

BIOLOGY

Bachelor of Science

Area A: Essential Skills

ENGL 1101	English Composition I	3
ENGL 1102	English Composition II	3
MATH 1113	Precalculus Mathematics	3

Area B: Institutional Options

COMM 1110	Fundamentals of Speech	3
One of the following electives:		1

COMM 1120	Argumentation and Advocacy	
ENGL 1105	Intro to Greek Mythology	
ENGL 1110	Creative Writing	
GEOL 1000	Natural Hazards	
HIST 1050	Appalachian Hist-Special Topic	
HIST 1051	Sports Hist & Amer Character	
HUMN 1000	Mystery Fiction in Pop Culture	
HUMN 1100	Political and Social Rhetoric	
HUMN 1300	Christian Fiction/Pop Culture	
PHED 1030	Health & Wellness Concepts	
SOCI 1000	Race and Ethnicity in America	

Area C: Humanities/Fine Arts

Choose one to two ENGL course(s):		3-6
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ENGL 2111	World Literature I	
ENGL 2112	World Literature II	
ENGL 2120	British Literature I	
ENGL 2121	British Literature II	
ENGL 2130	American Literature I	
ENGL 2131	American Literature II	
ENGL 2201	Intro to Film as Literature	

If only one ENGL course chosen, add one of the following:		0-3
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ARTS 1100	Art Appreciation	
HUMN 1201	Expressions of Culture I	
HUMN 1202	Expressions of Culture II	
MUSC 1100	Music Appreciation	
MUSC 1110	World Music	
MUSC 1120	American Music	
THEA 1100	Theatre Appreciation	

Area D: Science/Mathematics/Technology

MATH 2253	Calculus and Analytic Geom I *	4
CHEM 1211K	Principles of Chemistry I	4
CHEM 1212K	Principles of Chemistry II	4

Area E: Social Sciences

HIST 2111	United States History to 1877	3
or HIST 2112	United States Hist since 1877	
POLS 1101	American Government	3

Two of the following electives:		6
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ANTH 1103	Intro to Cultural Anthropology	
ECON 2105	Principles of Macroeconomics	
ECON 2106	Principles of Microeconomics	
GEOG 1100	Introduction to Geography	

GEOG 1101	Intro to Human Geography	
GEOG 1111	Intro to Physical Geography	
HIST 1111	World Civilization to 1500 CE	
HIST 1112	World Civilization since 1500	
HIST 2111	United States History to 1877	
HIST 2112	United States Hist since 1877	
PHIL 1103	Intro to World Religions	
PHIL 2010	Intro to Philosophical Issues	
PHIL 2020	Logic and Critical Thinking	
POLS 2101	Intro to Political Science	
POLS 2201	State and Local Government	
POLS 2301	Comparative Politics	
POLS 2401	International Relations	
PSYC 1101	Introduction to Psychology	
PSYC 2101	Psychology of Adjustment	
PSYC 2103	Human Development	
SOCI 1101	Introduction to Sociology	
SOCI 1160	Social Problems	

Area F: Major Related

BIOL 1107K	Principles of Biology I	4
BIOL 1108K	Principles of Biology II	4
BIOL 2270	Ethical Issues in Science	2
PHYS 1111K	Introductory Physics I	4
PHYS 1112K	Introductory Physics II	4

Upper Level Courses

BIOL 3200K	Cellular Biology	4
BIOL 3400K	Genetics	4
BIOL 3500K	Ecology	4
BIOL 4000	Senior Seminar	2
BIOL 4250	Evolution	3
CHEM 3211K	Organic Chemistry I	4
CHEM 3212K	Organic Chemistry II	4
MATH 2200	Introduction to Statistics	3

B.S. Biology Electives

Must include at least one Biology Lab Science (noted with "K").

BIOL 3000	Research Method/Scientific Com	
BIOL 3150	Science and Society	
BIOL 3300K	Developmental Biology	
BIOL 3340K	General Microbiology	
BIOL 3510K	Plant Biology	
BIOL 3520K	Invertebrate Zoology	
BIOL 3550	Conservation Biology	
BIOL 3600K	Ornithology	
BIOL 3700	Field Biology Techniques	
BIOL 3850	Neuroscience	
BIOL 3900	Readings in Biology **	
BIOL 4100	Immunology	
BIOL 4275	Bioremediation/Phytoremediatio	
BIOL 4360K	Comparative Vertebrate A & P	
BIOL 4410K	Molecular Biology	
BIOL 4500K	Biotechnology	
BIOL 4600	Ecotoxicology	

BIOL 4850K	Human Dissection	
BIOL 4800	Service Learning in Biology **	
BIOL 4900	Special Topics in Biology ***	
BIOL 4960	Research in Biology **	
MATH 2254	Calculus and Analytic Geom II	
MATH 3050	Biological Statistics	
Any 3000 or 4000 level Chemistry course EXCEPT CHEM 4000. **		
Free Electives		9
Select 9 hours from any transfer credit courses in the College curriculum other than PHED courses.		
Physical Education		
PHED Activity Elective		1
Total Hours		121

* MATH 2253 may be taken in Area A if the student meets the prerequisites, with MATH 2254 then taken in Area D. The additional hour of credit will be applied to the upper level curriculum.

** Students are limited to a maximum of eight credit hours in applied learning courses (BIOL 3900, CHEM 3900, BIOL 4800, CHEM 4800, CHEM 4860, BIOL 4960, and CHEM 4960). Students are limited to a maximum of four credit hours in any one of the three applied learning categories; readings (BIOL 3900 and CHEM 3900), service learning (BIOL 4800 and CHEM 4800), and research (BIOL 4960 and CHEM 4960).

*** BIOL 4900 (Special Topics in Biology) can be taken multiple times when topic has changed.

Courses

BIOL 1011K. Introduction to Biology. 3-2-4 Units.

An introduction to fundamental unifying principles in biology. Topics covered in the course include: chemistry of life, cell structure and membranes, cellular functions (metabolism, respiration, photosynthesis, communication, and reproduction), genetics (inheritance patterns, DNA structure and function, gene expression, and biotechnology), and evolution. This course involves both lecture and lab components.

BIOL 1100. Human Biology. 3-0-3 Units.

Prepares students for employment in the health professions. Topics include basic chemistry, cell biology, genetics, and digestive, excretory, respiratory, circulatory, endocrine, reproductive, and skeletal systems. Laboratory demonstrations and practices are included. (Career Course) (F,S,M)

BIOL 1105K. Environmental Studies. 3-2-4 Units.

Focuses on the interrelationship of the biological and physical components of the environment and the impact of human activities on the biosphere. (F,S,M)

Prerequisites: ENGL 0989 unless exempt.

BIOL 1107K. Principles of Biology I. 3-2-4 Units.

Introduces fundamental unifying principles of biology. Topics include scientific method, biological chemistry, cell structure and function, energetics, cell division, genetics and evolution. (F,S,M)

Prerequisites: ENGL 0999 unless exempt.

BIOL 1108K. Principles of Biology II. 3-2-4 Units.

Continuation of BIOL 1107. Topics include the structure and function of the following animal, including human, systems: nervous, circulatory, immune, respiratory, digestive, urinary, endocrine, and reproductive, as well as diversity, development, behavior and ecology. (F,S,M)

Prerequisites: BIOL 1107K.

BIOL 1203K. Principles of Botany. 3-2-4 Units.

Introduces students to plant cell biology, anatomy, physiology, genetics, biotechnology, economic importance, diversity, and classification.

Teaches students sterile technique, basic plant tissue culture, and techniques for microscopic observation of plants. (S)

Prerequisites: ENGL 0989 unless exempt.

BIOL 1224K. Entomology. 3-2-4 Units.

Presents an introduction to the anatomy, biology, and behavior of insects.

The laboratory emphasizes classification and identification of insects to family, which are required as part of assembling a collection during the course. (F)

Prerequisites: ENGL 0989 unless exempt.

BIOL 2212K. Anatomy and Physiology I. 3-3-4 Units.

Focuses on the study of human anatomy and physiology. Topics include chemistry, cells, tissues, and the integumentary, skeletal, muscular, nervous, and endocrine systems. (This course will NOT satisfy an Area D requirement and will only satisfy an Area F requirement only if specifically listed as an option for the program of study.) (F,S,M) Prerequisites: BIOL 1107K, except Associate of Science in Nursing (2 year) majors, Associate of Applied Science in Radiologic Technology and Associate of Applied Science in Respiratory Therapy.

Prerequisites: ENGL 0989 unless exempt.

BIOL 2213K. Anatomy and Physiology II. 3-3-4 Units.

Continues the study of human anatomy and physiology begun in Biology 2212. Topics covered include the circulatory-lymphatic, immune, respiratory, digestive-metabolic, excretory, and reproductive systems and human development and heredity. (This course will NOT satisfy an Area D requirement and will only satisfy an Area F requirement only if specifically listed as an option for the program of study.) (F,S,M)

Prerequisites: BIOL 2212K or permission of MLT advisor.

BIOL 2215K. Microbiology. 3-2-4 Units.

Introduces students to the biology of viruses, bacteria, fungi, and protozoan and animal parasites. Teaches students the fundamental principles of microbiology with special emphasis on the relationships of microbes to man. Trains students to isolate, culture, and identify microbes in a laboratory. (This course will satisfy an Area D or Area F requirement only if specifically listed as an option for the program of study.) (F,S,M)

Prerequisites: BIOL 1107K or BIOL 2212K.

BIOL 2270. Ethical Issues in Science. 2-0-2 Units.

Provides an introduction to basic ethical concepts and develops the concept of ethical decision-making and how this applies to the increasing number of biological ethics decisions made daily. A variety of bioethical questions will be proposed and students will explore the science and social science aspects of each particular question. (F,S)

Prerequisites: BIOL 1108K.

BIOL 3000. Research Method/Scientific Com. 3-0-3 Units.

Prepares students for independent research by training them in laboratory safety, storage and disposal of reagents, standard methods and equipment used for research in a range of specialties and the ethical conduct of research. Students will develop skills in critical analysis of literature, experimental design, project proposal preparation, maintain lab log books, data analysis, time-management and oral and written presentation of results. This class is a suggested pre or co-requisite for BIOL 3900 and BIOL 4960. (F) Prerequisites: BIOL 1108K, COMM 1110, MATH 2200

BIOL 3150. Science and Society. 3-0-3 Units.

This course provides historical and contemporary perspectives on the roles of science and technology in society. Specific historical periods will be reviewed, with selected biographical information to gain a social perspective relative to an individual scientist's contributions to a field, and the impact of science and technology on society. Current topics will be covered. Potential topics may include vaccines (e.g. historical research, currently available vaccines, and social controversies related to usage), climate change (e.g. aspects of ecology, evolution, energy policy & technology), reproductive biology (e.g. birth control, abortion), aging (e.g. theories of aging, medical treatments for age-related pathologies, social and economic costs), or other regional scientific issues and history.

Prerequisites: Completion of BIOL 1108K, BIOL 2270 & CHEM 1212K, and instructor approval for Study Abroad program.

BIOL 3200K. Cellular Biology. 3-3-4 Units.

An exploration of the basic unit of living organisms. Study of the structure and function of cellular structures with emphasis on the unifying nature of cell membrane systems, cellular energetics, motility and transport intercellular interactions, cellular communication, and cell division. Laboratory experiences introduce basic cytological study techniques.(F,S)

Prerequisites: BIOL 1108K.

Corequisites: CHEM 1211K.

BIOL 3300K. Developmental Biology. 3-2-4 Units.

Introduces students to the developmental process in animals with the formation of gametes through the embryonic stages, birth, maturation and aging. Anatomical development, experimental embryology and the molecular mechanisms of cell differentiation will be covered. Laboratory techniques in developmental biology including animal cell and tissue cultures will be utilized.(Spring as enrollment requires)

Prerequisites: BIOL 3200K.

BIOL 3340K. General Microbiology. 3-2-4 Units.

Introduces students to the biology of noncellular, prokaryotic, and eukaryotic microorganism. Topics include microbial metabolism, genetics, systematics, pathogenesis, epidemiology, and ecology. The history of microbiology, host defense against disease, and human exploitation of microbes will also be studied. The laboratory introduces students to the culture and identification of microorganisms.(Fall as enrollment requires)

Prerequisites: BIOL 1108K, CHEM 1211K.

BIOL 3400K. Genetics. 3-3-4 Units.

A study of Mendelian principles, molecular genetics and population genetics. Topics include simple Mendelian inheritance, extensions of Mendelian inheritance, linkage, genetic mapping, quantitative inheritance, population genetics, prokaryotic genetics, and molecular genetics.(F,S,M)

Prerequisites: BIOL 3200K, CHEM 1212K.

Corequisites: CHEM 3211K.

BIOL 3500K. Ecology. 3-3-4 Units.

A study of the interrelationships of organisms with their physical and biological environment. Topics include an exploration of adaptations, population structure and dynamics, organization and classification of communities, and nutrient and energy flows in ecosystems.(F,S,M)

Prerequisites: BIOL 1108K, CHEM 1211K.

BIOL 3510K. Plant Biology. 3-3-4 Units.

An in depth examination of the structures, growth, reproduction, competition, survival, and diversity of plants.(S)

Prerequisites: BIOL 1108K, CHEM 1211K.

BIOL 3520K. Invertebrate Zoology. 3-3-4 Units.

An in depth examination of the taxonomy, morphology, physiology, and evolution of the more common invertebrate phyla. A study of the distribution and interspecific relationships among invertebrates and other forms of life.(Fall as enrollment requires)

Prerequisites: BIOL 1108K.

BIOL 3550. Conservation Biology. 3-0-3 Units.

An in depth study of the biological aspects of environmental crises and how principles from major areas in biology can provide solutions to the conservation of species and ecosystems. Major topics will include population ecology, population genetics, and community ecology.

Because of the interdisciplinary nature of conservation we will discuss the social and political aspects of the field. Supplemental readings will come from primary literature. A semester long project which requires developing a management plan for a novel environmental problem is required. (Fall as enrollment requires) Prerequisites: BIOL 1108K

BIOL 3600K. Ornithology. 3-3-4 Units.

Birds have been the subjects of scientific investigation for centuries, and research on birds has contributed much to our modern understanding of morphology, physiology, behavior, ecology, evolution, and global change. The purpose of this course is to investigate these myriad but interrelated topics with birds as our focus in both lecture and laboratory settings. The course will involve hands-on learning of ornithology using traditional lecture and lab activities along with experimental design and research.

(Spring as enrollment requires)

Prerequisites: BIOL 1108K.

BIOL 3700. Field Biology Techniques. 3-0-3 Units.

This course is designed to expose students to standard field techniques for collecting habitat and specimen data. Additionally, this course is designed to expose students to current peer reviewed literature, learn basics of scientific writing and grant writing, and explore career options for students in biology.(Summer, Even Years)

Prerequisites: At least 1 upper level biology course (3000+) or permission of instructor.

BIOL 3850. Neuroscience. 3-0-3 Units.

This course introduces the cellular mechanisms of neural signals, neural systems for sensory and motor functions, and the basics of higher order brain functions. Research techniques are discussed in the context of the material.(Fall as enrollment requires)

Prerequisites: BIOL 3200K and CHEM 1212K.

BIOL 3900. Readings in Biology. 2-0-2 Units.

Independent in-depth study of the literature within a topic of current research in Biology.(F,S,M)

Prerequisites: 12 hours of 3000/4000 level Biology and approval of a faculty supervisor and Chair of Department of Natural Sciences required before registration.

BIOL 4000. Senior Seminar. 2-0-2 Units.

Survey of various topics, especially highlighting the interdisciplinary nature of biology.(F,S)

Prerequisites: 19 hours of 3000/4000 level Biology.

BIOL 4100. Immunology. 3-0-3 Units.

Provides an introduction to the cellular and molecular basis of the immune response, which includes antigen presentation, immunogenetics, effector mechanisms, and medical immunology.(Spring as enrollment requires)

Prerequisites: BIOL 3200K.

BIOL 4250. Evolution. 3-0-3 Units.

A study of the principles of evolutionary biology including discussions of natural selection, adaptation, population genetics, speciation, and phylogeny reconstruction, and the distribution, abundance and adaptations of living organisms as mediated by the environment and natural selection.(F,S,M)

Prerequisites: BIOL 3400K, CHEM 1212K.

BIOL 4275. Bioremediation/Phytoremediatio. 3-0-3 Units.

Bioremediation and phytoremediation use microbes and plants, respectively, in the treatment of contaminated soils and water. These methods are increasingly utilized at sites requiring remediation, either individually or in conjunction with more traditional remediation techniques. This course will examine the histories, theories, benefits, drawbacks and applications of various bioremediation and phytoremediation techniques of organic and inorganic pollutants. Some of the techniques addressed will be natural attenuation, biodegradation, bio filtration, phyto extraction and phyto stabilization.(Spring as enrollment requires)

Prerequisites: BIOL 1108K and CHEM 3211K.

BIOL 4360K. Comparative Vertebrate A & P. 3-3-4 Units.

Broad comparative analysis of vertebrate morphology by considering anatomical structure and function and the integration of these structures in the individual organism, as well as the functional process of vertebrate organs and organ systems, and their physiological integration. Consideration will be given to the relationship between structure and functional demands of vertebrates to particular environments as well as the details of each vertebrate organ system, emphasizing the structure-function relationship of the organs/organ systems, and the range of structural and evolutionary modifications of organ systems seen in different vertebrate classes.(Spring as enrollment requires)

Prerequisites: BIOL 3400K.

BIOL 4410K. Molecular Biology. 3-3-4 Units.

In depth examination of the molecular aspects of cell structure and function, emphasizing the chemical and molecular basis of cellular physiology. Addresses genetic function at the chromosomal and molecular levels, gene expression, and regulation.(Spring as enrollment requires)

Prerequisites: BIOL 3400K, CHEM 3211K.

BIOL 4500K. Biotechnology. 3-3-4 Units.

A study of the applied aspects of biochemistry and molecular biology in various fields, with emphasis on the use of recombinant DNA methods and protein engineering.(Fall as enrollment requires)

Prerequisites: BIOL 3400K.

BIOL 4600. Ecotoxicology. 3-0-3 Units.

This course provides an introduction to the field of ecotoxicology, classes of contaminants, mechanisms of action, biomarkers, and effects at the individual, population, and community level. Also included will be historical background of the field and the history of environmental legislation in the United States.(Fall as enrollment requires)

Prerequisites: CHEM 3212K, or BIOL 3200K, or BIOL 4275, or BIOL 3500K and approval of adviser and instructor.

BIOL 4800. Service Learning in Biology. 0-0-2 Units.

Independent and in-depth internship with a field of biology or lecture assistantship or laboratory assistantship within a biology course here at Dalton State. Repeatable for a maximum of 4 credit hours.(F,S,M)

Prerequisites: 12 hours of Upper Level Biology and approval from both a faculty supervisor and department chair.

BIOL 4850K. Human Dissection. 1-4-3 Units.

This is a laboratory course that requires prosection of a human cadaver which will be used as an instructional aid in other courses at Dalton State. Students will review the history of cadaver use, demonstrate various dissection techniques and knowledge of medical human anatomy. (S) Prerequisites are 3 upper level BIOL courses and permission of the instructor.

BIOL 4900. Special Topics in Biology. 3-0-3 Units.

Advanced concepts in biology will be presented, the detailed content varying from year to year. Course may be repeated for credit when topic differs. Course may be repeated for credit when topic differs.(Offered as Needed)

Prerequisites: BIOL 3400K and 3 additional upper level Biology courses.

BIOL 4960. Research in Biology. 0-0-1-3 Unit.

Research project conducted by a student under guidance of a faculty member. Repeatable for a maximum of 4 hours. Prerequisite: 16 hours of 3000/4000 level Biology and approval of a faculty supervisor and Chair of Department of Natural Sciences required before registration.(F,S,M)

Prerequisites: 16 hours of 3000/4000 level Biology and approval of a faculty supervisor and Chair of Department of Natural Sciences required before registration.