

# BIOLOGY (BIO)

## BIO-1060 Human Biology (4 semester hours)

The course examines the human organism and the impact of modern biology and medical discoveries on humans. Topics covered include anatomy/physiology, immunity, reproduction, development, genetics, and the relationship between humans and their environment. Laboratory experiences are incorporated into the course where appropriate.

## BIO-1100 Medical Terminology (2 semester hours)

This course is designed to teach word roots, combining forms, suffixes, and prefixes to develop an understanding of health care terms. Definitions, spelling and the use of correct abbreviations are emphasized. The course content is organized around body systems and emphasizes terminology and applications related to the health and fitness career fields.

## BIO-1150 Life Science for Educators (3 semester hours)

This course surveys the major principles of life science for those majoring in elementary, middle school or special education. Topics include evolution, the diversity of life, ecology, cell biology and inheritance.

**Co/prerequisite(s):** BIO-1150Z.

## BIO-1150Z Life Science for Educators Laboratory (1 semester hours)

Laboratory experiences will include exercises that enhance content understanding, and will focus on the pedagogy of life science.

**Co/prerequisite(s):** BIO-1150.

### Additional fee required

## BIO-1210 General Biology I (3 semester hours)

This course studies the cell as the basic unit of biology. Topics include structure and roles of biologically important molecules, prokaryote and eukaryote cell structure, concepts of metabolism and energy flow, enzymes, photosynthesis, ATP production, cell reproduction, molecular genetics, and the principles of Mendelian genetics.

**Co/prerequisite(s):** BIO-1210Z.

## BIO-1210Z General Biology I Laboratory (1 semester hours)

The laboratory will explore the biological methods, techniques, and practices that support the lecture topics of cell and molecular biology.

**Co/prerequisite(s):** BIO-1210.

### Additional fee required

## BIO-1220 General Biology II (3 semester hours)

This course studies the levels of the biological hierarchy above the level of the individual organism. Topics include microevolution and natural selection, macroevolution, the history and diversity of life, and ecological principles.

**Co/prerequisite(s):** BIO-1220Z.

## BIO-1220Z General Biology II Laboratory (1 semester hours)

The laboratory will explore the biological methods, techniques, and practices that support the lecture topics of evolution, diversity, and ecology.

**Co/prerequisite(s):** BIO-1220.

### Additional fee required

## BIO-1310 Biology of Cells for Nursing (4 semester hours)

This course studies the cell as the basic unit of biology. Topics include structure and roles of biologically important molecules; prokaryote and eukaryote cell structure; concepts of metabolism and energy flow; enzymes; photosynthesis; ATP production; cell reproduction; molecular genetics; and the principles of Mendelian genetics. This course is designed for students interested in nursing.

## BIO-1810-9 Selected Topics in Biology (Variable semester hours)

This course will address a specific area of study in biology not already covered by other course offerings. Prerequisites vary by topic.

## BIO-2080 Nutrition and Health Promotion (4 semester hours)

This course is intended to provide an understanding of basic nutritional science and dietetics to students with a limited nutrition background. This will be accomplished through exploration of fundamental concepts of nutrition, health, and wellness with special focus on contemporary issues and personal application. Topics covered include the principles of diet planning, government standards, and food labeling; the biological functions and food sources of each nutrient; energy balance, weight management, and physical activity; the role of nutrition in health, disease, and lifespan development; food safety issues; and nutrition pseudoscience, misinformation, and current controversies.

## BIO-2200 Humans and the Environment (4 semester hours)

This course provides students with an overview of the relationship between humans and their environment, and to the environmental problems that we face. Topics include human population growth, pollution, climate change, energy use, and loss of biodiversity, along with emerging contemporary issues. Implications and potential solutions will be discussed.

## BIO-2250 Local Ecosystems (4 semester hours)

This course introduces students to the variety of ecosystems in our local region, and to the ways that these systems impact and are impacted by humans. Students will learn about characteristics of these ecosystems, as well as gain introductory experience in identifying local flora and fauna. Exploration of local prairies, woodlands, and aquatic systems will be an important component of this course, as well as a field trip to the Aurora University George Williams College Campus on Geneva Lake in Wisconsin. A lab fee to cover the costs of field trips is included.

**Prerequisite(s):** BIO-2200 or NSM-1400.

### Additional fee required

## BIO-2280 Microbiology (3 semester hours)

This course covers principles and techniques of microbiology. Topics include the structure and life cycles of bacteria, viruses, protists, fungi, parasitic worms, characteristics of the major groups of bacteria, bacterial growth and metabolism, microbial genetics and pathogenesis, epidemiology, and selected infectious diseases.

**Prerequisite(s):** BIO-1210 or BIO-1310 with a grade of "C" or better

**Corequisite(s):** BIO-2280Z.

## BIO-2280Z Microbiology Laboratory (1 semester hours)

Laboratory experiences for Microbiology include microscopy and staining techniques, bacterial culture, control of microbes, and identification of microbes using metabolic and morphologic characteristics plus selected topics. Additional fee applies.

**Prerequisite(s):** Take BIO-1210 and BIO-1210Z with a grade of "C" or higher

**Corequisite(s):** BIO-2280.

### Additional fee required

**BIO-2300 Introduction to Zoology (3 semester hours)**

This course will examine the diversity and organ systems of animals, using a comparative approach. Topics include the classification and phylogeny of the major animal groups, the structure and function of animal organ systems, and the ways in which animals are adapted to their environments.

**Prerequisite(s):** BIO-1210 and BIO-1210Z or BIO-1310 with a grade of "C" or better; BIO-1220 with a grade of "C" or better; BIO-1220Z with a grade of "C" or better.

**Co/prerequisite(s):** BIO-2300Z.

**BIO-2300Z Introduction to Zoology Laboratory (1 semester hours)**

Laboratory experiences for Introduction to Zoology are designed to support the content presented in lecture and provide hands-on experience with representative body systems, animals, and biological techniques. It is strongly recommended that this course is taken along with BIO-2300 Introduction to Zoology lecture.

**Prerequisite(s):** BIO-1210 and BIO-1210Z or BIO-1310 with a grade of "C" or better; BIO-1220 with a grade of "C" or better; BIO-1220Z with a grade of "C" or better.

**Co/prerequisite(s):** BIO-2300.

**Additional fee required****BIO-2350 Introduction to Botany (3 semester hours)**

This course will examine the diversity and organ systems of "plants," using a comparative approach. Topics include the classification and phylogeny of the major photosynthetic groups (cyanobacteria, algae, and plants) as well as the heterotrophic fungi, characteristics of selected angiosperm families, the structure and function of plant and fungal organ systems, and the ways in which plants and fungi are adapted to their environments.

**Prerequisite(s):** BIO-1210 and BIO-1210Z or BIO-1310 with a grade of "C" or better; BIO-1220 with a grade of "C" or better; BIO-1220Z with a grade of "C" or better

**Co/prerequisite(s):** BIO-2350Z.

**BIO-2350Z Introduction to Botany Laboratory (1 semester hours)**

Laboratory experiences for Introduction to Botany are designed to support the content presented in lecture and provide hands-on experience with representative botanical specimens, body systems, and biological techniques. It is strongly recommended that this course is taken along with BIO 2350, Introduction to Botany lecture.

**Prerequisite(s):** BIO-1210 and BIO-1210Z or BIO-1310 with a grade of "C" or better; BIO-1220 with a grade of "C" or better; BIO-1220Z with a grade of "C" or better

**Co/prerequisite(s):** BIO-2350.

**Additional fee required****BIO-2520 Ecology and Evolution (4 semester hours)**

This course provides an introduction to evolutionary biology including examinations of evidence for evolution, mechanisms of evolutionary change, adaptation, speciation, extinction, and history of life. This course also provides an introduction to ecological principles and their interactions of organisms with the environment (living and non-living). Topics include organism's relationships to its environment, population, ecology, species interactions, community ecology, and ecosystem ecology.

**Prerequisite(s):** BIO-1210 and BIO-1210Z; BIO-1220 and BIO-1220Z.

**BIO-2650 Essentials of Anatomy and Physiology (4 semester hours)**

This course explores the interrelationship between structure and function in the human body at the macro, micro, and cellular levels, with an emphasis on how physiological mechanisms operate to maintain homeostasis. Topics include tissues, thermoregulation, and the major body systems (i.e., integumentary, skeletal, muscular, nervous, endocrine, cardiac, respiratory, digestive, renal, and reproductive). Laboratory experiences will reinforce lecture material through the use of models, dissection and various modes of technology. Registration Note: Credit WILL NOT be given for this course and BIO-2660 and/or BIO-2670.

**BIO-2660 Anatomy and Physiology I (4 semester hours)**

This course is the first of a two-course sequence that provides a detailed study of the relationship between structure and function of the human organism. Topics include physical and chemical principles related to the major organ systems, including integumentary, muscular, skeletal, nervous, and the sensory systems. Laboratory experiences for Anatomy and Physiology I will reinforce lecture material through the use of models, dissection, and various modes of technology. Note: Credit WILL NOT be given for this course and BIO-2650.

**Additional fee required****BIO-2670 Anatomy and Physiology II (4 semester hours)**

This course is the second of a two-course sequence that provides a detailed study of the relationship between structure and function of the human organism. Topics include the endocrine, digestive, respiratory, cardiovascular, immune, reproductive, and urinary systems, with discussion of acid-base and electrolyte balance. Laboratory experiences for Anatomy and Physiology II will reinforce lecture material through the use of models, dissection, and various modes of technology. Note: Credit WILL NOT be given for this course and BIO-2650.

**Prerequisite(s):** BIO-2660 with a grade of "C" or better.

**Additional fee required****BIO-2810-9 Selected Topics in Biology (Variable semester hours)**

This course will address a specific area of study in biology not already covered by other course offerings. Prerequisites vary by topic.

**BIO-3030 Geographic Information System (GIS) (4 semester hours)**

This course introduces the concepts and components of a geographic information system (GIS). It also teaches the essential skills of spatial data management, analysis, and visualization through the use of GIS software. Upon completion of this course, students understand the fundamental concepts of a GIS including spatial data models, spatial analysis, and cartographic principles for Environmental assessment.

**Prerequisite(s):** BIO-1220 and BIO-1220Z or CHM-1310 and CHM-1310Z.

**BIO-3100 Human Physiology (4 semester hours)**

This course covers the fundamentals of human physiology from a homeostatic perspective, emphasizing the intrinsic and extrinsic control of body systems. Topics include membrane and neuronal physiology, fluid and acid-base balance, energy balance, and temperature control, as well as the physiology of the nervous, musculoskeletal, cardiac, immune, respiratory, urinary, digestive, endocrine, and reproductive systems.

**Prerequisite(s):** BIO-2670.

**BIO-3150 Invertebrate Zoology (4 semester hours)**

This course provides an in-depth survey of the protozoa and invertebrate animals. Topics include taxonomic classification, key characteristics, body systems, and evolutionary innovations of each invertebrate group studied, using a comparative approach. Laboratory will involve detailed observations of select invertebrates (with emphasis on identification and classification) through behavioral, microscopy, dissection, and field techniques.

**Prerequisite(s):** BIO-2300; BIO-2300Z.

**Additional fee required****BIO-3240 Biomechanics (4 semester hours)**

This course gives students greater insight into the biomechanical design of human skeletal muscles and their interactions with the skeletal system. Biomechanics emphasizes the investigation and application of mechanical principles to the study of human motion and the motion of sport objects. Students will learn systematic approaches for the qualitative and quantitative analysis of the human body as it engages in motor activities. This course begins by developing the students' knowledge in several topics related to physics of motion as it relates to sports movement.

**Prerequisite(s):** PED-3215 or PED-3210.

**BIO-3250 Vertebrate Zoology (4 semester hours)**

This course provides an in-depth survey of the vertebrate animals beginning with fishes and ending with mammals. Emphasis will be placed on identification and evolution of vertebrates, comparative physiology, and descriptions of key characteristics and evolutionary innovations of the vertebrate classes, using a comparative approach. Laboratory will involve detailed observations of select vertebrates through behavioral observation, microscopy, dissection, and field techniques.

**Prerequisite(s):** BIO-2300; BIO-2300Z.

**Additional fee required****BIO-3260 Systematic Botany (4 semester hours)**

This course will examine the morphology and anatomy of the vascular plants, with an emphasis on the characteristics of major families to aid in the diagnostic identification of plant taxa. Topics include a comprehensive overview of vascular plant phylogeny through various lines of taxonomic evidence (e.g., morphology, anatomy, embryology, chromosomes, palynology, secondary plant compounds, proteins, and DNA), the history of plant classification and botanical nomenclature, and the interactions between humans and plants. Laboratory will involve detailed observations of plant morphology and anatomy, as well as field and herbarium methods.

**Prerequisite(s):** BIO-2350; BIO-2350Z.

**Additional fee required****BIO-3270 Plant Physiology (4 semester hours)**

This course will examine the functional and related structural aspects of vascular plants. Topics include transport and translocation of water and solutes; mineral nutrient requirements (including deficiency symptoms and availability from soil); biochemistry and metabolism of photosynthesis and respiration, plant regulators; and growth and development (with plant movements and responses to light and temperature). Laboratory will involve short- and long-term experiments in controlled conditions that explore physiological concepts.

**Prerequisite(s):** BIO-2350; BIO-2350Z.

**Additional fee required****BIO-3360 Biogerontology (4 semester hours)**

This course provides an in-depth exploration of the biology of aging in humans and distinguishes pathophysiological conditions from "normal aging." Topics include theories of aging and how nutrition, exercise, stress, and social interaction affect aging. Students will have the opportunity to conduct service-learning projects with older adults at long-term care facilities.

**Prerequisite(s):** BIO-1060 or BIO-2650 or BIO-2670.

**BIO-3370 Conservation Biology (4 semester hours)**

This course provides an introduction to conservation biology and conservation practice. Topics include the earth's biological diversity, threats to its biological diversity, how threats influence populations and species, and solutions to dealing with those threats. Laboratory experiences will provide opportunities to apply lecture material, and include both conservation management methods and fieldwork at local nature reserves to give students the opportunity for real-world application of conservation techniques.

**Prerequisite(s):** BIO-2300; BIO-2300Z; BIO-2350; BIO-2350Z; Highly Recommended BIO-3510.

**Additional fee required****BIO-3400 Genetics (4 semester hours)**

This course provides an in-depth analysis of both transmission and molecular genetics. Topics include the sources of genetic variation, Mendelian inheritance, chromosomal transmission, DNA structure and function, gene expression, gene mapping, bioinformatics, and the interaction between genetics and society.

**Prerequisite(s):** BIO-1210 and BIO-1210Z or BIO-1310 with "C" or better; MTH-1100.

**BIO-3410 Global Environmental History (4 semester hours)**

This course offers an introduction to global environmental history, focusing on the past two centuries – since the Industrial Revolution – when population growth and technological change have accelerated dramatically, transforming humans' place within and ideas about the natural world. Students will encounter a range of debates, readings, films, and other sources that offer vital perspectives on the planet's most pivotal contemporary challenges while also sharpening their reading, writing, speaking, and critical thinking skills in the process.

**BIO-3450 Advanced Cell Biology (4 semester hours)**

This course examines the integration of structure and function of living things on the cellular level. Topics include cell physiology and energetics, molecular biology, and contemporary problems in cell biology, immunology, and developmental biology. Research methods and primary literature will be discussed.

**Prerequisite(s):** BIO-3400; CHM-1320; CHM-1320Z.

**BIO-3460 Sports Nutrition (4 semester hours)**

This course will examine the different physiological relationships between nutrition and exercise. Emphasis is placed on the body's metabolic response to a wide range of stresses that occur in different sports. This course will examine the different physiological relationships between nutrition and exercise. Emphasis is placed on the body's metabolic response to a wide range of stresses that occur in different sports and activities, at different intensities, and within different environments. Macro and micronutrients and their respective roles in energy production and the development of improved athletic performance are discussed in detail. In addition, this course will study those methods of assessing an athlete's nutritional needs and status.

**Prerequisite(s):** BIO-1060 or BIO-2650 or BIO-2660.

**BIO-3510 Ecology (3 semester hours)**

This course includes ecological principles and the interactions of organisms with their environment (living and non-living). Topics include climate, soils, aquatic and marine environments, an organism's relationship to its environment, population ecology, species interactions, community ecology, and ecosystem ecology.

**Prerequisite(s):** BIO-1210 with a grade of "C" or higher; BIO-1210Z with a grade of "C" or higher; BIO-1220 with a grade of "C" or higher; BIO-1220Z with a grade of "C" or higher

**Corequisite(s):** BIO-3510Z.

**BIO-3510Z Ecology Laboratory (1 semester hours)**

This course will include laboratory exercises that will reinforce lecture material and enhance ecological research methods and data analysis through conducting small-scale experiments and exploring the biodiversity in our region.

**Prerequisite(s):** BIO-1210 with a grade of "C" or higher; BIO-1210Z with a grade of "C" or higher; BIO-1220 with a grade of "C" or higher; BIO-1220Z with a grade of "C" or higher

**Corequisite(s):** Concurrent registration in BIO-3510.

**Additional fee required****BIO-3520 Animal Behavior (4 semester hours)**

This course provides an introduction to the study of ethology, or animal behavior, with an emphasis on both the proximate and ultimate causes of behavior. Topics include genetic and hormonal influences on behavior, types of learning and cultural transmission, predation, foraging, habitat selection, mating systems, and social interactions. Laboratory exercises will reinforce lecture materials and expose students to research methods and data analysis in the animal behavior field.

**Prerequisite(s):** BIO-2300; BIO-2300Z; BIO-3400.

**Additional fee required****BIO-3530 Evolution (4 semester hours)**

This course discusses evolutionary biology. Topics include the evidence for evolution, inferring evolutionary relationships, mechanisms of evolutionary change, population genetics, speciation, and the history of life.

**Prerequisite(s):** BIO-3400.

**BIO-3540 Biological Anthropology (4 semester hours)**

This course provides an overview of the human species in the context of its evolutionary relationships with other primates, with emphasis on the interrelated realms of knowledge that shed light on leading hypotheses for human evolution, biology and behavior. Topics include evidence from the fossil record, molecular evolutionary trees, primatology, evolutionary biology, history of science, human biology, forensics, and psychology. Scientific findings from these fields will be explored to understand our origins and contemporary issues in human biology, science, and society.

**BIO-3555 Biochemistry (3 semester hours)**

This course explores the four classes of macromolecules and the related chemical processes of living cells. Topics include the structure, chemical and physical properties, and biological functions metabolism of amino acids and proteins, carbohydrates, lipids and nucleic acids, with a particular emphasis on enzymology. Research methods and primary literature will be discussed.

**Prerequisite(s):** CHM-2410 with a grade of "C" or better; CHM-2410Z with a grade of "C" or better.

**Corequisite(s):** BIO-3555Z.

**BIO-3555Z Biochemistry Laboratory (1 semester hours)**

This course introduces students to foundational biochemistry laboratory techniques for analysis of biomolecules. Skills students will learn include making buffers, biomolecule purification and quantification, enzyme kinetics studies, chromatography, and electrophoresis.

**Prerequisite(s):** CHM-2410 with a grade of "C" or better; CHM-2410Z with a grade of "C" or better.

**Corequisite(s):** BIO-3555.

**BIO-3560 Ecological Conservation (3 semester hours)**

This course will provide an in-depth survey of ecology and conservation of natural resources. Current and classical ecological research is used to introduce major concepts and methods, in ecological and conservation techniques. The course will utilize experiential methods in examining global and local ecosystem issues and current management practices.

**Prerequisite(s):** BIO-2520

**Corequisite(s):** BIO-3560Z.

**BIO-3560Z Ecological Conservation Lab (1 semester hours)**

The Ecology and Conservation laboratory is designed to give the students personal experience using scientific methods and tools in an environmental setting. Actual field and laboratory experiences are also necessary for proper interpretation of information obtained from lecture. Laboratory exercises will reinforce lecture material and enhance ecological and conservation research methods and data analysis through conducting small-scale experiments and exploring the biodiversity in our region.

**Corequisite(s):** BIO-3560.

**BIO-3600 Molecular Biology (3 semester hours)**

This advanced course examines topics such as the structure of genomes, structure and function of nucleic acids and genes, regulation of gene expression, mutations, mechanisms of DNA repair and interaction of macromolecules. The exploration of current topics in molecular biology including manipulation of genes and their expression, among others, is emphasized.

**Prerequisite(s):** BIO-3400 with a grade of "C" or better.

**Corequisite(s):** BIO-3600Z.

**BIO-3600Z Molecular Biology Laboratory (1 semester hours)**

Laboratory experiences involve common techniques such as extraction and purification of nucleic acids, Polymerase Chain Reaction, gel electrophoresis and a variety of bioinformatics tools commonly used in molecular research.

**Prerequisite(s):** BIO-3400 with a grade of "C" or higher

**Corequisite(s):** BIO-3600.

**Additional fee required****BIO-3610 Selected Topics Biotechnology (2 semester hours)**

This course will cover topics related to emergent biotechnologies, ethical issues related to biotechnology, the impact of biotechnology in society, current and historical events, and the biotechnology industry. Students will learn to make connections between science and society through the exploration and evaluation of current topics and readings related to biotechnology.

**Prerequisite(s):** BIO-3400 with a grade of "C" or better.



**BIO-3620 Techniques in Biotechnology (2 semester hours)**

The practice and application of diverse biotechnologies are broad and challenging, and the implementation of techniques and data interpretation requires critical thinking and problem-solving skills. This course exposes students to the scientific method as it is applicable to biotechnological investigations. Students will gain hands-on experiences as they design and execute experiments, collect and analyze data, and interpret and communicate results.

**Prerequisite(s):** BIO-3400.

**Additional fee required****BIO-3650 Instrumental Methods of Analysis (3 semester hours)**

This course will provide the fundamentals of instrumental and classical methods of analysis. It will be an introduction to biological and chemical sample preparation, separation techniques, volumetric, electrochemical, and spectroscopic methods. Laboratory work combines classical and instrumental methods of analysis.

**Prerequisite(s):** CHM-2450; CHM-2450Z.

**Co/prerequisite(s):** BIO-3650Z.

**BIO-3650Z Instrumental Methods of Analysis Laboratory (1 semester hours)**

This course addresses the basic principles of instrumental analysis, including infrared spectroscopy, elemental analysis, potentiometry, and X-ray diffraction.

**Co/prerequisite(s):** BIO-3650.

**Additional fee required****BIO-3700 Politics of Global Health and Medicine (4 semester hours)**

The course addresses the question of how social and political factors, such as race, nationality, or social class, as well as governmental laws, regulations, and politics shape and are shaped by individual and population health and well-being around the world. Among other questions, students discuss the impact of structural violence of social inequalities on human suffering and on the access to health care and medical care, including access to medications. The ethicality of medical research is also included in that discussion. Assigned readings and discussions address (1) the determinants of disease and health inequalities between populations and over time; (2) how social and political factors influence medical knowledge, health care and medical care; and 3) what must be done to combat and prevent health inequalities in local, national, and global contexts.

**Prerequisite(s):** SOC-1100 or SOC-2150; Highly Recommended: SOC-3480 or BIO-3540.

**BIO-3790 ACCA: Affiliated Course (4 semester hours)**

Aurora University, in collaboration with the other Associated Colleges of the Chicago Area (ACCA), the Shedd Aquarium, and Morton Arboretum offers a range of courses, including lecture series, laboratory courses, and field experiences which enrich our core curriculum. These will be offered as student interests and needs indicate. Permission of the Department Chair required.

**BIO-3810-9 Selected Topics in Biology (Variable semester hours)**

This course will address a specific area of study in biology not already covered by other course offerings. Prerequisites vary by topic.

**BIO-3820/CHM-3820 Secondary Methods in Science (4 semester hours)**

This course presents techniques that are effective for teaching in the biology content area at the secondary level. Topics include lesson planning, science education standards, assessment, curriculum design, inquiry-based lessons and alternative teaching strategies. This is usually the last course the student takes prior to student teaching, and includes a simultaneous practicum in addition to regular classroom hours. Placement applications for the practicum are due to the School of Education placement coordinator the January before the academic year of the practicum or for transfer students upon acceptance into the School of Education.

**Prerequisite(s):** Maintaining a constant GPA of 3.00, passing an FBI national fingerprint screening that encompasses passing a criminal background/sex offender check, passing a TB test, EDU-2100; EDU-2260; EDU-3720; EDU-3620.

**BIO-3830 Directed Study in Biology (0.5-17 semester hours)**

This is a course in which a student or students study on campus under the close supervision of an Aurora University faculty member. This is not "field experience," does not cover material in the regular curriculum, and is not as research and/or independently oriented in its instructional methodology as an independent study. Descriptions of directed studies are contained in the petition by which the learning experience was approved. Students should file the Directed Study Petition prior to registration. This petition must be signed/approved by the Instructor, Department chair, and Academic Dean. Regular tuition is charged, and additional fees may apply.

**BIO-3940 Biology Internship (1-4 semester hours)**

An academic internship experience for credit requires the student to be at least a sophomore in standing. The academic internship experience requires a faculty sponsor, educational criteria, and a current executed affiliation agreement and Schedule A on file. Internships can be designated as either credit/no credit or letter grade, depending on the school or program. Regular tuition is charged, and additional fees may apply.

**Grading Type:** Credit/No Credit

**BIO-3970 Research in Biology (2 semester hours)**

This course is designed to provide students with the opportunity to do biological research that has the potential to be published in a peer-reviewed scientific journal and/or presented at a scientific meeting. Students will accomplish these goals by performing a supervised research project and attending weekly seminars with their supervising instructor on how to conduct scientific research. A maximum of four semester hours can be used toward graduation. Permission of the Instructor or Department Chair required.

**Additional fee required****BIO-3980 Independent Study in Biology (0.5-17 semester hours)**

Descriptions of independent studies are contained in the petition by which the learning experience was approved. Prior to registration, students must file the Independent Study Petition. This petition requires the signature/approval of the Instructor, Department Chair, and Academic Dean. Regular tuition is charged. In most cases, Independent Study should be within the field of the student's major and should be something that cannot be pursued through established courses. These are pursued on campus under the direct supervision of an Aurora University faculty member. Regular tuition is charged, and additional fees may apply.

**BIO-4010 Soil and Water (4 semester hours)**

This course is an introduction to urban and rural soil and water science. Lectures will emphasize the inter-relationships of hydrology, hydrological cycle, landforms, vegetation, climate and geologic materials with soils and water. In addition, the course will analyze the impact of humans on the physical and chemical properties of soil and water, and issues related to soil and water distribution, usage, and management.

**Prerequisite(s):** BIO-1220 and BIO-1220Z.

**BIO-4040 Immunology (4 semester hours)**

This course introduces the components and functions of the immune system, focusing on how the body detects and defends against pathogens while maintaining tolerance to self. Students will explore innate and adaptive immunity, examining the cells and molecular students involved in pathogen recognition and response, including topics such as antigen recognition, lymphocyte activity, and immune diversity generation. Clinical topics such as immunodeficiency, autoimmunity, allergy, organ transplantation, and tumor immunity are covered to highlight the immune system's role in health and disease.

**Prerequisite(s):** BIO-2280 and BIO-2280Z.

**BIO-4810-9 Selected Topics in Biology (Variable semester hours)**

This course will address a specific area of study in biology not already covered by other course offerings. Prerequisites vary by topic.

**BIO-4830 Directed Study in Biology (0.5-17 semester hours)**

This is a course in which a student or students study on campus under the close supervision of an Aurora University faculty member. This is not "field experience," does not cover material in the regular curriculum, and is not as research and/ or independently oriented in its instructional methodology as an independent study. Descriptions of directed studies are contained in the petition by which the learning experience was approved. Students should file the Directed Study Petition prior to registration. This petition must be signed/approved by the Instructor, Department Chair, and Academic Dean. Regular tuition is charged, and additional fees may apply.

**BIO-4940 Biology Internship (1-4 semester hours)**

An advanced academic internship experience for credit requires the student to be at least a junior in standing, although individual programs may require senior standing. The academic internship experience requires a faculty sponsor, educational criteria, and a current executed affiliation agreement and Schedule A on file. Internships can be designated as either credit/no credit or letter grade, depending on the school or program. Regular tuition is charged, and additional fees may apply.

**Grading Type:** Credit/No Credit

**BIO-4980 Independent Study in Biology (0.5-17 semester hours)**

Descriptions of independent studies are contained in the petition by which the learning experience was approved. Prior to registration, students must file the Independent Study Petition. This petition requires the signature/approval of the Instructor, Department Chair, and Academic Dean. Regular tuition is charged. In most cases, Independent Study should be within the field of the student's major and should be something that cannot be pursued through established courses. These are pursued on campus under the direct supervision of an Aurora University faculty member. Regular tuition is charged, and additional fees may apply.

**BIO-4990 Senior Capstone Biological Sciences (2 semester hours)**

This course examines problems and issues at the intersection of the sciences and society. These problems will be explored through readings, writing, class discussion, group projects and presentations. Students will gather and analyze information from scientific journals, secondary sources and popular literature.