# BIOLOGY (BIO)

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<th>Course Code</th>
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<th>Lecture(s)</th>
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<tr>
<td>BIO-1040</td>
<td>The Cell and DNA</td>
<td>3</td>
<td>Designed for non-science majors. Considers cell structure, function, and metabolism, cell division, DNA structure and function, Mendelian and molecular genetics. Scientific method and reasoning are emphasized. To fulfill laboratory science requirements, students should enroll in the related laboratory course.</td>
<td>3 hours</td>
<td>ENG-0990 Language Fundamentals II, or appropriate score on English Placement Test. OAN Approved: TMNS.</td>
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<tr>
<td>BIO-104L</td>
<td>The Cell and DNA Laboratory</td>
<td>1</td>
<td>Laboratory course examines the scientific method, cell structure and function, cell division, DNA structure and function, and Mendelian and molecular genetics. Includes microscope work, models, and various experiments designed to illustrate concepts covered in the lecture course.</td>
<td>3 hours</td>
<td>Concurrent enrollment in BIO-1040 The Cell and DNA is strongly recommended. OAN Approved: TMNS.</td>
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<tr>
<td>BIO-1050</td>
<td>Human Biology</td>
<td>3</td>
<td>Designed for non-science majors. Considers concept of homeostasis of the human body. Basic structure and function of body systems and diseases of these systems studied. To fulfill laboratory science requirements, students should enroll in related laboratory course.</td>
<td>3 hours</td>
<td>ENG-0990 Language Fundamentals II, or appropriate score on English Placement Test. OAN Approved: TMNS.</td>
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<tr>
<td>BIO-105L</td>
<td>Human Biology Laboratory</td>
<td>1</td>
<td>Laboratory course designed for non-science majors that examines the microscopic and gross structure and function of the human body. Includes microscope work, models, animal dissections, and various experiments designed to illustrate concepts related to basic human biology and to complement topics covered in BIO-1050 Lecture course.</td>
<td>3 hours</td>
<td>ENG-0990 Language Fundamentals II or appropriate score on English Placement Test. Concurrent enrollment in BIO-1050 Human Biology is strongly recommended. OAN Approved: TMNS.</td>
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<tr>
<td>BIO-1060</td>
<td>Environment, Ecology, and Evolution</td>
<td>3</td>
<td>Designed for non-science majors. Questions about the natural world are explored through an introduction to the principles of evolution and ecology, including how populations change over time and how organisms interact with each other and the environment. Topics include scientific inquiry; nature of science; evolutionary processes; diversity of life; population, community, and ecosystem ecology; human impacts on the environment; environmental stewardship; and regional environmental concerns.</td>
<td>3 hours</td>
<td>ENG-0990 Language Fundamentals II, or appropriate score on English Placement Test. OAN Approved: TMNS.</td>
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<tr>
<td>BIO-106L</td>
<td>Environment, Ecology, &amp; Evolution Laboratory</td>
<td>1</td>
<td>Designed for non-science majors. Questions about the natural world are explored through hands-on laboratory and field activities focusing on evolution, ecology, and environmental science. Scientific inquiry is used to investigate how populations change over time; the diversity of life; community ecology; ecosystem ecology; and human impacts on the environment.</td>
<td>3 hours</td>
<td>ENG-0990 Language Fundamentals II or appropriate score on English Placement Test. Concurrent enrollment in BIO-1060 Environment, Ecology, and Evolution is strongly recommended. OAN Approved: TMNS.</td>
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<tr>
<td>BIO-1100</td>
<td>Introduction to Biological Chemistry</td>
<td>3</td>
<td>Basic principles of inorganic chemistry, organic chemistry and biochemistry necessary for study of human physiology. Physiological applications of the chemical processes of cellular transport, communication and metabolism emphasized. Laboratory includes use of metric system, basic chemistry techniques and physiological applications.</td>
<td>2 hours</td>
<td>MATH-0955 Beginning Algebra or appropriate score on Math placement test. OAN Approved: TMNS.</td>
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<tr>
<td>BIO-1221</td>
<td>Anatomy and Physiology for Diagnostic Medical Imaging</td>
<td>4 Credits</td>
<td>Basic understanding of cells, tissues, organs and body systems. Examination of their function based on their relationship to diagnostic medical imaging examinations. Particular emphasis placed on the skeletal system and the radiographic appearance of anatomical structures.</td>
<td>3 hours</td>
<td>MA-1020 Medical Terminology I or concurrent enrollment.</td>
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<tr>
<td>BIO-1230</td>
<td>Anatomy and Physiology of the Eye</td>
<td>4</td>
<td>Detailed examination of the anatomy and physiology of the eye. Emphasis on ocular terminology, structure, function, movement, disorders, diseases, lens physics, and visual testing/analysis. Study of eye model and preserved eye dissection.</td>
<td>3 hours</td>
<td>MA-1020 Medical Terminology I or concurrent enrollment.</td>
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OAN Approved: TMNS.
BIO-1300 Horticultural Botany
3 Credits

[This course is crosslisted as PST-1300. Credit can only be earned once for either course.] Plant structure and diversity is examined through the study of the cells, tissues, and organs of plants, as well as their life cycles and reproduction. The physiology of plants is explored through the study of plant transport, nutrients, hormones, growth, and metabolism. Additionally, horticulturally significant bacteria, protists, and fungi are examined.

Lecture: 2 hours. Laboratory: 3 hours
Prerequisite(s): ENG-0990 Language Fundamentals II, or appropriate score on English Placement Test.

BIO-1410 Anatomy & Physiology of Domestic Animals I
4 Credits

Explores the comparative anatomy and physiology of the canine, feline, equine, bovine, ovine, porcine and domestic fowl species. Focuses on cellular biology, tissues and membranes, and the integumentary, skeletal, muscular, nervous, endocrine, and circulatory systems with emphasis on species variations. Laboratory includes preserved and fresh specimens, models, microscopic observations, and audio/visual aids.

Lecture: 3 hours. Laboratory: 2 hours
Prerequisite(s): BIO-1100 Introduction to Biological Chemistry or concurrent enrollment; or CHEM-1010 Introduction to Inorganic Chemistry, or concurrent enrollment; or departmental approval: comparable knowledge or skills.
OAN Approved: TMNS.

BIO-1420 Anatomy & Physiology of Domestic Animals II
3 Credits

Explores the comparative anatomy and physiology of the canine, feline, equine, bovine, ovine, avian and porcine species. Focuses on lymphatic, digestive, respiratory, urinary and reproductive systems. Immunology, pregnancy, lactation, blood and genetics considered. Laboratory includes preserved and fresh specimens, models, microscopic observations, demonstrations and audio/visual aids.

Lecture: 2 hours. Laboratory: 2 hours
Prerequisite(s): BIO-1410 Anatomy and Physiology of Domestic Animals I.
OAN Approved: TMNS.

BIO-1500 Principles of Biology I
4 Credits

Designed for science majors. The molecular and cellular basis of life is explored through an introduction to cell biology, molecular biology, genetics and evolution with a strong focus on inquiry-based learning as the basis of scholarly research. Emphasis on evolution as the unifying theory in biology.

Lecture: 3 hours. Laboratory: 3 hours
Prerequisite(s): ENG-1010 College Composition I with grade of "B" or higher; or ENG-101H Honors College Composition I; and MATH-0955 Beginning Algebra or appropriate Math Placement score.
OAN Approved: TMNS, OSC004, and OSC024 (1 of 2 courses, both must be taken).

BIO-150H Honors Principles of Biology I
4 Credits

Honors course designed for science majors with exploration of the molecular and cellular basis of life through an introduction to cell biology, molecular biology, genetics and evolution with a strong focus on inquiry-based learning as the basis of scholarly research. Emphasis on evolution as the unifying theory in biology.

Lecture: 3 hours. Laboratory: 3 hours
Prerequisite(s): ENG-1010 College Composition I with grade of "B" or higher; or ENG-101H Honors College Composition I; and MATH-0955 Beginning Algebra or appropriate Math Placement score.
OAN Approved: TMNS, OSC003, and OSC024 (1 of 2 courses, both must be taken).

BIO-1510 Principles of Biology II
4 Credits

Designed for science majors. The diversity of life, animals, plants, and ecology are explored in both lecture and laboratory settings. Topics include the origin and evolution of life, systematics, classification, structural and functional variations in animals and plants, populations, communities, and ecosystems.

Lecture: 3 hours. Laboratory: 3 hours
Prerequisite(s): BIO-1500 Principles of Biology I; or BIO-150H Honors Principles of Biology I; or departmental approval: equivalent knowledge or skills.
OAN Approved: TMNS, OSC004, and OSC024 (2 of 2 courses, both must be taken).

BIO-151H Honors Principles of Biology II
4 Credits

Honors course designed for science majors. The diversity of life, animals, plants, and ecology are explored in both lecture and laboratory settings. Topics include the origin and evolution of life, systematics, classifications, structural and functional variations in animals and plants, populations, communities, and ecosystems. Emphasis on evolution as the unifying theory in biology. Strong focus on inquiry-based learning.

Lecture: 3 hours. Laboratory: 3 hours
Prerequisite(s): BIO-150H Honors Principles of Biology I or BIO-1500 Principles of Biology I.
OAN Approved: OSC024 (Course 2 of 2, both must be taken).

BIO-179H Honors Contract in Biology
1 Credit

Honors Contract complements and exceeds requirements and expected outcomes for an existing 1000-level honors course through formulation of a contract with a faculty mentor. This independent study at the honors level may also be taken with a non-honors course. When taken with a non-honors course the Honors Contract adds an honor experience to that course. In conjunction with a faculty mentor, student will formulate a contract, which upon completion will result in distinctive scholarship. The student is required to meet on a regularly scheduled basis with the instructor for mentor-student tutorial sessions. A maximum of six Honor Contracts (six credit hours) may be taken at the college (includes 179H and 279H).

Lecture: 1 hours
Prerequisite(s): Must be taken concurrently with a 1000-level course whose instructor agrees to mentor the student in this contract. Departmental approval required.
BIO-1812 Special Topics in Insect Biology, Behavior, and their Impact on Humans
3 Credits
Designed for non-science majors. Considers the use of insects as model organisms to direct learning of biological concepts. Discusses insect form, function, and evolution, as well as the affect insects have had on human development, politics, and scientific thought. Social and economic development through their roles as vectors of human diseases, food and fiber production, nutrition, medical/genetic research, and ethical issues surrounding pesticide use and genetically modified organisms are also explored.
Lecture: 3 hours
Prerequisite(s): ENG-0990 Language Fundamentals II, or appropriate score on English Placement Test.

BIO-1820 Independent Study/Research in Biology
1-3 Credits
Directed individual study. Study/research title and specific content arranged between instructor and student. (see Credit Schedule of classes for current offerings). May be repeated for a maximum of six credits of different topics.
Lecture: 1-3 hours
Prerequisite(s): Departmental approval, and instructor approval, and ENG-0990 Language Fundamentals II or appropriate score on English Placement Test.

BIO-182H Honors Independent Study in Biology
1-3 Credits
Honors-level directed individual study. Must meet criteria set forth in the Honors Course Checklist used to approve regular honors courses. Study/research title and specific content arranged between instructor and student. May be repeated for a maximum of six credits of different topics.
Lecture: 1-3 hours
Prerequisite(s): Departmental approval and instructor approval, and ENG-0990 Language Fundamentals II or appropriate English placement score, and must have earned an A or B in at least 3 honors courses.

BIO-2020 Tropical Biology
4 Credits
Introduction to biology of the tropics. Topics include major tropical biomes, biodiversity, conservation, sustainability, and consequences of human impact on the tropics. Studies include identification of flora and fauna and adaptations of tropical organisms. In addition to on-campus lecture/lab during an academic term, students are required to participate and travel to a tropical location for a real-world experience. A portion of the laboratory hours will be completed during the mandatory field trip to a tropical ecosystem. Field trip requires additional costs.
Lecture: 3 hours. Laboratory: 3 hours
Prerequisite(s): Departmental approval and any 1000 level science course.

BIO-2060 Principles of Genetics
3 Credits
Introductory level course. Topics include: structure and function of DNA, patterns of inheritance, gene expression and mutations, population genetics and gene technology.
Lecture: 3 hours
Prerequisite(s): BIO-1040 The Cell and DNA, or BIO-1420 Anatomy and Physiology of Domestic Animals II, or BIO-2341 Anatomy and Physiology, or BIO-1500 Principles of Biology I.
OAN Approved: TMNS.

BIO-2070 Techniques in Molecular Genetics
3 Credits
Advanced study of structure and function of DNA with emphasis on laboratory techniques used in molecular biology. Laboratory practices and applications of sterile techniques, gel electrophoresis, DNA isolation, RFLP analysis, plasmids, and recombinant DNA. Protein structure and methods of protein purification explored.
Lecture: 1 hour. Laboratory: 4 hours
Prerequisite(s): BIO-1040 The Cell and DNA, or BIO-2341 Anatomy and Physiology II, or BIO-1500 Principles of Biology I.

BIO-2100 Biology of Aging
3 Credits
Exploration of current biological theories of aging with emphasis on humans. Fundamental concepts of cell biology and physiology will be used to study extrinsic and intrinsic factors of aging. Topics will include normal age related changes and pathology in body systems, senescence, genetics, life expectancy, and improving longevity.
Lecture: 3 hours
Prerequisite(s): BIO-1040 The Cell and DNA, or BIO-1050 Human Biology, or BIO-1500 Principles of Biology I, or BIO-2331 Anatomy and Physiology I.

BIO-2150 Environmental Science
3 Credits
Fundamental ecological concepts and their application to environmental issues emphasizing the impact of human activity on the biosphere. Topics include natural resources, air, water and land pollution, energy, and populations.
Lecture: 3 hours
Prerequisite(s): BIO-1060 Environment, Ecology and Evolution; or BIO-1510 Principles of Biology II.
OAN Approved: TMNS.

BIO-2200 Radiobiology
2 Credits
Theories of the biological effects of ionizing radiation, quantities and units of measurement, proper protective measures for patient and personnel, effective dose equivalents radiation absorption processes and shielding, exposure monitoring devices.
Lecture: 2 hours
Prerequisite(s): BIO-1221 Anatomy and Physiology for Diagnostic Medical Imaging, and departmental approval: admission to Radiography Program.

BIO-2331 Anatomy and Physiology I
4 Credits
Study of structure and function of human body. Focus on fundamental concepts of cellular structure, tissues, organs, and systems. Considers structure, function, and terminology of skeletal, muscular, integumentary, nervous and endocrine systems. Laboratory experiences include demonstrations, microscopic observations, anatomic models, and videos related to topics.
Lecture: 3 hours. Laboratory: 3 hours
Prerequisite(s): Sufficient score on Biology Placement Test or BIO-1100 Introduction to Biological Chemistry, or CHEM-1010 Introduction to Inorganic Chemistry and CHEM-1020 Introduction to Organic Chemistry and Biochemistry, or BIO-1500 Principles of Biology.
BIO-2341 Anatomy and Physiology II
4 Credits
Structure and function of cells, tissues, and organs of the human cardiovascular, lymphatic/immune, respiratory, urinary, digestive, and reproductive systems. Cellular division, embryological and fetal development, classical genetics and genetic technology considered. Laboratory may include demonstrations, microscopic observations, anatomical models, and videos.
Lecture: 3 hours. Laboratory: 3 hours
Prerequisite(s): BIO-2331 Anatomy and Physiology I.

BIO-2500 Microbiology
4 Credits
The diversity of the microbial world is explored through subjects including microbial ecology and evolution, structure and function of microorganisms, metabolism and genetics, control of microorganisms, and host-microbe interactions.
Lecture: 3 hours. Laboratory: 3 hours
Prerequisite(s): BIO-1410 Anatomy and Physiology of Domestic Animals I; or BIO-2331 Anatomy and Physiology I; or BIO-1500 Principles of Biology I; or BIO-1050 Human Biology and BIO-105L Human Biology Laboratory and BIO-1100 Introduction to Biological Chemistry; or departmental approval: comparable knowledge or skills.
OAN Approved: TMNS.

BIO-2600 Pathophysiology
3 Credits
General mechanisms of disease processes and health problems including inflammation, degeneration, immunity, congenital, hereditary, neoplasia as well as diseases caused by deficiencies or excesses. The most commonly occurring diseases of body systems are surveyed.
Lecture: 3 hours
Prerequisite(s): BIO-2341 Anatomy and Physiology II.
OAN Approved: OHL019

BIO-2820 Independent Advanced Study/Research in Biology
1-3 Credits
Directed individual advanced study. Study/research title and specific content arranged between instructor and student. (See Credit Schedule of classes for current offerings). May be repeated for a maximum of six credits of different topics.
Lecture: 1-3 hours
Prerequisite(s): Departmental approval, and instructor approval, and ENG-0990 Language Fundamentals II or appropriate score on English Placement Test.

BIO-282S Independent Advanced Laboratory Study/Research in Biology
1-3 Credits
Independent two-hour lab per credit. Directed individual advanced study. Study/research title and specific content arranged between instructor and student (see Credit Schedule of classes for current offerings). May be repeated for a maximum of six credits of different topics.
Laboratory: 2-6 hours
Prerequisite(s): Departmental approval, and instructor approval, and ENG-0990 Language Fundamentals II or appropriate score on English Placement Test.