# Biology Courses (BIOL)

This is a list of all biology courses. For more information, see Biology.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL:1000</td>
<td>First-Year Seminar</td>
<td>1</td>
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<tr>
<td>BIOL:1060</td>
<td>Big Ideas: Origins of the Universe, Earth, and Life</td>
<td>3</td>
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<tr>
<td>BIOL:1140</td>
<td>Human Biology: Nonmajors</td>
<td>4</td>
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<tr>
<td>BIOL:1141</td>
<td>Human Biology: Health Professions</td>
<td>4</td>
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<tr>
<td>BIOL:1251</td>
<td>How the Brain Works (and Why it Doesn’t)</td>
<td>3-4</td>
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<tr>
<td>BIOL:1260</td>
<td>Plants and Human Affairs</td>
<td>2-3</td>
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<tr>
<td>BIOL:1261</td>
<td>Introduction to Botany</td>
<td>4</td>
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<tr>
<td>BIOL:1295</td>
<td>Career Preparation and Life Design for Biology Majors</td>
<td>1</td>
</tr>
<tr>
<td>BIOL:1370</td>
<td>Understanding Evolution</td>
<td>3</td>
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<tr>
<td>BIOL:1411</td>
<td>Foundations of Biology</td>
<td>4</td>
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<tr>
<td>BIOL:1412</td>
<td>Diversity of Form and Function</td>
<td>4</td>
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<tr>
<td>BIOL:1808</td>
<td>Ways of Knowing Science</td>
<td>1</td>
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<tr>
<td>BIOL:2211</td>
<td>Genes, Genomes, and the Human Condition</td>
<td>3</td>
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<tr>
<td>BIOL:2246</td>
<td>Entomology Lab</td>
<td>4</td>
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<tr>
<td>BIOL:2254</td>
<td>Endocrinology</td>
<td>3</td>
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<tr>
<td>BIOL:2346</td>
<td>Vertebrate Zoology</td>
<td>4</td>
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</tbody>
</table>

1 s.h. = 1 credit hour  
3 s.h. = 3 credit hours  
4 s.h. = 4 credit hours  
3-4 s.h. = 3 to 4 credit hours
**BIOL:2374 Biogeography** 3 s.h.  
Introduction to processes that lead to the patterns of plant and animal distributions we see across the globe; processes of focus include plate tectonics, climate, and human-ecological interactions; species management and conservation in relationship to climate and change in human patterns of environment. Prerequisites: BIOL:1141 or BIOL:1370 or BIOL:1261 or GEOG:1020 or BIOL:1412. Same as GEOG:2374.

**BIOL:2512 Fundamental Genetics** 4 s.h.  
Nature, function of genetic material: classical, molecular, developmental aspects. Prerequisites: BIOL:1411 with a minimum grade of C- and (BIOL:1412 with a minimum grade of C- or PSY:2701 with a minimum grade of C-) and CHEM:1110. Recommendations: CHEM:2210.

**BIOL:2603 Mechanisms of Aging** 3 s.h.  
Evolutionary theories of aging, cellular and genetic basis of aging and repair, disruption of homeostasis in aging; focus on studies of biological and environmental causes of age-related diseases. Prerequisites: BIOL:1411 and (BIOL:1412 or HHP:3500 or PSY:2701).

**BIOL:2663 Plant Response to the Environment** 3 s.h.  
Mechanisms of plant responses to environmental factors (biotic and abiotic) at organismal and molecular levels. Prerequisites: BIOL:1411 and BIOL:1412.

**BIOL:2673 Ecology** 3 s.h.  
Adaptations of organisms to their physical and biological environments; organism-environment interactions; population biology; interactions between species; ecology of communities, ecosystems; human impact on ecosystems. Prerequisites: BIOL:1411 and BIOL:1412. Recommendations: a basic statistics or calculus course. Same as ENV:2673.

**BIOL:2723 Cell Biology** 3 s.h.  
Structures of cells and organelles in relation to their functions at molecular, cellular levels; emphasis on higher eukaryotic cells. Prerequisites: BIOL:1411 and (BIOL:1412 or HHP:3500 or PSY:2701) and CHEM:1120.

**BIOL:2753 Introduction to Neurobiology** 3 s.h.  
Techniques of molecular biology, genomics, neuropharmacology, and functional brain imaging applied to understanding how the brain works. Prerequisites: (BIOL:1412 or HHP:3500) and BIOL:1411.

**BIOL:3172 Evolution** 4 s.h.  
Nature, evidence, analysis, implications, molecular/genetic basis; historical record, phylogeny, speculation, adaptation, investigative methods. Prerequisites: BIOL:2512 with a minimum grade of C- and (STAT:2010 or STAT:3510 or MATH:1550 or MATH:1850 or MATH:1460).

**BIOL:3233 Introduction to Developmental Biology** 3 s.h.  
Fundamental mechanisms in differentiation, organogenesis, morphogenesis; and pattern formation; mechanistic approach at molecular, cellular, tissue levels of organizations. Prerequisites: BIOL:1411 and CHEM:1120 and (BIOL:1412 with a minimum grade of C- or HHP:3500 with a minimum grade of C-). Recommendations: BIOL:2512.

**BIOL:3244 Animal Behavior** 3.5 s.h.  
Genetics, sensory physiology, migration, development of behavior, circadian rhythms, foraging strategies, aggression, sexual and parental behavior, group selection, social behavior. Prerequisites: BIOL:1411 and (BIOL:1412 or PSY:2701).

**BIOL:3253 Neurobiology I** 4 s.h.  
Neurobiology from molecular/cellular to systems levels including cell biology of the neuron; membrane electrophysiology; synaptic transmission and plasticity; functional neuroanatomy; sensory, motor, and autonomic systems; emotion, memory, sleep, language, attention and cognition, neuronal development; focus on systems and developmental neurobiology; first in a two-semester sequence. Prerequisites: BIOL:1411 and (PSY:2701 or BIOL:2753).

**BIOL:3254 Neurobiology II** 4 s.h.  
Neurobiology from molecular/cellular to systems levels including cell biology of the neuron; membrane electrophysiology; synaptic transmission and plasticity; functional neuroanatomy; sensory, motor, and autonomic systems; emotion, memory, sleep, language, attention and cognition, neuronal development; focus on molecular/cellular neurobiology and neurophysiology; second in a two-semester sequence. Prerequisites: BIOL:3253 and (PHYS:1512 or PHYS:1612).

**BIOL:3314 Genomics** 3 s.h.  
Major areas of genomics, including DNA and protein sequence analysis, structural diversity of whole genomes, microarray applications, proteomics; computer workshop experience in applying bioinformatics tools. Prerequisites: BIOL:2211 or BIOL:2512 or BIOL:3310 or BIOL:3120 or BIOL:3110. Same as IGPI:3314.

**BIOL:3343 Animal Physiology** 3 s.h.  
Principles of cellular and systems physiology; emphasis on quantitative and experimental aspects. Prerequisites: BIOL:1411 and CHEM:1110 and CHEM:1120 and (MATH:1380 or MATH:1460 or MATH:1550 or MATH:1850). Recommendations: (PHYS:1511 and PHYS:1512) or (PHYS:1611 and PHYS:1612).

**BIOL:3363 Plant Developmental Biology** 3 s.h.  
Developmental processes throughout life cycle of vascular plants; current knowledge of mechanisms, control; emphasis on molecular and genetic approaches to studying development. Prerequisites: BIOL:2512.

**BIOL:3373 Human Population Genetics and Variation** 3 s.h.  
Principles of evolutionary change of genes and genomes applied to human populations and to comparisons between humans and their closest primate relatives; emphasis on consequences of mutation, natural selection, and demographic changes. Prerequisites: BIOL:2512 with a minimum grade of C- or BIOL:2211 with a minimum grade of C-.

**BIOL:3383 Introduction to Systems Biology** 3 s.h.  
Concepts and skills used to develop computer models that provide insight into the operation of cellular processes like metabolic pathways and genetic circuits. Prerequisites: BIOL:1411 and (MATH:1460 or MATH:1550 or MATH:1850).

**BIOL:3626 Cell Biology Laboratory** 4 s.h.  
Conceptual understanding and technical skills in fluorescence microscopy and digital imaging, mammalian cell culture, tissue fractionation, centrifugation, electrophoresis, and expression of recombinant proteins. Prerequisites: BIOL:2723.
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<tr>
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<tr>
<td>BIOL:3655</td>
<td>Neurogenetics Laboratory</td>
<td>4 s.h.</td>
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<tr>
<td>BIOL:3656</td>
<td>Neurobiology Laboratory</td>
<td>4 s.h.</td>
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<tr>
<td>BIOL:3663</td>
<td>Plant Response to the Environment</td>
<td>3 s.h.</td>
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<tr>
<td>BIOL:3676</td>
<td>Evolution Lab</td>
<td>4 s.h.</td>
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<tr>
<td>BIOL:3713</td>
<td>Molecular Genetics</td>
<td>4 s.h.</td>
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<tr>
<td>BIOL:3716</td>
<td>Genetics and Biotechnology Lab</td>
<td>4 s.h.</td>
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<tr>
<td>BIOL:3736</td>
<td>Developmental Biology Lab</td>
<td>4 s.h.</td>
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<tr>
<td>BIOL:3994</td>
<td>Introduction to Research</td>
<td>2-3 s.h.</td>
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<tr>
<td>BIOL:3999</td>
<td>Independent Research in Neuroscience</td>
<td>2-3 s.h.</td>
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<tr>
<td>BIOL:4213</td>
<td>Bioinformatics</td>
<td>2.4 s.h.</td>
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<tr>
<td>BIOL:4314</td>
<td>Introduction to Synthetic Biology in the Lab</td>
<td>4 s.h.</td>
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<tr>
<td>BIOL:4333</td>
<td>Genes and Development</td>
<td>3 s.h.</td>
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<tr>
<td>BIOL:4353</td>
<td>Neurophysiology: Cells and Systems</td>
<td>3-4 s.h.</td>
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<tr>
<td>BIOL:4373</td>
<td>Molecular Evolution: Genes, Genomes, and Organisms</td>
<td>3 s.h.</td>
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<tr>
<td>BIOL:4386</td>
<td>Introduction to Scientific Computing for Biologists</td>
<td>3 s.h.</td>
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BIOL:3655 Neurogenetics Laboratory: Emphasis on project-oriented training to develop fundamental hands-on experimental manipulations and techniques, problem-solving skills, and data analysis methodology; students utilize modern genetic, behavioral, and electrophysiological methods to explore how gene and environment influence nervous system function and behavioral expression using genetic model organisms. Prerequisites: BIOL:2512 or BIOL:2211. Recommendations: BIOL:2753 or PSY:2701.

BIOL:3656 Neurobiology Laboratory: Principles and practice of neurobiology research, including microscopy and imaging, cellular and molecular neurobiology, and electrophysiology. Prerequisites: (BIOL:1411 and PSY:2701) or BIOL:2753.

BIOL:3663 Plant Response to the Environment: Mechanisms of plant responses to environmental factors (biotic and abiotic) at organismal and molecular levels. Prerequisites: BIOL:2512 or BIOL:2723 or BIOL:3716 or BIOL:3120.

BIOL:3676 Evolution Lab: Methods of sampling and describing variation in natural populations; application of molecular genetic, bioinformatic, and computational techniques to describe genetic variation through sequence analysis; use of controlled laboratory experiments and computer simulations to illustrate evolutionary principles. Prerequisites: BIOL:2512 or BIOL:2211. Corequisites: BIOL:3172 or BIOL:3373, if not taken as a prerequisite. Recommendations: grade of C or higher in BIOL:3172.

BIOL:3713 Molecular Genetics: Mechanism, regulation of RNA, DNA, protein biosynthesis, with emphasis on methods of genetic analysis; application of modern recombinant DNA techniques to basic problems. Prerequisites: BIOL:2512 or BIOL:3120 or BIOL:3110.


BIOL:3736 Developmental Biology Lab: Experimental manipulation of embryos to examine mechanisms of early development, including gametogenesis and fertilization, cleavage, gastrulation, pattern formation and organogenesis; in vivo imaging of development, methods to visualize gene expression and independent research; model organisms including sea urchin, fish, frog, chick, mouse. Prerequisites: BIOL:3233.

BIOL:3994 Introduction to Research: Independent scientific research related to the field of biology.

BIOL:3999 Independent Research in Neuroscience: Independent scientific research related to the field of neuroscience. Same as PSY:3999.
BIOL:4806 Service Learning in Biology.arr.
Credit for community outreach and/or service; service learning projects involve more than just volunteering; preparation of a detailed plan summarizing project goals, activities, and audience; routine meetings with team members and faculty mentor; research and development of educational materials and/or activities focused on a biology topic; plan, promote, support, and assess an event that engages the targeted community.

BIOL:4897 Teaching Internship in Biology 1-3 s.h.
Training and practical experiences in the teaching of biology; includes a weekly training session with a Ph.D. instructor or course supervisor, active assistance of the primary instructor in one or more class meetings each week, and/or providing constructive written feedback on laboratory or classroom exercises; additional experiences may include leading a training session, co-teaching or lead-teaching one or more lab or classroom exercises, and assisting with the development of classroom activities or resources; specific experiences will vary depending on the course and supervisor needs. Prerequisites: BIOL:1411 with a minimum grade of B and BIOL:1412 with a minimum grade of B. Requirements: third- or fourth-year standing and interview with instructor.

BIOL:4898 Communicating Research 1 s.h.
Independent, investigative research experience; research process and communication—establishing goals and expectations with a mentor, developing and framing a research hypothesis or question, communicating results in written and oral form to scientist and nonscientist audiences; supportive learning environment to share research experiences and develop identities as scientists, learn skills to become effective independent researchers and science communicators. Corequisites: BIOL:3994 or BIOL:4999.

BIOL:4995 Honors Research in Neuroscience arr.
Independent scientific research related to the field of neuroscience. Requirements: honors standing in neuroscience, UI g.p.a. of at least 3.33, and neuroscience g.p.a. of at least 3.33. Same as PSY:4995.

BIOL:4998 Honors Seminar in Biology 2 s.h.
Prerequisites: BIOL:1411. Requirements: honors standing.

BIOL:4999 Honors Research in Biology arr.
Independent scientific research related to the field of biology. Requirements: honors standing in biology, UI g.p.a. of at least 3.33, and biology g.p.a. of at least 3.33.

BIOL:5117 Topics in Molecular Genetics 0-2 s.h.
Prerequisites: BIOL:2512 with a minimum grade of B-.

BIOL:5199 Critical Readings in Biology 3 s.h.
Organization, expression, and evolution of genes in context of genomes; focus on human genome; distribution and transmission of variation in human population. Recommendations: BIOL:1411 highly recommended. Same as IGPI:5211.

BIOL:5218 Microscopy for Biomedical Research arr.
Basic microscopic methods for research including optics, preparation, and analysis of biomedical specimens; light, fluorescence, confocal, transmitting electron, scanning electron, atomic force microscopes, elemental analysis; immunochemistry and stereology techniques; individualized laboratory instruction. Prerequisites: BIOL:2723. Same as ACB:5218, MICR:5218.

BIOL:5286 Monoclonal Antibody Technologies 2 s.h.
Provides knowledge of screening and characterization methods for monoclonal antibodies, a powerful tool in molecular cytology, immunohistochemistry, and studies of gene regulation; methods include screening for monoclonal antibodies (mAbs), fluorescence-activated cell sorting (FACS) analysis, enzyme-linked immunosorbent assay (ELISA), Southern blot hybridization, cytochemistry, histochemistry, and induced polarization (IP).

BIOL:5320 Computational Genomics 3 s.h.
Introduction to computational methods used in genome analysis and functional genomics; biological sequence analysis, sequence database search, microarray data analysis, biological network analysis; in-depth coverage of principal genome science challenges and recent solutions. Prerequisites: (BIOS:4120 or STAT:3510) and (CS:5110 or ENGR:1300). Recommendations: completion of BME:5320. Same as BME:5330, ECE:5220, GENE:5173, IGPI:5330.

BIOL:5412 Fundamental Genetics - Graduate Lecture 3 s.h.

BIOL:5512 Fundamental Genetics - Graduate Discussion 1 s.h.
Critical evaluation of classic genetics papers. Requirements: biology graduate standing.

BIOL:5653 Fundamental Neurobiology I 3 s.h.
Neurobiology from molecular/cellular to systems levels, including cell biology of the neuron; membrane electrophysiology; synaptic transmission and plasticity, functional neuroanatomy, sensory, motor and autonomic systems; emotion, memory, sleep, language, attention and cognition, neuronal development; focus on systems and developmental neurobiology; first in a two-semester sequence. Same as NSCI:5653, PSY:5203.

BIOL:5654 Fundamental Neurobiology II 3 s.h.
Neurobiology from molecular/cellular to systems levels, including cell biology of the neuron; membrane electrophysiology; synaptic transmission and plasticity, functional neuroanatomy, sensory, motor and autonomic systems; emotion, memory, sleep, language, attention and cognition, neuronal development; focus on molecular/cellular neurobiology and neurophysiology; second in a two-semester sequence. Prerequisites: BIOL:5653 or NSCI:5653 or PSY:5203.

BIOL:5658 Fundamental Neurobiology I Discussion 1 s.h.
Discussion of selected papers, including classics from neurobiology literature; coordinated with BIOL:5653 lecture material. Same as NSCI:5658, PSY:5204.

BIOL:5659 Fundamental Neurobiology II Discussion 1 s.h.
Discussion of selected papers, including classics from neurobiology literature; coordinated with BIOL:5654 lecture material.

BIOL:6188 Seminar: Writing in Natural Sciences 2 s.h.
Writing and critiquing skills in the natural sciences.

BIOL:6199 Research: Biology arr.

BIOL:6265 Neuroscience Seminar 0-1 s.h.
Research presentations. Same as ACB:6265, MPB:6265, NSCI:6265, PSY:6265.
Analysis and presentation of primary research on central biological questions utilizing a full array of model and non-model organisms and analytical approaches; development of effective skills in public speaking, presentation, and scientific writing.

BIOL:6899 Independent Study in Biology arr.

BIOL:7270 Principles of Scholarly Integrity 1 s.h.
Training in responsible conduct of research; student/mentor responsibilities; authorship and reviewing; plagiarism/falsification/fabrication of data; intellectual property; conflict of interest; fiscal, institutional, societal; treatment of human and animal subjects; data handling. Requirements: enrollment in graduate psychology or biology program. Same as PSY:7270.

BIOL:7604 Principles of Scholarly Integrity 0 s.h.
Training in responsible conduct of research and scholarly activities; student/mentor responsibilities; authorship; plagiarism/falsification/fabrication of data; intellectual property; conflict of interest; fiscal, institutional, societal; treatment of human and animal subjects; data handling. Requirements: postdoctoral standing in psychology or biology. Same as PSY:7604.