

BIOLOGY - BIO

BIO 109 Nutrition 3 Credits

How food intake influences us as individuals and as components of society, what food is, how we get and use food, processes regulating its use.
Fulfills College Core: Field 6 (Natural Sciences)

BIO 111 Introductory Biology I 3 Credits

Introductory course for freshmen biology and other science majors. Course provides foundation of evolution, natural selection and heredity, and ecological principles as mechanisms of selection and evolution. Topics include the basis of evolutionary theory, concept of natural selection, evolution of living cells, basic inheritance, biological diversity, intra- and inter-specific interactions between organisms, and interactions between organisms and their environment. Three hours of lecture and a one and a half hour recitation per week.

Fulfills College Core: Field 6 (Natural Sciences)

Offered: every fall.

BIO 111L Introductory Biology Laboratory I 1 Credit

Laboratories in selection, heredity, diversity, population biology and ecology. Also includes introduction to scientific method and scientific writing. Three hours of lab per week.

Corequisite: BIO 111.

Offered: every fall.

BIO 112 Introductory Biology II 3 Credits

Introductory course for freshmen biology and other science majors. Course focuses on homeostasis in multicellular organisms through exploring structure and function relationships in plants and animals. Topics include cell interactions in tissues and organs, anatomy and physiology of plants and animals, and the role of natural selection in shaping the anatomy and physiology of plants and animals. Three hours of lecture and a one and a half hour recitation per week.

Prerequisite: minimum grade of C- in BIO 111.

Offered: every spring.

BIO 112L Introductory Biology Laboratory II 1 Credit

Laboratories that provide an examination of the structure and function of living organisms (plants and animals). Three hours of lab per week.

Offered: every spring.

BIO 113 Introductory Biology II: Organismal Biology 3 Credits

Introductory course for science majors not on a pre-health track. Course explores structure and function relationships in plants and animals. Topics include cell interactions in tissues and organs, anatomy and physiology of plants and animals through several organ systems, and how plants and animals respond to internal and external stimuli.

Prerequisite: C- in BIO 111. **Corequisite:** BIO 112L.

Offered: every spring.

BIO 114 Human Anatomy and Physiology I 3 Credits

An introductory course for students requiring an understanding of the structure and function of the human body. After a general overview of anatomy and physiology and some key principles related to homeostasis, biological control systems and feedback loop, the course proceeds to examine the chemical, cellular, tissue, organ, organ system, and organismal levels of organization. From there, the course examines multiple organ systems, including the integumentary, nervous, endocrine, cardiovascular, lymphatic, immune, and respiratory systems. This course examines the relationships among physiology, anatomy, metabolism, genetics, evolution, the physical environment, and exercise, and how they relate to diet, human health and disease, and also emphasizes the interrelationships between organ systems.

Fulfills College Core: Field 6 (Natural Sciences)

Offered: fall & spring.

BIO 114L Human Anatomy and Physiology I Laboratory 1 Credit

One three-hour lab per week.

Corequisite: BIO 114.

Offered: fall & spring.

BIO 115 Human Anatomy and Physiology II 3 Credits

Although the courses can be taken in any order, this course builds on BIO 114 Human Anatomy and Physiology I in providing an introduction to the structure and function of the human body. The course begins with a review of the chemical, cellular, tissue, organ, organ system, and organismal levels of organization. From there, the course examines multiple organ systems, including the anatomical, physiological, and biomechanical aspects of the skeletal and muscular systems, and how these systems interact with the digestive system and metabolism to fuel exercise and all other energy-requiring processes in the body. The urinary and reproductive systems will also be covered.

Corequisite: BIO 115L.

Offered: every spring.

BIO 115L Human Anatomy and Physiology II Laboratory 1 Credit

One three-hour lab per week.

Corequisite: BIO 115.

Offered: fall & spring.

BIO 121 Human Reproduction 3 Credits

This course will explore the following topics: the process of human sexual development, birth control and fertility, human reproductive anatomy, the reproductive process, body changes during pregnancy, human embryonic and fetal development and developmental disorders. Scientific literature will be consulted on important issues including abortion, in vitro fertilization, germ-line CRISPR-modifications, sexuality, and gender identity. There will be a focus on the variety of paths and outcomes possible at all life stages of sexual reproduction and development.

Fulfills College Core: Field 6 (Natural Sciences)

Offered: occasionally.

BIO 132 Genes and People 3 Credits

How human characteristics are transmitted and affect future generations. Ethical and legal ramifications of genetic advances.

Fulfills College Core: Field 6 (Natural Sciences)

Offered: occasionally.

BIO 166 Biology of Birds 3 Credits

An introduction to the diversity, behavior, anatomy, and physiology of birds. Students will learn how to identify common local birds. Topics include flight, songs and calls, finding mates, nesting behaviors, and migration. Three hours of lecture per week.

Fulfills College Core: Field 6 (Natural Sciences)

Offered: occasionally.

<p>BIO 211 Biochemistry and Cell Biology I 3 Credits Fundamentals of biochemistry (biological chemistry) and cell biology for students majoring in the biological sciences. Structure and biological activities of proteins and lipids. Integrates the cellular and biochemical relationships between systems within the cell, with an emphasis on membrane transport, signal transduction, and cell motility. Three hours of lecture and a one and a half hour recitation per week. Prerequisite: Minimum grade of C- in BIO 112 or BIO 113 & CHM 111 or co-enrollment in CHM 112 with permission of Chair. Offered: every fall.</p>	<p>BIO 301 Research Methods (credit) 1 Credit Training in experimental methods for the biological sciences under the direct supervision of a faculty member. Each section and research methodologies taught within the section unique to the instruction and research work of a specific faculty member. May be taken in multiple semesters for credit. Requires approval of faculty member for enrollment into an individual section. Offered: fall, spring, & summer.</p>
<p>BIO 211L Biochemistry and Cell Biology Lab I 1 Credit Investigative laboratory provides opportunity for students to learn how to isolate, measure, and characterize macromolecules present within a variety of cellular systems. Three hours of lab per week. Students must also register for BIO 211. Offered: every fall.</p>	<p>BIO 305 Medical Microbiology and its Ecological Basis 3 Credits Microbiology course that merges discussion of microbial interactions in the human environment (both beneficial and disease-causing) with discussion of microbial interactions in other natural environments. Topics include microbial & ecosystem diversity, the human microbiome compared to other microbial communities, human host-pathogen interaction compared to microbial competition in soil and water, and disease treatment compared to environmental bioremediation. Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113. Offered: occasionally.</p>
<p>BIO 212 Biochemistry and Cell Biology II 3 Credits Fundamentals of biochemistry (biological chemistry) and cell biology for students majoring in the biological sciences. Structure and biological activities of carbohydrates and nucleic acids. Integrates the cellular and biochemical relationships between systems within the cell with an emphasis on the role cell communication, respiration, photosynthesis, gene expression, and cell division. Three hours of lecture and a one and a half hour recitation per week. Prerequisite: minimum grade of C- in BIO 211 & CHM 112. Offered: every spring.</p>	<p>BIO 305L Medical Microbiology and its Ecological Basis Lab 1 Credit Current and historical techniques for the isolation and measurement of microorganisms in the environment and for differentiation between medically important bacteria. Topics include microscopy, preparation of culture media and aseptic technique, staining of microorganisms, isolation and culture of specialized groups of bacteria from human, soil or aquatic environments, and determination of antibiotic resistance. Three hours of lab per week. Prerequisite: minimum grade of D in BIO112L. Corequisite: BIO 305.</p>
<p>BIO 212L Biochemistry and Cell Biology Lab II 1 Credit Examination of experimental methodologies that relate the expression and action of various macromolecules to biological processes at the cellular/ molecular level. The role of experimentation in the scientific process is emphasized. Three hours of lab per week. Prerequisite: BIO 211 & minimum grade of D in BIO 211L. Corequisite: BIO 212. Offered: spring.</p>	<p>BIO 307 Microbiology 3 Credits Cell structure, genetics, biochemistry and physiology of microorganisms, with emphasis on bacteria. Medical microbiology, epidemiology, and some immunology also are discussed. Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113. Offered: occasionally.</p>
<p>BIO 251 Career Exploration in STEM 1 Credit Have you ever wondered what other career options a degree in Biology allows you to pursue besides a medical path? This seminar will explore career options and pathways through interviews with various professionals in the fields of biological research, public health, biotechnology, and education. Offered: occasionally.</p>	<p>BIO 307L Microbiology Laboratory 1 Credit Microbiology laboratory is concerned primarily with the cell structure, growth, physiology and identification of bacteria. Three hours of lab per week. Prerequisite: minimum grade of D in BIO112L. Corequisite: BIO 307.</p>
<p>BIO 298 Pre-clinical Experience for Undergraduates 1 Credit Students undertake a substantial shadowing experience in a clinical setting. Must document and complete a minimum of 100 hours of voluntary work with the same clinician within the academic period. An academic component is also required. Student arranges contact with clinician. Application process is required. Prerequisite: BIO 111, BIO 112, & approval of the department chair. Offered: fall & spring.</p>	<p>BIO 308 Parasitology 3 Credits Parasitism is the most common biological interaction on the planet, and virtually every organism can be infected by one or more parasites. This course will provide a comprehensive introduction to parasites, their hosts, and the co-evolutionary relationship between them. This class deals primarily with human and animal parasites of public health/ecological importance, including amoeba, malaria, trypanosomes, helminths, and other microparasites. Prerequisite: C- in BIO 111 and BIO 112 or BIO 113. Offered: occasionally.</p>
<p>BIO 300 Research Methods (non-credit) 0 Credits Training in experimental methods for the biological sciences under the direct supervision of a faculty member. Each section and research methodologies taught within the section unique to the instruction and research work of a specific faculty member. Requires approval of faculty member for enrollment into an individual section. Offered: fall, spring, & summer.</p>	<p>BIO 312 Primatology 3 Credits Primatology is the scientific study of primates. Topics include primate evolution, behavior, ecology, and conservation. Emphasis will be placed on reading and critiquing primary literature. Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113. Fulfills College Core: Advanced Writing-Intensive Offered: every fall.</p>

BIO 317 Sex, Evolution and Behavior	3 Credits	BIO 340L Physiology Laboratory	1 Credit
Reproductive behavior of diverse animal species, including humans, from an evolutionary perspective. Focus on how evolutionary accounts explain male-female differences in life style and behavior.		Experimental study of physiological systems, using biochemical, cellular and hematological techniques and electronic instrumentation. Three hours of lab per week.	
Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113.		Prerequisite: minimum grade of D in BIO112L. Corequisite: BIO 340.	
Offered: occasionally.		BIO 343 Entomology	4 Credits
BIO 320 Field Ecology	4 Credits	Introduction to the diversity and natural history of insects. The structure, function, evolution and ecology of this group are emphasized. Laboratory focuses on anatomy, diversity and classification. Lab required. Three hours of lecture and three hours of lab per week.	
Introduction to the flora, fauna and physical characteristics of regional terrestrial and aquatic ecosystems. Emphasis on field methods and implementation of scientific method from data collection, analysis, and data presentation. Introduction to Geographic Information System (GIS) and its applications in ecology. Lab required. Three hours of lecture and six hours of lab per week.		Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113.	
Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113.		Offered: occasionally.	
Offered: fall of even-numbered years.		BIO 343L Entomology Lab	0 Credits
BIO 320L Field Ecology Lab	0 Credits	BIO 343 Entomology Lab.	
BIO 320 Field Ecology lab.		Offered: occasionally.	
Offered: fall of even-numbered years.		BIO 345 Functional Neuroanatomy	3 Credits
BIO 322 Conservation Biology	3 Credits	Examination of human neuroanatomy, with emphasis on the relationship between neuronal circuits and nervous system function/dysfunction. Three hours of lecture per week.	
Study of the plight of endangered species, the biological consequences of fragmented populations, and the scientific basis of habitat/species restoration.		Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113.	
Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113.		Offered: occasionally.	
Offered: every spring.		BIO 351 Biology Seminar I	1 Credit
BIO 324 Human Anatomy	4 Credits	Designed to provide sophomore biology major students with the opportunity to learn various methods of preparing scientific/experimental information for oral presentation. Attendance at departmental seminars required. Meets for 1.5 hours per week.	
A structure/function approach based on what was learned in BIO112, this course will allow the student to increase their conceptual understanding of human anatomy. Lab required. Three hours of lecture and three hours of lab per week.		Offered: every spring.	
Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113.		BIO 353 Biology Seminar II	1 Credit
Offered: every fall.		Provides opportunities for fourth-year Biology major students to present seminars on research of the primary biological literature. Attendance at departmental seminars required. Meets for 1.5 hours per week.	
BIO 324L Human Anatomy Lab	0 Credits	Prerequisite: BIO 351.	
Required lab for BIO 324.		Fulfills College Core: Oral Communication	
Corequisite: BIO 324.		Offered: every fall.	
Offered: every fall.		BIO 357 Evolution	3 Credits
BIO 335 Plant Biology	3 Credits	An in-depth examination of the unifying principles of evolutionary biology. Pre-Darwin ideas about evolution, Darwinian evolution, the Modern Synthesis, and contemporary evolutionary biology. Specific concepts include, but are not limited to, population genetics, speciation, origin of life, phylogenetic analysis, with special emphasis on the evolution of sexual reproduction, virulence evolution, and human evolution. Three hours of lecture per week.	
Critical examination of the structure, physiology and biochemistry of vascular plants. The interaction of plants with light, water and predators is included. The plants' ability to grow in the face of global climate change is discussed.		Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113.	
Prerequisites: minimum grade of C- in BIO 111 & BIO 112 (or BIO 113).		Offered: occasionally.	
Offered: occasionally.		BIO 335L Plant Biology Lab	1 Credit
BIO 335L Plant Biology Lab	1 Credit	Investigative survey of plant structure and function. Three hours of lab per week.	
Investigative survey of plant structure and function. Three hours of lab per week.		Prerequisite: minimum grade of D in BIO112L. Corequisite: BIO 335.	
Prerequisite: minimum grade of D in BIO112L. Corequisite: BIO 335.		BIO 340 Physiology	3 Credits
Offered: occasionally.		Examination of the biochemical, molecular and cellular regulatory mechanisms involved in maintaining stable internal environments required for normal cell, tissue and organ function. Course focuses on cell and organ function, integrated physiological control systems for various organ systems (including cardiovascular, respiratory, GI, renal, reproductive, and immune), and the maintenance of homeostasis. Three hours of lecture per week.	
BIO 340 Physiology	3 Credits	Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113.	
Examination of the biochemical, molecular and cellular regulatory mechanisms involved in maintaining stable internal environments required for normal cell, tissue and organ function. Course focuses on cell and organ function, integrated physiological control systems for various organ systems (including cardiovascular, respiratory, GI, renal, reproductive, and immune), and the maintenance of homeostasis. Three hours of lecture per week.		Offered: every spring.	
Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113.		BIO 340L Physiology Laboratory	1 Credit
Offered: every spring.		Experimental study of physiological systems, using biochemical, cellular and hematological techniques and electronic instrumentation. Three hours of lab per week.	
		Prerequisite: minimum grade of D in BIO112L. Corequisite: BIO 340.	
		BIO 343 Entomology	4 Credits
		Introduction to the diversity and natural history of insects. The structure, function, evolution and ecology of this group are emphasized. Laboratory focuses on anatomy, diversity and classification. Lab required. Three hours of lecture and three hours of lab per week.	
		Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113.	
		Offered: occasionally.	
		BIO 343L Entomology Lab	0 Credits
		BIO 343 Entomology Lab.	
		Offered: occasionally.	
		BIO 345 Functional Neuroanatomy	3 Credits
		Examination of human neuroanatomy, with emphasis on the relationship between neuronal circuits and nervous system function/dysfunction. Three hours of lecture per week.	
		Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113.	
		Offered: occasionally.	
		BIO 351 Biology Seminar I	1 Credit
		Designed to provide sophomore biology major students with the opportunity to learn various methods of preparing scientific/experimental information for oral presentation. Attendance at departmental seminars required. Meets for 1.5 hours per week.	
		Offered: every spring.	
		BIO 353 Biology Seminar II	1 Credit
		Provides opportunities for fourth-year Biology major students to present seminars on research of the primary biological literature. Attendance at departmental seminars required. Meets for 1.5 hours per week.	
		Prerequisite: BIO 351.	
		Fulfills College Core: Oral Communication	
		Offered: every fall.	
		BIO 357 Evolution	3 Credits
		An in-depth examination of the unifying principles of evolutionary biology. Pre-Darwin ideas about evolution, Darwinian evolution, the Modern Synthesis, and contemporary evolutionary biology. Specific concepts include, but are not limited to, population genetics, speciation, origin of life, phylogenetic analysis, with special emphasis on the evolution of sexual reproduction, virulence evolution, and human evolution. Three hours of lecture per week.	
		Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113.	
		Offered: occasionally.	
		BIO 357L Evolution Laboratory	1 Credit
		Examination of fundamental evolutionary processes through a combination of laboratory experiments, simulations, and analysis of experimental data sets. Three hours of lab per week.	
		Prerequisite: minimum grade of D in BIO112L. Corequisite: BIO 357.	
		Offered: occasionally.	
		BIO 360 Environmental Health	3 Credits
		Environmental effects on human health, including biological, physical and chemical hazards in water soil, and air. Course focuses on public health and epidemiological study approaches. Emerging issues also discussed.	
		Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113.	
		Offered: Every other year.	

BIO 364 Zoology: Diversity of Animal Life	3 Credits	BIO 400 Independent Study	1-3 Credits
This course will explore differences in form, function, systematics and evolutionary relationships of the major groups of animal life on the planet. The course will focus on the evolution of major patterns in body plans and physiological adaptations of the major phyla within the animal kingdom. Prerequisite: C- in BIO 111 and BIO 112 or BIO 113. Offered: occasionally.		Independent study under the direction of a faculty member. Arrangements made prior to registration. Independent studies require an application and approval by the associate dean. Prerequisite: permission of the instructor, department chair, & associate dean.	
BIO 366 Ornithology	4 Credits	BIO 401 Independent Research	1-4 Credits
Diversity, relationships, ecology, natural history and the behavior of birds. Laboratory focuses on world-wide diversity, local species and field techniques. Lab required. Three hours of lecture and three hours of lab per week. Prerequisite: minimum grade of C- in BIO 111 & BIO 112 (or BIO 113). Corequisite: BIO 366L. Offered: occasionally.		Independent laboratory research in biology conducted under the supervision of a faculty member. Arrangements made prior to registration. Prerequisite: written permission of faculty member & department chair.	
BIO 366L Ornithology Laboratory	0 Credits	BIO 404 Genetics	3 Credits
BIO 366 Ornithology lab. Corequisite: BIO 366. Offered: occasionally.		Principles of Mendelian, molecular, population, human and quantitative genetics, with emphasis on inherited diseases. Three hours of lecture and a one and a half hour of recitation per week. Prerequisite: minimum grade of C- in BIO 212.	
BIO 375 Community Ecology	3 Credits	BIO 404L Genetics Laboratory	1 Credit
Examination of how processes in multi-species assemblages affect communities by altering species' abundances, distributions, composition and driving long-term evolutionary change. Both theoretical models and empirical studies are used to illustrate concepts. Three hours of lecture per week. Prerequisites: minimum grade of C- in BIO 111 & BIO 112 or BIO 113. Offered: occasionally.		Principles of Mendelian and molecular genetics as demonstrated by experiments with <i>Drosophila</i> and other experimental organisms. Three hours of lab per week. Prerequisite: minimum grade of D in BIO212L. Corequisite: BIO 404. Fulfills College Core: Advanced Writing-Intensive	
BIO 375L Community Ecology Laboratory	1 Credit	BIO 406 Population and Conservation Genetics	3 Credits
The laboratory reinforces ecological concepts discussed in lecture through computer simulations along with field- collected and experimental data. Three hours of lab per week. Prerequisite: minimum grade of D in BIO112L. Corequisite: BIO 375.		General introduction to the field of population genetics, the branch of evolutionary biology concerned with the genetic structure of populations and how it changes through time. We will examine the interaction of basic evolutionary processes (including mutation, natural selection, genetic drift, inbreeding, recombination, and gene flow), with special emphasis on their application to species conservation. Three hours of lecture per week. Prerequisite: minimum grade of C- in BIO 212.	
BIO 377 Freshwater Biology	4 Credits	BIO 406L Population and Conservation Genetics Laboratory	1 Credit
Explores the biology of lakes, rivers, and wetlands. Lectures cover the main concepts in freshwater ecology, including the major physical, biological, and biogeochemical characteristics of freshwater environments. Lab required. The laboratory component covers field techniques, laboratory analyses and identification of common aquatic organisms. Three hours of lecture and three hours of lab per week. Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113. Offered: occasionally.		Experimental studies designed to explore fundamental concepts in population genetics and their application in conservation. Laboratory is a combination of in vitro <i>Drosophila</i> experiments and in silico computer simulations/data analyses. Prerequisite: minimum grade of D in BIO212L.	
BIO 377L Freshwater Biology Laboratory	0 Credits	BIO 412 Evolution & Development	3 Credits
BIO 377 Freshwater Biology lab. Offered: occasionally.		This course will cover concepts, methods and paradigmatic examples in the field of evolutionary developmental biology ("evodevo"). Evo-devo is both a new and old field of biology focusing on how mechanisms controlling development have changed during evolution. The course will cover basic developmental mechanisms based on gene regulation, cell communication, differentiation, growth, etc.(the "genetic toolkit"). Other concepts include evolutionary novelty, evolution of patterning, the genetic basis of complexity, and evolution of the gene regulatory network controlling development. Prerequisite: minimum grade of C- in BIO 212. Offered: occasionally.	
BIO 378 Wetlands	3 Credits	BIO 412L Evolution & Development Lab	1 Credit
Explores the plants, animals and environmental conditions that define wetland environments. The course covers the physical characteristics such as the soils and hydrology, the biological adaptations by plants and animals, and human interaction with these diverse and vibrant ecosystems. Prerequisite: minimum grade of C- in BIO 111 & BIO 112 or BIO 113. Offered: occasionally.		Optional lab for EvoDevo. The lab will explore the use of non-model organisms for EvoDevo research and illustrate examples from class. Prerequisite: minimum grade of D in BIO 212L. Corequisite: BIO 412. Offered: occasionally.	
BIO 378L Wetlands Laboratory	1 Credit	BIO 419 Cell Biology	3 Credits
Optional lab for Wetlands. Meets once a week for three hours.		In depth examination of cellular processes, including metabolism, motility, gene expression, protein processing and sorting, signal transduction, cell cycle, cell death, cell renewal and differentiation are discussed. Three hours of lecture per week. Prerequisite: minimum grade of C- in BIO 212.	

- BIO 419L Cell Biology Laboratory** 1 Credit
Experimental laboratories examining different cellular processes, including cytoskeleton, protein localization, and gene expression. Three hours of lab per week.
Prerequisite: minimum grade of D in BIO212L. **Corequisite:** BIO 419.
- BIO 424 Epigenetics and Disease** 3 Credits
Epigenetic mechanisms alter how the genome is utilized and it is apparent that this changes between healthy and disease states and may start during development. This course focuses on the impact of environment influences on phenotype via epigenetic changes. Topics include cancer, metabolism and metabolic syndromes, autoimmune disorders and allergies. Three hours of lecture per week.
Prerequisite: minimum grade of C- in BIO 212.
- BIO 425 Cellular Neurobiology** 3 Credits
Cellular and molecular mechanisms underlying nervous system function. Topics include neuron/glia interactions, signaling within the nervous system, neuroplasticity, and neurodegeneration. Three hours of lecture per week.
Prerequisite: minimum grade of C- in BIO 212.
- BIO 425L Cellular Neurobiology Laboratory** 1 Credit
Experimental laboratories researching current topics in cell and molecular neurobiology. Three hours of lab per week.
Prerequisite: minimum grade of D in BIO212L. **Corequisite:** BIO 425.
- BIO 426 Immunochemistry** 3 Credits
Structural concept of antigenic determinants, immunoglobulin sequences and combining site specificity related to the diversity of the immune response and its control. Three hours of lecture per week.
Prerequisite: minimum grade of C- in BIO 212.
- BIO 426L Immunochemistry Laboratory** 1 Credit
Current methods in immunological research and diagnosis. Designed to present available methodology and insight into the underlying principles. Three hours of lab per week.
Prerequisite: minimum grade of D in BIO212L. **Corequisite:** BIO 426.
- BIO 430 Advanced Cellular Biochemistry and Metabolism** 3 Credits
This course focuses on the Biochemistry of human nutrition with emphasis on nutritional components and their metabolism in humans. The course will also discuss various disease treatments and their mechanisms of effect in disease systems. A mechanism-based approach will be utilized to elucidate functional biochemistry within human physiology and establish links to disease states. The function of metabolic pathways, vitamins and metals as essential players in cell survival and human disease is discussed.
Prerequisite: Minimum grade of C- in BIO 212 OR BCH 301, and a minimum grade of C- in CHM 228.
Offered: occasionally.
- BIO 430L Advanced Cellular Biochemistry and Metabolism Laboratory** 1 Credit
This course focuses on the Biochemistry of pathways associated with higher plant and animal metabolism. A function / mechanism-based approach will be utilized to elucidate the biochemistry within protein and enzyme structure. The regulation of enzyme activity and functional conformation will be examined in several hands on, inquiry based research experiences.
Prerequisite: Minimum grade of C- in BIO 212 or BCH 301. **Corequisite:** BIO 430.
Offered: occasionally.
- BIO 432 Developmental Biology** 3 Credits
A study of the basic principles that shape the development of a complex, multicellular organism from a single cell, with a particular emphasis being placed on the underlying cellular and molecular mechanisms. Relevant topics include fertilization, cell fate determination and differentiation, pattern formation, and organogenesis. Three hours of lecture per week.
Prerequisite: minimum grade of C- in BIO 212.
Fulfills College Core: Advanced Writing-Intensive
Offered: occasionally.
- BIO 432L Developmental Biology Laboratory** 1 Credit
Examination of the cellular and molecular aspects of animal development using classical model organisms. Three hours of lab per week.
Prerequisite: BIO 211L & BIO 212L.
Offered: occasionally.
- BIO 435 Developmental Neurobiology** 3 Credits
Cellular and molecular mechanisms underlying development of the nervous system and neurodevelopmental disorders. Topics include: neural induction, neurogenesis, migration, axon guidance, synaptogenesis, and regeneration. Three hours of lecture per week.
Prerequisite: minimum grade of C- in BIO 212.
- BIO 435L Develop Neurobiology Laboratory** 1 Credit
Experimental studies of the development and regeneration of nervous tissue using neuronal tissue culture and digital microscopy. Three hours of lab per week.
Prerequisite: minimum grade of D in BIO212L. **Corequisite:** BIO 435.
- BIO 441 Neurobiology of Nervous System Disorders** 3 Credits
Cellular and molecular mechanisms underlying diseases of the nervous system, with an emphasis on emerging therapeutic approaches to treating diseases. Topics covered include: neurodegenerative diseases, neurodevelopmental disorders, infectious diseases, neuropsychiatric illnesses, stroke, and trauma. Three hours of lecture per week.
Prerequisite: minimum grade of C- in BIO 212.
- BIO 444 Cancer Biology** 3 Credits
The causes of cancer, progression of the disease, and therapeutic approaches will be discussed. Students learn the common features of cancers as well as the distinguishing characteristics of a few specific cancers. Throughout the course therapeutic targets will be identified and novel therapeutic approaches will be discussed. Three hours of lecture per week.
Prerequisite: minimum grade of C- in BIO 212.
- BIO 450 Molecular Biology** 3 Credits
This course focuses on genomes and nuclear organization and function. Topics include genome content and organization from an evolutionary perspective, epigenetic inheritance, chromatin structure and organization, somatic recombination, and organismal complexity. Three hours of lecture per week.
Prerequisite: minimum grade of C- in BIO 212.
- BIO 450L Molecular Biology Laboratory** 1 Credit
Experimental laboratories examining the regulation of gene expression and how regulation affects expression. Three hours of lab per week.
Prerequisite: minimum grade of D in BIO212L. **Corequisite:** BIO 450.
- BIO 477 Plants and Society** 3 Credits
Various ways in which plants affect human existence. Topics include food products, building (utilitarian) applications, medicinal and poisonous plants, propagation and improvement, roles in ecology. Open to students in any major. This course does not count for the biology major.
Fulfills College Core: Core Capstone

BIO 498 Biology With Distinction Thesis 3 Credits

Requirement for any student seeking to complete the Biology with Distinction degree option. Must be taken by seniors in the fall or spring of their senior year.

BIO 499 Biology Internship 3 Credits

Provides students with work experience in the biological sciences. Practical application of material taught in biology classes to the work environment. Requires an application and approval by the associate dean.

Prerequisite: permission of the department chair & associate dean.