

Biology (BIOL)

Courses

BIOL 10004. Biological Principles (ACTS Equivalency = BIOL 1004 Lecture). 4 Hours.

Integrated lecture and laboratory focusing on the overriding principles of Biology. Designed to convey biological reasoning to non-science majors. May not count as prerequisite for advanced courses in BIOL. Corequisite: Lab component. (Typically offered: Fall, Spring and Summer)

BIOL 10101. Principles of Biology Laboratory (ACTS Equivalency = BIOL 1014 Lab). 1 Hour.

Experimental and observational techniques used in biology with emphasis on the acquisition and interpretation of results that illustrate major biological principles. Corequisite: BIOL 10103. (Typically offered: Fall, Spring and Summer)

BIOL 10103. Principles of Biology (ACTS Equivalency = BIOL 1014 Lecture). 3 Hours.

Principles that unify biology with emphasis on scientific study that demonstrates how all organisms are the product of evolution and are parts of interacting systems from the molecular to the ecosystem level. Corequisite: BIOL 10101. (Typically offered: Fall, Spring and Summer)

BIOL 10104. Biology for Majors (ACTS Equivalency = BIOL 1014 Lecture). 4 Hours.

Integrated lecture and laboratory course designed to prepare Biology Majors to enter the rest of the Biology Core of Cell Biology, General Genetics, Evolutionary Biology, and General Ecology. Pre- or Corequisite: CHEM 14103 or CHEM 12073. (Typically offered: Fall and Spring)

BIOL 101H1. Honors Principles of Biology Laboratory. 1 Hour.

This course is designed for the well prepared student in the Honors program. It focuses on teaching students experimental and observational techniques used in the science of biology. It emphasizes the acquisition and interpretation of results that illustrate the major principles of biology. Corequisite: BIOL 101H3 or BIOL 10103. (Typically offered: Fall and Spring)

This course is equivalent to BIOL 10101.

BIOL 101H3. Honors Principles of Biology. 3 Hours.

This course is designed for the well prepared student in Honors program. It focuses on the principles that unify the science of biology. Students will be exposed to how scientific principles have been used to demonstrate that all organisms are the products of evolution and are parts of interacting systems from the molecular to the ecosystem level. Corequisite: BIOL 101H1 or BIOL 10101. (Typically offered: Fall and Spring)

This course is equivalent to BIOL 10103.

BIOL 10301. Plant Biology Laboratory (ACTS Equivalency = BIOL 1034 Lab). 1 Hour.

Plant biology lab. Pre- or Corequisite: BIOL 10303. (Typically offered: Spring and Summer)

BIOL 10303. Plant Biology (ACTS Equivalency = BIOL 1034 Lecture). 3 Hours.

Consideration of basic flowering plant structure, growth, development, physiology, genetics, ecology, and a brief survey of other plant groups. Lecture 3 hours per week. BIOL 10301 is recommended as a corequisite and both are required for partial fulfillment of the Fulbright College natural sciences requirement. Prerequisite: BIOL 10104 or BIOL 10103 and BIOL 10101. (Typically offered: Spring and Summer)

BIOL 10501. Principles of Zoology Laboratory (ACTS Equivalency = BIOL 1054 Lab). 1 Hour.

Laboratory exercises illustrating animal structure, physiology, genetics, and ecology. Corequisite: BIOL 10503. (Typically offered: Fall and Summer)

BIOL 10503. Principles of Zoology (ACTS Equivalency = BIOL 1054 Lecture). 3 Hours.

Introduction to zoological principles relating to cells, organ systems, development, genetics, ecology, and animal phyla. Corequisite: BIOL 10501. Prerequisite: BIOL 10104 or BIOL 10103 and BIOL 10101. (Typically offered: Fall and Summer)

BIOL 16973. Biology Bridges. 3 Hours.

Prepares students for advanced biology courses including genetics, cell biology, ecology, and evolutionary biology, among others. Synthesizes sub-disciplines within biology using the underlying concepts of evolutionary theory found in scientific literature. Prerequisite: BIOL 10103 or BIOL 10104. (Typically offered: Spring)

BIOL 20001. General Microbiology Laboratory (ACTS Equivalency = BIOL 2004 Lab). 1 Hour.

Techniques for handling microorganisms. Does not count toward BS in Biology. Corequisite: BIOL 20003. (Typically offered: Fall, Spring and Summer)

BIOL 20003. General Microbiology (ACTS Equivalency = BIOL 2004 Lecture). 3 Hours.

Basic concepts of microbiology including diversity, genetics, metabolism, growth, control of growth, pathogenesis, and immunology. Does not count towards BS in Biology. Corequisite: BIOL 20001. Prerequisite: (BIOL 10103 and BIOL 10101 or BIOL 10104) and (CHEM 12103 and CHEM 12101 or CHEM 14103 or CHEM 14203 and CHEM 14201 or CHEM 12073 and CHEM 12071). (Typically offered: Fall, Spring and Summer)

BIOL 200H1. Honors General Microbiology Laboratory. 1 Hour.

Techniques for handling microorganisms. Does not count towards BS in Biology. Corequisite: BIOL 20003. (Typically offered: Fall, Spring and Summer)
This course is equivalent to BIOL 20001.

BIOL 23371. General Genetics Laboratory. 1 Hour.

Analysis of genetic problems and experiments with emphasis on "hands-on" experience with a variety of organisms. May require time outside laboratory period. Laboratory 3 hours per week. Pre- or Corequisite: BIOL 23373. (Typically offered: Fall and Spring)

BIOL 23373. General Genetics. 3 Hours.

Surveys of Mendelian, molecular, and population mechanisms of inheritance and gene expression in prokaryotes and eukaryotes. Lecture 3 hours per week. Prerequisite: (BIOL 10104 or BIOL 10103 and BIOL 10101) and (CHEM 14103 or CHEM 12073) and (MATH 11003 or higher or STAT 28233 or MATH 21003 or equivalent). (Typically offered: Fall and Spring)

BIOL 24001. Human Anatomy Laboratory (ACTS Equivalency = BIOL 2404 Lab). 1 Hour.

Laboratory 3 hours exercises in mammalian anatomy. Cannot be taken without prior credit in BIOL 24003 or concurrent enrollment in BIOL 24003. Does not count toward BS in Biology. Corequisite: BIOL 24003. (Typically offered: Fall, Spring and Summer)

BIOL 24003. Human Anatomy (ACTS Equivalency = BIOL 2404 Lecture). 3 Hours.

Description of human body as a series of organ systems and their interrelationships. Does not count towards BS in Biology. Corequisite: BIOL 24001. Prerequisite: Four hours of biological sciences. (Typically offered: Fall, Spring and Summer)

BIOL 24101. Human Physiology Laboratory (ACTS Equivalency = BIOL 2414 Lab). 1 Hour.

Exercises include experiments on osmosis, reflexes, senses, muscle, cardiovascular system, ventilation, metabolism, renal function, etc. Data collection, analysis, and report writing. Does not satisfy the Fulbright College writing requirement. Does not count toward BS in Biology. Corequisite: BIOL 24103. (Typically offered: Fall and Spring)

BIOL 24103. Human Physiology (ACTS Equivalency = BIOL 2414 Lecture). 3 Hours.

Fundamental concepts of physiology with emphasis in the human. Does not count toward BS in Biology. Corequisite: BIOL 24101. Prerequisite: (CHEM 12103 and CHEM 12101) or (CHEM 14103) or (CHEM 14203 and CHEM 14201) and MATH 11003. (Typically offered: Fall and Spring)

BIOL 25471. Cell Biology Laboratory. 1 Hour.

Introduction to methods and techniques used in Cell Biology research. Laboratory experiences to highlight topics covered in BIOL 25473. Pre- or Corequisite: BIOL 25473. (Typically offered: Fall and Spring)

BIOL 25473. Cell Biology. 3 Hours.

Introduction to cell structure, cell processes, biological polymers, energetics, and diversity. An introduction to biochemistry and cell chemistry. Recommended: (CHEM 14203 and CHEM 14201) or (CHEM 12283 and CHEM 12281) or equivalent. Prerequisite: BIOL 10104, or BIOL 10103 and BIOL 10101. (Typically offered: Fall and Spring)

BIOL 30171. Principles of Plant Pathology Lab. 1 Hour.

Lab course in examination of the causes and symptoms of plant disease and the genetics of plant disease. Physiology, and ecology of host-pathogen interactions. Spread of disease and principles of disease control. Pre- or Corequisite: PLPA 30003 or BIOL 30173. (Typically offered: Fall)
This course is cross-listed with PLPA 30001.

BIOL 30173. Principles of Plant Pathology. 3 Hours.

Examination of the causes and symptoms of plant disease and the genetics of plant disease. Physiology, and ecology of host-pathogen interactions. Spread of disease and principles of disease control. (Typically offered: Fall)
This course is cross-listed with PLPA 30003.

BIOL 30271. Introduction to Insect Identification Lab. 1 Hour.

Introductory lab course on insect identification, collection, and curation techniques, primarily designed as an intensive add-on to BIOL 30373 for students wanting a more in-depth examination of insect diversity. Insect collection required. Course includes field trips. Students are encouraged to contact instructor before enrolling. Pre- or corequisite: BIOL 30373. (Typically offered: Fall)
This course is cross-listed with ENTO 30101.

BIOL 30373. Introduction to Entomology. 3 Hours.

Fundamentals of insect biology including structure and function, development, ecology, behavior, plant feeding and disease transmission. Lecture 3 hours/week. Students interested in a more intensive examination of insects, including collection, curation, and identification techniques, should sign up for the separate one credit lab BIOL 30271. Students are strongly encouraged to take BIOL 10103 before registering for this course. (Typically offered: Fall)
This course is cross-listed with ENTO 30103.

BIOL 30473. Evolutionary Biology. 3 Hours.

An introduction to the mechanisms and patterns of evolutionary change. Seeks to develop logical, scientific skills and to apply them in understanding how life has changed during the history of the earth. Corequisite: Drill component. Prerequisite: (BIOL 10104 or BIOL 10103, BIOL 10101) and BIOL 23373. (Typically offered: Fall and Spring)

BIOL 30573. Bones, Bodies, and Brains in Evolutionary Perspective. 3 Hours.

Reviews the anatomy of the human body, comparing this anatomy with primates, mammals, and vertebrates, and it will consider how the major features of the human body emerged throughout evolution. (Typically offered: Spring)
This course is cross-listed with ANTH 30403.

BIOL 32773. Inquiry and Modeling in Science Education. 3 Hours.

Study of science practices with emphasis on modeling and inquiry for learning/teaching. Includes practical, philosophical, cognitive, and disciplinary specific dimensions of doing science in academic and nonacademic settings. Includes planning and implementing multiple scientific inquiries, engaging in reflective practices, writing and presenting scientific information. Safety and ethical issues are included. Prerequisite: 8 hours of BIOL courses. Corequisite: Drill component. (Typically offered: Fall and Spring)

BIOL 34074. Comparative Vertebrate Morphology. 4 Hours.

Anatomy of selected vertebrate animals with emphasis upon homologous structures in various animal groups. The recommended anatomy course for Biology BS majors. Lecture 2 or 3 hours, laboratory 4 or 6 hours per week. Corequisite: Lab component. Prerequisite: BIOL 10104 or BIOL 10103 and BIOL 10101. (Typically offered: Fall and Spring)

BIOL 38771. General Ecology Laboratory. 1 Hour.

General ecology lab. Pre- or Corequisite: BIOL 38773. (Typically offered: Fall)

BIOL 38773. General Ecology. 3 Hours.

Ecological principles and concepts; environmental factors and interactions that determine distribution and abundance of organisms. Prerequisite: 7 hours of biological science. (Typically offered: Fall and Spring)

BIOL 392H3. Honors Colloquium. 3 Hours.

Covers a special topic or issue, offered as part of the honors program. Prerequisite: honors candidacy (not restricted to candidacy in biological sciences). (Typically offered: Irregular) May be repeated for degree credit.

BIOL 40063. Laboratory in Prokaryote Biology. 3 Hours.

Laboratory techniques in prokaryote culture, identification, physiology, metabolism, and genetics. Laboratory 6 hours per week. Prerequisite: BIOL 40403. (Typically offered: Fall and Spring)

BIOL 40173. Insect Behavior and Chemical Ecology. 3 Hours.

Basic concepts in insect senses and patterns of behavioral responses to various environmental stimuli. Previous knowledge of basic entomology is helpful, but not required. Lecture 2 hours, laboratory/discussion 2 hours per week. Corequisite: Lab component. (Typically offered: Spring Even Years)
This course is cross-listed with ENTO 40103.

BIOL 40403. Prokaryote Biology. 3 Hours.

An in-depth coverage of prokaryote diversity, genetics, metabolism, growth, structures and functions. Prerequisite: BIOL 25473. (Typically offered: Spring)

BIOL 40573. Insect Ecology. 3 Hours.

To develop understanding of important ecological concepts through study of dynamic relationships among insects and their environment. To become familiar with the literature of insect ecology, and interpretation and critique of ecological research. Previous knowledge of basic entomology and/or ecology will be assumed. Corequisite: Lab component. (Typically offered: Fall Even Years)
This course is cross-listed with ENTO 40503.

BIOL 40703. Mitochondrial Biology and Medicine. 3 Hours.

Overview of mitochondrial biology with a focus on the clinical spectrum of human diseases affected by dysfunctional mitochondria. Introduces basic mitochondrial biology, structure and function, genetics and bioenergetics. Highlights common and rare diseases influenced by mitochondrial malfunction. Prerequisite: BIOL 25473. (Typically offered: Fall)

BIOL 41074. Taxonomy of Flowering Plants. 4 Hours.

Identifying, naming, and classifying of wildflowers, weeds, trees, and other flowering plants. Emphasis is on the practical aspects of plant identification. Lecture 3 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: BIOL 10303 and BIOL 10301 and BIOL 23373 and BIOL 30473. (Typically offered: Spring)

BIOL 41174. Dendrology. 4 Hours.

Morphology, classification, geographic distribution, and ecology of woody plants. Lecture 3 hours, laboratory 3 hours per week, and fieldtrips. Corequisite: Lab component. Prerequisite: BIOL 38773. (Typically offered: Fall)

BIOL 41272. Food Microbiology. 2 Hours.

The study of food microbiology including classification/taxonomy, contamination, preservation and spoilage of different kinds of foods, pathogenic microorganisms, food poisoning, sanitation, control and inspection and beneficial uses of microorganisms. Prerequisite: BIOL 20003 and BIOL 20001 or BIOL 25473. (Typically offered: Fall)
This course is cross-listed with FDSC 41202.

BIOL 41373. Plant Disease Control. 3 Hours.

Principles, methods and mechanics of plant disease control. Emphasis is given to the integration of control measures and epidemiology of plant diseases. Lecture 3 hours per week. Prerequisite: PLPA 30003. (Typically offered: Fall)
This course is cross-listed with PLPA 42203.

BIOL 41573. Biology of Global Change. 3 Hours.

Covers impact of global change on sustainability and adaptability of biological systems. Corequisite: BIOL 42572. Prerequisite: (BIOL 10103 and BIOL 10101) or BIOL 10104. (Typically offered: Spring)

BIOL 41673. Dynamic Models in Biology. 3 Hours.

Mathematical and computational techniques for developing, executing, and analyzing dynamic models arising in the biological sciences. Both discrete and continuous time models are studied. Applications include population dynamics, cellular dynamics, and the spread of infectious diseases. Prerequisite: MATH 24004. (Typically offered: Irregular)
This course is cross-listed with MATH 41603.

BIOL 41774. Conservation Genetics. 4 Hours.

Covers concepts of biodiversity identification and illustrates how genetic data are generated and analyzed to conserve and restore biological diversity. Corequisite: Lab component and drill. Prerequisite: BIOL 30473, BIOL 38773 and STAT 28233 (or equivalent), and Junior standing. (Typically offered: Spring)

BIOL 42173. Biological Regulation and Subcellular Communication. 3 Hours.

Combines lectures, review of primary literature, student presentations, and small group discussions to explore a diversity of topics related to mechanisms of biological regulation and subcellular communication. Prerequisite: BIOL 23373 and BIOL 25473. (Typically offered: Irregular)

BIOL 42384. Comparative Physiology. 4 Hours.

Comparison of fundamental physiological mechanisms in various animal groups. Adaptations to environmental factors at both the organismal and cellular levels are emphasized. Lecture 3 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: BIOL 25473 and CHEM 36203 and (CHEM 36201 or CHEM 362H2). (Typically offered: Fall)

BIOL 42491. Ichthyology Laboratory. 1 Hour.

Practical application of fish identification based on anatomy, fish sampling methods, and curation of fish specimen. Laboratory component of BIOL 42493. Corequisite: BIOL 42493. (Typically offered: Spring Odd Years)

BIOL 42493. Ichthyology. 3 Hours.

Comprehensive overview of the diversity of fishes. Covers anatomy, physiology, evolution, taxonomy, ecology, behavior, zoogeography and conservation of marine and freshwater fishes. Lecture 3 hours per week. Prerequisite: Eight credits in Biology. Corequisite: BIOL 42491. (Typically offered: Spring Odd Years)

BIOL 424H1. Honors Ichthyology Laboratory. 1 Hour.

Practical application of fish identification based on anatomy, fish sampling methods, and curation of fish specimen. Laboratory component of BIOL 424H3. Prerequisite: Honors standing. Corequisite: BIOL 424H3. (Typically offered: Spring Odd Years)
This course is equivalent to BIOL 42491.

BIOL 424H3. Honors Ichthyology. 3 Hours.

Comprehensive overview of the diversity of fishes. Covers anatomy, physiology, evolution, taxonomy, ecology, behavior, zoogeography and conservation of marine and freshwater fishes. Lecture 3 hours per week. Prerequisite: Eight credits in Biology and honors standing. Corequisite: BIOL 42491. (Typically offered: Spring Odd Years)
This course is equivalent to BIOL 42493.

BIOL 42572. Biology of Global Change Seminar. 2 Hours.

Readings, essays, and group discussions that parallel the 27 lectures in BIOL 41573 and which dissect the resulting impacts of global change on sustainability and adaptability of biological systems. Corequisite: BIOL 41573. Prerequisite: BIOL 10104 or BIOL 10103 and BIOL 10101. (Typically offered: Spring)

BIOL 425H2. Honors Biology of Global Change Seminar. 2 Hours.

Readings, essays, and group discussions that parallel the 27 lectures in BIOL 41573 and which dissect the resulting impacts of global change on sustainability and adaptability of biological systems. Corequisite: BIOL 41573. Prerequisite: BIOL 10104 or BIOL 10103 and BIOL 10101. (Typically offered: Spring)
This course is equivalent to BIOL 42572.

BIOL 42673. Cell Physiology. 3 Hours.

In-depth molecular coverage of cellular processes involved in growth, metabolism, transport, excitation, signalling and motility, with emphasis on function and regulation in eukaryotes, primarily animals. Prerequisite: BIOL 25473 and BIOL 23373 and CHEM 38103 and PHYS 20203. (Typically offered: Fall)

BIOL 42773. Endocrinology. 3 Hours.

In endocrinology we study hormonal integration of living processes as all levels from molecule to organism. We will work with the mechanisms of hormone action, the endocrine control axes and hormones physiological role. The course will include paper discussions and student presentations on topics of special interest. Prerequisite: BIOL 25473 or equivalent. (Typically offered: Spring)

BIOL 43173. Molecular Cell Biology. 3 Hours.

In-depth molecular coverage of transcription, cell cycle, translation, and protein processing in eukaryotes and prokaryotes. Prerequisite: BIOL 25473 and BIOL 23373 and CHEM 36053 and CHEM 36051 and CHEM 36203 and CHEM 36201. (Typically offered: Spring)

BIOL 431H3. Honors Molecular Cell Biology. 3 Hours.

In-depth molecular coverage of transcription, cell cycle, translation, and protein processing in eukaryotes and prokaryotes. Prerequisite: BIOL 25473 and BIOL 23373 and CHEM 36053 and CHEM 36051 and CHEM 36203 and CHEM 36201. (Typically offered: Spring)
This course is equivalent to BIOL 43173.

BIOL 43273. Comparative Neurobiology. 3 Hours.

Exploration of modern research approaches to understanding the development and function of animal nervous systems, with emphasis on molecular and cellular approaches in non-human animal models commonly used in biomedical research. Format combines lectures, group discussions, and student presentations using examples from the primary neurobiology literature. Prerequisite: BIOL 23373 and BIOL 25473 or equivalents. (Typically offered: Irregular)

BIOL 43373. Biotechnology in Agriculture. 3 Hours.

Discussion of the techniques, applications, and issues of biotechnology as it is being used in modern agriculture. Coverage includes the basics of molecular biology, production of transgenic plants and animals, and new applications in the agricultural, food, and medical marketplace. Lecture and discussion, 3 hours per week. (Typically offered: Fall)
This course is cross-listed with PLPA 43303.

BIOL 43573. Ecological Genetics/Genomics. 3 Hours.

Analysis of the genetics of natural and laboratory populations with emphasis on the ecological bases of evolutionary change. Prerequisite: BIOL 23373 and BIOL 23371 and MATH 24004 and STAT 28233 or equivalents. (Typically offered: Fall Odd Years)

BIOL 44373. Principles of Evolution. 3 Hours.

Advanced survey of the mechanisms of evolutionary change with special emphasis on advances since the Modern Synthesis. Historical, theoretical, and population genetics approaches are discussed. Recommended BIOL 30473 and BIOL 23371 and BIOL 38771. Prerequisite: BIOL 23373 and BIOL 38773. (Typically offered: Fall Even Years)

BIOL 44673. Physiological Ecology. 3 Hours.

Interactions between environment, physiology, and properties of individuals and populations on both evolutionary and ecological scales. Prerequisite: BIOL 38773 and BIOL 42384 and its lab component. (Typically offered: Spring Odd Years)

BIOL 45151. Population Ecology Laboratory. 1 Hour.

Population Ecology Lab. Pre- or Corequisite: BIOL 45153. (Typically offered: Fall Even Years)

BIOL 45153. Population Ecology. 3 Hours.

Survey of theoretical and applied aspects of population processes stressing models of growth, interspecific interactions, and adaptation to physical and biotic environments. Prerequisite: BIOL 38773. (Typically offered: Fall Even Years)

BIOL 45263. Plant Ecology. 3 Hours.

To develop understanding of important ecological concepts through study of dynamics relationships among plants and their environment. To become familiar with the literature of plant ecology, and interpretation and critique of ecological research. Prerequisite: BIOL 38773. (Typically offered: Spring Even Years)

BIOL 45473. Developmental Biology. 3 Hours.

An analysis of the principles and mechanisms of development emphasizing the embryonic and postembryonic development of animals. Prerequisite: BIOL 25473 and BIOL 23373. (Typically offered: Irregular)

BIOL 45574. Developmental Biology with Laboratory. 4 Hours.

An analysis of the concepts of mechanisms of development emphasizing the experimental approach. Lecture 3 hours, laboratory 3 hours per week. Students may not receive degree credit for both BIOL 45473 and BIOL 45574. Corequisite: Lab component. Prerequisite: BIOL 25473 and BIOL 23373 or graduate standing. (Typically offered: Fall)

BIOL 45673. Cancer Biology. 3 Hours.

An introduction to the fundamentals of cancer biology. Prerequisite: BIOL 25473. (Typically offered: Fall)

BIOL 45703. Laboratory in Marine Invertebrate Development and Evolution. 3 Hours.

Provides a hands-on introduction to investigation of problems in marine invertebrate development and evolution. Emphasizes comparative molecular genetic approaches using non-traditional model organisms. The topic of research may vary from year to year; examples include, but are not limited to, the mechanisms of life cycle transition. Prerequisite: BIOL 23373. (Typically offered: Fall)

BIOL 45803. Genetic Engineering. 3 Hours.

Provides an overview of current methods for altering gene expression, as well as ethical concerns arising from genetic engineering. Special emphasis is placed on practical considerations and techniques necessary for implementing genetic engineering strategies. Prerequisite: BIOL 23373 and BIOL 25473. (Typically offered: Fall)

BIOL 46173. Primate Adaptation and Evolution. 3 Hours.

Introduction to the biology of the order Primates. This course considers the comparative anatomy, behavioral ecology and paleontology of our nearest living relatives. Prerequisite: BIOL 30473 or ANTH 10143. (Typically offered: Spring)
This course is cross-listed with ANTH 46103.

BIOL 46973. Forest Ecology. 3 Hours.

Introduction to the various biological, ecological and historical aspects of forest communities, with particular emphasis on the forests of the central and southeastern United States. Prerequisite: BIOL 38773. (Typically offered: Irregular)

BIOL 47073. Mechanisms of Pathogenesis. 3 Hours.

A survey of the events causing human disease at the molecular, cellular and genetic levels. Seeks to develop an appreciation that both the tricks pathogens use and the body's own defenses contribute to pathology. Prerequisite: BIOL 25473. (Typically offered: Fall)

BIOL 47183. Basic Immunology. 3 Hours.

A general overview of immunity with emphasis on the underlying cellular, molecular, and genetic events, and discussions of more specialized issues in immunology, such as disease states involving the immune system, and other interesting problems in modern immunology. Lecture 2 hours, laboratory 4 hours per week. Prerequisite: BIOL 23373 and BIOL 25473. (Typically offered: Spring)

BIOL 471H3. Honors Basic Immunology. 3 Hours.

A general overview of Immunity with emphasis on the underlying cellular, molecular, and genetic events, and discussions of more specialized issues in Immunology, such as disease states involving the Immune system, and other interesting problems in modern Immunology. Prerequisite: BIOL 23373 and BIOL 25473. (Typically offered: Spring)

This course is equivalent to BIOL 47183.

BIOL 47203. Laboratory in Microbial Fermentation. 3 Hours.

An inquiry-based lab focusing on the microbiology of brewing. Introduces students to laboratory techniques used in molecular ecology, microbial physiology, genetics, and brewing. Laboratory 6 hours per week. Pre- or corequisite: FDSC 27203. Prerequisite: BIOL 20003 or BIOL 23373 or BIOL 25473. (Typically offered: Fall Even Years)

BIOL 47374. Wildlife Management Techniques. 4 Hours.

To familiarize students with techniques used in the management of wildlife populations. Students will be exposed to field methods, approaches to data analysis, experimental design, and how to write a scientific paper. Management applications will be emphasized. Lecture 3 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: BIOL 38773. (Typically offered: Irregular)

BIOL 47474. Fish Biology. 4 Hours.

Morphology, classification, life history, population dynamics, and natural history of fishes and fish-like vertebrates. Lecture 3 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: 12 hours of biological science. (Typically offered: Spring Odd Years)

BIOL 47673. Ornithology. 3 Hours.

Taxonomy, morphology, physiology, behavior, and ecology of birds. Lecture, laboratory, and field work. Corequisite: Lab component. Prerequisite: BIOL 38773 (Typically offered: Spring Even Years)

BIOL 47774. Biometry. 4 Hours.

Students learn biological statistics and experimental design by actually designing experiments and analyzing data, as well as through lecture, discussion, reading, writing, and problem solving. Lecture 3 hours, laboratory 3 hours each week. Corequisite: Lab component. Prerequisite: (STAT 28233 or MATH 21003 or equivalent) and BIOL 38773. (Typically offered: Spring Even Years)

BIOL 47973. Introduction to Neurobiology. 3 Hours.

Exploration of the neurological underpinnings of perception, action, and experience including: how sense receptors convert information in the world into electricity, how information flows through the nervous systems, how neural wiring makes vision possible, how the nervous system changes with experience, and how the system develops. Prerequisite: BIOL 25473. (Typically offered: Spring)

BIOL 4807V. Special Topics in Biological Sciences. 1-6 Hour.

Consideration of new areas of biological sciences not yet treated adequately in other courses. Prerequisite: 8 hours of biological sciences. (Typically offered: Fall, Spring and Summer) May be repeated for degree credit.

BIOL 480HV. Honors Special Topics in Biological Sciences. 1-6 Hour.

Consideration of new areas of biological sciences not yet treated adequately in other courses. Prerequisite: 8 hours of biological sciences. (Typically offered: Fall, Spring and Summer) May be repeated for degree credit.

This course is equivalent to BIOL 4807V.

BIOL 48373. Animal Behavior. 3 Hours.

Organization, regulation, and phylogeny of animal behavior, emphasizing diversity across animal taxa. Lecture, laboratory, and field work. Corequisite: Lab component. (Typically offered: Spring)

BIOL 48474. Community and Ecosystem Ecology. 4 Hours.

Survey of theoretical and applied aspects of community processes stressing structure, tropic dynamics, community interactions, and major community types. Corequisite: Lab component. Prerequisite: BIOL 38773. (Typically offered: Fall Odd Years)

BIOL 48673. Analysis of Animal Populations. 3 Hours.

Basic principles of design and analysis for population studies of fish and wildlife species. Students will be instructed in the use of the latest software for estimating population parameters. Focus will be on both concepts and applications. Management applications of estimated parameters will be emphasized. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: BIOL 38773. (Typically offered: Spring Even Years)

BIOL 48773. Microbial Molecular Genetics and Informatics. 3 Hours.

Fundamentals of microbial genomics and bioinformatics. Course covers microbial genetics, genetic structure, genome organization, proteome organization, approaches for the analysis of DNA, RNA, and proteins, cellular metabolic pathways, genetic regulation, small RNA molecules, functional genomics, metagenomics, and bioinformatics approaches for analysis of microbial genomes. Prerequisite: BIOL 23373 or BIOL 25473. (Typically offered: Fall)

BIOL 48873. Mammalian Evolution and Osteology. 3 Hours.

Focuses on describing the evolutionary history of mammals, a group of vertebrates that include over 5,000 species in 29 orders, and will provide an overview of living species and their identifying features. Prerequisite: ANTH 10143 and ANTH 10141, or BIOL 10103 and BIOL 10101, or instructor consent. (Typically offered: Fall Even Years)

This course is equivalent to ANTH 47003.

BIOL 4967V. Culture and Environment: Field Studies. 1-6 Hour.

May be taken by students participating in overseas study programs or other domestic field study programs approved by the department. (Typically offered: Irregular) May be repeated for up to 12 hours of degree credit.

BIOL 496HV. Honors Culture and Environment: Field Studies. 1-6 Hour.

May be taken by students participating in overseas study programs or other domestic field study programs approved by the department. (Typically offered: Irregular) May be repeated for up to 12 hours of degree credit.
This course is equivalent to BIOL 4967V.

BIOL 4987V. Senior Thesis. 1-6 Hour.

Senior thesis. (Typically offered: Fall, Spring and Summer)

BIOL 4997V. Research In Biological Sciences. 1-4 Hour.

Research. Prerequisite: Senior standing. (Typically offered: Fall, Spring and Summer) May be repeated for up to 8 hours of degree credit.

BIOL 499HV. Honors Research in Biological Sciences. 1-4 Hour.

Honors research. Prerequisite: Senior standing. (Typically offered: Fall, Spring and Summer) May be repeated for up to 8 hours of degree credit.
This course is equivalent to BIOL 4997V.

BIOL 50071. Seminar in Biology. 1 Hour.

Discussion of selected topics and review of current literature in any area of the biological sciences. (Typically offered: Fall and Spring) May be repeated for degree credit.

BIOL 50173. Laboratory in Prokaryote Biology. 3 Hours.

Laboratory techniques in prokaryote culture, identification, physiology, metabolism, and genetics. Laboratory 6 hours per week. Prerequisite: BIOL 40403. (Typically offered: Fall and Spring)

BIOL 50274. Insect Diversity and Taxonomy. 4 Hours.

Principles and practices of insect classification and identification with emphasis on adult insects. 2.5 hours lecture, 4 hours lab. Previous knowledge of basic entomology is necessary. Graduate degree credit will not be given for both BIOL 40274 and BIOL 50274. Prerequisite: Instructor consent. Corequisite: Lab component. (Typically offered: Fall)
This course is cross-listed with ENTO 50204.

BIOL 50374. Wildlife Management Techniques. 4 Hours.

To familiarize students with techniques used in the management of wildlife populations. Students will be exposed to field methods, approaches to data analysis, experimental design, and how to write a scientific paper. Management applications will be emphasized. Lecture 3 hours, laboratory 3 hours per week. Graduate degree credit will not be given for both BIOL 47374 and BIOL 50374. Corequisite: Lab component. Prerequisite: BIOL 38773. (Typically offered: Irregular)

BIOL 50403. Prokaryote Biology. 3 Hours.

An in-depth coverage of prokaryote diversity, genetics, metabolism, growth, structures and functions. (Typically offered: Spring)

BIOL 50573. Insect Ecology. 3 Hours.

Teaches important ecological concepts through study of dynamic relationships among insects and their environment. Introduces literature of insect ecology, and interpretation and critique of ecological research. Previous knowledge of basic entomology and/or ecology will be assumed. 2 hours lecture/2 hours lab. Graduate degree credit will not be given for both BIOL 40573 and BIOL 50573. Prerequisite: Instructor consent. Corequisite: Lab component. (Typically offered: Fall Even Years)
This course is cross-listed with ENTO 50503.

BIOL 50703. Mitochondrial Biology and Medicine. 3 Hours.

Overview of mitochondrial biology with a focus on the clinical spectrum of human diseases affected by dysfunctional mitochondria. Introduces basic mitochondrial biology, structure and function, genetics and bioenergetics. Highlights common and rare diseases influenced by mitochondrial malfunction. Prerequisite: Graduate Standing. (Typically offered: Fall)

BIOL 51173. Insect Behavior and Chemical Ecology. 3 Hours.

Basic concepts in insect senses and patterns of behavioral responses to various environmental stimuli. Previous knowledge of basic entomology is helpful, but not required. Prerequisite: Instructor consent. Corequisite: Lab component. (Typically offered: Spring Even Years)
This course is cross-listed with ENTO 51103.

BIOL 51274. Dendrology. 4 Hours.

Morphology, classification, geographic distribution, and ecology of woody plants. Lecture 3 hours, laboratory 3 hours per week, and fieldtrips. Graduate degree credit will not be given for both BIOL 41174 and BIOL 51274. Prerequisite: BIOL 38773. (Typically offered: Fall)

BIOL 51573. Practical Programming for Biologists. 3 Hours.

Hands-on instruction in the fundamentals of biological computing. Students learn how to set up a Unix work station, work from the command line, install software, build databases, and program in Python, a popular scripting language for biological applications. Most examples focus on the analysis of genomic data. (Typically offered: Spring)

BIOL 51673. Dynamic Models in Biology. 3 Hours.

Mathematical and computational techniques for developing, executing, and analyzing dynamic models arising in the biological sciences. Both discrete and continuous time models are studied. Applications include population dynamics, cellular dynamics, and the spread of infectious diseases. Graduate degree credit will not be given for both BIOL 41673 and BIOL 51673. Prerequisite: MATH 24004. (Typically offered: Irregular)

BIOL 51774. Conservation Genetics. 4 Hours.

Covers concepts of biodiversity identification and illustrates how genetic data are generated and analyzed to conserve and restore biological diversity. Corequisite: Lab component. Prerequisite: BIOL 30473, BIOL 38773 and STAT 28233 (or equivalent) and graduate standing. (Typically offered: Spring)

BIOL 52173. Biological Regulation and Subcellular Communication. 3 Hours.

Combines lectures, review of primary literature, student presentations, and small group discussions to explore a diversity of topics related to mechanisms of biological regulation and subcellular communication. Prerequisite: Graduate standing. (Typically offered: Irregular)

BIOL 52461. Ichthyology Laboratory. 1 Hour.

Practical application of fish identification based on anatomy, fish sampling methods, and curation of fish specimen. Laboratory component of BIOL 52463. Corequisite: BIOL 52463. (Typically offered: Spring Odd Years)

BIOL 52463. Ichthyology. 3 Hours.

Comprehensive overview of the diversity of fishes. Covers anatomy, physiology, evolution, taxonomy, ecology, behavior, zoogeography and conservation of marine and freshwater fishes. Lecture 3 hours per week. Corequisite: BIOL 52461. (Typically offered: Spring Odd Years)

BIOL 52574. Comparative Physiology. 4 Hours.

Comparison of fundamental physiological mechanisms in various animal groups. Adaptations to environmental factors at both the organismal and cellular levels are emphasized. Lecture 3 hours, laboratory 3 hours per week. Graduate degree credit will not be given for both BIOL 42384 and BIOL 52574. Prerequisite: BIOL 25473 and CHEM 36203 and (CHEM 36201 or CHEM 361H1). (Typically offered: Fall)

BIOL 52673. Cell Physiology. 3 Hours.

In-depth molecular coverage of cellular processes involved in growth, metabolism, transport, excitation, signaling and motility, with emphasis on function and regulation in eukaryotes, primarily animals. Prerequisite: BIOL 23373, BIOL 25473, BIOL 25471, CHEM 38103, and PHYS 20203. (Typically offered: Fall)

BIOL 52773. Endocrinology. 3 Hours.

In endocrinology we study hormonal integration of living processes at all levels from molecule to organism. We will work with the mechanisms of hormone action, the endocrine control axes and hormones physiological role. The course will include paper discussions and student presentations on topics of special interest. (Typically offered: Spring)

BIOL 53173. Molecular Cell Biology. 3 Hours.

In-depth molecular coverage of transcription, cell cycle, translation, and protein processing in eukaryotes and prokaryotes. Prerequisite: BIOL 25473 and BIOL 23373 and CHEM 36053 and CHEM 36051 and CHEM 36203 and CHEM 36201. (Typically offered: Spring)

BIOL 53273. Comparative Neurobiology. 3 Hours.

Exploration of modern research approaches to understanding the development and function of animal nervous systems, with emphasis on molecular and cellular approaches in non-human animal models commonly used in biomedical research. Format combines lectures, group discussions, and student presentations using examples from the primary neurobiology literature. Prerequisite: Graduate standing. (Typically offered: Irregular)

BIOL 53473. Advanced Immunology. 3 Hours.

Aspects of innate, cell-mediated, and humoral immunity in mammalian and avian species. Molecular mechanisms underlying the function of the immune system are emphasized. A course in Basic Immunology prior to enrollment in Advanced Immunology is recommended but not required. Lecture 3 hours per week. (Typically offered: Spring)

This course is cross-listed with POSC 53403.

BIOL 53572. Immunology in the Laboratory. 2 Hours.

Laboratory course on immune-diagnostic laboratory techniques and uses of antibodies as a research tool. Included are cell isolation and characterization procedures, immunochemistry, flow cytometry, ELISA and cell culture assay systems. Laboratory 6 hours per week. Prerequisite: POSC 53403 or BIOL 53473. (Typically offered: Spring)

This course is cross-listed with POSC 53502.

BIOL 53583. Ecological Genetics/genomics. 3 Hours.

Analysis of the genetics of natural and laboratory populations with emphasis on the ecological bases of evolutionary change. Prerequisite: BIOL 23373 and BIOL 23371, BIOL 30473 and MATH 24004 and STAT 28233 or equivalents. (Typically offered: Fall Odd Years)

BIOL 54074. Comparative Botany. 4 Hours.

A comparative approach to organisms classically considered to be plants with emphasis on morphology, life history, development, and phylogeny. Three hours lecture, 4 hours lab per week. Corequisite: Lab component. Prerequisite: Graduate standing. (Typically offered: Fall Odd Years)

BIOL 54671. Population Ecology Laboratory. 1 Hour.

Demonstration of the models and concepts from BIOL 55183. Pre- or Corequisite: BIOL 55183. (Typically offered: Fall Even Years)

BIOL 54673. Physiological Ecology. 3 Hours.

Interactions between environment, physiology, and properties of individuals and populations on both evolutionary and ecological scales. Prerequisite: BIOL 38773 and BIOL 42384. (Typically offered: Spring Odd Years)

BIOL 55183. Population Ecology. 3 Hours.

Survey of theoretical and applied aspects of populations processes stressing models of growth, interspecific interactions, and adaptation to physical and biotic environments. Corequisite: BIOL 54671. Prerequisite: BIOL 38773. (Typically offered: Fall Even Years)

BIOL 55284. Developmental Biology with Laboratory. 4 Hours.

An analysis of the concepts and mechanisms of development emphasizing the experimental approach. Students may not receive degree credit for both BIOL 55473 Developmental Biology and BIOL 55284 Developmental Biology with Laboratory. Corequisite: Lab component. (Typically offered: Fall)

BIOL 55573. Astrobiology. 3 Hours.

Discusses the scientific basis for the possible existence of extraterrestrial life. Includes the origin and evolution of life on Earth, possibility of life elsewhere in the solar system (including Mars), and the possibility of life on planets around other stars. Prerequisite: Instructor consent. (Typically offered: Irregular)

This course is cross-listed with SPAC 55503.

BIOL 55673. Cancer Biology. 3 Hours.

An introduction to the fundamentals of cancer biology. Prerequisite: BIOL 25473. (Typically offered: Fall)

BIOL 55703. Laboratory In Marine Invertebrate Development and Evolution. 3 Hours.

Provides a hands-on introduction to investigation of problems in marine invertebrate development and evolution. Emphasizes comparative molecular genetic approaches using non-traditional model organisms. The topic of research may vary from year to year; examples include, but are not limited to, the mechanisms of life cycle transition. (Typically offered: Fall)

BIOL 57073. Mechanisms of Pathogenesis. 3 Hours.

A survey of events causing human disease at the molecular, cellular and genetic levels. Seeks to develop an appreciation that both the tricks pathogens use and the body's own defenses contribute to pathology. (Typically offered: Fall)

BIOL 57183. Basic Immunology. 3 Hours.

A general overview of Immunity with emphasis on the underlying cellular, molecular and genetic events controlling immune reactions. Reading of the primary literature on disease states involving the immune system. (Typically offered: Spring)

BIOL 57273. Fish Biology. 3 Hours.

Morphology, classification, life histories, population dynamics, and natural history of fishes and fish-like vertebrates. Lecture 2 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: 12 hours of biological sciences. (Typically offered: Spring Odd Years)

BIOL 57473. Herpetology. 3 Hours.

Morphology, classification and ecology of amphibians and reptiles. Lecture 2 hours, laboratory 1 hour per week. Corequisite: Lab component. (Typically offered: Spring Even Years)

BIOL 57673. Ornithology. 3 Hours.

Taxonomy, morphology, physiology, behavior, and ecology of birds. Lecture, laboratory, and field work. Corequisite: Lab component. Prerequisite: 10 hours of biological sciences. (Typically offered: Spring Even Years)

BIOL 57774. Biometry. 4 Hours.

Students learn biological statistics and experimental design by actually designing experiments and analyzing data, as well as through lecture, discussion, reading, writing, and problem solving. Lecture 3 hours, laboratory 3 hours each week. Graduate degree credit will not be given for both BIOL 47774 and BIOL 57774. Corequisite: Lab component. Prerequisite: STAT 28233 or equivalent, BIOL 38773. (Typically offered: Spring Even Years)

BIOL 5800V. Special Topics in Biological Sciences. 1-6 Hour.

Consideration of new areas of biological sciences not yet treated adequately in other courses. Prerequisite: 8 hours of biological sciences. (Typically offered: Fall, Spring and Summer) May be repeated for degree credit.

BIOL 58273. Science Communication. 3 Hours.

Covers the foundations of writing strategies, how to communicate with discipline-specific versus broad audiences, elements of an effective presentation, and the manuscript and proposal review process. (Typically offered: Fall)

BIOL 58373. Animal Behavior. 3 Hours.

Organization, regulation, and phylogeny of animal behavior, emphasizing diversity across animal taxa. Lecture, laboratory, and field work. Corequisite: Lab component. (Typically offered: Spring)

BIOL 58464. Community Ecology. 4 Hours.

Survey of theoretical and applied aspects of community processes stressing structure, trophic dynamics, community interactions, and major community types. Corequisite: Lab component. Prerequisite: BIOL 38773. (Typically offered: Fall Odd Years)

BIOL 58473. Conservation Biology. 3 Hours.

The study of direct and indirect factors by which biodiversity is impacted by human activity. It is a synthetic field of study that incorporates principles of ecology, biogeography, population genetics, economics, sociology, anthropology, philosophy, geology, and geography. Prerequisite: BIOL 38773. (Typically offered: Irregular)

BIOL 59174. Stream Ecology. 4 Hours.

Current concepts and research in lotic ecosystem dynamics. Lecture, laboratory, field work and individual research projects required. Corequisite: Lab component. Prerequisite: 3 hours of ecology-related coursework. (Typically offered: Fall Even Years)

BIOL 59373. Global Biogeochemistry: Elemental Cycles and Environmental Change. 3 Hours.

This course explores the chemical, biological, and geological processes occurring within ecosystems. An understanding of these processes is used to investigate how they form the global biogeochemical cycles that provide energy and nutrients necessary for life. Class discussions focus on global change and the effects of more recent anthropogenic influences. Prerequisite: 3 hours of chemistry or biochemistry and ecology. (Typically offered: Spring Odd Years)

BIOL 6007V. Master's Thesis. 1-6 Hour.

Master's Thesis. Prerequisite: Graduate standing. (Typically offered: Fall, Spring and Summer) May be repeated for degree credit.

BIOL 7007V. Doctoral Dissertation. 1-18 Hour.

Doctoral Dissertation. Prerequisite: Graduate standing. (Typically offered: Fall, Spring and Summer) May be repeated for degree credit.