

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.

Corequisite: BIO 112.

Offered: every spring.

BIO 114 Human Biology: Introduction to Human Anatomy and Physiology 3 Credits

Introductory course for those students requiring an understanding of the structure and function of the human body. 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. Three hours of lecture and one three-hour lab per week.

Fulfills College Core: Field 6 (Natural Sciences)

Offered: fall & spring.

BIO 114L Human Biology: Introduction to Human Anatomy and Physiology Laboratory 1 Credit

One three-hour lab per week.

Corequisite: BIO 114.

Offered: fall & spring.

BIO 115 Musculoskeletal Anatomy and Physiology 3 Credits

Examination of the anatomy, physiology and biomechanical characteristics of the musculoskeletal components, and associated neural and vascular structures, of the human body. Three hours of lecture and one three-hour lab per week.

Prerequisite: minimum grade of C in BIO 114.

Offered: fall & spring.

BIO 115L Musculoskeletal Anatomy and Physiology Laboratory 1 Credit

One three-hour lab per week.

Corequisite: BIO 115.

Offered: fall & spring.

BIO 116 Disease: Myth and Reality 3 Credits

Exploration of causation, treatment and prevention of illness. Objective: to increase awareness and understanding of health and disease.

Fulfills College Core: Field 6 (Natural Sciences)

BIO 120 Biology in the News 3 Credits

The biological concepts underlying science articles appearing in the current news media, examining these concepts in the context of relevant economic, social and cultural issues. Topics will vary.

Fulfills College Core: Field 6 (Natural Sciences)

Offered: fall.

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)

BIO 150 Animal Nutrition 3 Credits

Nutrition and dietary science focused on the maintenance of wildlife in captivity. Practical examples at our local zoo and aquariums are included.

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.

BIO 199 Science Scholars Transfer Student Seminar 1 Credit

Seminar course for first year BIO/ENV/ABEC transfer students to aid in integration into respective major. During the semester, we will review skill necessary for success in the major(s), discuss topics identified as missing/lacking from transferred introductory biology courses, and how to get involved in departmental activities (i.e. research, clubs, etc.). Course meets once a week (75 minutes) and will be scheduled around availability of participants, as possible. All Science Scholar Transfer students are required to take this course during the first year of their scholarship.

Restrictions: Canisius Science Scholar transfer scholarship recipient or permission of instructor.

Offered: every fall.

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 both BIO 111 & BIO 112; completion of CHM 110 or CHM 111; and CHM 112 (may be taken concurrently).

Corequisite: BIO 211L.

Offered: every fall.

- 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.
Corequisite: BIO 211.
Offered: fall.
- 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.
Offered: every spring.
- 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.
- BIO 221 Biology of Women** 3 Credits
Biological principles applied to the human female. Structure, function, growth and development throughout the life cycle. Includes relevant social, psychological and medical information. Associated with Women's Studies Program.
Fulfills College Core: Field 6 (Natural Sciences)
Offered: occasionally.
- 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.
- 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.
- 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.
- BIO 302 Science Scholars Seminar I: Research, Presentations, & Publishing** 1 Credit
Seminar course for students actively pursuing undergraduate research, or students planning on pursuing graduate research in the future. During the semester, we will discuss how to get involved in research lab, how to pursue independent research projects, how to seek research funding, how to present research (posters & oral presentations), and finally how to publish research results. Course meets once a week (75 minutes) and will be scheduled around availability of participants, as possible. All Science Scholars are required to take this course once during the three years of their scholarship.
Restrictions: Canisius College Science Scholar scholarship recipient or permission of instructor.
Offered: every spring.
- BIO 303 Science Scholars Seminar II: Career Preparation, Applications, & Interviews** 1 Credit
Seminar course for students actively pursuing, or planning on pursuing graduate school or post-graduate employment in biology-related fields. During the semester, we will discuss how to identify potential graduate schools/employers, how to prepare application materials, and how to prepare for in-person interviews. Course meets once a week (75 minutes) and will be scheduled around availability of participants, as possible. All Science Scholars are required to take this course once during the three years of their scholarship.
Restrictions: Canisius Science Scholar scholarship recipient or permission of instructor.
Offered: every fall.
- 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.
- 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.
- 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.
- 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.

BIO 310 Histology and Histophysiology	4 Credits	BIO 322 Conservation Biology	3 Credits
A systematic study of structure and function of cells and tissues as viewed by light microscopy. Lab employs tissue slides and digital images. Lab required. Three hours of lecture and one three-hour lab 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.		Prerequisite: minimum grade of C- in BIO 111 & BIO 112.	
BIO 312 Primatology	3 Credits	Offered: every spring.	
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.		BIO 324 Human Anatomy	3 Credits
Prerequisite: minimum grade of C- in BIO 111 & BIO 112.		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.	
Fulfills College Core: Advanced Writing-Intensive		Prerequisite: minimum grade of C- in BIO 111 & BIO 112.	
Offered: every fall.		BIO 324L Human Anatomy Lab	1 Credit
BIO 313 Embryology	4 Credits	Required lab for BIO 324.	
Emphasis will be on early developmental stages as seen in the invertebrate sea urchin and in the chordate animals, including human embryology. Establishment of the basic vertebrate body plan will be shown by classic models such as the frog, chick and pig. Specific embryological and anatomical knowledge will be gained through macro- and microscopic investigations and dissections. Lab required. Three hours of lecture and three hours of lab per week.		Corequisite: BIO 324.	
Prerequisite: minimum grade of C- in BIO 111 & BIO 112.		BIO 325 Reproductive Biopsychology	3 Credits
BIO 314 Comparative Anatomy of Vertebrates	4 Credits	Neuro-endocrine mechanisms underlying behavior associated with sex, pregnancy, and parental care. Equal focus on human and non-human behavior.	
Evolution of chordates, with emphasis on comparative anatomic, functional, and developmental aspects of vertebrate organ systems. The laboratory portion will include dissection of vertebrate specimens including shark, amphibian, cat, and selected mammal organs. Lab required. Three hours of lecture and three hours of lab per week.		Prerequisite: minimum grade of C- in BIO 111 & BIO 112.	
Prerequisite: minimum grade of C- in BIO 111 & BIO 112.		Offered: fall of odd-numbered years.	
BIO 316 Social Organization of Mammals	3 Credits	BIO 335 Plant Biology	3 Credits
Behavior and social structures of rodents, felines, canines, cetaceans, elephants, monkeys, apes and humans. Laboratory includes observation of animal groupings at local zoos and aquariums. Three hours of lecture. Lab optional.		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.		Prerequisites: minimum grade of C- in BIO 111 & BIO 112.	
Offered: fall 2016 and spring 2018.		BIO 335L Plant Biology Lab	1 Credit
BIO 316L Social Organization of Mammals Lab	1 Credit	Investigative survey of plant structure and function. Three hours of lab per week.	
Observation of live animal groupings in local zoos and in the wild. Students acquire skills at hypothesis formation and data collection. May include additional fee.		Prerequisite: minimum grade of D in BIO112L. Corequisite: BIO 335.	
Prerequisite: minimum grade of D in BIO112L. Corequisite: BIO 316.		BIO 340 Physiology	3 Credits
BIO 317 Sex, Evolution and Behavior	3 Credits	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.	
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.		Prerequisite: minimum grade of C- in BIO 111 & BIO 112.	
Prerequisite: minimum grade of C- in BIO 111 & BIO 112.		BIO 340L Physiology Laboratory	1 Credit
Offered: spring 2017 and fall 2017.		Experimental study of physiological systems, using biochemical, cellular and hematological techniques and electronic instrumentation. Three hours of lab per week.	
BIO 320 Field Ecology	4 Credits	Prerequisite: minimum grade of D in BIO112L. Corequisite: BIO 340.	
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.		BIO 343 Entomology	4 Credits
Prerequisite: minimum grade of C- in BIO 111 & BIO 112.		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.	
Offered: fall of even-numbered years.		Prerequisite: minimum grade of C- in BIO 111 & BIO 112.	
		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.	

BIO 351 Biology Seminar I	1 Credit	BIO 370 Plant Morphology	3 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. Offered: every spring.		Examination of plant morphology and the relationship between morphology, evolution, plant adaptation and plant biology is emphasized. Laboratory focuses on examining morphological features of local and non-local plants in a hands-on-setting. Lab required. Three hours of lecture and three hours of lab per week. Prerequisite: minimum grade of C- in BIO 111 & BIO 112. Corequisite: BIO 370L.	
BIO 353 Biology Seminar II	1 Credit	BIO 370L Plant Morphology Lab	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.		Required lab for BIO 370. Prerequisite: minimum grade of D in BIO112L. Corequisite: BIO 370.	
BIO 355 Behavioral Neuroscience	3 Credits	BIO 375 Community Ecology	3 Credits
Functions of nervous and endocrine systems in mediating motivation, movement, sensation, ingestion, aggression, emotion, sleep, learning, memory, thought and behavior disorders. Prerequisite: minimum grade of C- in BIO 111 & BIO 112. Offered: fall of even-numbered years.		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.	
BIO 357 Evolution	3 Credits	BIO 375L Community Ecology Laboratory	1 Credit
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.		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.	
BIO 357L Evolution Laboratory	1 Credit	BIO 377 Freshwater Biology	4 Credits
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.		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.	
BIO 360 Environmental Health	3 Credits	BIO 378 Wetlands	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.		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.	
BIO 364 Zoology: Diversity of Animal Life	3 Credits	BIO 378L Wetlands Laboratory	1 Credit
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: BIO 112. Offered: fall.		Optional lab for Wetlands. Meets once a week for three hours.	
BIO 364L Zoology: Diversity of Animal Life Laboratory	1 Credit	BIO 400 Independent Study	1-3 Credits
This laboratory course will explore anatomical and physiological differences within and among taxonomic groups in the animal kingdom. Corequisite: BIO 364. Offered: fall.		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. Offered: spring of odd-numbered years.		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 404 Genetics	3 Credits
		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.	

<p>BIO 404L Genetics Laboratory 1 Credit 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</p>	<p>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.</p>
<p>BIO 406 Population and Conservation Genetics 3 Credits 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.</p>	<p>BIO 420 Phylogenetics 4 Credits Students will learn how to interpret what phylogenetic trees communicate about the evolution of a group of related species, how clues to the history of populations accumulate at the molecular level in DNA, and how statistical models based on this understanding allows us to build phylogenetic trees that reveal evolutionary history to us. Students will also understand how phylogenies allow us to test specific hypotheses concerning evolution. Three hours of lecture and three hours of lab per week. Prerequisite: minimum grade of C- in BIO 212.</p>
<p>BIO 406L Population and Conservation Genetics Laboratory 1 Credit 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.</p>	<p>BIO 420L Phylogenetics Laboratory 0 Credits Students will get firsthand experience generating genetic data, building phylogenies, and testing their own hypotheses. To accomplish this, students will work both at the lab bench and on the computer, using a number of programs to manipulate the data they generate. In short, this is a class where evolution, genetics, statistics, and computer science meet. Prerequisite: minimum grade of D in BIO212L.</p>
<p>BIO 408 Biotechnology, Theory in Practice 4 Credits Introduction to the theory and experiments that are the foundation of biotechnology through lecture and laboratory. Topics include genetic engineering, mutagenesis, separation technology, immunobiotechnology and cell biology. Lab required. Three hours of lecture and three hours of lab per week. Prerequisite: minimum grade of C- in BIO 212. Corequisite: BIO 408L.</p>	<p>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.</p>
<p>BIO 414 Enzymes and Proteins 3 Credits The biochemical characteristics of proteins and enzymes will be examined using a modular approach to target important structural proteins and regulatory enzymes of animal and plant metabolism. Three hours of lecture per week. Prerequisite: minimum grade of C- in BIO 212.</p>	<p>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.</p>
<p>BIO 414L Enzymes and Proteins Laboratory 1 Credit Experimental techniques for the purification of proteins, the analysis of protein function and the measurement of enzyme kinetics. Three hours of lab per week. Prerequisite: minimum grade of D in BIO212L. Corequisite: BIO 414.</p>	<p>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.</p>
<p>BIO 418 Endocrinology 3 Credits Synthesis and cellular/molecular actions of peptides and steroid hormones, growth factors, cytokines, and their roles in regulating physiological processes, maintenance of homeostasis and cancer biology. Three hours of lecture per week. Prerequisite: minimum grade of C- in BIO 212.</p>	<p>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.</p>
<p>BIO 418L Endocrinology Laboratory 1 Credit Experimental laboratories researching current topics in endocrinology at the molecular, cellular and organismal levels. Three hours of lab per week. Prerequisite: minimum grade of D in BIO212L. Corequisite: BIO 418.</p>	<p>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.</p>
<p>BIO 419 Cell Biology 3 Credits 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.</p>	<p>BIO 430 Nutrition and Metabolism 3 Credits This course offers an in depth examination of cellular nutrition and metabolism. The function of vitamins and metals as essential players in energy generation, cell survival and human disease are discussed. Prerequisite: minimum grade of C- in BIO 212. Offered: spring 2018.</p>

<p>BIO 432 Developmental Biology 3 Credits</p> <p>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.</p> <p>Prerequisite: minimum grade of C- in BIO 212.</p>	<p>BIO 477 Plants and Society 3 Credits</p> <p>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.</p> <p>Fulfills College Core: Core Capstone, (part of the Sustainability Core Pathway)</p>
<p>BIO 432L Developmental Biology Laboratory 1 Credit</p> <p>Examination of the cellular and molecular aspects of animal development using classical model organisms. Three hours of lab per week.</p> <p>Prerequisite: BIO 211L & BIO 212L. Corequisite: BIO 432.</p>	<p>BIO 498 Biology With Distinction Thesis 3 Credits</p> <p>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.</p>
<p>BIO 435 Developmental Neurobiology 3 Credits</p> <p>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.</p> <p>Prerequisite: minimum grade of C- in BIO 212.</p>	<p>BIO 499 Biology Internship 3 Credits</p> <p>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.</p> <p>Prerequisite: permission of the department chair & associate dean.</p>
<p>BIO 435L Develop Neurobiology Laboratory 1 Credit</p> <p>Experimental studies of the development and regeneration of nervous tissue using neuronal tissue culture and digital microscopy. Three hours of lab per week.</p> <p>Prerequisite: minimum grade of D in BIO212L. Corequisite: BIO 435.</p>	
<p>BIO 440 Medical Biochemistry 3 Credits</p> <p>Biochemistry of disease. Includes examination of pathways and regulatory enzymes that lead to normal and disease states. Three hours of lecture per week.</p> <p>Prerequisite: minimum grade of C- in BIO 212.</p>	
<p>BIO 441 Neurobiology of Nervous System Disorders 3 Credits</p> <p>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.</p> <p>Prerequisite: minimum grade of C- in BIO 212.</p>	
<p>BIO 444 Cancer Biology 3 Credits</p> <p>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.</p> <p>Prerequisite: minimum grade of C- in BIO 212.</p>	
<p>BIO 450 Molecular Biology 3 Credits</p> <p>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.</p> <p>Prerequisite: minimum grade of C- in BIO 212.</p>	
<p>BIO 450L Molecular Biology Laboratory 1 Credit</p> <p>Experimental laboratories examining the regulation of gene expression and how regulation affects expression. Three hours of lab per week.</p> <p>Prerequisite: minimum grade of D in BIO212L. Corequisite: BIO 450.</p>	