BIOLOGICAL SCIENCES (BIO)

BIO 101 | NAVIGATING AND SUCCEEDING IN BIOLOGY | 2 quarter hours
(Undergraduate)
This two-credit course is designed for Biology majors in their first year in the program (FR and transfer). The course will help students learn how to navigate and succeed in the Biology program, and the college of CSH more broadly. By the end of the course, every student will be empowered to chart their own journey for success. Students will also become part of the learning community where they will be provided with opportunities to develop a deep understanding of the resources available for support, strategies to overcome challenges they are likely to face and career paths that are available post-graduation.

BIO 104 | EVOLUTION AND SOCIETY | 4 quarter hours
(Undergraduate)
In this course you will learn to identify questions that can or cannot be answered by science, the assumptions made by science, how evidence is connected to predictions, and evaluate the role of communication and peer-review to promote scientific progress. It also includes current and foundational issues in evolution starting with Darwin's voyage of the Beagle, the Darwinian Natural Selection Theory, and the impact of evolution on disease and society.

BIO 105 | THE SCIENCE BEHIND HUMAN HEALTH | 4 quarter hours
(Undergraduate)
In this course, students will study the causes of health problems and how they are treated in order to develop their understanding of the nature and process of science. Students will learn how to recognize common problems with scientific studies and how to distinguish good science from pseudoscience. Genetics and nutrition will be key topics; hormonal disorders and infectious diseases will also be touched upon. By the end of the course, students will be better equipped to assess the quality of health science and other scientific information that they will encounter in the future.

BIO 110 | EVOLUTION IN HEALTH AND MEDICINE | 4 quarter hours
(Undergraduate)
This course examines how scientists are increasingly incorporating evolutionary thinking and research methods in medicine and health sciences. Throughout the course, emphasis will be placed on how the scientific method works and how scientists go about answering pressing questions related to human health. By the end of the course, students should have a greater appreciation of the value of science and how our place in the natural world relates to the health challenges that we face.

BIO 115 | INTRODUCTION TO BIOLOGY | 4 quarter hours
(Undergraduate)
Survey of major topics in the life sciences including biochemistry, cell biology, genetics, evolution, ecology, biodiversity, anatomy and physiology. Students will examine, graph, and draw conclusions from data related to course content, and will discuss the ethical practice of science and interactions between science and society. Earns SWK credit for the SI Domain of the Liberal Studies Program. Cannot receive credit for both BIO 115 and BIO 155, no credit for Biology majors or minors.

BIO 118 | MARINE BIOLOGY | 4 quarter hours
(Undergraduate)
Study of marine diversity, marine ecosystems, and connections between oceans and humans. Student cannot receive credit for both BIO 118 and 160, No credit for Biology majors or minors.
MAT 120 is a prerequisite for this class.

BIO 119 | FROM MUSIC TO MIND: THE NEUROSCIENCE OF MUSIC | 4 quarter hours
(Undergraduate)
This Science as a Way of Knowing course presents the foundations of neuroscience by exploring the relationship between music and the nervous system. Mechanisms of sensory perception and music cognition will be explored and related to motor systems and musical performance. The course will also cover the processes of learning, memory, and emotional content of musical experiences. Throughout the course, emphasis is placed on the process of scientific discovery.

BIO 120 | THE SCIENCE AND ART OF VISION | 4 quarter hours
(Undergraduate)
This Science as a Way of Knowing course will survey how our understanding of visual system function and our perception of the visual arts has developed through scientific inquiry. We will examine hypotheses about the evolution of human vision and the nature of visual anomalies, and will discuss creative efforts to evaluate these hypotheses. We will review questions that remain unresolved, and identify related technical and/or ethical constraints. Basic knowledge of visual processing will be applied to explore how artists employ techniques that interface with the visual system to create specific impressions.

BIO 121 | INFECTIOUS DISEASES AND IMMUNITY | 4 quarter hours
(Undergraduate)
This course is designed to introduce students to the world of microorganisms, especially those which cause infectious diseases and to explain how the immune system protects the body against these organisms. Cannot receive credit for both BIO 121 and BIO 161, No credit for Biology majors or minors.

BIO 122 | INTRODUCTION TO PALEOBIOLOGY | 4 quarter hours
(Undergraduate)
This course focuses on the concepts and practices of paleobiology, the scientific study of the biology of extinct organisms preserved as fossils. No credit for Biology majors or minors.

BIO 126 | BRAIN AND BEHAVIOR | 4 quarter hours
(Undergraduate)
Examines basic concepts in neurobiology, including how the brain is organized, how it sends messages throughout the body, and how these messages turn into daily activities such as sensing, moving, sleeping, feeling, and learning. We also discuss how these behaviors are altered due to challenge or dysfunction in the cases of substance abuse, mental health disorders, stress, and neurodevelopmental and neurodegenerative disease. Cannot receive credit for both BIO 126 and BIO 162. Formerly BIO 206. No credit for Biology majors or minors or Neuroscience majors.

BIO 128 | STRESS, HORMONES AND THE NERVOUS SYSTEM | 4 quarter hours
(Undergraduate)
A study and discussion of the basic concepts of stress and stressors, and their effects on the functioning of the Nervous System, the Endocrine System and the Immune System; the feedback influence of hormones and neurochemicals on cerebral processing, and the relation of these phenomena to health and behavioral medicine. Formerly BIO 208. No credit for Biology majors or minors or Neuroscience majors.

BIO 134 | HOW THE HUMAN BODY WORKS | 4 quarter hours
(Undergraduate)
Fundamentals of human body functions through an examination of organs and organ systems. The quantitative component of this course will explore the concepts of scientific discovery through structured out-of-class projects. Cannot receive credit for both BIO 202 and BIO 134. Formerly BIO 224. No credit for Biology majors or minors.

BIO 140 | THE SCIENCE OF BEEKEEPING | 4 quarter hours
(Undergraduate)
The honeybee (Apis mellifera) is the most important insect species for agriculture. In addition to providing resources like honey and beeswax, bees also pollinate numerous plants, including flowers, trees and crops. However, bee populations in North America are under serious threat from climate change, Colony Collapse Disorder, pesticides, and invasive Varroa mites. This Science as a Way of Knowing course presents the basics of bee biology, the best practices for managing an apiary, and gives students opportunities to get hands-on experience handling bees. In addition to classroom activities, this is a Service Learning Course; the class will partner with a Chicago-area community garden that wants to host a beehive, and students will be responsible for helping install and maintain the hive after the class ends.

BIO 155 | INTRODUCTION TO BIOLOGY WITH LABORATORY | 4 quarter hours
(Undergraduate)
This lecture-laboratory course deals with the scientific method, biological chemistry, structure and function of cells, organs, and organ systems, heredity, evolution and ecology. Course includes a laboratory experience involving biological concepts discussed in class. Cannot receive credit for both BIO 115 and BIO 155. No credit for Biology majors or minors.

BIO 156 | FOOD, FUEL FOR LIFE | 4 quarter hours
(Undergraduate)
Food from a biological perspective: defined at the chemical and biochemical level and as it fuels life through metabolism and nutrition. Other topics include improving foods by traditional breeding and new genetic engineering technology, food production, sustainable agriculture; food safety issues, and feeding world populations. No credit for Biology majors or minors.

BIO 161 | INFECTIOUS DISEASES AND IMMUNITY WITH LABORATORY | 4 quarter hours
(Undergraduate)
This course is designed to introduce students to the world of microorganisms with particular emphasis on how microorganisms cause disease and the actions of the human body in fighting disease. This course includes a laboratory experience to reinforce concepts and introduce students to practical aspects of disease causing microorganisms. Cannot receive credit for both BIO 121 and BIO 161. No credit for Biology majors or minors.

BIO 162 | THE BRAIN: BIOLOGY AND BEHAVIOR | 4 quarter hours
(Undergraduate)
Explores basic concepts in neurobiology, including the organization and evolution of the vertebrate system, how the nervous system sends messages through the body and how these messages are translated into the variety of human behaviors. Alterations in behavior due to brain disease or injury is also discussed. The laboratory elaborates on lecture material and provides insight into how scientific reasoning and testing can help to discover how the brain works. Cannot receive credit for both BIO 126 and BIO 162. Formerly BIO 239. No credit for Biology majors or minors or Neuroscience majors.

BIO 166 | INTRODUCTION TO PLANT BIOLOGY WITH LAB | 4 quarter hours
(Undergraduate)
This course deals with the characteristic features of higher plants, plant products that are beneficial to humans, structure, physiology and ecology of cultivated plants, and modern horticultural and genetic approaches to the improvement of plants and plant productivity. No credit for Biology majors or minors.

BIO 183 | NATURAL HISTORY OF THE GALAPAGOS | 4 quarter hours
(Undergraduate)
This course is designed to present students with the diversity and unique life forms that exist on the Galapagos Islands and the nearby coastal region of Ecuador. The organisms of the Galapagos Islands are isolated from the mainland of South America, resulting in a large number of animal and plant species found only on these islands. This course will cover the ecosystems, geology, and plant/animal adaptations of these islands, and on the way in which these unique adaptations relate to the ecological pressures found on the islands and the surrounding marine environment. Comparisons between mainland and island populations will be discussed to help demonstrate the way in which new ecological pressures on isolated ancestral populations can give rise to evolution.

BIO 191 | GENERAL BIOLOGY I FOR SCIENCE MAJORS | 4 quarter hours
(Undergraduate)
Focuses on the unity of life: its biochemical and cellular makeup and functions, the acquisition and utilization of energy, and the storage and utilization of genetic information. Lecture-laboratory. CHE 130 and CHE 131 are recommended as corequisites.
MAT 130 is a prerequisite for this class.

BIO 192 | GENERAL BIOLOGY II FOR SCIENCE MAJORS | 4 quarter hours
(Undergraduate)
Introduction to evolution, ecology, organismal development and diversity. Lecture-laboratory.
A grade of C- or higher in BIO 191 is a prerequisite for this class.

BIO 193 | GENERAL BIOLOGY III FOR SCIENCE MAJORS | 4 quarter hours
(Undergraduate)
Deals primarily with diversity and development within the plant and animal kingdoms including basic principles of physiology. Lecture-laboratory.
A grade of C- or higher in BIO 192 is a prerequisite for this class.

BIO 201 | HUMAN ANATOMY | 4 quarter hours
(Undergraduate)
Structure of the human body with an emphasis on gross anatomy. Lecture-laboratory. Lecture covers human anatomy; laboratory emphasis on feline dissection.
At least Sophomore Standing is a prerequisite for this course.

BIO 202 | HUMAN PHYSIOLOGY | 4 quarter hours
(Undergraduate)
Introduction to concepts and mechanisms of human organ system function including respiratory, cardiovascular, renal, muscular, nervous, endocrine and digestive systems. Lecture-laboratory. Primarily for Health Science majors. No credit for Biology majors or minors. Cannot receive credit for both BIO 202 and BIO 134.
At least Sophomore Standing is a prerequisite for this course.

BIO 206 | BIOSTATISTICS | 4 quarter hours
(Undergraduate)
A survey of a variety of statistical methods used to analyze biological data.
BIO 193 or instructor consent is a prerequisite for this class.

BIO 209 | PLANT BIOLOGY | 4 quarter hours
(Undergraduate)
A study of plant evolution, diversity, reproduction, developmental plant anatomy, regulation of plant growth and development, and plant physiology.
BIO 193 is a prerequisite for this class.

BIO 210 | MICROBIOLOGY | 4 quarter hours
(Undergraduate)
Biology of microorganisms with emphasis on viruses, bacteria, fungi, and protozoa. Lecture-laboratory.
A grade of C- or better in BIO 193 is a prerequisite for this class.

BIO 215 | ECOLOGY | 4 quarter hours
(Undergraduate)
This course provides a broad survey of ecological principles and methods of lab and field investigation, using ecological theory to explain patterns observed in nature. Topics link interactions between organisms and their environment to their consequences in populations, communities, and ecosystems, including: the distribution and abundance of organisms in nature; factors that influence population size, growth and regulation; species interactions; community organization and diversity; and ecosystem level processes focused on moving energy and matter among living and nonliving parts of the environment. Labs involve applying ecological methods and sampling techniques to better understand ecological concepts and to gain an increased awareness of the organization and complexity in the natural world. Labs emphasize hypothesis testing and experimental design, the analysis of ecological data, and communicating research findings.
BIO 193 is a prerequisite for this class.

BIO 220 | BIOTECHNOLOGY | 4 quarter hours
(Undergraduate)
This course will address aspects of the research and methodologies used in Modern Biotechnology, and place the field in the context of current societal and ethical concerns. Lecture-laboratory.
BIO 193 is the prerequisite for this course.

BIO 225 | PHYSIOLOGY OF POVERTY | 4 quarter hours
(Undergraduate)
Low socioeconomic status is associated with psychological stress, nutritional challenges, and toxin exposure, in addition to low access to high-quality healthcare and education often discussed. In the US, it is also inseparable from racism, on a personal and structural level. This course will consider the effects of these stressors in driving cardiovascular, metabolic, immunological, and neurological diseases that contribute to striking disparities in quality of life and lifespan. With the support of lecture introductions, students will interpret data from basic research, biomedical studies, and epidemiology, and integrate them with public health and sociological perspectives. Documentaries and popular texts will contextualize these data and foster reflection and discussion in class meetings. By the end of the course, students will be able to apply what they have learned from the breadth of their scientific and liberal arts coursework to understand the critical challenges in addressing the impacts of socioeconomic inequality on human health.
BIO 193 is a prerequisite for this class.

BIO 230 | EPIDEMIOLOGY | 4 quarter hours
(Undergraduate)
This course will involve the study of the frequency and distribution of human disease. Students will learn how the health of a population is measured, and how medical interventions are quantitatively evaluated. Students will analyze data from historical and modern health studies, including population surveys, case-control studies, cohort studies, and clinical trials for prevention and treatment.
BIO 206 is a prerequisite for this class.

BIO 235 | EVOLUTION | 4 quarter hours
(Undergraduate)
This lecture/laboratory course will examine basic selection, population genetics, development, speciation, extinction, systematics, and the history of evolution. In the lab, students will learn some of the modern research methods used in the study of evolution.
BIO 193 is a prerequisite for this class.

BIO 250 | CELL BIOLOGY | 4 quarter hours
(Undergraduate)
Fundamentals of cell form and function studied at the molecular and organelle level, including basic cellular biochemistry, ultrastructure and physiology. Lecture-laboratory.
A grade of C- or better in BIO 193 and a grade of C- or better in CHE 134 (or CHE 138 or CHE 144) are prerequisites for this class.

BIO 260 | GENETICS | 4 quarter hours
(Undergraduate)
Transmission of heritable traits, nature of genetic material, manner of its expression, its mutability, and its significance with respect to organismal and species variation. Lecture-laboratory.
A grade of C- or better in BIO 193 is a prerequisite for this class.

BIO 270 | COMPARATIVE VERTEBRATE ANATOMY | 4 quarter hours
(Undergraduate)
This lecture-laboratory course explores the diversity, anatomy, and evolution of vertebrates. The laboratory portion includes dissection and observation of various vertebrates.
BIO 192 and BIO 193 are a prerequisite for this class.

BIO 290 | TOPICS IN BIOLOGY | 2-4 quarter hours
(Undergraduate)
Occasional courses offered at intermediate levels. See the schedule of classes for current offerings. 2 or 4 quarter hours.
Sophomore standing is a prerequisite for this class.

BIO 299 | INTRODUCTION TO RESEARCH | 2-4 quarter hours
(Undergraduate)
This course provides the opportunity to work with a faculty mentor in Biology on a project that provides an introduction to the research experience. Each student will work on a research project either individually or as a member of a collaborative team. Students will gain experience reading primary literature, collecting and analyzing data, presenting their research and generating a written report. Relevant safety and ethical training will be provided based on the specific proposed research. Sophomore standing required. In some cases, sophomore standing can be waived with consent of the faculty mentor.

BIO 301 | ANIMAL BEHAVIOR | 4 quarter hours
(Undergraduate)
An exploration of the types of animal behavior and modifiers of behavior as based on neuroendocrine function, with special emphasis on Felids. Lecture - Field Studies. Laboratory required.
BIO 191, BIO 192, BIO 193, BIO 206 and (BIO 215 or BIO 235) are a prerequisite for this class.

BIO 302 | STUDENT TEACHING EXPERIENCE | 4 quarter hours
(Undergraduate)
Students will work with lecture instructors to develop effective approaches for communicating and teaching Biology. Completion of the course requires students to work as part of a collaborative team to teach a biology laboratory section during the same quarter.

BIO 303 | INTRODUCTION TO SCIENTIFIC RESEARCH | 4 quarter hours (Undergraduate)
Introduction to Scientific Research. Course requires that student has had (or currently having) experience in scientific research.

BIO 306 | RESEARCH METHODS & APPLIED BIOSTATISTICS | 4 quarter hours
(Undergraduate)
Approaches to conducting research and a variety of statistical approaches will be discussed and used to answer questions applied to biological data. A computer lab will introduce and use the statistical software program R for graphing and statistically analyzing biological data sets. Includes such topics as: study design, data management, presenting data, analysis of variance (one-way and multi-factor), analysis of covariance, multiple regression, logistic regression, and AIC model selection.
BIO 206 is a prerequisite for this class.

BIO 307 | ANIMAL PHYSIOLOGY | 4 quarter hours
(Undergraduate)
Physiology is a branch of biology dealing with the functions of living organisms; it addresses questions that relate to how living organisms work. This lecture-laboratory course focuses on the physiology of a broad range of animals including both vertebrates and invertebrates. The primary objectives of the course are (1) to define many of the physiological challenges experienced by animals living in different environments (respiratory gas exchange, temperature regulation, ion and water balance, etc.) and (2) to study the strategies and physiological mechanisms involved in dealing with these challenges. Although this course will take a broad approach examining many interesting physiological adaptations, students will learn to appreciate that there are far more similarities between how different animals do things than there are differences. (Cannot receive credit for both BIO 307 and BIO 308. Cannot receive credit for BIO 307 if credit already earned for BIO 310.)
A grade of C- or better in BIO 250 is a prerequisite for this class.

BIO 308 | HUMAN PHYSIOLOGY | 4 quarter hours
(Undergraduate)
Physiology is a branch of biology dealing with the functions of living organisms; it addresses questions that relate to how living organisms work. This lecture-laboratory course focuses on human physiology at the organ system level. The human approach has immediate personal relevance; most of us are interested in how the human body solves the basic problems associated with life. The primary objectives of the course are (1) to define many of the physiological problems experienced by the human body (respiratory gas exchange, body nutrition, temperature regulation, body fluid regulation, etc.), (2) to study the concepts and mechanisms involved in solving these problems, and (3) to evaluate the effects of various disease states (e.g., emphysema, hypertension, renal failure, fever, hypercholesterolemia, diabetes) on normal body function. Although this course focuses on the human organism, the concepts and mechanisms to be addressed are applicable to a broad range of other vertebrates. (Cannot receive credit for both BIO 307 and BIO 308. Cannot earn credit for BIO 308 if received credit for BIO 310.)
A grade of C- or better in BIO 250 is a prerequisite for this class.

BIO 309 | PLANT PHYSIOLOGY | 4 quarter hours
(Undergraduate)
The purpose of this course is to provide students with the opportunity to take a detailed look at how vascular plants function. Specifically to understand what biochemical life sustaining processes are occurring in the plant, what a plant needs from the environment, and how a plant reacts to and influences its environment. The general topics that will be covered in this course include: 1) The properties of water and its function in plants; 2) Substances moved in plants and the pathways involved in this movement; 3) Mineral uptake and roles of essential elements; 4) Intermediary metabolism and metabolic regulation as they pertain to plants; and 5) Control of plant growth and development. The laboratory portion of this course will be used to reinforce and expand upon the topics covered in lecture.
BIO 250 or instructor consent is a prerequisite for this class.

BIO 311 | HISTOLOGY | 4 quarter hours
(Undergraduate)
A Lecture/Laboratory course covering the microscopic structure of the tissues that make up animal organs. The development of these tissues as well as their relationship to the principles of gross anatomy, physiology, cell biology and molecular biology is stressed.
A grade of C- or better in BIO 193 is a prerequisite for this class.

BIO 312 | TOPICS IN EXERCISE PHYSIOLOGY | 4 quarter hours
(Undergraduate)
This course provides an introduction to exercise physiology to enable exploration of current research topics in the field. Weekly discussion and presentation of articles from peer-reviewed journals will reinforce and elaborate on concepts covered in lecture. Topics include: muscle structure and bioenergetics, cardiovascular and respiratory responses to exercise, human evolution and endurance, training and adaptation, nutrition and ergogenic aids, and the relationships between exercise, health, and longevity.
BIO 250 or instructor consent is a prerequisite for this class.

BIO 313 | CELL CULTURE METHODS | 4 quarter hours
(Undergraduate)
This course will focus on the hands-on skills in cell culture techniques such as: operate and maintain tissue culture equipment and cell cultures; maintain aseptic techniques during the preparation of stock and working solutions; autoclave glassware and solutions; maintain a sterile working condition all through; perform cell culture assays to determine cell viability, movement and death; design, perform and troubleshoot experiments and equipment; data analysis; participate and strictly follow universal or employer sponsored cell culture safety training standards; handle and dispose of biohazard materials per safety standards; maintain a lab notebook; and establish good practices in cell culture, communication of results and overall team skills.
BIO 210 or BIO 220 or BIO 250 or BIO 260 is a prerequisite for this class.

BIO 315 | TOPICS IN ECOLOGY | 4 quarter hours
(Undergraduate)
The focus of this course is to read and critique classic papers in ecology and to connect their foundational ideas with modern research and understanding.
BIO 215 is the prerequisite for this course.

BIO 317 | AQUATIC BIOLOGY | 4 quarter hours
(Undergraduate)
The study of biological, physical and chemical phenomena in freshwater environments. Emphasis on organisms and their ecology. Lecture-laboratory.
BIO 193 and either BIO 206 or BIO 215 or BIO 235 are the prerequisites for this course.

BIO 318 | FIELD STUDIES IN MARINE AND ESTUARINE BIOLOGY | 4 quarter hours
(Undergraduate)
This course provides a Course-Based Undergraduate Experience (CURE) and is designed for science majors with an interest in marine and estuarine biology. The primary objectives of the course are: 1) to explore the diversity of marine and estuarine life; 2) to understand the manner in which physical and biological factors influence biological diversity in marine systems; 3) to gain an authentic research experience; and 4) to develop professional connections in marine science.
BIO 193 and either BIO 206 or BIO 215 or BIO 235 are prerequisites for this course (or consent of instructor).

BIO 319 | TOPICS IN BEHAVIORAL PARASITOLOGY | 4 quarter hours
(Undergraduate)
This course is designed for science majors and graduate students with an interest in animal behavior, ecology, evolution, health science, veterinary science and parasitology. The course adopts an integrative approach to the study of Behavioral Parasitology, which draws on modern developments in the fields of Animal Behavior, Parasitology, Ecology and Evolution. The primary objectives of the course are to: 1) explore the diverse relationships that occurs between parasite infection and host behavior; 2) understand proximate mechanisms that underlie behavioral manipulation by parasites; 3) explore the ecological and evolutionary impacts of behavioral manipulation in nature; 4) extend findings from animal systems to human-related issues (health, psychology); 5) develop familiarity with reading and interpreting primary literature. The teaching approach will be primarily discussion- and presentation-based and will be highly-interactive in nature.
BIO 215 or BIO 235 is the prerequisite for this course.

BIO 320 | ADVANCED MICROBIOLOGY | 4 quarter hours
(Undergraduate)
Advanced microbiology lecture-lab course designed for science majors and graduate students that will focus on developing technical and critical thinking skills in the field of microbiology. Labs will involve independent or small group research projects.
BIO 210 or BIO 220 is the prerequisite for this course.

BIO 321 | MOLECULAR METHODS IN ECOLOGY AND EVOLUTION | 4 quarter hours
(Undergraduate)
This course will provide hands-on experience in methods of detecting and analyzing molecular variation in nature. By the end of the course, students should be competent employing molecular markers to answer a wide variety of basic questions in ecology and evolution. Molecular Methods in Ecology and Evolution is a course-based undergraduate research experience (CURE).
BIO 215 or BIO 235 is a prerequisite for this class.

BIO 325 | PALEOBIOLOGY | 4 quarter hours
(Undergraduate)
This lecture/laboratory course will introduce students to various principles of paleobiology and to provide a broad survey of important taxonomic groups. This course will cover topics such as: the concept of geologic time, evolution, extinction, morphology, taxonomic classification, fossilization, paleoecology, biogeography, and biostratigraphy. The laboratory portion of the course will reinforce the lecture topics and offer an opportunity to examine fossil specimens and compare them with modern forms.
BIO 192, BIO 193 and (BIO 215 or BIO 335) or instructor's consent are a prerequisite for this class.

BIO 330 | DEVELOPMENTAL BIOLOGY | 4 quarter hours
(Undergraduate)
A survey of developmental phenomena in animals from fertilization to sexual maturity. Students will gain a current understanding of the genetic, cellular, and environmental mechanisms that shape the body and its major organs.
BIO 250 and BIO 260 are a prerequisite for this class.

BIO 331 | TOPICS IN DEVELOPMENTAL BIOLOGY | 4 quarter hours
(Undergraduate)
This seminar course examines the current embryological literature using both evolutionary and molecular perspectives. Previous student-led topics include: how early embryos are organized, the signals controlling left-right asymmetry, the evolutionary origin of feathers and the development of the retina.
BIO 330 or 360 is a prerequisite for this class.

BIO 332 | POPULATION ECOLOGY | 4 quarter hours
(Undergraduate)
This course covers concepts and models in population ecology and their applications for predicting population trends and disease spread across populations, understanding conservation biology approaches, and the sustainable management of wildlife populations.
ENV 250 or BIO 215 is a prerequisite for this class.

BIO 335 | CONCEPTS IN EVOLUTION | 4 quarter hours
(Undergraduate)
Study of evolution and diversity in the living world. Lecture only.
BIO 235 or (BIO 215 and BIO 260) are a prerequisite for this class.

BIO 339 | CELLULAR NEUROBIOLOGY | 4 quarter hours
(Undergraduate)
This course examines the cellular and molecular mechanisms of neuronal function and the changes that occur in processes such as learning and memory. Emphasis on electrophysiology, synaptic communication, and cellular signaling. Cross-listed with BIO 439 and NEU 339.
BIO 250 (or NEU 201 or PSY 377 or HLTH 301) is a prerequisite for this class.

BIO 340 | BEHAVIORAL NEUROSCIENCE | 4 quarter hours
(Undergraduate)
Explores the organization of the nervous system on a gross anatomical level and based on functional units. The emphasis is on understanding how individual behaviors are produced by different neural systems and how these individual behaviors integrate into the activities of whole organisms. Formerly Systems Neurobiology. Cross-listed as BIO 440.
BIO 307 or BIO 308 or BIO 339 or NEU 201 or NEU 339 or HLTH 301 or PSY 377 is the prerequisite for this course.

BIO 341 | TOPICS IN NEUROBIOLOGY | 4 quarter hours
(Undergraduate)
A seminar course examining current topics in neurobiology. Original readings will include both current review and classic neuroscience articles.
BIO 340 (or BIO 339 or NEU 339 or BIO 342 or PSY 377) is a prerequisite for this class.

BIO 342 | COGNITIVE NEUROSCIENCE | 4 quarter hours (Undergraduate)
This course explores the neuroscience of human behaviors such as emotions, attention, executive function, language, learning, memory, and social interaction by exploring both the underlying biological mechanisms and the psychological theories behind these behaviors. Cognitive Neuroscience is an emerging field of study that attempts to help one gain an understanding of the interdisciplinary nature of the human mind.
NEU 201 (or BIO 339 or BIO 340 or BIO 341 or PSY 377) is a prerequisite for this class.

BIO 345 | TOPICS IN PALEOBIOLOGY | 4 quarter hours (Undergraduate)
A seminar course examining various topics in paleobiology (the study of ancient life) including morphological concepts, macroevolutionary processes, extinction events, phylogenetic systematics, paleoecology, paleoebiogeography, and the adequacy of the fossil record. Readings include classic and recent articles in the fields of paleobiology.
BIO 192, BIO 193 and (BIO 215 or BIO 235) or instructor's consent are a prerequisite for this class.

BIO 347 | TOPICS IN MEDICAL BACTERIOLOGY | 4 quarter hours (Undergraduate)
This course will address current topics of concern and research in medical bacteriology. Students participating in this course will explore key concepts used in bacterial pathogenesis and learn how to critically appraise recent research papers in the field.
BIO 210 or BIO 220 (or consent of instructor) is a prerequisite for this class..

BIO 348 | THE BIOLOGY OF INFECTION | 4 quarter hours (Undergraduate)
This course will provide students with detailed knowledge of medically important bacteria. The course will first examine common events in infections and the body's responses to infection. We will highlight in these studies the changes in both hosts and pathogens as strategies of infection and immunity evolve relative to one another. Within this framework we will examine a spectrum of infectious diseases in detail.
BIO 210 and BIO 370 are a prerequisite for this class.

BIO 349 | TOPICS IN MICROBIOLOGY AND BIOTECHNOLOGY | 4 quarter hours
(Undergraduate)
This course will address current topics of concern and research in microbiology and biotechnology. Students participating in this course will explore fundamental concepts being used and new discoveries and emerging technologies in microbiology and biotechnology. Students will learn how to critically appraise recent research papers in these fields.
BIO 210 or BIO 220 is a prerequisite for this class.

BIO 350 | ANIMAL ADAPTATIONS | 4 quarter hours (Undergraduate)
An introduction to the ecological concept of adaptation. Adaptation is defined and illustrated using specific animal examples. Discussion will focus on how these specializations in structure and function equip the animal for survival.
Bio 215 (Ecology) or Bio 235 (Evolution) or consent of the instructor is a prerequisite for this class.

BIO 352 | ENVIRONMENTAL PHYSIOLOGY | 4 quarter hours (Undergraduate)
Comparative and environmental approach to the functions and mechanisms of vertebrate organ systems. Selected topics will be addressed using a lecture/discussion/seminar format. Cross-listed as BIO 452.
BIO 250 is a prerequisite for this class.

BIO 355 | GENETIC TOXICOLOGY | 4 quarter hours (Undergraduate)
This course will deal with the study of agents that damage the genome or alter the proper functioning of the genome that can lead to disease in humans. Topics covered will include basic spectrum of genetic damage and chromosomal effects, mechanisms of mutations, DNA repair, genetic assays used for evaluation of genetic toxicology, health consequences of genetic damage, including cancer and inheritable mutations, and the current position of US government and global regulatory agencies on the issues of genetic toxicology.
BIO 260 is a prerequisite for this class.

BIO 360 | MOLECULAR BIOLOGY | 4 quarter hours (Undergraduate)
Study of biology at the molecular level, focusing on the regulation of gene expression and the principles of genetic engineering. Lecture-laboratory.
BIO 260 is the prerequisite for this course.

BIO 361 | TOPICS IN MOLECULAR BIOLOGY | 4 quarter hours (Undergraduate)
Discussion and seminars in selected areas of molecular biology. Cross-listed as CHE 461.
BIO 360 is a prerequisite for this class.

BIO 362 | ADVANCED GENETIC ANALYSIS | 4 quarter hours (Undergraduate)
High-throughput genomic technologies have revolutionized the study of biology. With whole genome sequencing, RNA sequencing and proteomic analysis, it is now possible to collect data about every gene in a species at the same time. This course will cover how these technologies work, and what they can tell us about how cells function. DePaul has joined The Genomics Education Partnership (www.thegep.org) consortium, which does distributed genomic science through Course-based Undergraduate Research Experience (CURE) classes, where students learn about genomics by analyzing real genomic data that was generated by the consortium. In the CURE lab component of this class, students will annotate genes that have never been previously studied; their work is then submitted to the consortium at the end of the class, which can earn students co-authorship on published manuscripts that include their work. Cross-listed with BIO 462.
Bio 260 (Genetics) or consent of instructor is a prerequisite for this class.

BIO 365 | PRINCIPLES OF TOXICOLOGY | 4 quarter hours (Undergraduate)
A study of the adverse effects of chemicals on living organisms, including the chemical natures, kinetics, dose-response relationships, metabolism, and mechanisms of action of various toxins and toxicants.
BIO 193 and (CHE 234 or CHE 238) are a prerequisite for this class.

BIO 369 | PEER MENTORING IN BIOLOGY | 4 quarter hours
(Undergraduate)
This course is designed for undergraduates who will be mentoring students in the Biology Program of the College of Science and Health. The purpose of the course is to prepare mentors to welcome biology students into the culture of the scientific community at DePaul. Mentors will encourage their peers to use tools and resources designed to help them build a sense of belonging and achieve academic success. The course will include readings, presentations, and activities, which will support the student's development as a peer mentor. Students will reflect on their experiences to inform their efforts in creating a supportive learning environment for their peers.

BIO 370 | IMMUNOBIOLOGY | 4 quarter hours
(Undergraduate)
Basic factors governing immune phenomena and antigen-antibody reactions. Lecture-laboratory. Cross-listed as BIO 471.
BIO 250 or BIO 260 is a prerequisite for this class.

BIO 375 | INTRODUCTION TO PHARMACOLOGY | 4 quarter hours
(Undergraduate)
Introduction to Pharmacology will explore the relationships between an organism and its response to an administered drug. This will include: 1) How drugs are administered to the body 2) What is their fate once in the body, i.e. Pharmacokinetics 3) What their mechanisms actions are - i.e. Pharmacodynamics, and 4) Adverse reactions to drugs. We will explore these relationships in different physiological systems of the human body including (but not limited to) the nervous system, circulatory system, digestive system and endocrine system. Lastly, this course will provide an understanding of the pharmaceutical system by providing a framework to explore how drugs are discovered, produced, tested, and regulated.
One of the following is a prerequisite for this class: BIO 307, BIO 308, BIO 310, HLTH 301, HLTH 302, or NEU 201

BIO 380 | CANCER BIOLOGY | 4 quarter hours
(Undergraduate)
This course will explore the cellular and molecular aspects of cancer. Topics will include the pathology and epidemiology of cancer, the origin and spread of cancer, hereditary and familial cancers, cancer associated genes and strategies of cancer therapy.
BIO 250 is the prerequisite for this course.

BIO 381 | TOPICS IN CANCER | 4 quarter hours
(Undergraduate)
This course is a seminar based course that discusses current topics in the field of cancer biology from a cellular and molecular perspective. This course demonstrates the recent advances made in the most common cancers in the western world, toward etiology, diagnosis, therapy and prevention. Scientific articles taken from peer-reviewed scientific journals will illustrate available and potential chemotherapeutic approaches towards achieving a treatment for the most common cancers.
BIO 250 is a prerequisite for this class.

BIO 385 | MAMMALIAN REPRODUCTION | 4 quarter hours
(Undergraduate)
Molecular, cellular, physiological, and behavioral aspects of mammalian reproduction. Mechanisms and strategies used by mammals in reproductive processes including sexual differentiation, gamete production, puberty, reproductive hormone cyclicity, neuroendocrine control mechanisms, pregnancy, parturition, and reproductive behavior. Cross-listed with BIO 485.
BIO 250 and either BIO 307 or BIO 308 are the prerequisites for this course (or consent of instructor).

BIO 386 | ENDOCRINOLOGY | 4 quarter hours
(Undergraduate)
A study of hormones as chemical regulators of development, growth, metabolism, homeostasis, reproduction, response to stress, and behavior; as well as hormone synthesis, chemistry, mechanisms of action, and endocrine gland structure.
BIO 250 and either BIO 307, BIO 308, or [HLTH 301 & HLTH 302] are the prerequisites for this course (or consent of instructor).

BIO 388 | RESEARCH METHODS IN BIOLOGY | 4 quarter hours
(Undergraduate)
Research Methods in Biology is a methods-based course designed for science majors that will focus on learning a variety of cutting edge methods used by biologists to carry out research. Throughout the course, students will develop an in-depth understanding and appreciation for one or two research methods which are associated with projects they will undertake as part of BIO 389 (Research in Field Biology). Biology is a very broad field, so your chosen method(s) may end up being based in any of a variety of sub-fields including cell biology, physiology, biochemistry, molecular biology, ecology or evolution. In order to utilize methods to collect biological data you will need to `become an expert'. In this course you will learn that being an expert means more than just `following a recipe'. An expert will also understand the theory behind how their method works and appreciate the history of how the method was developed over time (and by whom). An expert will also understand the specifics of how all of the required equipment works (including how it is properly maintained and calibrated) and how to properly collect or prepare any samples/chemicals needed to carry out the process. Finally you will learn how to analyze the data you collect and how to interpret it while acknowledging what limitations may be associated with your data. Research Methods in Biology in a hands-on course. You will learn your method(s), you will practice and you will become an expert. To test whether you are an expert, you will be challenged to teach the method to your peers and produce a detailed methods handout which others can use to carry out the method on their own. This means you will also be taught the methods selected by your peers. Finally, you will collect data utilizing your method to complete your chosen research project in BIO 389.
(BIO 191, BIO 192 and BIO 193) and (one of the following: BIO 206, BIO 215, BIO 235, BIO 250, BIO 260, BIO 307, BIO 308, BIO 309, BIO 310) or instructor consent are prerequisites for this class. BIO 389 is a co-requisite.

BIO 389 | RESEARCH IN FIELD BIOLOGY | 4 quarter hours
(Undergraduate)
BIO 389/489 is a research-intensive course designed for science majors and graduate students that will focus on developing skills of collaborative field-based research. Throughout the course, students (working in groups of 2 or 3) will utilize the scientific method to develop and carry out an original research project. Students will utilize the primary literature to learn the current state of research in an area that interests them, then use that knowledge to develop a novel question they can test with a field-based experiment. Data collected will be analyzed and results compiled into a publication quality paper. Students will then present their study to their peers in the form of an oral or poster presentation.
Study Abroad Course

BIO 390 | ADVANCED TOPICS IN BIOLOGY | 4 quarter hours
(Undergraduate)
Occasional courses offered at an advanced level. Cross-listed as BIO 490.
Junior or Senior standing is a prerequisite for this class.

BIO 392 | EXTRAMURAL INTERNSHIP | 4 quarter hours
(Undergraduate)
An opportunity for students to integrate their academic experience with real-world work situations; supervision is provided by a member of the DePaul Faculty in the Biological Sciences and the private or public enterprise. 0-4 credit hours.
At least Sophomore standing and a declared Biological Sciences major, or by arrangement with the Biology internship director or department permission are prerequisites for this class.

BIO 393 | INTEGRATED APPLICATIONS OF CELL CULTURE TECHNIQUES | 2 quarter hours
(Undergraduate)
This course is designed as the defining or capping course for the Cell Culture Techniques and Applications Certificate Program. The aim of this course is to provide students with the opportunity to integrate the practical and conceptual knowledge acquired in the certificate program with the diverse fields covered in the program. The course will also help students to develop a career plan and bridge the skills gained and future employment.

BIO 395 | BIOLOGY CAPSTONE SEMINAR | 4 quarter hours
(Undergraduate)
The aim of this course is to integrate current biological view(s) of humanity with the perspectives of the liberal studies curriculum. Students will develop and debate topics that demonstrate mastery of the biology core curriculum (cell biology, genetics, physiology and ecology) while touching on history, philosophy, ethics and the law.

BIO 397 | MENTORED RESEARCH EXPERIENCE IN BIOLOGY | 2-4 quarter hours
(Undergraduate)
This course provides the opportunity to work with a faculty research mentor in Biology on an advanced research project. The faculty research mentor and student will work together to formulate a research question based on current biological knowledge and the scientific literature. They will develop hypotheses and then design and conduct a research study to test the hypotheses. Under faculty supervision, the student will conduct relevant analysis generated by the research and propose follow-up studies. Students will produce a written report of the results and may be provided with the opportunity to present their research at a professional conference. In addition, the student will reflect on how the project activities and experiences have contributed to their personal growth as a scientist and their future career plans. Relevant safety and ethical training will be based on the specific proposed research.
Junior standing and consent of instructor required. In some cases, junior standing can be waived with consent of the instructor.

BIO 399 | INDEPENDENT STUDY - RESEARCH | 2-4 quarter hours
(Undergraduate)
This course provides the opportunity to work with a faculty mentor in Biology on an advanced research project. The faculty research mentor and student will work together to formulate a research question based on current biological knowledge and the scientific literature. They will develop hypotheses and then design and conduct a research study to test these hypotheses. Under faculty supervision, the student will conduct relevant analysis generated by the research and propose follow-up studies. Students will produce a written report of the results and may be provided with the opportunity to present their research at a professional conference. Relevant safety and ethical training will be provided based on the specific proposed research. Junior standing and consent of instructor required. In some cases, junior standing can be waived with consent of the instructor.

BIO 401 | INDEPENDENT STUDY | 2-4 quarter hours
(Graduate)
Experimental and/or Library study of selected topics in the life sciences. A-Cell Biology, B-Immunobiology, C-Developmental Biology, D-Physiology, E-Endocrinology, F-Genetics, G-Structural Biology, H-Ecology, I-Molecular Biology, J-Neurobiology. Offered in the Autumn, Winter, Spring and Summer quarters. 2 or 4 quarter hours.

BIO 402 | INTRODUCTION TO GRADUATE STUDIES | 2 quarter hours
(Graduate)
Presents the biology faculty and facilities. Various research and teaching methods in biology will be explored. Required of all graduate students.
Status as a graduate Biology student (MA or MS) is a prerequisite for this class.

BIO 403 | DEVELOPMENT OF TOPICS FOR RESEARCH | 4 quarter hours
(Graduate)
The purpose of this course is to help graduate students in formulating research questions and design methods while improving written expression and oral presentation skills. Students will, with the guidance of a faculty member, undertake a detailed investigation of a topic, formulate a potential research project in that area, and present their proposal orally to the faculty at the end of the quarter.
Status as a graduate Biology student (MA or MS) is a prerequisite for this class.

BIO 406 | RESEARCH METHODS & APPLIED BIOSTATISTICS | 4 quarter hours
(Graduate)
Approaches to conducting research and a variety of statistical approaches will be discussed and used to answer questions applied to biological data. A computer lab will introduce and use the statistical software program R for graphing and statistically analyzing biological data sets. Includes such topics as: study design, data management, presenting data, analysis of variance (one-way and multi-factor), analysis of covariance, multiple regression, logistic regression, and AIC model selection.
Status as a graduate Biology student (MA or MS) is a prerequisite for this class.

BIO 409 | PLANT PHYSIOLOGY | 4 quarter hours
(Graduate)
A study of the functional and developmental aspects of flowering plants. Lecture-laboratory. Cross-listed as BIO 309.

BIO 412 | TOPICS IN EXERCISE PHYSIOLOGY | 4 quarter hours
(Graduate)
This course provides an introduction to exercise physiology to enable exploration of current research topics in the field. Weekly discussion and presentation of articles from peer-reviewed journals will reinforce and elaborate on concepts covered in lecture. Topics include: muscle structure and bioenergetics, cardiovascular and respiratory responses to exercise, human evolution and endurance, training and adaptation, nutrition and ergogenic aids, and the relationships between exercise, health, and longevity.

BIO 415 | TOPICS IN ECOLOGY | 4 quarter hours
(Graduate)
The focus of this course is to read and critique classic papers in ecology and to connect their foundational ideas with modern research and understanding.

BIO 417 | AQUATIC BIOLOGY | 4 quarter hours
(Graduate)
The study of biological, physical and chemical phenomena in fresh water and marine environments. Emphasis on organisms and their interactions. Lecture-laboratory.

BIO 419 | TOPICS IN BEHAVIORAL PARASITOLOGY | 4 quarter hours
(Graduate)
This course is designed for science majors and graduate students with an interest in animal behavior, ecology, evolution, health science, veterinary science and parasitology. The course adopts an integrative approach to the study of Behavioral Parasitology, which draws on modern developments in the fields of Animal Behavior, Parasitology, Ecology and Evolution. The primary objectives of the course are to: 1) explore the diverse relationships that occurs between parasite infection and host behavior; 2) understand proximate mechanisms that underlie behavioral manipulation by parasites; 3) explore the ecological and evolutionary impacts of behavioral manipulation in nature; 4) extend findings from animal systems to human-related issues (health, psychology); 5) develop familiarity with reading and interpreting primary literature. The teaching approach will be primarily discussion- and presentation-based and will be highly-interactive in nature.

BIO 420 | ADVANCED MICROBIOLOGY | 4 quarter hours
(Graduate)
Advanced microbiology lecture-lab course designed for science majors and graduate students that will focus on developing technical and critical thinking skills in the field of microbiology. Labs will involve independent or small group research projects.

BIO 421 | MOLECULAR METHODS IN ECOLOGY AND EVOLUTION | 4 quarter hours
(Graduate)
This course will provide hands-on experience in methods of detecting and analyzing molecular variation in nature. By the end of the course, students should be competent employing molecular markers to answer a wide variety of basic questions in ecology and evolution. Molecular Methods in Ecology and Evolution is a course-based research experience. Cross-listed with BIO 321.

BIO 425 | CELLULAR EVENTS IN THE IMMUNE RESPONSE | 4 quarter hours
(Graduate)
Analysis of cellular and subcellular interactions in the immune response. Lecture, seminar, discussion. BIO 470 recommended.

BIO 430 | DEVELOPMENTAL BIOLOGY | 4 quarter hours
(Graduate)
A survey of developmental phenomena in animals from fertilization to sexual maturity. Topics include gametogenesis, early cell divisions, organ formation, metamorphosis, regeneration, birth defects, stem cells, reproductive technology and mammalian cloning. Lecture-laboratory.

BIO 431 | TOPICS IN DEVELOPMENTAL BIOLOGY | 4 quarter hours
(Graduate)
This seminar course examines the current embryological literature using both evolutionary and molecular perspectives. Previous student-led topics include: how early embryos are organized, the signals controlling left-right asymmetry, the evolutionary origin of feathers and the development of the retina. BIO 430 or BIO 460 recommended.

BIO 432 | POPULATION ECOLOGY | 4 quarter hours
(Graduate)
This course covers concepts and models in population ecology and their applications for predicting population trends and disease spread across populations, understanding conservation biology approaches, and the sustainable management of wildlife populations.

BIO 435 | CONCEPTS IN EVOLUTION | 4 quarter hours
(Graduate)
Study of evolution and diversity in the living world. Lecture only.

BIO 439 | CELLULAR NEUROBIOLOGY | 4 quarter hours
(Graduate)
This course examines the cellular and molecular mechanisms of neuronal function and the changes that occur in processes such as learning and memory. Emphasis on electrophysiology, synaptic communication, and cellular signaling. Cross-listed as BIO439, NEU339, NEU439.

BIO 440 | BEHAVIORAL NEUROSCIENCE | 4 quarter hours
(Graduate)
An examination of the ways in which neural systems underpin behavior with an emphasis on vertebrates. In this course, behavior is understood in its broadest sense, from the functioning of organs and organ systems to the activities of whole organisms. Formerly Systems Neurobiology. Lecture-Laboratory.

BIO 441 | TOPICS IN NEUROBIOLOGY | 4 quarter hours
(Graduate)
A seminar course examining current topics in neurobiology. Original readings will include both current review and classic articles in the fields of neurobiology, neuroethology and the related neurosciences. BIO 439 or BIO 440 is recommended.

BIO 442 | COGNITIVE NEUROSCIENCE | 4 quarter hours
(Graduate)
This course explores the neuroscience of human behaviors such as emotions, attention, executive function, language, learning, memory, and social interaction by exploring both the underlying biological mechanisms and the psychological theories behind these behaviors. Cognitive Neuroscience is an emerging field of study that attempts to help one gain an understanding of the interdisciplinary nature of the human mind.

BIO 445 | TOPICS IN PALEOBIOLOGY | 4 quarter hours
(Graduate)
A seminar course examining various topics in paleobiology (the study of ancient life) including morphological concepts, macroevolutionary processes, extinction events, phylogenetic systematics, paleoecology, paleobiogeography, and the adequacy of the fossil record. Readings include classic and recent articles in the fields of paleobiology.

BIO 447 | TOPICS IN MEDICAL BACTERIOLOGY | 4 quarter hours
(Graduate)
This course will address current topics of concern and research in medical bacteriology. Students participating in this course will explore key concepts used in bacterial pathogenesis and learn how to critically appraise recent research papers in the field.

BIO 448 | THE BIOLOGY OF INFECTION | 4 quarter hours
(Graduate)
This course will provide students with detailed knowledge of medically important bacteria. The course will first examine common events in infections and the body's responses to infection. We will highlight in these studies the changes in both hosts and pathogens as strategies of infection and immunity evolve relative to one another. Within this framework we will examine a spectrum of infectious diseases in detail. BIO 470 is recommended.

BIO 449 | TOPICS IN MICROBIOLOGY AND BIOTECHNOLOGY | 4 quarter hours
(Graduate)
This course will address current topics of concern and research in microbiology and biotechnology. Students participating in this course will explore fundamental concepts being used and new discoveries and emerging technologies in microbiology and biotechnology. Students will learn how to critically appraise recent research papers in these fields.

BIO 452 | ENVIRONMENTAL PHYSIOLOGY | 4 quarter hours
(Graduate)
Comparative and environmental approach to the function and mechanisms of vertebrate organ systems. Selected topics in comparative physiology will be addressed using a lecture/discussion/seminar format.

BIO 455 | GENETIC TOXICOLOGY | 4 quarter hours
(Graduate)
This course will deal with the study of agents that damage the genome or alter the proper functioning of the genome that can lead to disease in humans. Topics covered will include basic spectrum of genetic damage and chromosomal effects, mechanisms of mutations, DNA repair, genetic assays used for evaluation of genetic toxicology, health consequences of genetic damage, including cancer and inheritable mutations, and the current position of US government and global regulatory agencies on the issues of genetic toxicology.
BIO 260 is a prerequisite for this class.

BIO 460 | MOLECULAR BIOLOGY | 4 quarter hours
(Graduate)
Study of biology at the molecular level, focusing on the regulation of gene expression and the principles of genetic engineering. Lecture-laboratory. Cross-listed as BIO 360.

BIO 461 | TOPICS IN MOLECULAR BIOLOGY | 4 quarter hours
(Graduate)
Discussion and seminars in selected areas of molecular biology.

BIO 462 | ADVANCED GENETIC ANALYSIS | 4 quarter hours
(Graduate)
High-throughput genomic technologies have revolutionized the study of biology. With whole genome sequencing, RNA sequencing and proteomic analysis, it is now possible to collect data about every gene in a species at the same time. This course will cover how these technologies work, and what they can tell us about how cells function. DePaul has joined The Genomics Education Partnership (www.thegep.org) consortium, which does distributed genomic science through Course-based Undergraduate Research Experience (CURE) classes, where students learn about genomics by analyzing real genomic data that was generated by the consortium. In the CURE lab component of this class, students will annotate genes that have never been previously studied; their work is then submitted to the consortium at the end of the class, which can earn students co-authorship on published manuscripts that include their work. Cross-listed with BIO 362.

BIO 465 | PRINCIPLES OF TOXICOLOGY | 4 quarter hours
(Graduate)
A study of the adverse effects of chemicals on living organisms, including the chemical natures, kinetics, dose-response relationships, metabolism, and mechanisms of action of various toxins and toxicants.

BIO 471 | IMMUNOBIOLOGY | 4 quarter hours
(Graduate)
Basic factors governing immune phenomena and antigen antibody reactions. Lecture-laboratory.

BIO 475 | INTRODUCTION TO PHARMACOLOGY | 4 quarter hours
(Graduate)
Introduction to Pharmacology will explore the relationships between an organism and its response to an administered drug. This will include: 1) How drugs are administered to the body 2) What is their fate once in the body, i.e. Pharmacokinetics 3) What their mechanisms actions are - i.e. Pharmacodynamics, and 4) Adverse reactions to drugs. We will explore these relationships in different physiological systems of the human body including (but not limited to) the nervous system, circulatory system, digestive system and endocrine system. Lastly, this course will provide an understanding of the pharmaceutical system by providing a framework to explore how drugs are discovered, produced, tested, and regulated. Cross-listed with BIO 375.

BIO 480 | CANCER BIOLOGY | 4 quarter hours
(Graduate)
This course will explore the cellular and molecular aspects of cancer. Topics will include the pathology and epidemiology of cancer, the origin and spread of cancer, hereditary and familial cancers, cancer associated genes and strategies of cancer therapy.

BIO 481 | TOPICS IN CANCER | 4 quarter hours
(Graduate)
This course is a seminar based course that discusses current topics in the field of cancer biology from a cellular and molecular perspective. This course demonstrates the recent advances made in the most common cancers in the western world, toward etiology, diagnosis, therapy and prevention. Scientific articles taken from peer-reviewed scientific journals will illustrate available and potential chemotherapeutic approaches towards achieving a treatment for the most common cancers.

BIO 485 | MAMMALIAN REPRODUCTION | 4 quarter hours
(Graduate)
Molecular, cellular, physiological, and behavioral aspects of mammalian reproduction. Mechanisms and strategies used by mammals in reproductive processes including sexual differentiation, gamete production, puberty, reproductive hormone cyclicity, neuroendocrine control mechanisms, pregnancy, parturition, and reproductive behavior. Cross-listed with BIO 385.

BIO 486 | ENDOCRINOLOGY | 4 quarter hours
(Graduate)
A study of hormones as chemical regulators of development, growth, metabolism, homeostasis, reproduction, response to stress, and behavior; as well as hormone synthesis, chemistry, mechanisms of action, and endocrine gland structure.

BIO 489 | RESEARCH IN FIELD BIOLOGY | 4 quarter hours
(Graduate)
BIO 389/489 is a research-intensive course designed for science majors and graduate students that will focus on developing skills of collaborative field-based research. Throughout the course, students (working in groups of 2 or 3) will utilize the scientific method to develop and carry out an original research project. Students will utilize the primary literature to learn the current state of research in an area that interests them, then use that knowledge to develop a novel question they can test with a field-based experiment. Data collected will be analyzed and results compiled into a publication quality paper. Students will then present their study to their peers in the form of an oral or poster presentation.

BIO 490 | ADVANCED TOPICS IN BIOLOGY | 4 quarter hours
(Graduate)
Occasional courses offered at the graduate level. See schedule for current offerings.

BIO 494 | COMMUNICATING SCIENCE | 4 quarter hours
(Graduate)
Students will refine their oral and written presentation skills using their own research as the subject. The components of an effective research talk, poster presentation, and formal thesis will be examined. Students will have several opportunities to present their research and to receive and participate in peer review. This course is required for second year Biology MS students.
Status as a graduate Biology student (MA or MS) is a prerequisite for this class.

BIO 496 | RESEARCH | 2-8 quarter hours
(Graduate)
Experimental work in selected areas of biology. These studies do not necessarily relate to a thesis. Autumn, Winter, Spring, Summer. Laboratory. Two or four quarter hours.

BIO 499 | THESIS RESEARCH | 2-8 quarter hours
(Graduate)
Original study of a specific biological problem leading to a thesis.

BIO 502 | CANDIDACY CONTINUATION | 0 quarter hours
(Graduate)
Students who have completed their coursework and are actively working on the requirements for the Master's thesis (MS), or final project (MA), must enroll in candidacy continuation each quarter of the academic year until the Master's requirement has been completed. This course carries the equivalent of half-time enrollment status. Course requires graduate program director approval and proof of work each quarter. Pass/No Pass grading. (0 credit hours)

BIO 503 | CANDIDACY MAINTENANCE | 0 quarter hours
(Graduate)
This course is meant for Master's students not actively working on their thesis. It is only used to maintain active student status. It will not give the student full- or half-time enrollment status and will not permit deferment of student loans. Course requires graduate program director approval each quarter. (0 credit hours)