BIOLOGY (BI)

BI 107 - Molecular and Cellular Foundations of Life
Credits: 4
An introduction to the molecular and cellular processes of life. The course explores topics in molecular biology, biochemistry, cell structure and function, and transmission genetics in a variety of organisms. Students will use a reductionist approach to consider fundamentals, which will be applied to a holistic understanding of the molecular basis of life. In the laboratory, students will carry out inquiry-based exercises using the modern technologies typically deployed by molecular and cellular life scientists.
Note(s): This course is a foundation requirement for the major in Biology and other life sciences- while it will satisfy the scientific inquiry requirement, owing to the workload and intensity we strongly discourage non-life science majors from taking this course. Fulfills Natural Sciences requirement; fulfills Scientific Inquiry requirement.

BI 108 - Organismal Biology
Credits: 4
An introduction to the processes that shape and regulate individuals, populations, communities and ecosystems. Students develop foundational knowledge of evolutionary theory and, from this perspective, explore topics in organismal biology with an emphasis on physiology and ecology. Students will study the different ways organisms have evolved to maintain their internal milieu in the face of environmental challenges and how the composition, functioning, and stability of communities and ecosystems are shaped by biotic and abiotic factors. The laboratory portion of the course is inquiry-based and introduces students to theories and methodologies of modern biology.
Note(s): This course is a foundation requirement for the major in Biology and other life sciences- while it will satisfy the scientific inquiry requirement, owing to the workload and intensity we strongly discourage non-life science majors from taking this course. The course partially fulfills the departmental writing requirement. Three hours of lecture, three hours of lab per week. Fulfills Natural Sciences requirement; fulfills Scientific Inquiry requirement.

BI 110 - Biology of the Mind
Credits: 4
An introductory-level examination of the basic neurobiology of the human brain and nervous system. A sufficient depth of biological perspective is developed to allow the student to consider the neurobiological underpinnings of a wide variety of brain-related topics including pathology (select mental and nervous system diseases), socially significant issues (drugs, alcohol), higher function (language, sleep, memory, consciousness), and philosophical issues (mind-body problem, artificial intelligence, ethical issues).
Note(s): Three hours of lecture, three hours of lab per week. Fulfills Natural Sciences and QR2 requirements; fulfills Scientific Inquiry requirement.

BI 112 - Straw into Gold: Science in the Fiber Arts
Credits: 4
An introductory-level class combining the science of fibers and dying dyeing with their use in creating textiles. Students will learn how to form and test hypotheses and draw evidence-based conclusions while exploring the science behind differences between different fibers and dying dyeing techniques. Topics will include how different animal and vegetable fibers are generated, harvested, and prepared; the relationship between the observed structure and physical properties of fibers and their function; and the chemistry of natural and synthetic dyes and dyeing. Students will also be introduced to creating different textiles, weaving a fabric structure, and the stages and processes involved in constructing a creative textile art form. No previous experience in fiber arts or college level science required. Class will use a flipped classroom and case study project-based pedagogy, meeting for two 3 hour periods per week. A one day weekend workshop and two weekend field trips will be required, as a s well as a final project for display/exhibition.
Note(s): Fulfills Natural Sciences requirement; fulfills Scientific Inquiry requirement.

BI 115H - Ecology of Food
Credits: 4
The study of fundamental concepts in ecology from a who-eats-whom perspective. Topics include the behavior and ecology of herbivores, predators, parasites, and mutualists, interactions among competitors in quest of food, trophic connections, and analyses of communities and landscapes managed for agricultural and aquacultural production. Quantitative field investigations of herbivory in Skidmore's North Woods are complemented by laboratory investigations of plant physical defenses and secondary chemicals, including the use and function of these secondary chemicals in world cuisine. A similar investigative approach is taken to the study of pollination, seed dispersal, and predation. Local food producers contribute to the study of agroecology. Ecological impacts of various agricultural and aquacultural practices and the implications and potential ecological impacts of genetically modified foods are explored.
Prerequisites: *QR1 or MA 100 or placement at the FQR level or placement at the AQR level.*
Note(s): Three hours of lecture, three hours of lab per week. One Saturday field trip. Fulfills Natural Science requirement; fulfills Scientific Inquiry requirement.

BI 120 - Human Biology and Medical Decisions: Food, Disease, Sex, Sleep
Credits: 4
We share many fundamental biological processes with other living things (food, disease, sex, sleep), but humans also gain and organize information to make evidence-based decisions about our health and lives. This course examines a range of topics in biology (physiology, cell biology, genetics, and neuroscience) and how information is obtained and used to draw conclusions about biology and health. Topics covered do not overlap with BI 105/106, so this course can be taken by pre-med students to address additional MCAT competencies. BI 120H is appropriate for students who are interested in bioethics and a deeper understanding of evidence-based medical decision making.
Prerequisites: *QR1 or MA 100 or placement at the FQR level or placement at the AQR level.*
Note(s): Three hours of lecture, two hours of lab per week plus 1 hour of discussion for 120H. Fulfills Natural Sciences requirement; fulfills Scientific Inquiry requirement.

BI 120H - Human Biology and Medical Decisions: Food, Disease, Sex, Sleep
Credits: 4
We share many fundamental biological processes with other living things (food, disease, sex, sleep), but humans also gain and organize information to make evidence-based decisions about our health and lives. This course examines a range of topics in biology (physiology, cell biology, genetics, and neuroscience) and how information is obtained and used to draw conclusions about biology and health. Topics covered do not overlap with BI 105/106, so this course can be taken by pre-med students to address additional MCAT competencies. BI 120H is appropriate for students who are interested in bioethics and a deeper understanding of evidence-based medical decision making.
Prerequisites: *QR1 or MA 100 or placement at the FQR level or placement at the AQR level.*
Note(s): Three hours of lecture, two hours of lab per week plus 1 hour of discussion for 120H. Fulfills Natural Sciences requirement; fulfills Scientific Inquiry requirement.

BI 136 - Ecology of the Adirondacks
Credits: 4
An introduction to the basic principles of ecology through the lens of the Adirondacks, a 6-million-acre state park in upstate New York. Students will explore the habitats of the Adirondack region, the flow of energy and nutrients through these systems, and how organisms adapt to the environment and interact with one another. Particular emphasis will be given to the way in which environmental issues such as acid rain, invasive species, and climate change affect the ecology of the Adirondacks. Several outdoor labs and one full-day field trip are required.
Prerequisites: *QR1 or MA 100 or placement at the FQR level or placement at the AQR level.*
Note(s): Fulfills QR2 and Natural Science requirements; fulfills Scientific Inquiry requirement.

BI 140 - Marine Biology
Credits: 4
An examination of the intricate and delicate nature of plant, animal, fungal, and microbial life beneath Earth's oceans and on its shorelines. Lecture topics include ocean chemistry and biochemistry, physiology of marine organisms, evolution and diversity of the marine world, marine ecosystems, and human ocean interactions. The lab will include experimental manipulations of marine plants and animals, survey of various life forms, culture techniques, ecological sampling, and mariculture.
Note(s): Three hours of lecture, three hours of lab per week. Fulfills Natural Sciences requirement; fulfills Scientific Inquiry requirement.

BI 149 - The Birds and the Bees: the Biology of Sex
Credits: 4
An introduction to the anatomy, physiology and development of human reproductive systems. Students will become familiar with female and male anatomy and development, and will gain a sophisticated understanding of the process of reproduction. Although the focus of the course is on human sex and reproduction, students will study a variety of biological model systems in the laboratory portion of the course.
Note(s): 3 hours lecture and 3 hours lab per week. Fulfills QR2 and Natural Sciences requirements; fulfills Scientific Inquiry requirement.

BI 150 - Biology: The Scientific Study of Life
Credits: 4
An introduction to the basic principles underlying the study of life. Topics may range from the origin and evolution of life to the molecular basis of heredity and development, to the structure and function of the global ecosystem. The lectures and labs emphasize the diversity of life, the unifying characteristics shared by all organisms, and an understanding of life based on scientific methods of analysis.
Note(s): Three hours of lecture, two hours of lab per week. Fulfills Natural Sciences requirement; fulfills Scientific Inquiry requirement.

BI 151 - Topics in Biology without Lab
Credits: 1-4
An introductory examination of topics in Biology that are not regularly offered. Topics will vary each time the course is taught.

BI 152 - Topics in Biology
Credits: 4
An opportunity to study topics at the 100 level that are not offered on a regular basis. This course has a 3-hour laboratory component that complements the lecture. The specific topics will vary each time the course is taught. All BI 152 Topics courses fulfill the natural science requirement, but are not generally counted toward a major in biology. If offered as BI 152H, the specific topic course is approved by the Honors Forum as an honors course and is specifically designed to allow students the opportunity to explore the topic in greater depth.
Note(s): May be repeated for credit if on a different topic. Fulfills Natural Sciences requirement; fulfills Scientific Inquiry requirement.

BI 152H - Topics in Biology: Honors
Credits: 4
An opportunity to study topics at the 100 level that are not offered on a regular basis. This course has a 3-hour laboratory component that complements the lecture. The specific topics will vary each time the course is taught. All BI 152 Topics courses fulfill the natural science requirement, but are not generally counted toward a major in biology. If offered as BI 152H, the specific topic course is approved by the Honors Forum as an honors course and is specifically designed to allow students the opportunity to explore the topic in greater depth.
Note(s): May be repeated for credit if on a different topic. Fulfills Natural Sciences requirement; fulfills Scientific Inquiry requirement.

BI 155 - Evolutionary Biology
Credits: 4
An introduction to evolution as the central organizing principle of the biological sciences. This writing-intensive course explores the mechanisms of evolutionary change and introduces the academic and applied issues that challenge modern evolutionary theory. Topics include: human origins, Darwinian medicine, adaptation, and sexual selection.
Note(s): Three hours of lecture, two hours of lab per week. Fulfills Expository Writing and Natural Sciences requirements; fulfills Scientific Inquiry requirement.

BI 160 - Conservation Biology
Credits: 4
The biology of species, communities, and ecosystems that are perturbed or threatened by human activities. This course will examine the principles and tools for preserving biological diversity. Topics to be covered include principles of ecology, geographic distribution, animal and plant classification, and population dynamics.
Note(s): Three hours of lecture, two hours of lab per week; one all-day field trip. Fulfills Natural Sciences requirement; fulfills Scientific Inquiry requirement.

BI 165 - Microbes and Society
Credits: 4
An introduction to basic microbiology that focuses on the impact microbes have on our society. While everybody knows microbes can cause diseases and food spoilage, microbes have a much deeper and positive impact on our lives than most of us realize. Students will focus on basic concepts in microbiology while exploring the vast diversity of microbes, the benefits we obtain from them (cheese, anyone?), and the harms they inflict upon us. We will keep track of the latest news regarding the impact of microbes on our society, and explore our own human microbiome. (Did you know that you are composed of more microbial cells than human cells?) In the lab students will learn basic laboratory and analytical tools and techniques for the study of microbes. In addition the laboratory will focus on aspects of medical microbiology, environmental microbiology, and microscopy.
Note(s): Three hours of lecture, three hours of lab per week. Fulfills Natural Sciences and QR2 requirements; fulfills Scientific Inquiry requirement.

BI 170 - Human Genetics
Credits: 4
An introduction to the principles of genetics and their application to human biology. Topics include the history of genetics; the structure, function, and inheritance of genes; medical genetics; and genetic engineering.
Note(s): Three hours of lecture, two hours of lab per week. Fulfills Natural Sciences and QR2 requirements; fulfills Scientific Inquiry requirement.

BI 195 - Inside Equus: Biology of the Horse
Credits: 4
An investigation of equine biology as an exceptional and accessible model of animal physiology and behavior. Students will study what makes horses superb athletes and how the genetics, physiology, and behavior of horses have adapted to domestication. Class time will be spent primarily on case studies and problem solving using real life examples. Labs will involve field trips off campus and in-lab experiments. Previous experience with animals/horses is not required.
Prerequisites: *QR1.*
Note(s): Three hours of lecture, three hours of lab per week. Fulfills Natural Sciences requirement and QR2 requirements; fulfills Scientific Inquiry requirement.

BI 224 - Evolution
Credits: 4
A survey of topics in evolutionary biology: the evidence for evolution, mechanisms of evolutionary change, species concepts, and speciation. Introduction to the concepts of variability, adaptation, neutrality, and phylogeny through discussion and lab work.
Prerequisites: *BI 108 and BI 107 or ES 205 or ES 206.*
Note(s): Three hours of lecture, three hours of lab a week.

BI 235 - Biostatistics
Credits: 4
Quantitative and statistical skills required for the study of biology and medicine. Topics include: inference, experimental design and hypothesis testing; assumptions behind statistical models and choice of statistical tests; analysis of variance and covariance; general linear models; regression and multiple regression; parametric and non-parametric tests.
Prerequisites: *BI 107 and BI 108 and placement at the AQR level or completion of an FQR course or QR1.*
Note(s): Three hours of lecture/discussion, three hours of lab each week. Fulfills Applied QR requirement.

BI 239 - Parasitology, Epidemiology, and Public Health
Credits: 4
An exploration of the intersecting central tenets of parasitology, epidemiology, and public health. Students will study their commonalities to better understand the dynamics of antagonistic networks; their application to veterinary and human medicine, agriculture, and conservation; and to gain, share, and merge knowledge from different levels of biological organization (subcellular to landscapes and social networks). The course contrasts the insights, opportunities, and methodologies particular to correlative studies, manipulative experiments, in-silico experiments, and meta-analyses, and is grounded in an analysis of current published research.
Prerequisites: *BI 107 and BI 108.*

BI 240 - Environmental Biology
Credits: 4
An examination of the physical and biotic features of the earth, the role of humans in affecting the planet's ecology, and the ways ecological systems affect humans. This course provides the fundamental concepts of environmental biology, along with specific examples from the natural world and human modification. Topics include the basics of the physical nature of the earth; physiological ecology, including the biochemistry and metabolism of life forms and nutrient cycles; biodiversity; interspecific relationships; population and community dynamics; ecosystem structure; pollution and environmental toxicology; resource management; and restoration design. Laboratory consists of field trips, ecological sampling techniques, ecological survey of local habitats, phytoremediation, pollution simulation, and examination of biodiversity.
Prerequisites: *ES 105.*
Note(s): The course explores writing conventions specific to the subdiscipline; partially fulfills the departmental writing requirement. Does not count toward the major.

BI 241 - Ecology
Credits: 4
A field, laboratory, and lecture course in which interactions among organisms and between organisms and their environment are explored. Students will observe ecological patterns and evaluate evidence and arguments for why those patterns exist.
Prerequisites: *BI 108.*
Note(s): The course explores writing conventions specific to the subdiscipline; partially fulfills the departmental writing requirement.

BI 242 - Molecular Cell Biology
Credits: 4
A molecular approach to the study of eukaryotic cell biology. Students gain an understanding of the molecular nature of key processes in cell biology including 1) the dynamic structure of proteins and nucleic acids and how they interact to promote cell function; 2) eukaryotic cell cycle; 3) control of cell growth and cell death by key regulatory molecules that, if misregulated, predictably lead to states characteristic of transformed and cancerous cells; and 4) essentials of eukaryotic gene expression-including chromatin architecture, nuclear pre-mRNA processing, mRNA export and quality control of gene expression. The laboratory portion of the course is project-based and designed to expose students to current methodologies and experimental strategies commonly used in the study of cell biology at the molecular level.
Prerequisites: *BI 107, BI 108, and CH 125 or CH 126.*
Note(s): The course explores writing conventions specific to the sub-discipline; partially fulfills the departmental writing requirement.

BI 244 - Comparative Vertebrate Physiology
Credits: 4
The function and structure of major systems of vertebrates considered principally from the perspective of their ability to meet environmental demands.
Prerequisites: *BI 107 and BI 108 and CH 125 or CH 126.*
Note(s): The course explores writing conventions specific to the subdiscipline; partially fulfills the departmental writing requirement.

BI 245 - Principles of Genetics
Credits: 4
A study of biological patterns of heredity explained by genes, their structure, function, and transmission from cell to cell and parent to offspring, and the expression of genetic information. Topics include an in-depth study of mitosis, meiosis, Mendelian genetics and extension of Mendelian genetics, to complex traits and their analysis in individuals and populations. Breeding and analysis of fruit flies requires lab work outside of scheduled lab time.
Prerequisites: *BI 107 and BI 108 or permission of instructor.*
Note(s): The course explores writing conventions specific to the subdiscipline; partially fulfills the departmental writing requirement.

BI 246 - General Microbiology
Credits: 4
A comprehensive introduction to the biology of three major groups of microbes: bacteria, protists, and viruses. Microbial diversity will be explored in the context of the structure, physiology, metabolism, and molecular genetics of various microbial taxa. We will discuss microbial diseases, nonspecific and specific human immune responses, and general strategies used by microbes to overcome these defenses. The final section of the course will explore key concepts in microbial ecology. Emphasis will be placed on the central role of bacteria in geochemical cycles and symbiotic associations with plants and animals. In the laboratory, students will isolate bacteria from a variety of environments (wounds, soil, etc.) and apply standard techniques used in clinical and environmental microbiology labs to study their physiology and metabolism.
Prerequisites: *BI 107. BI 108 and CH 125 recommended.*
Note(s): The course explores writing conventions specific to the subdiscipline; partially fulfills the departmental writing requirement. Fulfills Natural Sciences requirement.

BI 247 - Cell Biology
Credits: 4
The course provides a cellular and organismal view of essential features of eukaryotic cell biology. Students will study cellular functions such as protein structure and function, cytoskeletal organization, cell migration, cellular metabolism, and cell signaling. These topics will be explored in the context of healthy and cancerous cells. In the laboratory, students will gain experience with modern techniques for visualizing cell biological processes, with emphasis on model organisms, pharmacology, fluorescence and confocal microscopy.
Prerequisites: *BI 107, BI 108, and CH 125 or CH 126.*
Note(s): The course explores writing conventions specific to the subdiscipline; partially fulfills the departmental writing requirement.

BI 251 - Topics in Biology
Credits: 3
An opportunity to study topics that are not offered on a regular basis. The specific topics will vary each time the course is taught.
Note(s): May be repeated for credit if on a different topic.

BI 252 - Topics in Biology with Lab
Credits: 4
An opportunity to study topics that are not offered on a regular basis. This course has a 3-hour laboratory component that complements the lecture. The specific topics will vary each time the course is taught.
Note(s): May be repeated for credit if on a different topic.

BI 275 - Introduction to Biological Research
Credits: 1
An introductory exploration of research in the biological sciences. Students plan, design, and implement a small research project from the laboratory or field in coordination with a faculty member. This experience will allow students at various stages of their careers to sample research methodologies in particular subdisciplines of biology.
Prerequisites: *Completion of one 100-level course in biology or requirements set forth in individual sections plus permission of instructor.*
Note(s): Students may only take four BI 275 courses in their careers and no more than two in any given semester. If more than one is taken in one semester, each BI 275 must be in a different section. BI 275 does not fulfill the departmental writing requirement for the major. Offered as S/U only.

BI 299 - Professional Internship in Biology
Credits: 1-4
Internship opportunity for students whose curricular foundations and experience have prepared them for professional work related to the major field. With faculty sponsorship and department approval, students may extend their educational experience into such areas as laboratory or field research, or clinical medicine.
Prerequisites: *Completion of at least one related 200-level course (as determined by the department).*
Note(s): Does not count toward the major. Must be taken S/U.

BI 302 - Behavioral Ecology
Credits: 3
An examination of the relationship between ecological factors and animal behavior, particularly social behavior. Students will analyze comparative studies of behavior, employ and critique economic models of behavior and models of evolutionarily stable strategies, and explore relationships among resource distribution, kinship, breeding systems, and social evolution.
Prerequisites: *BI 108 or ES 105 and any two 200-level biology courses, except BI 299.*

BI 306 - Mammalian Physiology
Credits: 4
A study of selected topics in mammalian physiology, including respiratory, renal, and neural physiology.
Prerequisites: *BI 108 and BI 244 or permission of instructor; for neuroscience students: NS 101, BI 107, and BI 244.*
Note(s): Three hours of lecture, three hours of lab per week. Offered in alternate years.

BI 307 - Ornithology
Credits: 4
Birds as model organisms for an integrative study of biology. This course explores avian form and function; the ecology, evolution, and behavior of birds; and avian conservation.
Prerequisites: *BI 108 and any two 200-level biology courses except BI 299, or ES 205 and ES 206.*
Note(s): Three hours of lecture, three hours of fieldwork or lab a week. One Saturday field trip. Currently not offered.

BI 309 - Microbial Genetics
Credits: 4
An advanced exploration of the genetic aspects of microbiology. Students will study the genetic characteristics of prokaryotes and how bacterial model organisms contribute to our understanding of fundamental genetic processes in all living cells. Students will also explore applied topics, including the genetics of bioremediation and increasing prevalence of bacterial antibiotic resistance. In the laboratory, students will use modern methods in molecular genetics to explore the use of microorganisms in basic research.
Prerequisites: *BI 108, CH 125 and BI 242 or BI 246.*

BI 311 - Biological Electron Microscopy
Credits: 4
Practical and theoretical study of the operation and application of electron microscopes and the preparation of samples for electron microscopy. Topics include chemical fixation, cryofixation, cytochemistry, immunolabeling, ultramicrotomy, transmission electron microscopy, scanning electron microscopy, and electron microscopic photography.
Prerequisites: *BI 108 and BI 244 or BI 247.*
Note(s): Two hours of lecture and four hours of lab a week.

BI 316 - Animal Behavior
Credits: 4
Behavior is a product of evolution and a means of animal adaptation. This course considers the mechanisms, proximate causes, and ultimate origins of behavior.
Prerequisites: *BI 108 and any two 200-level biology courses (except BI 299, ES 205, or ES 206); for neuroscience students: NS 101, BI 107, and BI 244.*
Note(s): Three lectures, three hours of lab or fieldwork a week. One Saturday field trip.

BI 324 - Evolution
Credits: 4
A survey of topics in evolutionary theory: the evidence for evolution, mechanism of evolutionary change, species concepts, and speciation. Introduction to the concepts of variability, adaptation, neutrality, and phylogeny through discussion and lab work. Three hours of lecture, three hours of lab a week.

BI 325 - Tropical Ecology
Credits: 3
An introduction to the ecology of tropical regions, with an emphasis on Central and South American forests. In this course, we will take an ecological approach to investigating the patterns, processes, and organisms characterizing tropical ecosystems. We will study the forces that gave rise to tropical biodiversity, and discuss both the preservation and destruction of tropical ecosystems.
Prerequisites: *BI 108 and ES 206 and any two 200-level biology courses except BI 299 and ES 205.*
Note(s): Please refer to the companion course TX 301.

BI 327 - Conservation Ecology
Credits: 3
Focuses upon developing an understanding of the diversity of life, in an ecological and evolutionary context, and applying that understanding to critical analyses of issues and problems in conservation biology.
Prerequisites: *BI 108 and any two 200-level biology courses except BI 299, or ES 205 and ES 206.*

BI 328 - Global Change Biology
Credits: 3
Explores five major facets of global change and their interaction as they relate to living organisms in their current and emerging environments. These are: 1) the redistribution of greenhouse gases and limiting nutrients, 2) climate change, 3) urbanization and associated novel contaminants, 4) habitat fragmentation, and 5) the redistribution of biodiversity. Students will study ongoing change in terrestrial, marine, and freshwater environments; explore responses by microbes, protists, plants, invertebrates and vertebrates, as well as the processes that link the taxa; and make significant use of predictive and descriptive quantitative models.
Prerequisites: *BI 108 and any two 200-level biology courses except BI 299 or BI 275. ES 205 or ES 206 may be substituted for one of the 200-level Biology courses.*

BI 329 - Marine Biology
Credits: 3
A deep dive into marine life that applies and leverages the students' diverse expertise and interests within Biology. Students will explore the physiologies and ecological phenomena associated with life in marine environments including the open ocean, deep sea, coastlines, estuaries, coral reef systems, and ice. Connectivity and interaction between these habitats and their occupants is a focus. This course is taxonomically broad fish, sharks, marine mammals and seabirds, as well as invertebrates, algae and bacteria and students will additionally explore how these organisms and their environments change over time in response to historical and emerging pressures.
Prerequisites: *BI 108 and any one 200-level biology course except BI 299 or BI 275.*

BI 336 - Plant Biology
Credits: 3
An introduction to the biology of plants, including molecular, cellular, developmental, and ecological approaches. Plants and other photosynthetic eukaryotes (e. g. algae) profoundly influence the infrastructure and functional dynamics of virtually all of Earth's ecosystems. Plants also contribute significantly to the foundation of human economy including the food, pharmaceutical, textile, building and biofuels industries. Students will analyze the biology of plants within the framework of a comprehensive survey of various plant and algal groups. Students will review primary literature focused on novel experimental approaches to the study of plants.
Prerequisites: *BI 107 and BI 108 and at least one new 200-level course in the new Biology curriculum or permission of instructor. (Fulfills Natural Sciences requirement).*

BI 337 - Plant Biochemistry and Physiology
Credits: 4
The biochemistry, molecular biology, expansion dynamics , transport processes, and environmental responses of plants. Topics include survey of the structure and biosynthetic pathways of carbohydrates, lipids, proteins and secondary compounds, DNA/RNA mechanics, membrane dynamics and function, plant cell development, mineral and vitamin nutrition, respiration, photosynthesis, hormone action, photoperiodism, taxes and stress biology.
Prerequisites: *BI 107 and BI 108 and any one 200-level course in biology.*
Note(s): Two lectures, four hours of lab a week.

BI 338 - Plant Biotechnology
Credits: 4
A modern analysis of humankind's use of plants and fungi and their derived products. Major subjects covered include ethnobotany, plant genetic engineering, plant biochemistry, techniques of plant production, agricultural practices, horticulture, and medicinal botany/mycology.
Prerequisites: *BI 108.*

BI 339 - Plant-Animal Interactions
Credits: 4
Exploration of the evolution and ecology of interactions between plants and animals. Topics include mutualism (e.g., pollination, frugivory), antagonism (e.g., herbivory, granivory), indirect effects that cascade across taxa, and mechanisms by which plant-animal interactions affect the susceptibility of both groups to pathogenic microbes and fungi. Students perform all the steps of active research (research design, data collection, analysis and presentation), as well as read and critique classic and recent studies from the literature. Student research in Skidmore's North Woods and surrounding areas will be emphasized.
Prerequisites: *BI 108 and any two 200-level biology courses except BI 299, or ES 205 and ES 206.*
Note(s): Three hours of lecture/discussion and one three-hour lab per week.

BI 341 - Neurodevelopment
Credits: 4
An examination of neurodevelopment from an anatomical, genetic, and molecular perspective. Students will study cellular migrations, tissue organization, patterning, and differentiation. In laboratory, students will gain experience with visualizing the developing nervous system at various stages, using techniques such as immunocytochemistry, in situ hybridization, and live fluorescent and bright field imaging.
Prerequisites: *BI 108; BI 242 or BI 247; and one additional 200-level BI course (except BI 299 and BI 275).*
Note(s): Three hours of lecture, three hours of lab per week.

BI 342 - Frontiers in Molecular Neuroscience
Credits: 3
Historic examination of axon guidance research using primary sources. Students will review and present seminal research articles that transitioned the field of axon guidance from a small research question to a major field in neurobiology. Students will study mechanisms of axon guidance, model systems, relevant gene families, and cellular and molecular approaches. Substantial emphasis will be placed on strengths and weakness of methodologies currently in use in the field. Students will develop scientific writing and oral presentation skills through multiple graded assignments.
Prerequisites: *BI 108 , BI 242 or BI 247 , and one 200-level biology course except BI 299 A-C; for neuroscience students: NS 101, BI 107, and BI 242 or BI 244 or BI 247.*

BI 343 - Endocrinology
Credits: 3
A survey of the role of hormones in coordinating key aspects of organismal function, including growth, development, metabolism, stress, and reproduction. Students will compare and contrast the structure and function of endocrine systems across vertebrate groups with an emphasis on understanding how endocrine systems mediate adaptive responses to environmental challenges. In addition, students will explore how our understanding of endocrine systems informs the treatment of a variety of human diseases. Through detailed analysis of primary literature, students will focus on the technical approaches and model systems currently used in modern endocrinology.
Prerequisites: *BI 106 or BI 108 and any two 200-level Biology course.*

BI 344 - Biological Clocks
Credits: 4
Organisms in all the major taxonomic groups have internalized geophysical and other periodicities in the form of endogenous biological mechanism that function as clocks. Theoretical, molecular, cellular, physiological, behavioral, ecological, and biomedical aspects of biological clocks will be examined, with an emphasis on circadian clocks.
Prerequisites: *BI 108 and any 200-level course in the natural sciences, or permission of instructor.*
Note(s): Three hours of lecture, three hours of lab per week.

BI 345 - Human Genetics
Credits: 4
An investigation into the concepts and mechanisms foundational to the study of human genetics and biomedical research on the genetic basis of health and disease. Topics include identifying mutations that cause genetic disorders or contribute to risk of disease, developmental, cellular and molecular mechanisms mediating genetic mechanisms of disease, and the use of genetic technology in diagnosis and treatment of medical disorders. A working knowledge of basic concepts in Mendelian and molecular genetics is assumed.
Prerequisites: *BI 242 or BI 245 or BI 246 or BI 247 or permission of instructor.*

BI 346 - Cannabis sativa
Credits: 4
An exploration of cell biological functions and effects of Cannabis sativa . Students will examine cellular, developmental, behavioral and physiological questions posed in Cannabis research. In lecture, students will read and present cutting-edge primary literature that addresses these questions. In lab, students will engage completely in problem-based activities where they develop their own hypothesis, methodology and analysis and communicate their results in written and oral formats. Students will become familiar with Cannabis macro- and micro-anatomy, growth, and harvest coupled with greenhouse technology. They will determine the chemical constituents of Cannabis sativa. Finally, they will explore the effect of Cannabis extracts on zebrafish nervous system development using cell biological approaches. Sophisticated technologies include stereomicroscopy, conventional fluorescent microscopy, and Liquid Chromatography and Mass Spectrophotometry.
Prerequisites: *Two of the following: NS 201, NS 202, BI 247, BI 242, BI 244, BI 245, BI 246.*

BI 351 - Topics in Biology
Credits: 3
This course gives students an opportunity to study topics that are not offered on a regular basis. The specific topics will vary each time the course is taught.
Prerequisites: *Permission of department.*
Note(s): May be repeated for credit if on a different topic.

BI 352 - Topics in Biology with Lab
Credits: 4
An opportunity to study advanced topics that are not offered on a regular basis. This 4-credit course has a 3-hour laboratory component that complements the lecture. The specific topics will vary each time the course is taught, and prerequisites will vary according to the topic.
Prerequisites: *Permission of the department.*
Note(s): May be repeated for credit if on a different topic.

BI 360 - Genome Biology: Chromatin Structure, Function and Epigenetic Regulation
Credits: 3
A study of eukaryotic genome structure, evolution and function. We will explore genome structural complexity including the dynamic composition and architecture of chromatin and the mechanisms by which its integrity is maintained and its function is regulated. This course will culminate in the exploration in the exploration of the causes and consequences of epigenetic control that together drive genome plasticity. Integral to this course will be the study of the various modes of inquiry and research tools utilized by scientists to investigate these questions.
Prerequisites: *BI 108 and BI 242 and CH 221; BI 245 recommended.*

BI 361 - Biology of Viruses
Credits: 3
An exploration of the structure, genetics, and pathogenesis of all types of viruses, from bacterial to mammalian. Rather than taking an encyclopedic approach, the course begins as an overview of common themes in the life cycles of all viruses. Building upon this foundation, the course will then draw largely from recent published research to explore features of the life cycle and pathogenesis of specific viruses.
Prerequisites: *BI 108 and BI 242 or BI 246.*

BI 362 - Bacterial Pathogenesis: A Molecular Approach
Credits: 3
An exploration of the latest techniques used to study bacteria-host interactions at the molecular level. The course delves into common obstacles that disease-causing bacteria must overcome in order to colonize a human host and the general strategies bacteria have evolved to overcome these obstacles. Comparisons will be made to symbiotic bacteria-host interactions, and questions such as "How did pathogenic bacteria evolve?" will be addressed. Grounded in current published research, the class will also explore, at the molecular level, mechanisms used by specific pathogens to colonize and damage host tissue.
Prerequisites: *BI 108 and BI 246; BI 245 recommended.*

BI 363 - RNA Metabolism
Credits: 3
An investigation into our current understanding of the central features of eukaryotic gene expression, including the synthesis, processing, export, translation, and turnover of mRNA and the biological machines that carry out these fundamental processes. When appropriate, we will examine how defects in these processes contribute to human disease. We will also explore how structural (micro and long non-coding) RNA molecules exert regulatory control over gene expression. Central to our work will be an exploration of the biochemical, molecular, and genetic methods and emerging technologies used to study RNA metabolism.
Prerequisites: *BI 108, BI 242, and CH 221.*

BI 368 - Advanced Light Microscopy
Credits: 4
A study of the theory and practice of advanced light microscopy. This course will introduce students to the theory and practice of advanced light microscopy and its role in biological research. Lecture and laboratory will interact closely and present students with such topics as immunocytochemistry, fluorescent protein construction and transformation, three-dimensional reconstruction, and time-lapse imaging. In the laboratory, students will have extensive hands-on practice with our fluorescence research microscopes and confocal laser scanning microscopy culminating in digital portfolio.
Prerequisites: *BI 108 and one 200-level BI course or BI 311 or BI 338.*
Note(s): Three hours of lecture, three hours of lab per week.

BI 370 - Computer Modeling of Biological Systems
Credits: 3
An introductory course in the methods, procedures, uses, and implications of digital computer modeling of biological processes, from the molecular through the population level or organization, with particular focus on the systems level.
Prerequisites: *BI 108.*

BI 371 - Independent Study in Biology
Credits: 1-3
An opportunity for students to pursue in-depth specialized topics not available through regular course offerings.
Prerequisites: *Agreement of a faculty member to serve as tutor, a topic acceptable both to student and tutor, and permission of the Department.*

BI 373 - Scientific Communications in Life Sciences
Credits: 3
An opportunity for students to identify and prepare for pre- and post-baccalaureate goals in the biological sciences. Students will work with the Career Development Center and peers to craft a polished résumé, curriculum vitae, and cover letter addressing internship opportunities, graduate and professional programs, and jobs. Students will also generate and critique examples of the three main forms of scientific communication-posters, oral presentations, and journal articles-and practice the communication of scientific information to the general public.
Prerequisites: *Two 200-level courses in Biology.*
Note(s): Fulfills the Writing in the Major requirement. To be taken during the Junior year.

BI 374 - Senior Seminar Series in Biology
Credits: 1
A seminar where students engage with biological topics of broader relevance through interaction with speakers, group discussion/projects, and reflection. Speakers (current Department faculty members and guests from other institutions) will present their work as well as career path. Students will discuss and communicate relevant topics in Biology and reflect on their own biology education and career goals.
Prerequisites: *BI 373 and senior status.*
Note(s): Fulfills Senior Experience Coda requirement.

BI 375 - Advanced Research in Biology
Credits: 1-3
An opportunity for students to engage in advanced laboratory or field research under the guidance of a faculty member. The emphasis is on the development of analytical and technical expertise in biological research.
Prerequisites: *Two 200-level courses in biology (except BI 275 and BI 299) and permission of instructor.*

BI 376 - Senior Thesis in Biology
Credits: 4
An opportunity for Biology seniors for in-depth research or independent study under supervision of a Biology faculty member cumulating in a research paper and presentation to the department.
Prerequisites: *BI 375C or equivalent and BI 373 and permission of department.*
Note(s): This course is required of all majors who wish to be considered for Biology honors. A proposal for the thesis project, prepared in consultation with the faculty project advisor and second reader, which can be outside the department or college, must be submitted to the Biology department during the semester prior to enrollment. See the Biology website for additional information on thesis proposal submission, including deadlines.

BI 399 - Professional Internship in Biology
Credits: 1-4
Professional experience at an advanced level for juniors and seniors with substantial academic experience in the major field. With faculty sponsorship and department approval, students may extend their educational experience into such areas as laboratory or field research, or clinical medicine.
Prerequisites: *Completion of at least one related 300-level course (as determined by the department).*
Note(s): Does not count toward the major. Must be taken S/U.