2206 or BIOL 2233. F, S

BIOL 3399 Experimental Course: 1-6 semester hours.

The content of this course is not described in the catalog. Title and number of credits are announced in the Class Schedule. Experimental courses may be offered no more than three times with the same title and content. May be repeated.

BIOL 4400 Oral Histology and Embryology: 3 semester hours.

The microanatomy and formative processes of the teeth and their surrounding structures. COREQ: BIOL 4400L. F

BIOL 4400L Oral History and Embryology Lab: 0 semester hours.

Assignments to apply principles from BIOL 4400. S

BIOL 4404 Plant Physiology: 3 semester hours.

Study of plant physiological processes with emphasis on plant-environment interactions. Topics include physiological ecology, water relations, mineral nutrition, photosynthesis, respiration, translocation of photosynthate, secondary compounds and phytohormones. PREREQ: BIOL 1101 and BIOL 1102; one year of college chemistry. OF

BIOL 4404L Plant Physiology Lab: 1 semester hour.

Assignments to apply principles from BIOL 4404. COREQ: BIOL 4404. OF

BIOL 4405 Plant Form and Function: 3 semester hours.

Integrated studies of anatomical and physiological adaptations of plants to their natural environment. Data collection and analysis will be emphasized. PREREQ: BIOL 1102. COREQ: BIOL 4405L. EF

BIOL 4405L Plant Form and Function Lab: 1 semester hour.

Assignments to apply principles from BIOL 4405. EF

BIOL 4406 Plant Diversity and Evolution: 4 semester hours.

Study of the reproduction, structure, development, evolution, and classification of the fungi, algae, bryophytes, and vascular plants. PREREQ: BIOL 1101 and BIOL 1102. COREQ: BIOL 4406L. D

BIOL 4406L Plant Diversity and Evolution Lab: 0 semester hours.

Assignments to apply principles from BIOL 4406. D

BIOL 4408 Plant Ecology: 3 semester hours.

Major factors limiting plant growth and distribution with emphasis on adaptation and response at the individual, population, and community levels. Lectures, Laboratories. PREREQ: BIOL 1101, BIOL 1102, and BIOL 2209. OS

BIOL 4408L Plant Ecology Lab: 1 semester hour.

Assignments to apply principles from BIOL 4408. OS

BIOL 4412 Systematic Botany: 4 semester hours.

Study of classification and evolution of flowering plants; techniques of phylogeny reconstruction based on molecular and morphological characters. Collection/identification of local flora. Field trips. PREREQ: BIOL 1101 and BIOL 1102. COREQ: BIOL 4412L. D

BIOL 4412L Systematic Botany Lab: 0 semester hours.

Assignments to apply principles from BIOL 4412. D

BIOL 4413 Biology Teaching Methods: 3 semester hours.

Designed for prospective or practicing biology educators to learn how to design science lessons and units that are aligned with the three dimensions of national and state science standards: Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas. Instructional strategies and high-leverage teaching practices for implementing science lessons will be modeled, discussed, and practiced. Topics include lesson planning, designing units around anchoring phenomena, learning cycles, responsive science teaching, laboratory/field safety, selecting and designing science tasks, talk moves as pedagogical tools, orchestrating task-based discussions, and more. Course content centers on secondary science education contexts and is appropriate for educators in biology and other science disciplines. Required for secondary teaching majors in biology. PREREQ: 16 credit hours of biology or permission of instructor. D

BIOL 4415L Human Neurobiology Lab: 1 semester hour.

Detailed examination of the gross anatomy and pathways of the human central nervous system. PREREQ: Permission of instructor. S

BIOL 4416 Population Ecology: 3 semester hours.

Introduces quantitative analysis of populations, emphasizing demography, distribution, abundance, spatial and temporal dynamics, biodiversity, coexistence, and applications to conservation and land use decision-making. Includes data collection and analysis. PREREQ: BIOL 2209. COREQ: BIOL 4416L. ES

BIOL 4416L Population Ecology Lab: 1 semester hour.

Assignments to apply principles from BIOL 4416. ES

BIOL 4417 Organic Evolution: 3 semester hours.

An integrated study of evolution as a unifying concept in biology. An examination of patterns and processes that affect the origin and diversification of species through time. PREREQ: BIOL 3358 and BIOL 2209. F, S

BIOL 4418 Ecological Topics: 1 semester hour.

Flexible use of seminars, lectures, and laboratory/field work dealing with current issues in ecology. Topic/emphasis varies. May be repeated for up to 3 credits. PREREQ: BIOL 2209 or permission of instructor. F, S

BIOL 4419 Mammalian Histology: 4 semester hours.

Study of animal tissues, including structural and functional characteristics of tissues and organs. PREREQ: BIOL 2206, and either (BIOL 3303/BIOL 3303L and BIOL 3314/BIOL 3314L) or (BIOL 3301 and BIOL 3302). COREQ: BIOL 4419L.. F

BIOL 4419L Mammalian Histology Lab: 0 semester hours.

Assignments to apply principles from BIOL 4419. F

BIOL 4420 Musculo-Skeletal Anatomy: 2 semester hours.

Study of human body structure emphasizing muscular system and its relationship to axial and appendicular skeleton. Focus is on extremities, thorax, and pelvis with applications toward normal, diseased and rehabilitative functions. PREREQ: BIOL 3301 and BIOL 3302. ES

BIOL 4423 General Parasitology: 3 semester hours.

Study of parasitic symbioses of animals, plants and other organisms focusing on concepts, principles, and consequences of such interactions and the coevolutionary processes by which they are created. PREREQ: BIOL 1101 and BIOL 1102. F

BIOL 4426 Herpetology: 3 semester hours.

The biology of amphibians and reptiles: lecture topics include evolutionary history, functional morphology, physiological ecology, biogeography, reproductive, and population ecology. Laboratories and field trips cover systematic, natural history, and collecting/sampling techniques. PREREQ: BIOL 2209. COREQ: BIOL 4426L. ES

BIOL 4426L Herpetology Lab: 1 semester hour.

Assignments to apply principles from BIOL 4426. ES

BIOL 4427 Ichthyology: 3 semester hours.

The biology of fishes: lecture topics include evolutionary history, functional morphology, physiological ecology, and biogeography. Laboratory and weekend field trips cover identification, natural history and collecting techniques. Emphasis on Idaho species. PREREQ: BIOL 2209. COREQ: BIOL 4427L. EF

BIOL 4427L Ichthyology Lab: 1 semester hour.

Assignments to apply principles from BIOL 4427. EF

BIOL 4428 Medical Parasitology and Entomology: 3 semester hours.

Study of animal parasites, with an emphasis on protists, helminths and arthropods affecting human health and welfare by their presence or indirectly via pathogens they transmit. PREREQ: BIOL 1101 and BIOL 1102. COREQ: BIOL 4428L. D

BIOL 4428L Medical Parasitology and Entomology Lab: 0 semester hours.

Assignments to apply principles from BIOL 4428. D

BIOL 4429 Regional Anatomy and Histology: 3 semester hours.

Regional approach to gross human anatomy emphasizing the use of prosected materials and microscopic anatomy. Designed primarily for students in the Physician Assistant Program. PREREQ: BIOL 3301, BIOL 3302. COREQ: BIOL 4429L. F

BIOL 4429L Regional Anatomy and Histology Lab: 1 semester hour.

Assignments to apply principles from BIOL 4429. F

BIOL 4430 Bioethics: 3 semester hours.

Examines the roles and responsibilities of science in society and the ethical considerations for current and future practices in biology and medicine. Topics include genetic engineering and reproductive science, animals and humans as research subjects, medical treatments, and environmental issues. Also discusses practices used within research settings including cost, waste, publishing and power dynamics. PREREQ: BIOL 1102 and BIOL 1102L. EF

BIOL 4431 General Entomology: 3 semester hours.

Structure, development, classification, and life histories of insects, including ecological, economic and management considerations. An insect collection may be required. Field trips. PREREQ: BIOL 1101 and BIOL 1102. COREQ: BIOL 4431L. OF

BIOL 4431L General Entomology Lab: 1 semester hour.

Assignments to apply principles from BIOL 4431. OF

BIOL 4432 Biochemistry: 3 semester hours.

Comprehensive discussion/presentation of structure, function and metabolism of biological macromolecules and their constituents, including energetics, regulation, and molecular biology, with emphasis on critical analysis of biochemical issues. PREREQ: BIOL 1101 and CHEM 3301. F, S

BIOL 4433 Microbial Physiology: 3 semester hours.

Comparative physiology of microorganisms, including structure/function, metabolic diversity, enzymatic mechanisms of microbial metabolism, and physiology of extreme organisms. This course is a coreq for BIOL 4433L. May be repeated upon completion of BIOL 4433L. PREREQ: BIOL 2233, BIOL 2233L and completion of 90 credits. F

BIOL 4433L Microbial Physiology Laboratory: 1 semester hour.

Laboratory exercises in comparative physiology of microorganisms. PREREQ: BIOL 2235, BIOL 2235L, and either BIOL 4432 or BIOL 4445. COREQ: BIOL 4433. F

BIOL 4434 Microbial Diversity: 3 semester hours.

Factors influencing the enrichment, cultivation, and isolation of prokaryotes from various metabolic groups and environments. May be repeated upon completion of BIOL 4434L. PREREQ: BIOL 2233 and BIOL 2233L. PRE-or-COREQ: BIOL 4434L. S

BIOL 4434L Microbial Diversity Lab: 1 semester hour.

Enrichment, cultivation and isolation of prokaryotes from various metabolic groups and environments. COREQ: BIOL 4434. S

BIOL 4435 Vertebrate Paleontology: 4 semester hours.

Phylogenetic history of the vertebrates outlined in the light of morphology, classification, evolution, paleoecology, and the significance of fossils. Field trips. Equivalent to GEOL 4435. PREREQ: BIOL 1102. ES

BIOL 4436 Food Microbiology: 3 semester hours.

This is a hybrid lecture/laboratory course that explores the use of microorganisms (Bacteria and Yeasts/Fungi) in the production of food products consumed by humans. Techniques (brining, dehydration, pressure canning, etc.) employed for the prevention of spoilage of foodstuffs by microorganisms are also investigated. PREREQ: BIOL 2233. OS

BIOL 4437 Experimental Biochemistry: 1 semester hour.

Laboratory course including both qualitative and quantitative experiments. Equivalent to CHEM 4438. PREREQ or COREQ: BIOL 4432 or BIOL 4445/CHEM 4445. F, S

BIOL 4438 Ornithology: 4 semester hours.

Study of the origin, evolution, structure, habits, adaptations, distribution, and classification of birds. Field trips. PREREQ: BIOL 1101, BIOL 1102, and BIOL 2209. OS

BIOL 4439 Principles of Taphonomy: 3 semester hours.

Effects of processes which modify organisms between death and the time the usually fossilized remains are studied. Emphasis on vertebrates. Equivalent to ANTH 4439 and GEOL 4439. PREREQ: Permission of instructor. D

BIOL 4440 Human Gross Anatomy: 4 semester hours.

Comprehensive regional study of gross human anatomy with emphasis on the upper limb, thorax, abdomen, pelvis, and perineum. Designed for first year dental students and complements BIOL 4450. COREQ: BIOL 4440L. F

BIOL 4440L Human Gross Anatomy Lab: 0 semester hours.

Assignments to apply principles from BIOL 4440. F

BIOL 4441 Mammalogy: 3 semester hours.

General study of mammals including classification, identification, habits, ecology, economics, and techniques of study, with emphasis on North American forms. Field trips. PREREQ: BIOL 2209. COREQ: BIOL 4441L. OF

BIOL 4441L Mammalogy Lab: 1 semester hour.

Assignments to apply principles from BIOL 4441. OF

BIOL 4442 Plant Animal Interactions: 3 semester hours.

Coevolution of plant and animal form and function emphasizing pollination, herbivory, parasitism, frugivory/seed dispersal, and optimal foraging. PREREQ: BIOL 2209. EF

BIOL 4443 Endocrinology: 3 semester hours.

Study of the anatomy and physiology of the ductless glands and the properties and uses of natural and synthetic hormones. PREREQ: BIOL 3303/BIOL 3303L or equivalent. ES

BIOL 4444 Molecular Biology: 3 semester hours.

Fundamental principles of cell structure, function and molecular biology: DNA replication, repair, and recombination, transcriptional and post-transcriptional regulation of gene expression, RNA metabolism, protein synthesis, targeting and turnover, post-translational modifications, signal transduction, regulation of the cell division cycle, and molecular genetics of development. May be repeated upon completion of BIOL 4444L. PREREQ or COREQ: BIOL 4444L. PREREQ: BIOL 3358 and CHEM 3301. S

BIOL 4444L Molecular Biology Lab: 1 semester hour.

Laboratory techniques in cell and molecular biology, including cloning, PCR and DNA sequencing. PRE-or-COREQ: BIOL 4444. S

BIOL 4445 Biochemistry I: 3 semester hours.

Introduction to basic aspects of biochemical systems, including fundamental chemical and physical properties of biomolecules. Enzymology, including allosterism, metabolic regulation, bioenergetics, and carbohydrate metabolism. Equivalent to CHEM 4445. PREREQ: BIOL 1101 and CHEM 3302. F

BIOL 4446 Selected Topics in Physiology: 1 semester hour.

Selected topics in physiology for dental students: blood coagulation-complement-kinin systems, prostaglandin and related substances, vitamins, steroids, mucopolysaccharides, collagen and other extracellular matrix macromolecules and cyto- and molecular genetics. S

BIOL 4447 Biochemistry II: 3 semester hours.

Functional continuation of BIOL 4445. Lipid, amino acid, and nucleotide metabolism. Emphasis is on regulation of metabolism, metabolic dysfunctions, biochemical mechanisms of hormone action, biochemical genetics, protein synthesis, and metabolic consequences of genetic defects. Equivalent to CHEM 4447. PREREQ: BIOL 4445/CHEM 4445. S

BIOL 4448 Advanced Experimental Biochemistry: 2 semester hours.

Advanced laboratory projects designed to emphasize techniques of qualitative and quantitative biochemical analysis. Equivalent to CHEM 4448. PREREQ: BIOL 4437/CHEM 4438. COREQ: BIOL 4447/CHEM 4447. F, S

BIOL 4449 Human Physiology I: 4 semester hours.

First of a two semester sequence. Physiology of the nervous, muscular and circulatory systems. Equivalent to PHAR 9949. PREREQ: BIOL 1101. OF

BIOL 4450 Head and Neck Anatomy: 3 semester hours.

Comprehensive presentation of the anatomy of the head and neck as it applies to the practice of dentistry. COREQ: BIOL 4450L. F

BIOL 4450L Head and Neck Anatomy Lab: 0 semester hours.

Assignments to apply principles from BIOL 4450. S

BIOL 4451 Immunology: 3 semester hours.

Study of antigens, antibodies, complement, humoral and cell-mediated immune responses, hypersensitivity, immunodeficiency, autoimmunity, tumor immunology, transplantation, vaccines, infectious disease immunology, and immunodiagnostic assays. PREREQ: BIOL 2233 and BIOL 2233L. S

BIOL 4451L Immunology Laboratory: 1 semester hour.

Selected laboratory experiments to accompany Immunology BIOL 4451. PREREQ or COREQ: BIOL 4451. Open to non-majors by special permission. S

BIOL 4453 Foundations in Neuroscience: 3 semester hours.

Organizing principles in neuroscience including biological signaling of excitable cells, neuroanatomy and regional brain functions, and sensorimotor integration of behavior. PREREQ: Permission of instructor. S

BIOL 4454 Advanced Immunology: 3 semester hours.

Detailed study of selected areas of immunobiology. Course content will vary with current demand. Students will lead discussions and present current literature. PREREQ: BIOL 4451 or permission of instructor. ES

BIOL 4455 Pathogenic Microbiology: 3 semester hours.

How the medically important bacteria, viruses and fungi interact with the host to produce disease, including microbe characteristics, pathogenesis, pathological processes, prevention, and treatment methods. PREREQ: BIOL 2233 and BIOL 2233L. F

BIOL 4455L Pathogenic Microbiology Laboratory: 1 semester hour.

Will emphasize procedures for the isolation and identification of pathogenic bacteria. Clinical specimens will be provided for use in identification of unknowns. PREREQ or COREQ: BIOL 4455. F

BIOL 4456 Human Physiology II: 4 semester hours.

Physiology of the respiratory, renal, gastrointestinal, and endocrine systems. Includes studies of acid-base balance. Equivalent to PHAR 9956. PREREQ: BIOL 4449 or equivalent. ES

BIOL 4459 Fish Ecology: 3 semester hours.

Study of the behavior, habitat use, population dynamics, and management of freshwater fishes, especially salmon and trout. Laboratory and weekend field trips emphasize sampling techniques and data analysis. COREQ: BIOL 4459L. PREREQ: BIOL 2209. OF

BIOL 4459L Fish Ecology Laboratory: 1 semester hour.

Assignments to apply principles from BIOL 4459. COREQ: BIOL 4459. OF

BIOL 4460 Neuroscience: 4 semester hours.

Comprehensive presentation of the anatomy and physiology of the central nervous system, the brain and spinal cord, including clinical pathologies. Combined lecture and laboratory demonstration. PREREQ: BIOL 4453. S

BIOL 4461 Microbial Genetics: 3 semester hours.

Detailed discussion of Bacterial, Archaeal, Unicellular Eukaryotic, and Viral Genetics. PREREQ: BIOL 2233 and BIOL 3358. EF

BIOL 4462 Freshwater Ecology: 3 semester hours.

Study of the interaction of physical and biotic factors in aquatic ecosystems. Field trips. PREREQ: BIOL 2209. COREQ: BIOL 4462L. EF

BIOL 4462L Freshwater Ecology Lab: 1 semester hour.

Assignments to apply principles from BIOL 4462. COREQ: BIOL 4462. EF

BIOL 4463 Human Pathophysiology: 4 semester hours.

The study of basic process underlying diseases, with an emphasis on correlating anatomical, functional, and biochemical alterations with clinical manifestations. PREREQ: BIOL 3301 and BIOL 3302, or permission of instructor. COREQ: BIOL 4463L. F

BIOL 4463L Human Pathophysiology Lab: 0 semester hours.

Assignments to apply principles from BIOL 4463. COREQ: BIOL 4463. F

BIOL 4464 Lectures in Human Physiology: 4 semester hours.

Physiology of the nervous, muscular, circulatory, respiratory, and excretory systems. PREREQ: BIOL 3301, BIOL 3302, and one year of college chemistry. F

BIOL 4466 Medical Mycology: 3 semester hours.

Lecture/laboratory course addressing medically important fungi. Taxonomy, clinical disease, pathogenesis, immunological diagnosis and laboratory identification of contaminants, opportunists, superficial, cutaneous, subcutaneous and systemic mycoses. PREREQ: BIOL 2233. D

BIOL 4469 Special Topics in Microbiology: 1-4 semester hours.

Study of selected topics in microbiology. Course contents will vary with topics selected. May be repeated with departmental approval for nonrepetitive course content. PREREQ: Permission of instructor. F, S

BIOL 4470 Cross-Sectional Anatomy: 2 semester hours.

Applied regional anatomy as viewed in sectional planes, emphasizing topographic relationships of organs and surface anatomy, with interpretation of correlated CT and MRI imaging. PREREQ: Either BIOL 3301 and BIOL 3302, or BIOL 2227 and BIOL 2228, or BIOL 2227 and BIOL 3302. S

BIOL 4471 Fundamentals of Biological Imaging: 3 semester hours.

Introduction to microscopy with an emphasis on image formation, documentation, interpretation and analysis relevant to experimental applications in the biological sciences. Lecture and laboratory with independent research component. EF

BIOL 4472 Clinical Physiology: 2 semester hours.

A survey of selected organ systems with clinical correlations of pathophysiologic states. PREREQ: BIOL 4464. S

BIOL 4473 Applied and Environmental Microbiology: 3 semester hours.

Concepts in applied microbiology and microbial ecology, including fermentation, biotechnology, and ecophysiology. May be repeated upon completion of BIOL 4473L. PREREQ: BIOL 2233 and BIOL 2233L. COREQ: BIOL 4473L. ES

BIOL 4473L Applied Environmental Microbiology Lab: 1 semester hour.

Laboratory exercises in applied and environmental microbiology. COREQ: BIOL 4473. ES

BIOL 4474 Human Anatomy Occupational and Physical Therapy: 5 semester hours.

Applied regional anatomy emphasizing the development, histology and gross anatomy of the musculoskeletal, peripheral nervous, and cardiopulmonary systems. Includes laboratory with cadaver dissection. PREREQ: Permission of instructor. COREQ: BIOL 4474L. F

BIOL 4474L Human Anatomy Occupational and Physical Therapy Lab: 0 semester hours.

Assignments to apply principles from BIOL 4474. COREQ: BIOL 4474. F

BIOL 4475 General Virology: 3 semester hours.

Introduction to the general principles of virology through consideration of structure, genetics, replication and biochemistry of animal and bacterial viruses. PREREQ: BIOL 2233 and BIOL 3358, or instructor approval. OF

BIOL 4480 Vertically Integrated Project: 1 semester hour.

Discovery research in life sciences conducted in a cooperative learning community. May be repeated. PREREQ: Permission of instructor. F, S

BIOL 4481 Independent Problems: 1-4 semester hours.

Individual problems will be assigned to students on the basis of interest and previous preparation. May be repeated for up to 4 credits. PREREQ: A minimum of two courses in biological sciences and permission of the instructor. F

BIOL 4482 Independent Problems: 1-4 semester hours.

Individual problems will be assigned to students on the basis of interest and previous preparation. May be repeated for up to 4 credits. PREREQ: A minimum of two courses in biological sciences and permission of the instructor. S

BIOL 4486 Human Systemic Physiology: 5 semester hours.

One-semester lecture/laboratory human physiology course emphasizing the function and regulation of the muscular, skeletal, circulatory, respiratory, urinary, reproductive, and immune systems. PREREQ: CHEM 1111, CHEM 1111L, CHEM 1112, and CHEM 1112L; BIOL 3301 and BIOL 3302 or equivalent. COREQ: BIOL 4486L. F

BIOL 4486L Human Systemic Physiology Lab: 0 semester hours.

Assignments to apply principles from BIOL 4486. COREQ: BIOL 4486. F

BIOL 4488 Advanced Radiobiology: 3 semester hours.

An advanced-level class covering aspects of molecular radiobiology, teratogenesis, oncogenesis, and acute radiation illnesses. It also considers nonstochastic radiation effects and the epidemiology of radiation exposures. Equivalent to HPHY 4488. PREREQ: Permission of instructor. AF

BIOL 4489 Field Ecology: 4 semester hours.

An intensive field study of at least one biogeographical region to increase student's knowledge of, and skill with, field sampling techniques, field-study design, data collection and analysis, and report preparation. Lectures, laboratories. PREREQ: BIOL 2209 and a course in statistics. S

BIOL 4490 Ecosystem Ecology and Global Changes: 4 semester hours.

Examination of the structure and function of ecosystems and their responses to natural and anthropogenic changes emphasizing energy, water, carbon, and nitrogen cycling. Field trip. Equivalent to GEOL 4490. PREREQ: BIOL 2209 or permission of instructor. PRE-or-COREQ: CHEM 1111. OS

BIOL 4491 Seminar: 1 semester hour.

Review of current research and literature in the general fields of biological science. May be repeated for up to 2 credits. PREREQ: Senior standing or permission of department. F, S

BIOL 4492 Seminar: 1 semester hour.

Review of current research and literature in the general fields of biological science. May be repeated for up to 2 credits. PREREQ: Senior standing or permission of department. F, S

BIOL 4493 Senior Thesis: 1-4 semester hours.

This is a course supervised by a committee of at least two faculty members, approved by the department chair. The thesis topic may be interdisciplinary, with four credits conferred by one or more departments. May be repeated for up to 4 credits. PREREQ: Senior status; permission of department. F, S

BIOL 4494 Seminar in Microbiology: 1 semester hour.

Presentation of written and oral review of library research in microbiology and molecular biology by students for discussion with faculty and fellow students. May be repeated for up to 2 credits. F, S

BIOL 4495 Animal Behavior: 4 semester hours.

Behavior of animals and the evolutionary mechanisms which dictate behavioral patterns. PREREQ: Upper-division or Graduate status. EF

BIOL 4496 Ecology Senior Seminar: 1 semester hour.

Review of current research in ecology and related areas. Attendance at departmental seminars and written summaries of the seminars required. May be repeated for up to 2 credits. PREREQ: Senior status and Ecology major or permission of department. F, S

BIOL 4498 Seminar in Biochemistry, Microbiology, and Molecular Biology: 1 semester hour.

Review of current research and literature in the field of biochemistry. Equivalent to CHEM 4498. May be repeated for up to 2 credits. PREREQ: Senior standing or permission of department. F, S

BIOL 4498P Professional Development Workshop: 3 semester hours.

New methods and opportunities to enhance and supplement skills. Subject to the approval of the Dean of the student's college, a maximum of eight credits earned in workshops may be applied toward a degree; students taking the courses only for personal development may choose the 0-credit option; those seeking professional development must choose a for-credit option.

BIOL 4499 Experimental Course: 1-6 semester hours.

The content of this course is not described in the catalog. Title and number of credits are announced in the Class Schedule. Experimental courses may be offered no more than three times with the same title and content. May be repeated.