BIOLOGICAL SCIENCES

biosci.northwestern.edu

The science of biology constitutes the study of organisms at all levels of complexity and in all their diversity. The undergraduate major in biological sciences provides a broad, modern curriculum in the life sciences and offers focused concentrations and the potential for laboratory research.

The goal of a major in biological sciences at a research university is to develop and enhance the intellectual and creative potential of life sciences students. To this end, the major includes the following:

- A foundation in mathematics, statistics, chemistry, and physics
- A core curriculum introducing fundamental areas of biological science
- Concentrations that subsequently focus students' interests
- Opportunities to conduct research

In addition to biology courses, students complete the courses listed as related courses (see biological sciences major (https://catalogs.northwestern.edu/undergraduate/arts-sciences/biological-sciences/biological-sciences-major/)). First-year students usually complete the general chemistry, calculus, and statistics requirements; in spring quarter they take BIOL_SCI 201-0 Molecular Biology.

During the sophomore year, students usually complete the organic chemistry requirement, BIOL_SCI 202-0 Cell Biology, BIOL_SCI 203-0 Genetics and Evolution, BIOL_SCI 232-0 Molecular and Cellular Processes Laboratory, BIOL_SCI 233-0 Genetics and Molecular Processes Laboratory, BIOL_SCI 234-0 Investigative Laboratory, and BIOL_SCI 301-0 Principles of Biochemistry. These core biology courses address the central topics in contemporary biology with a goal of preparing students for further study in either the biological sciences or professional school. The physics requirement may be completed in this or later years.

The junior and senior years permit students to explore a focused area in biological sciences that builds on the principles of the core. There are eight areas of concentration from which to choose. A student's concentration will be noted on the transcript; only one concentration may be noted. (Biochemistry and Biophysics is not available as a concentration to students also pursuing a Biochemistry track in the Chemistry major. Molecular Neurobiology is not available to students also pursuing a Neuroscience major.)

Once the biological sciences major is declared, students are assigned faculty academic advisers.

Students have the opportunity to conduct a research project in the laboratory of a faculty research supervisor with whom they design a plan of study. The supervisor may be a Northwestern faculty member in any department who is engaging in biological research. Research areas of faculty can be accessed via the biological sciences website.

Honors Program in Medical Education Students

See the relevant section of this Catalog for information on the Honors Program in Medical Education (https://catalogs.northwestern.edu/undergraduate/dual-graduate-undergraduate-degrees/honors-program-medical-education/). Waiver of one 300-level Elective course is the only HPME waiver that may be applied toward the biological sciences major.

The Teaching of Biological Sciences

Weinberg College students pursuing a major in biological sciences who also wish to be certified for secondary teaching must be admitted to the Secondary Teaching Program (https://catalogs.northwestern.edu/undergraduate/education-social-policy/secondary-teaching/) in the School of Education and Social Policy and complete all requirements as outlined in the SESP chapter of this catalog. Students are urged to contact the Office of Student Affairs in SESP as early as possible in their academic careers.

Programs of Study

- Biological Sciences Major (https://catalogs.northwestern.edu/undergraduate/arts-sciences/biological-sciences/biological-sciences-major/)
- Biological Sciences Second Major for ISP Students (https://catalogs.northwestern.edu/undergraduate/arts-sciences/biological-sciences/biological-sciences-second-major-isp-students/)

BIOL_SCI 100-0 Introduction to Biological Sciences at Northwestern (1 Unit) For participants in Bio&ChemEXCEL summer program. An overview of recent advances in biological research and leadership within the field of biology. Taken with CHEM 100-0. *Natural Sciences Distro Area*

BIOL_SCI 101-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

BIOL_SCI 102-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

BIOL_SCI 103-0 Diversity of Life (1 Unit) Comparative survey of organisms, emphasizing adaptation and phylogenetic relationships. Particular emphasis on animals. *Natural Sciences Distro Area*

BIOL_SCI 103-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

BIOL_SCI 104-0 Plant-People Interactions (1 Unit) Biology and history of the interaction of humans and flowering plants. *Natural Sciences Distro Area*

BIOL_SCI 104-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

BIOL_SCI 105-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

BIOL_SCI 106-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

BIOL_SCI 107-6 First-Year Seminar (1 Unit) *WCAS First-Year Seminar*

BIOL_SCI 108-6 First-Year Seminar (1 Unit)

BIOL_SCI 109-0 The Nature of Plants (1 Unit) Plant adaptations for growth, survival, and reproduction. Plant defense against herbivory, pollination, and seed dispersal. *Natural Sciences Distro Area*

BIOL_SCI 109-6 First-Year Seminar (1 Unit)

BIOL_SCI 110-6 First-Year Seminar (1 Unit)

BIOL_SCI 111-6 First-Year Seminar (1 Unit)

BIOL_SCI 112-6 First-Year Seminar (1 Unit)

BIOL_SCI 115-6 First-Year Seminar (1 Unit) For participants in the NUBioscientist program. Biological Thought & Action; preparatory to BIOL_SCI 116-6. *WCAS First-Year Seminar*

BIOL_SCI 116-6 First-Year Seminar (1 Unit) For participants in the NUBioscientist program. Science Research Preparation; follows BIOL_SCI 115-6. *WCAS First-Year Seminar*

BIOL_SCI 150-0 Human Genetics (1 Unit) Basic principles of human inheritance and genetic variation. *Natural Sciences Distro Area*

BIOL_SCI 160-0 Human Reproduction (1 Unit) Basic biology of reproduction; relation between hormones, emotions, intelligence, and behavior; related policy issues. *Natural Sciences Distro Area*

BIOL_SCI 164-0 Basic Genetics and Evolution (1 Unit) Principles of inheritance as they apply to evolution. May not receive credit after taking BIOL_SCI 203-0 or BIOL_SCI 215-0. *Natural Sciences Distro Area*

BIOL_SCI 201-0 Molecular Biology (1 Unit) This course focuses on how information is stored and propagated in DNA, and used and regulated to generate proteins at the proper time and location. It also applies this information to understanding fundamentals of biotechnology. Credit not allowed for both BIOL_SCI 201-0 and BIOL_SCI 215-0. *Natural Sciences Distro Area*

BIOL_SCI 201-SG Peer-Guided SG: Molecular Biology (0 Unit) Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U. Co-requisite: BIOL_SCI 201-0.

BIOL_SCI 202-0 Cell Biology (1 Unit) This course covers how biomolecules function together to generate the complexity of cells, and how cells behave collectively to communicate with each other and to enact key decisions, such as proliferation and cell death. Must be taken concurrently with BIOL_SCI 232-0. Prerequisite: BIOL_SCI 201-0. Credit not allowed for both BIOL_SCI 202-0 and BIOL_SCI 219-0. *Natural Sciences Distro Area*

BIOL_SCI 202-SG Peer-Guided SG: Cell Biology (0 Unit) Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U. Co-requisite: BIOL_SCI 202-0.

BIOL_SCI 203-0 Genetics and Evolution (1 Unit) This course provides an analytic framework for studying the flow of biological information across generations, and understanding how phenotypes reveal biological mechanisms. This framework is applied to development, cancer, the history of life, and mechanisms governing the evolution and distribution of organisms over time. Must be taken concurrently with BIOL_SCI 233-0. Prerequisite: BIOL_SCI 202-0. *Natural Sciences Distro Area*

BIOL_SCI 203-SG Peer-Guided Study Group: Genetics and Evolution (0 Unit) Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U. Co-requisite: BIOL_SCI 203-0.

BIOL_SCI 213-0 Undergraduate Teaching Assistant (0 Unit) Prerequisite: consent of instructor.

BIOL_SCI 215-0 Genetics and Molecular Biology (1 Unit) Principles of inheritance; gene function; mechanisms by which DNA is replicated, transcribed into RNAs, and translated into proteins; basics of the process of natural selection. Prerequisite: CHEM 131-0, CHEM 151-0, or CHEM 171-0. *Natural Sciences Distro Area*

BIOL_SCI 215-SG Peer-Guided Study Group: Genetics & Molecular Biology (0 Unit) Peer-guided study group for students enrolled in BIOL_SCI 215-0. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

BIOL_SCI 217-0 Physiology (1 Unit) Organization and functioning of the major organ systems in mammals. Prerequisite: CHEM 131-0, CHEM 151-0, or CHEM 171-0. *Natural Sciences Distro Area*

BIOL_SCI 217-SG Peer-Guided Study Group: Physiology (0 Unit) Peer-guided study group for students enrolled in BIOL_SCI 217-0. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

BIOL_SCI 219-0 Cell Biology (1 Unit) Mechanisms that cells use to compartmentalize and transport proteins, to move, to regulate growth and death, and to communicate with their environments. Prerequisite: CHEM 131-0, CHEM 151-0, or CHEM 171-0. *Natural Sciences Distro Area*

BIOL_SCI 219-SG Peer-Guided Study Group: Cell Biology (0 Unit) Peer-guided study group for students enrolled in BIOL_SCI 219-0. Meets weekly in small groups, along with a peer facilitator, to collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

BIOL_SCI 220-0 Genetics and Molecular Processes Laboratory (0.34 Unit) Laboratory techniques and experiments in fundamental aspects of transmission genetics and molecular biology. Prerequisite: CHEM 131-0, CHEM 151-0, or CHEM 171-0.

BIOL_SCI 221-0 Cellular Processes Laboratory (0.34 Unit) Laboratory techniques and experiments in fundamental aspects of cell biology. Prerequisite: BIOL_SCI 220-0.

BIOL_SCI 222-0 Investigative Laboratory (0.34 Unit) A culminating life-science lab experience. Prerequisite: BIOL_SCI 221-0.

BIOL_SCI 232-0 Molecular and Cellular Processes Laboratory (0.34 Unit) Laboratory techniques and experiments in fundamental aspects of cell and molecular biology. Must be taken concurrently with BIOL_SCI 202-0. Credit not allowed for both BIOL_SCI 221-0 and BIOL_SCI 232-0.

BIOL_SCI 233-0 Genetics and Molecular Processes Laboratory (0.34 Unit) Laboratory techniques and experiments in fundamental aspects of transmission genetics and molecular biology. Must be taken concurrently with BIOL_SCI 203-0. Prerequisite: BIOL_SCI 232-0. Credit not allowed for both BIOL_SCI 220-0 and BIOL_SCI 233-0.

BIOL_SCI 234-0 Investigative Laboratory (0.34 Unit) A culminating life-science laboratory experience. Prerequisite: BIOL_SCI 233-0. Credit not allowed for both BIOL_SCI 222-0 and BIOL_SCI 234-0.

BIOL_SCI 240-0 Biochemistry, Molecular and Cell Biology - 1 for ISP (1 Unit) This course aims to provide a framework for understanding the chemistry, structure and function of life's smallest functional units known as cells. Starting out with a basic description of inherent properties of biological macromolecules, the course deals with information storage, the flow of genetic information, cytoskeleton, cell organelles, and cell division. Prerequisite: must be enrolled in the Integrated Science Program.

BIOL_SCI 241-0 Biochemistry, Molecular and Cell Biology - 2 for ISP (1 Unit) The course takes an in depth look at how the chemical and physical properties of organic molecules drive all aspects of life. Focus on principles of chemical evolution/diversification, biological membranes, membrane transport processes, enzyme structure and function, molecular signaling and design principles of the metabolic engine that enables the breakdown and synthesis of biological macromolecules. Prerequisites: CHEM 171-0, CHEM 172-0, CHEM 212-1, BIOL_SCI 240-0, and ISP standing.

BIOL_SCI 301-0 Principles of Biochemistry (1 Unit) Biochemical processes. May not receive credit for both BIOL_SCI 301-0 and the former BIOL_SCI 308-0. Prerequisite: CHEM 210-2 or CHEM 212-2. *Natural Sciences Distro Area*

BIOL_SCI 301-SG Peer-Guided Study Group: Principles of Biochemistry (0 Unit) Peer-guided study group for students enrolled in BIOL_SCI 301-0. Meets weekly in small groups, along with a peer facilitator, to

collaboratively review material, work through practice problems, and clarify course concepts. Enrollment optional. Graded S/U.

BIOL_SCI 302-0 Fundamentals of Neurobiology (1 Unit)
Cellular and biochemical approaches to the nervous system, focusing on neuron structure and function. May not receive credit for both BIOL_SCI 302-0 and NEUROSCI 202-0.
Prerequisites: BIOL_SCI 201-0 or BIOL_SCI 215-0; BIOL_SCI 219-0; and BIOL_SCI 301-0.

BIOL_SCI 303-0 Molecular Neurobiology (1 Unit) Exploration of the overlap between neurobiology and molecular biology. Prerequisite: BIOL_SCI 302-0 or NEUROSCI 311-0.

BIOL_SCI 305-0 Neurobiology Laboratory (1 Unit)
Hands-on experience in the performance of experiments in cellular neurophysiology.
Prerequisites: BIOL_SCI 222-0; BIOL_SCI 302-0 or NEUROSCI 311-0.

BIOL_SCI 307-0 Brain Structure, Function, and Evolution (1 Unit) An overview of the evolution of the nervous system and cognition, from the origin of neurons to the structure and function of the human brain. No P/N. Prerequisite: BIOL_SCI 302-0, BIOL_SCI 325-0, or BIOL_SCI 344-0. *Natural Sciences Distro Area*

BIOL_SCI 315-0 Advanced Cell Biology (1 Unit)
Relationship of shape, structural dynamics, and function with the cellular state and gene expression; cell-to-cell communication.
Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; BIOL_SCI 301-0 or the former BIOL_SCI 308-0.

BIOL_SCI 319-0 Biology of Animal Viruses (1 Unit) Virus structure, synthesis of viral nucleic acids and proteins, the interaction of the viral and cellular genomes. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; BIOL_SCI 301-0 or the former BIOL_SCI 308-0.

BIOL_SCI 323-0 Bioinformatics: Sequence and Structure Analysis (1 Unit)
Use of informational and modeling techniques to explore evolutionary and other problems related to the genome.
Prerequisite: BIOL_SCI 241-0, BIOL_SCI 301-0, or the former BIOL_SCI 308-0.

BIOL_SCI 325-0 Animal Physiology (1 Unit) Physiological principles and mechanisms responsible for the ability of animals to regulate variables in the steady state. Prerequisite: BIOL_SCI 217-0.

BIOL_SCI 327-0 Biology of Aging (1 Unit)
Biological aspects of aging, from molecular to evolutionary.
Prerequisite: BIOL_SCI 219-0.

BIOL_SCI 328-0 Microbiology (1 Unit) How microbes interact with their environments, including with humans. Lecture and Laboratory.
Prerequisites: BIOL_SCI 201-0 or BIOL_SCI 215-0; BIOL_SCI 219-0; BIOL_SCI 222-0; and BIOL_SCI 301-0.

BIOL_SCI 332-0 Conservation Genetics (1 Unit) Critical issues in the management and understanding of endangered populations.
Prerequisite: BIOL_SCI 215-0 or ENVR_SCI 202-0.

BIOL_SCI 333-0 Plant-Animal Interactions (1 Unit) Plant-animal interactions, and their consequences for individuals, populations, ecological communities, and ecosystems. Examination of how these interactions are responding to ongoing global factors such as anthropogenic habitat destruction and climate change. Prerequisite: The former BIOL_SCI 330-0, BIOL_SCI 339-0, or ENVR_SCI 202-0. *Natural Sciences Distro Area*

BIOL_SCI 334-0 Soils and the Environment: The Earth's Critical Zone (1 Unit) Soil development and morphology; physical, chemical, hydrologic, and biological properties of soils. Prerequisite: BIOL_SCI 215-0 or ENVR_SCI 202-0.

BIOL_SCI 336-0 Spring Flora (1 Unit) Life cycles, vegetative and reproductive structures, and adaptations for pollination and fruit and seed dispersal of the wildflowers, trees, and shrubs of oak woodland. Prerequisite: BIOL_SCI 215-0, BIOL_SCI 240-0, or ENVR_SCI 202-0.

BIOL_SCI 337-0 Biostatistics (1 Unit) Approaches, methods, and techniques for analyzing datasets in ecology and conservation biology. Prerequisites: BIOL_SCI 215-0 or ENVR_SCI 202-0; a course in statistics.

BIOL_SCI 339-0 Critical Topics in Ecology and Conservation (1 Unit)
Seminar discussing historical and modern publications in the field.
Prerequisite: BIOL_SCI 201-0, BIOL_SCI 215-0, or ENVR_SCI 202-0.

BIOL_SCI 341-0 Population Genetics (1 Unit)
Processes that affect allele frequency change and thus cause evolution.
Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; a course in statistics.

BIOL_SCI 342-0 Evolutionary Processes (1 Unit) Evolutionary mechanisms (natural selection, genetic drift), evolutionary history (speciation, phylogenetics), and adaptations (sex, cooperation, aging, life history). Prerequisites: BIOL_SCI 201-0 or BIOL_SCI 215-0, BIOL_SCI 219-0; and a course in statistics.

BIOL_SCI 344-0 Anatomy of Vertebrates (1 Unit) Vertebrate phylogeny illustrated via comparative morphology; anatomical/ functional and ontogenetic considerations; dissections. Prerequisite: BIOL_SCI 103-0 or BIOL_SCI 203-0.

BIOL_SCI 345-0 Topics in Biology (1 Unit)
Topics vary but always deal with an area of advanced study in the life sciences. With laboratory. May be repeated for credit with different topic.
Prerequisites: BIOL_SCI 201-0 or BIOL_SCI 215-0; BIOL_SCI 219-0; and BIOL_SCI 222-0.

BIOL_SCI 346-0 Field Ecology (1 Unit)
An intensive experience in field ecological research.
Prerequisites: BIOL_SCI 215-0; a course in statistics.

BIOL_SCI 347-0 Conservation Biology (1 Unit)
Evolution, ecology, and conservation of patterns of biological diversity.
Prerequisites: BIOL_SCI 215-0 or ENVR_SCI 202-0; a course in statistics.

BIOL_SCI 349-0 Community Ecology (1 Unit) Abundance, distribution, diversity, and scaling in plant communities in space-time. Prerequisite: The former BIOL_SCI 330-0 or BIOL_SCI 339-0.

BIOL_SCI 350-0 Plant Evolution and Diversity Lab (1 Unit) Introduction to the diversity and evolutionary history of land plants. Prerequisite: The former BIOL_SCI 330-0 or BIOL_SCI 339-0.

BIOL_SCI 353-0 Molecular Biology Laboratory (1 Unit) Project-based approach to learning lab skills in eukaryotic molecular biology.
Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; BIOL_SCI 301-0 or the former BIOL_SCI 308-0.

BIOL_SCI 354-0 Quantitative Analysis of Biology (1 Unit)
Random genetic processes, gene expression, cell adaptation, cell cycle, developmental morphogens, phylgenomics.
Prerequisite: BIOL_SCI 201-0 or BIOL_SCI 215-0.
Natural Sciences Distro Area

BIOL_SCI 355-0 Immunobiology (1 Unit)
Nature of host resistance; characteristics of antigens, antibodies; basis of immune response; hypersensitivity.
Prerequisites: BIOL_SCI 201-0 or BIOL_SCI 215-0; BIOL_SCI 219-0; and BIOL_SCI 301-0.

BIOL_SCI 356-0 Endocrinology (1 Unit)

Physiology and biochemistry of hormones and glands of internal secretion in vertebrates; endocrine glands.
Prerequisite: BIOL_SCI 325-0.

BIOL_SCI 358-0 Advanced Physiology Laboratory (1 Unit)
Experiments in several physiological systems. Design, techniques, data analysis, and report writing emphasized.
Prerequisites: BIOL_SCI 217-0, BIOL_SCI 222-0.

BIOL_SCI 359-0 Quantitative Experimentation in Biology (1 Unit)
Laboratory in experimental methods in quantitative biology. Random genetic processes, gene expression, cell cycle, developmental morphogens, genome sequencing. Prerequisite: BIOL_SCI 201-0, BIOL_SCI 215-0, or BIOL_SCI 354-0. *Natural Sciences Distro Area*

BIOL_SCI 360-0 Principles of Cell Signaling (1 Unit) Emphasis on principles, components, and logic that are common to different cell signaling systems. Modern experimental strategies for studying cellular signaling as well as the implications of disrupting cell communication pathways in disease will be described. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0.

BIOL_SCI 361-0 Protein Structure and Function (1 Unit)
Structure and function of proteins; x-ray crystallography and NMR.
Prerequisite: BIOL_SCI 301-0.

BIOL_SCI 363-0 Biophysics (1 Unit) Protein interaction with small molecules; protein tertiary structure determination. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; BIOL_SCI 301-0 or the former BIOL_SCI 308-0.

BIOL_SCI 378-0 Functional Genomics (1 Unit)
Patterns of gene expression and their causes.
Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; a course in statistics.

BIOL_SCI 380-0 Biology of Cancer (1 Unit) The disease of cancer: causation at the cell and molecular levels; treatment. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0, and (BIOL_SCI 301-0 or the former BIOL_SCI 308-0).

BIOL_SCI 381-0 Stem Cells and Regeneration (1 Unit) Developmental and molecular biology of tissue regeneration, with regard to regeneration from embryonic or adult stem cells. Discussion of conserved developmental pathways necessary for regeneration. Applications in regenerative medicine. Prerequisites: BIOL_SCI 215-0 and BIOL_SCI 219-0. *Natural Sciences Distro Area*

BIOL_SCI 390-0 Advanced Molecular Biology (1 Unit)
Nucleic acid structure; DNA mutation, repair, recombination, replication, restriction, and modification; translation.
Prerequisites: BIOL_SCI 201-0 or BIOL_SCI 215-0; BIOL_SCI 219-0; and BIOL_SCI 301-0.

BIOL_SCI 391-0 Development and Evolution of Body Plans (1 Unit)
Molecular mechanisms underlying early embryonic development, including establishment of the body and organogenesis. Discussion of original literature.
Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0; BIOL_SCI 301-0 or the former BIOL_SCI 308-0.

BIOL_SCI 392-0 Developmental Genetics Laboratory (1 Unit)
Development of independent projects alongside classic readings and experiments exploring key concepts in developmental biology.
Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0, BIOL_SCI 222-0; BIOL_SCI 301-0 or the former BIOL_SCI 308-0.

BIOL_SCI 393-0 Human Genomics (1 Unit) Recent advances in human ancestry and clinical medicine have underscored the importance of genetic principles. Biomedical Genetics will dive deeply into the logic and methods of transmission and regulatory genetics. Prerequisites: BIOL_SCI 215-0, BIOL_SCI 219-0, and either BIOL_SCI 301-0 or the former BIOL_SCI 308-0. *Natural Sciences Distro Area*

BIOL_SCI 395-0 Molecular Genetics (1 Unit)
Exploration of recent advances that have revolutionized the fields of gene expression and cell regulation. Discussion of articles and primary research papers.
Prerequisite: BIOL_SCI 378-0, BIOL_SCI 390-0, or BIOL_SCI 393-0.

BIOL_SCI 396-0 Evolution and Diversity: Mushroom Genetics and Genomics (1 Unit) The occurrence of natural genetic variation is the raw material with which evolution has sculpted every species that has ever existed. In this laboratory-based course, students are immersed in the world of a widespread and biologically famous mushroom-forming fungus. Prerequisites: BIOL_SCI 215-0 and BIOL_SCI 222-0.

BIOL_SCI 397-0 Senior Thesis Colloquium (1 Unit) Supervision while writing a Senior Thesis. Discussion of students' research. Instructor feedback on thesis drafts. Continued student research. Enrollment limited to Senior Biological Sciences majors hoping to graduate with Program Honors and/or to produce a Senior Thesis. Registration required for all Honors candidates.

BIOL_SCI 398-0 Tutorial in Biology (1 Unit) Supervised reading and discussion or supervised laboratory work. P/N only.

BIOL_SCI 399-0 Independent Research (1 Unit) Supervised independent research project. Prerequisite: BIOL_SCI 398-0 or previous BIOL_SCI 399-0.