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# Biology (BIOL)

## Courses

**BIOL 111. Concepts of Biology. 4 Credits.**
An introductory level non-majors transferable class designed to meet the requirements of a lab science. This class is an introduction to the major concepts of modern biology through lecture and laboratory work on the structure, function, diversity, and interrelationships of living organisms, with emphasis on areas of human concern.
**Typically Offered:** Fall, Spring.

**BIOL 121. Introduction to Fisheries and Wildlife Sciences. 4 Credits.**
An introduction to the basic principles that are integral to understanding fisheries and wildlife sciences. The course covers the history of management and legislation, general concepts of management, general field and lab methods, and wildlife and fisheries careers.
**Typically Offered:** Fall.

**BIOL 122. Fisheries and Wildlife Techniques. 4 Credits.**
A study of the field and laboratory techniques necessary for management and research of fish and wildlife populations, habitat evaluation, and sex and aging techniques.
**Typically Offered:** Spring.

**BIOL 150. General Biology I. 4 Credits.**
A two-semester sequenced study of the fundamental concepts of biology through lecture and laboratory work. BIOL 150 is focused on cellular biology and physiology. BIOL 151 focuses on concepts such as classification, evolution, and ecology. Recommended for students interested in science (required for certain majors and minors).
**Typically Offered:** Fall, Spring.

**BIOL 151. General Biology II. 4 Credits.**
A two-semester sequenced study of the fundamental concepts of biology through lecture and laboratory work. BIOL 150 is focused on cellular biology and physiology. BIOL 151 focuses on concepts such as classification, evolution, and ecology. Recommended for students interested in science (required for certain majors and minors).
**Typically Offered:** Spring.

**BIOL 170. General Zoology. 4 Credits.**
A survey of the animal kingdom. Major invertebrate and vertebrate animal groups are studied with emphasis on structure, function, life history and evolutionary advancements of each.
**Typically Offered:** Spring.

**BIOL 171. Medical Terminology. 3 Credits.**
An introduction into medical terminology. Topics includes prefixes, suffixes and root words, their meaning, spelling and pronunciation and the use of term in medical documentation. Emphasis is on building a working medical vocabulary based on body systems and diseases.
**Typically Offered:** Fall.

**BIOL 194. Independent Study. 1-3 Credits.**
Directed reading, study, and/or activities in selected topics.
**Typically Offered:** On sufficient demand.
**Repeatable:** Up to 12 Credits.

**BIOL 199. Special Topics. 1-4 Credits.**
Courses not offered in the regular catalog that provide an opportunity to extend student learning.
**Typically Offered:** On sufficient demand.
**Repeatable:** Up to 12 Credits.

**BIOL 200. Field Biology. 2 Credits.**
A survey of the animal and plant species in local natural habitats with concentrated work on a selected topic. Filed trips for collection, identification, and preservation of specimens are required.
**Typically Offered:** On sufficient demand.

**BIOL 220. Human Anatomy and Physiology I. 4 Credits.**
A study of the structures and functions of the human body. The lab work includes physiological exercises, cat dissection with comparison to human structures and computer simulations. Topics include cells and tissues and the skin, bone, muscle, circulatory and the respiratory system.
**Typically Offered:** Fall.
**Prerequisite**: BIOL 111 or BIOL 150 or BIOL 151.

**BIOL 221. Human Anatomy and Physiology II. 4 Credits.**
The study of the structures and functions of the human body. The lab work includes physiological exercises, cat dissection with comparison to human structures and computer simulations. Topics include nerve system and the brain, senses and special senses and the endocrine, immune, reproductive, urinary and digestive systems. This course is designed to fulfill the anatomy and physiology requirements for psychology majors.
**Typically Offered:** Spring.
**Prerequisite**: BIOL 111 or BIOL 150 or BIOL 151.

**BIOL 267. Environmental History. 3 Credits.**
A survey of the interrelationship between the natural environment and the people who inhabit the land. Emphasis is given to the factors and events which have changed and challenged America's attitude toward the land and its natural resources. The course covers both grassroots movements and government policies that have resulted in the conservation and environmental movements in American history. Cross-referenced with HIST 267.
**Typically Offered:** Spring, odd years.
**Same As:** BIOL 267/HIST 267.

**BIOL 280. Park Management and Communications. 4 Credits.**
This course provides students with the skills necessary to manage a park for the purpose of balancing conservation and resource management with public recreation and education. Topics covered include park operations and management, communications and public relations, and nature interpretation through experiential learning. Labs feature field trips including park visits, hands-on projects and demonstrations by professionals from the region.
**Typically Offered:** Fall.

**BIOL 294. Independent Study. 1-3 Credits.**
Directed reading, study, and/or activities in selected topics.
**Typically Offered:** On sufficient demand.
**Repeatable:** Up to 12 Credits.

**BIOL 299. Special Topics. 1-4 Credits.**
Courses not offered in the regular catalog that provide an opportunity to extend student learning.
**Typically Offered:** On sufficient demand.
**Repeatable:** Up to 12 Credits.

**BIOL 310. Microbiology. 4 Credits.**
An introduction to the morphology, physiology, taxonomy, and ecology of micro organisms. Lecture and laboratory work deal with the history, isolation, identification, and culture of microorganisms. The fields of epidemiology, bioethics, and environmental microbiology will be discussed.
**Typically Offered:** Spring.
**Prerequisites**: one Biology class and one Chemistry class.

**BIOL 311. General Botany. 4 Credits.**
A general botany course covering plant evolutionary history, form, structure, and physiology. Lectures focus on plant diversity through time and a general knowledge of plant function. Labs emphasize cells, tissues, phyla, and physiology of plants.
**Typically Offered:** Spring.
**Prerequisites**: BIOL 150 and BIOL 151.

**BIOL 312. Plant Diversity. 4 Credits.**
A plant taxonomy course focusing on classification of plants at the family level and identification at the species level. Lectures focus on learning traits of plant families with an emphasis on North Dakota plants and an occasional lesson on economically important plants. Labs focus on plant identification, using a dichotomous key, and a large plant collection.
**Typically Offered:** Fall.
**Prerequisites**: BIOL 150 and BIOL 151.

**BIOL 315. Genetics. 4 Credits.**
A study of the basis of heredity with emphasis on the structure and function of DNA and Mendelian genetics. Course work includes lecture and discussion on concepts in linkage, mutation, mechanisms of heredity, genetic mapping, molecular genetics, population genetics, current issues and research in genetics. Laboratory work includes experiments with Drosophila chromosomes and inheritance patterns.
**Typically Offered:** Spring.
**Prerequisites**: BIOL 150 and BIOL 151.

**BIOL 330. North Dakota Flora. 3 Credits.**
A systematic study of North Dakota summer flora including field work consisting of plant identification and ecology. Lectures and lab work cover taxonomy and classification, and the medicinal and economic value of plants.
**Typically Offered:** On sufficient demand.

**BIOL 336. Range Management and Range Plants. 4 Credits.**
An application of rangeland management methods in the Northern Great Plains. After being provided an overview of rangeland ecological concepts, students will explore current research in rangeland management and apply ecological concepts to the development of a land management plan of their own. Labs include field trips to observe land management in action and identification of common rangeland plants with an emphasis on grasses.
**Typically Offered:** Fall.

**BIOL 340. Research Methods. 4 Credits.**
An overview of research techniques and methodologies used in biomedical research and health care. This course covers practices of qualitative and quantitative research design and analysis, measurement concepts in research and state and federal regulations using animals and humans in research. Fundamentals and specific applications of the most common data gathering and measurement techniques are addressed.
**Typically Offered:** Fall.
**Prerequisite**: Junior Standing or Senior Standing.

**BIOL 343. Ornithology. 4 Credits.**
A study of the identification, life history, physiology, migration, and ecology of birds. Course includes frequent field trips for practice in the recognition of species common to North Dakota.
**Typically Offered:** Spring.
**Prerequisite**: BIOL 151.

**BIOL 347. Aquatic Entomology. 4 Credits.**
A study of the diversity of aquatic insects and invertebrates focusing on their identification and importance in aquatic ecosystems. Course includes frequent field trips for collection of specimens.
**Typically Offered:** Fall.
**Prerequisites**: BIOL 150 and BIOL 151.

**BIOL 350. Environmental Contaminants. 3 Credits.**
An introduction to the major groups of environmental contaminants and their effects on ecosystems and human health. Students will learn about sources of contaminants, their persistence in the environment, and the pathways of contaminants into waterways, organisms, and the atmosphere. Efforts or methods to prevent or mitigate contamination will also be covered. Students will research and present case studies related to environmental contamination.
**Typically Offered:** Fall, odd years.

**BIOL 355. Mammalogy. 4 Credits.**
A study of the biology, classification, biogeography, ecology, and behavior of North American mammals. Labs cover mammal identification and life histories, trapping, and include multiple field trips.
**Typically Offered:** Fall.
**Prerequisite**: BIOL 151.

**BIOL 360. Environmental Law and Regulations. 3 Credits.**
An introduction to environmental laws and policies including their development and current status. State and Federal laws affecting fish and wildlife; their application, administration and the organizational structure of state and federal agencies will be covered.
**Typically Offered:** Spring.

**BIOL 367. Ichthyology. 4 Credits.**
A study of the biology, classification, biogeography, ecology, evolution, and behavior of fishes, with special emphasis to fishes found in the northern Great Plains. Labs cover identification and life histories of fishes and field trips.
**Typically Offered:** Fall.
**Prerequisite**: BIOL 151.

**BIOL 375. Conservation Biology. 4 Credits.**
An introduction to the study and conservation of biodiversity. Topics include historical and current trends in conservation of biological diversity, migratory corridors, endangered species, invasive species, conservation of genetic integrity, and island biogeography.
**Typically Offered:** Fall.
**Prerequisites**: BIOL 150 and BIOL 151.

**BIOL 376. Yellowstone Ecology. 2 Credits.**
A field based course on the ecology of the Greater Yellowstone Ecosystem illustrating its complexity. Topics include: impact of the reintroduction of the wolves, evidence of climate change, wildlife populations, current research, influence of stakeholders, park management, and other issues within the park and Greater Yellowstone Ecosystem. A field trip to Yellowstone National Park is part of the course.
**Typically Offered:** Fall.
**Prerequisites**: BIOL 150 and BIOL 151.

**BIOL 380. Human Sexuality. 3 Credits.**
A study of the role and meaning of human sexuality in relations to oneself as well as in all interrelationships with other people. Course work includes a study of anatomy and physiology of the reproductive system, human sexual response, process and role of identity, sexual value systems, contraception, and the importance of sexuality in preparation for family living. Cross-referenced with PSYC 380.
**Typically Offered:** Spring, Summer.
**Same As:** BIOL 380/PSYC 380.

**BIOL 394. Independent Study. 1-3 Credits.**
Directed reading, study, and/or activities in selected topics.
**Typically Offered:** On sufficient demand.
**Repeatable:** Up to 12 Credits.

**BIOL 395. Laboratory Preparation and Management. 1 Credit.**
A practicum-like course that allows the student to directly assist the instructor in numerous aspects of laboratory instructional delivery. The course is designed to improve the competency of teaching laboratories. This course may be repeated up to three semester credit hours.
**Typically Offered:** Fall, Spring, Summer.
**Repeatable:** Up to 3 Credits.

**BIOL 399. Special Topics. 1-4 Credits.**
Courses not offered in the regular catalog that provide an opportunity to extend student learning.
**Typically Offered:** On sufficient demand.
**Repeatable:** Up to 12 Credits.

**BIOL 410. Field Ecology. 4 Credits.**
A study of plant and animal communities, their diversity, interactions and adaptation to the environment. The course includes extensive fieldwork, independent research, statistical analysis and scientific writing.
**Typically Offered:** Fall.
**Prerequisites**: BIOL 150 and BIOL 151.

**BIOL 411. Wildlife Management. 4 Credits.**
A study of advanced principles and applications of the management of terrestrial vertebrates and their population dynamics. Strategies for wildlife conservation, utilization, and enhancement are covered. Labs cover the collection and analysis of data, scientific writing, and consist of multiple field trips.
**Typically Offered:** Fall.
**Prerequisites**: BIOL 121 and BIOL 122.

**BIOL 412. Fisheries Management. 4 Credits.**
A study of advanced principles of managing fisheries resources with an emphasis on freshwater fishes and ecosystems. Includes field and laboratory techniques used in fisheries management and research.
**Typically Offered:** Spring.
**Prerequisites**: BIOL 121, BIOL 122, and BIOL 367.

**BIOL 413. Restoration and Plant Ecology. 4 Credits.**
This course covers both the fundamentals and advanced application of plant ecology to restoration ecology. Students will cover topics such as ecosystem processes, invasive species, population dynamics, rarity, communities, philosophical ecology, and climate change. The class focuses on students learning how to communicate complex ideas and facilitate a productive conversation around those ideas.
**Typically Offered:** Spring.
**Prerequisites**: BIOL 150 and BIOL 151.

**BIOL 430. Human Dimensions in Fisheries and Wildlife. 3 Credits.**
The objective of this course is for students to build an understanding and appreciation for the role of human dimensions in fisheries and wildlife management. Topics covered include public relations and communication for natural resources managers, land ethic, agency administration, natural resource law enforcement, and survey preparation.
**Typically Offered:** Spring.
**Prerequisites**: BIOL 121 and BIOL 122.

**BIOL 440. Biostatistics and Experimental Design. 4 Credits.**
An introduction to analysis and interpretation of biological data. Topics include statistical assessment of field and laboratory research, experimental design, and application of computer software.
**Typically Offered:** Spring.
**Prerequisite**: MATH 103 or MATH 104 or MATH 107 or MATH 165 or MATH 210.

**BIOL 441. Cell Biology. 4 Credits.**
A study of processes common to life at the cellular level including biochemical and structural organization, membrane function, motility, signal transduction, growth, division, and genetic regulation of the cellular function. Laboratory work utilizes techniques to study life at the cellular level including chemical composition and characterization, enzyme kinetics, metabolism, and microscopy.
**Typically Offered:** Spring, even years.
**Prerequisites**: one Biology class and one Chemistry class.

**BIOL 455. Introduction to GIS. 4 Credits.**
An application of the principles of geographic information systems and integrally related mapping to solve problems related to natural resource management and other environmental issues. Comprehensive lab assignments are included to give students hands-on experience solving problems with current state-of-the-art software and GPS units, including data creation, data integration, mapping, and spatial analysis.
**Typically Offered:** Spring.

**BIOL 470. Limnology. 4 Credits.**
The study of biological, physical, and chemical features of freshwater ecosystems. The course includes field sampling, lab work and GIS mapping.
**Typically Offered:** Fall.
**Prerequisites**: BIOL 150 and BIOL 151.

**BIOL 490. Secondary Science Methods and Techniques. 3 Credits.**
A course designed to prepare prospective science teachers in the areas of curriculum planning, textbook selection, supplemental teaching aids, laboratory procedures, and the ordering of equipment and supplies. The course includes laboratory practicum experience.
**Typically Offered:** Fall, even years.
**Prerequisite**: Admitted to Teacher Education.

**BIOL 491. Integrated Science Capstone. 2 Credits.**
A capstone course that requires students to apply previously-learned knowledge and skills to develop solutions to practical scientific issues. Students will be divided into small groups for plan development. Various majors are involved to allow for integrated course material.
**Typically Offered:** Fall, Spring.
**Prerequisite**: Senior Standing.
**Same As:** BIOL 491/CHEM 491.

**BIOL 494. Undergraduate Research. 3-12 Credits.**
The course is designed to integrate subject matter from major coursework and other disciplines into a project that leads to the creation of an original body of knowledge.
**Typically Offered:** On sufficient demand.
**Prerequisite**: Junior Standing or Senior Standing.
**Repeatable:** Up to 12 Credits.

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**BIOL 497. Internship. 3-12 Credits.**
An opportunity for students to apply classroom learning to an on-the-job work experience. Internship must be related to the student's major or minor course of study and may be in any geographic location. Credit is granted in the range of three to twelve hours per semester and may be repeated up to a maximum of 12 credit hours. Application and approval through Career Services.
**Typically Offered:** Fall, Spring, Summer.
**Prerequisites**: Junior Standing or Senior Standing and cum GPA of 2.50 or higher.
**Grading:** S/U only.
**Repeatable:** Up to 12 Credits.

**BIOL 499. Special Topics. 1-4 Credits.**
Courses not offered in the regular catalog that provide an opportunity to extend student learning.
**Typically Offered:** On sufficient demand.
**Repeatable:** Up to 12 Credits.