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## BIOLOGICAL SCIENCES (BIOE, BIOF, BIOL)

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### BIOE 511 Advanced Biological Topics and Techniques (1-3 credits)

Designed for secondary education science teachers, this course is composed of three one credit "short courses." Short course topics will vary and will also serve the continuing needs of teachers for professional development. Possible topics could include whales of Massachusetts, isolation of plasmids, fungal genetics, spring migratory birds, freshwater macroinvertebrates of local ponds and streams, New England wetland plants, intertidal invertebrates, New England wildflowers, etc. This course may be repeated for different topics.

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### BIOE 512 Advances in Biological Science (3 credits)

Designed for secondary education science teachers, this course will consist of a seminar covering a selected area of biology related to the curriculum frameworks and teaching in the schools. The seminar could cover one topic or several related topics in 3-5 week blocks per topic and could be team-taught. Some topics may be team taught by a biology faculty member and a K-12 master teacher with appropriate background and qualifications, such as a PALMS science specialist. This course may be repeated for different topics.

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### BIOE 513 Advances in Cell/Molecular Biology (3 credits)

This graduate level course designed for secondary education science teachers will cover subject areas of cell and molecular biology. Possible subject area components could include molecular biology, techniques of molecular biology, microbiology, embryology, cytology, biological electron microscopy, the foundations of biology, biology of the fungi, virology, human genetics, advanced cellular biology and advanced developmental biology. This course may be repeated for different topics.  
*Laboratory may be included*

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### BIOE 514 Advances in Biomedical/Physiological Biology (3 credits)

This graduate level course designed for secondary education science teachers will cover subject areas of biomedical and physiological biology. Possible subject area components could include embryology, parasitology, neurobiology and advanced physiology. This course may be repeated for different topics.  
*Laboratory may be included*

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### BIOE 515 Advances in Ecological/Environmental Biology (3 credits)

Designed for secondary education science teachers, this course will cover subject areas in ecological and environmental biology. This course may be repeated for different topics. *Laboratory may be included*

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### BIOE 537 Applied Research Project (1 credit)

In this course, students complete an applied research project, which integrates theory and practice utilizing education research format and disciplinary knowledge. Graded on a (P) Pass/(N) No Pass basis.

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### BIOF 501 Characteristics of Organisms (3 credits)

*Prerequisite: An undergraduate degree and teacher license; this course cannot be used as part of the MAT in Biology*

Designed for elementary and middle school teachers. Coverage is keyed to the life sciences strand in the Massachusetts Science and Technology Curriculum Framework. Covers the cell and cell structure as the basic unit of life. Topics to be covered include single celled life forms, multi-cellular organisms, the five kingdoms of life and their characteristics, examples of the major taxonomic groups, cell structure in the five kingdoms, common features and differences, the process of cellular replication, comparison of mitosis and meiosis, complex integration of cells that comprise complex multi-cellular organisms, and major cell processes including food procurement or manufacture (photosynthesis and chemosynthesis) and breathing and respiration.

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### BIOF 502 Diversity and Adaptation of Organisms (3 credits)

*Prerequisite: An undergraduate degree and teacher license; this course cannot be used as part of the MAT in Biology*

Designed for elementary and middle school teachers. Coverage is keyed to the life sciences strand in the Massachusetts Science and Technology Curriculum Framework. Provides an understanding of the diversity of living organisms on earth. Topics to be covered include the characteristics of the major groups of organisms, how organisms adapt to environments, the process of heredity and the nature of environments, the way in which short term and long term environmental change affects organisms, how long term change may result in elimination of a population or the introduction of new populations, the ways in which short and long term changes in the environment result in qualitative and quantitative changes in the diversity of life, and the process of organic evolution from both the short term and long term perspective. Special attention is placed on how humans are affecting the global environment and the impact on the diversity of life.

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### BIOF 503 Heredity, Reproduction and Development (3 credits)

*Prerequisite: An undergraduate degree and teacher license; this course cannot be used as part of the MAT in Biology*

Designed for elementary and middle school teachers. Coverage is keyed to the life sciences strand in the Massachusetts Science and Technology Curriculum Framework. Explains the importance of reproduction to the survival of species and examines the processes by which organisms which have two parents receive genetic instructions. Topics to be covered include the principles of heredity that determine the traits exhibited by offspring, how sorting and recombining of the genetic material produces variation among offspring, and the importance of variation in producing differences among individuals from the same population or species.

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### BIOF 504 Ecosystems and Organisms (3 credits)

*Prerequisite: An undergraduate degree and teacher license; this course cannot be used as part of the MAT in Biology*

Designed for elementary and middle school teachers. Coverage is keyed to the life sciences strand in the Massachusetts Science and Technology Curriculum Framework. Presents the fundamental principles of ecology. Examines the concept of an ecosystem, the structure and function of an ecosystem, the ways in which organisms interact with each other and with the non-

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living components of their environments. Topics to be covered include flow of energy, cycling of matter, primary production, light energy transfer to plants in photosynthesis, food chains, food webs and energy pyramids and recycling of matter. Local ecosystems will serve as examples of these processes.

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**BIOF 505 The Biology of Fresh Waters (3 credits)**

*Prerequisite: An undergraduate degree and teacher license; this course cannot be used as part of the MAT in Biology*

Designed for elementary and middle school teachers. Topics covered will be closely tied to the Watershed Access Lab and to the Massachusetts Science and Technology Framework. Provides content background in biology for understanding watersheds as ecological and biological systems. Introduction to investigative techniques used in the analysis of watersheds and water quality. Emphasis is placed on the use of freshwater ecology for watershed studies in the school curriculum. Topics will include principles of watershed ecology, basic principles of hydrology and river systems, and the use of macroinvertebrates as water quality indicators. Active/cooperative investigations will be emphasized as a means of constructing knowledge.

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**BIOF 506 Applied Biology for the Laboratory (3 credits)**

*Prerequisite: An undergraduate degree and teacher license; this course cannot be used as part of the MAT in Biology*

Designed for elementary and middle school teachers. Topics covered will be closely tied to CityLab and to the Massachusetts Science and Technology Framework. Provides content background in biology for understanding principles of cell and molecular biology as applied to the CityLab project. Content covered will relate to basic biology, basic chemistry, basic physics, graph construction and interpretation needed to teach the material of the CityLab Program. Teachers using CityLab will acquire sufficient academic depth to field questions regarding the labs and principles that underlie them. Teachers will learn to interpret the array of each experiment's possible experimental outcomes in order to guide their students to an appreciation and understanding not only of conclusions, but also the supporting experimental evidence.

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**BIOF 507 Special Topics in Elementary Life Science (1-3 credits)**

This course is designed to accommodate 1-credit modules, 3-credit courses and workshops and institutes with variable credit in selected areas of elementary (grades 3-5) level life science as determined by the requirements of the Massachusetts Curriculum Framework in Science and Technology/Engineering. Possible topics include classification of plants and animals, plant structures and functions, adaptations of living things, and energy and living things. Specific content will be developed to meet the assessed needs of teachers and the school districts. This course is designed to accommodate topics of teacher professional development under grant supported projects and school district supported projects as well as occasional credit offerings for elementary level in-service and pre-service teachers. This course is repeatable for different topics.

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**BIOF 508 Special Topics in Middle School Life Science (1-3 credits)**

This course is designed to accommodate 1-credit modules, 3-credit courses and workshops and institutes with variable credit in selected areas of middle school (grades 6-8) level life science as determined by the requirements of the Massachusetts Curriculum Framework in Science and Technology/Engineering. Possible topics include: classification of organisms, structure and function of cells, systems in living things, reproduction and heredity, evolution and biodiversity, living things and their environment, energy and living things and changes to ecosystems over time. Specific content will be developed to meet the assessed needs of teachers and the school districts. This course is designed to accommodate topics of teacher professional development under grant supported projects and school district supported projects as well as occasional credit offerings for middle school level in-service and pre-service teachers. This course is repeatable for different topics.

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**BIOL 100 General Principles of Biology (4 credits)**

The biological principles at the cellular and organismal levels are discussed. The topics covered include cell structure, respiration, photosynthesis, osmosis, enzymes, DNA and protein synthesis, genetics, ecology and evolution. Three hours of lecture and one two-hour laboratory period weekly. *Offered every semester (CNSL)*

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**BIOL 102 Introduction to Zoology (4 credits)**

This course considers the zoological aspects of biology with emphasis on human systems. Topics include the chemical basis of life, the structure and physiology of cells, tissues, organs and organ-systems, embryonic development, heredity, evolution and ecology. Three hours of lecture and one two-hour laboratory period weekly. *Offered every semester (CNSL)*

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**BIOL 110 Biology: A Human Approach (3 credits)**

This course examines biological principles as they apply to the human biology and to the role of humans in nature. A study of different levels of organization leads to analysis of the structure and function of the major systems of the human body. Topics will include human heredity, evolution and ecology. *Spring semester (CNSN)*

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**BIOL 111 Human Heredity (3 credits)**

The principles of genetics which are important to an understanding of the hereditary mechanism in humans. Individual differences in relation to gene-environment interaction and the role of heredity in society, behavior, health and disease. Primarily an elective for non-science majors.

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**BIOL 112 Biology and Human Thought (3 credits)**

The development of the fetal brain, its cellular structures and organization and the functions associated with various brain regions will be discussed. Major emphasis will be devoted to neuronal cell conduction and transmission and the cellular basis for movement, sensory activity, emotions, memory and language production. In addition, students will explore a variety of brain and neurological disorders. Three hours lecture weekly.

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**BIOL 115 Microbial World and You (3 credits)**

This course considers microorganisms (bacteria, algae, fungi, protozoa, and viruses) and their interactions with humans. The principles and applications of environmental, industrial and medical microbiology are discussed. *Either semester (CNSN)*

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**BIOL 117 The Biological Environment (4 credits)**

The ecological relationship between humanity and the environment is discussed with a focus on biological issues. Topics dealing with humanity's past, present and future role in the ecosystem are discussed with such considerations as: energy in ecosystems, biochemical cycles, populations, endangered species, acid precipitation, climate change, renewable resources, and biodiversity. The course focus, examples, and class discussion projects will be drawn from Canada, North America, or other regions as indicated by the college's course schedule for each semester offered. Three hours of lecture and one two-hour laboratory weekly. (CNSL)

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**BIOL 119 The Botanical World (3 credits)**

An introduction to the biology of plants, exploring their diversity, peculiar adaptations, associations with animals, practical uses, and the profound effect they have had on modern civilization. (CNSN)

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**BIOL 121 General Biology I (4 credits)**

This core course in the Biology major is an introduction to the concepts of molecular and cellular biology, reproduction, metabolism, genetics, and mechanisms of evolution. Three hours of lecture and one two-hour laboratory weekly. *Fall semester* (CNSL)

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**BIOL 122 General Biology II (4 credits)**

*Prerequisite: BIOL 121 or equivalent*

A survey of the major groups of organisms, their morphology, physiology, evolution and ecology. Three hours of lecture and one two-hour laboratory weekly. *Spring semester*

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**BIOL 128 The Biology of Human Sexuality (3 credits)**

The Biology of Human Sexuality is designed to introduce students to the basics of the human reproductive system. The students will develop a healthy understanding of sexuality, its role in society and how it applies to our daily life. Three hours of lecture per week. (CNSN)

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**BIOL 199 First Year Seminar (3 credits)**

*Prerequisite: Open to all freshmen with a writing placement score of 3 or above or a SAT score of 500 or above. Students with 24 or more transfer credits will have this requirement waived.*

First Year Seminars (FYS) are writing-intensive, topic courses that introduce students to academic thought, discourse and practices. FYS courses prepare and orient students toward productive and fulfilling college careers by actively engaging them in a specific academic area of interest. Students will improve their writing, reading, research, and basic information and technology skills while learning to work both collaboratively and independently. These courses will fulfill the First Year Seminar requirement and may fulfill other requirements for the Core Curriculum. Each course may fulfill different requirements and topics may change each semester. Only one FYS course may be taken for credit. (CFYS)

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**BIOL 200 Cell Biology (4 credits)**

*Prerequisite: BIOL 121 or equivalent; CHEM 131 or CHEM 141; CHEM 132 or CHEM 142 or concurrent enrollment; or consent of the instructor*

This course is an introduction to the basic concepts in cell structure and cell physiology. Topics will include the function of cellular organelles, enzymes and cell metabolism, the synthesis of macromolecules, and the flow of genetic information in the cell, including transcription and translation. Three hours of lecture and one two-hour laboratory period weekly. *Spring semester*

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**BIOL 225 Ecology (3 credits)**

*Prerequisite: An introductory laboratory course in biology; CHEM 131 or CHEM 141 either taken previously or concurrently; or consent of instructor*

Fundamentals of the interactions of populations, communities and ecosystems are investigated in lecture. Students will be acquainted with techniques of data gathering and analysis in ecology. Laboratory trips will allow students to investigate ecological communities in southeastern Massachusetts. One all day Saturday field trip will be required as part of the lab. Two hours of lecture and one two-hour laboratory period weekly. *Fall semester*

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**BIOL 243 Systematic Botany (3 credits)**

*Prerequisite: BIOL 121 or consent of the instructor*

Lecture presentations in the identification, naming and classification of higher plants. The laboratory will focus on acquiring skills in plant identification with an emphasis on the flora of Massachusetts. Two hours of lecture and one two-hour laboratory period weekly.

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**BIOL 251 Human Anatomy and Physiology I (4 credits)**

*Prerequisite: BIOL 100 or BIOL 102 or BIOL 121 or BIOL 122, or consent of the instructor*

An intensive study of the biochemistry and cellular structures of tissues; the integumentary and skeletal systems; joints; fundamentals of the nervous system; the peripheral, central and autonomic nervous systems; the special senses; and heart activity. Three hours of lecture and one two-hour laboratory per week. *Fall semester*

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**BIOL 252 Human Anatomy and Physiology II (4 credits)**

*Prerequisite: BIOL 251 or consent of the instructor*

An intensive study of the structure and function of the muscles and muscular system; circulatory system and blood; and the organ system including lymphatic, endocrine, respiratory, digestive and reproductive systems. Three hours of lecture and one two-hour laboratory per week. *Spring semester*

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**BIOL 280 Human Physiology (3 credits)**

*Prerequisite: BIOL 100 or BIOL 102 or BIOL 121 or consent of the instructor*

General physiological principles and their application to the human body. Three hours of lecture weekly. *Offered alternate years*

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**BIOL 284 Invertebrate Zoology (3 credits)**

*Prerequisite:* BIOL 121-122 or equivalent or consent of the instructor  
The biology of invertebrates from a phylogenetic standpoint with emphasis on taxonomy, morphology, physiology, development, and natural history. Representatives of the principal classes of each phylum are studied. Two hours of lecture and one two-hour laboratory period weekly. *In alternate spring semesters, either BIOL 284 or BIOL 382 will be offered*

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**BIOL 298 Second Year Seminar (Speaking Intensive) (3 credits)**

*Prerequisite:* \_\_\_\_199; Open to all sophomores and juniors who have completed ENGL 101, and the speaking skills requirement. Students with 54 or more transfer credits will have this requirement waived. Cannot be taken if \_\_\_\_299 is taken for credit.

Second Year Seminars (SYS) are speaking-intensive, topic courses that build on the academic skills and habits introduced in the First Year Seminar. SYS courses engage students in a specific academic area of interest and provide them with the opportunity to reinforce, share and interpret knowledge. Students will improve their speaking, reading, research, and basic information and technology skills while building the connections between scholarship and action that are required for lifelong learning. These courses will fulfill the Second Year Seminar requirement and may fulfill other requirements for the Core Curriculum. Each course may fulfill different requirements and topics may change each semester. Only one SYS course may be taken for credit. (CSYS)

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**BIOL 299 Second Year Seminar (Writing Intensive) (3 credits)**

*Prerequisite:* \_\_\_\_199; Open to all sophomores and juniors who have completed ENGL 101 and ENGL 102. Students with 54 or more transfer credits will have this requirement waived. Cannot be taken if \_\_\_\_298 is taken for credit.

Second Year Seminars (SYS) are writing-intensive, topic courses that build on the academic skills and habits introduced in the First Year Seminar. SYS courses engage students in a specific academic area of interest and provide them with the opportunity to reinforce, share and interpret knowledge. Students will improve their writing, reading, research, and basic information and technology skills while building the connections between scholarship and action that are required for lifelong learning. These courses will fulfill the Second Year Seminar requirement and may fulfill other requirements for the Core Curriculum. Each course may fulfill different requirements and topics may change each semester. Only one SYS course may be taken for credit. (CSYS)

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**BIOL 320 Biochemistry (3 credits)**

*Prerequisite:* BIOL 200; CHEM 131-132 or CHEM 141-142; MATH 141; or consent of the instructor. A course in physiology recommended, e.g. BIOL 252, BIOL 280, BIOL 341 or BIOL 373  
A study of the characteristics and metabolism of biological molecules. Topics include enzyme structure and function; techniques of enzyme study; anabolic and catabolic pathways and their regulation; and applications of thermodynamics and kinetics to biological systems. Three hours of lecture weekly.

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**BIOL 321 Genetics (4 credits)**

*Prerequisite:* BIOL 121-122 or equivalent, BIOL 200 or equivalent; CHEM 131-132 or CHEM 141-142; or consent of the instructor  
Analysis of the basic principles underlying heredity and the mechanisms involved in the replication, recombination, mutation, variation and expression of genetic material in representative plant, animal and microbial systems. Three hours of lecture and one two-hour laboratory period weekly. *Fall semester*

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**BIOL 325 Ichthyology (3 credits)**

*Prerequisite:* An introductory course in biology or consent of instructor  
Lecture presentations in ichthyology will examine the key aspects of anatomy, sensory systems, organ systems, physiology and ecology of fishes. Emphasis will be placed on identification of New England freshwater and coastal fishes. Field investigations will focus on the behavior and ecology of the fish populations in the Taunton River system. Laboratory sessions will also include techniques of age and growth analysis for assessment of local fish populations, and basic identification of external and internal anatomy of various teleosts. Two hours of lecture and one two-hour laboratory per week.

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**BIOL 326 Marine Biology (3 credits)**

*Prerequisite:* BIOL 122 or equivalent, or consent of the instructor  
An introduction to the marine ecosystems with emphasis on factors involved in the growth, diversity, and distribution of populations occupying the marine habitats of the eastern Atlantic coast. Two hours of lecture and one two-hour laboratory period weekly. *Offered once in three years*

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**BIOL 327 Wetlands Biology (3 credits)**

*Prerequisite:* BIOL 225 or consent of the instructor  
A course that considers the values, functions, protection and recognition of wetlands. Field trips will allow students to investigate wetlands of southeastern Massachusetts. Two two-hour meetings weekly, integrated lecture and laboratory. *Offered alternate fall semesters*

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**BIOL 328 Stream Ecology (4 credits)**

*Prerequisite:* An introductory laboratory course in biology; BIOL 225; CHEM 131 or CHEM 141 taken previously or concurrently; basic algebra (at least FRSK 102 skills); or consent of instructor  
This course examines factors affecting the population size and distribution of aquatic organisms in streams and the biotic indices used to assess stream communities. Laboratory and field projects apply basic skills of organism identification, biotic indices and G.I.S. to investigate aquatic communities of a local river. Three hours of lecture and one two-hour laboratory per week. *Offered every other year in the fall semester*

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**BIOL 338-339 Honors Tutorial (3 credits each semester)**

*Prerequisite:* Open to Commonwealth and Departmental Honors students  
Special topics in biology. Three hourly meetings weekly. *BIOL 338 Fall semester, BIOL 339 Spring semester*

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**BIOL 341 Plant Physiology (4 credits)**

*Prerequisite:* BIOL 121-122; BIOL 200; CHEM 131-132 or CHEM 141-142; or consent of the instructor  
The growth and function of plants including cellular physiol-

ogy, water relations, respiration, photosynthesis, nutrition, growth regulation, and the influence of environment. Three hours of lecture and one two-hour laboratory period weekly. *Fall semester*

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**BIOL 350 Molecular Biology (4 credits)**

*Prerequisite: BIOL 200*

This course will examine the molecular nature of biological processes. The structure and function of biological macromolecules will be examined along with the research methodologies and techniques currently utilized in this field. Five hours of lecture/laboratory weekly. *Fall semester*

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**BIOL 371 Histology (4 credits)**

*Prerequisite: BIOL 121-122; CHEM 131-132 or consent of the instructor*

This course is a study of the microscopic anatomy of mammalian tissues and organs with emphasis on human materials. The study of prepared slides in the laboratory will serve as a basis for discussion of the interdependence of structure and function in the animal body. Three hours of lecture and one two-hour laboratory period weekly.

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**BIOL 372 Animal Behavior (3 credits)**

*Prerequisite: BIOL 121-122 or equivalent or consent of the instructor*

This introduction to the study of animal behavior from the biological viewpoint covers such topics as drives and reflexes, animal communication, biological rhythms and migration. Emphasis will be placed, where applicable, on the relationships between animal and human behavior.

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**BIOL 373 Animal Physiology (3 credits)**

*Prerequisite: BIOL 121-122; CHEM 131-132 or CHEM 141-142 or equivalents; or consent of the instructor*

Physiological principles concerned in irritability, contraction, circulation, gas exchange, excretion, and hormonal regulation. Special focus will be placed on unique physiological features found in a variety of animals. Topics will vary and may include hibernation, echolocation, communication through pheromones, bioluminescence, and migration. Two hours of lecture and one two-hour laboratory period weekly. *Alternate spring semesters*

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**BIOL 375 Immunology (3 credits)**

*Prerequisite: BIOL 200; BIOL 252 or BIOL 280 or BIOL 371 or BIOL 373*

The immune system and its components, including their structure, function, genetics and ontogeny. Three hours lecture weekly. *Offered alternate spring semesters*

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**BIOL 376 General Endocrinology (3 credits)**

*Prerequisite: BIOL 122*

A survey of the morphology, ultrastructure, and physiology of endocrine glands and their hormones, in animals with special emphasis on humans, will be presented. The course will discuss the hormonal actions and their control on the cellular and organ level. Three hours lecture weekly.

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**BIOL 382 Comparative Chordate Anatomy (3 credits)**

*Prerequisite: BIOL 121-122 or equivalent, or consent of the instructor*

An ontogenetic and phylogenetic survey of chordate gross anatomy, supplemented by laboratory dissections of representative species. Emphasis is placed on ecomorphology and the

†May be taken for graduate level credit.

changes in chordate structure and biology of chordates that comprise their evolution, with an analysis of the significance of these changes in light of our modern knowledge of evolution. Two hours of lecture and one two-hour laboratory period weekly. *In alternate spring semesters, either this course or BIOL 284 will be offered.*

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**BIOL 396 Research Problems in Biology (1-3 credits)**

*Prerequisite: Not open to freshmen. Acceptance by the supervising faculty member*

The student will conduct an individual research experience over one semester or multiple semesters in collaboration with a faculty member. At the end of each semester, a written progress report must be submitted for review by the supervising faculty member and a presentation is made to the biology faculty and students. The course may be repeated and up to 3 credits can be used toward a concentration elective in biology.

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**BIOL 408 The Biology of Marine Mammals (3 credits)†**

*Prerequisite: BIOL 122 or equivalent or consent of the instructor*

An introductory course in the study of marine mammals. Topics to be covered include the evolution, classification, distribution, life histories, anatomy, morphology, behavior, and ecology of marine mammals. We will consider the role of marine mammals in marine ecosystems and the interaction between marine mammals and humans. Three hours lecture weekly.

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**BIOL 420 Limnology (4 credits)†**

*Prerequisite: An introductory course in biology; CHEM 132 or CHEM 142, which may be taken concurrently; basic algebra (minimum FRSK 102 skills); or consent of instructor*

Limnology examines the interaction of physical and chemical processes in freshwater ecosystems and how they influence populations of freshwater organisms. Laboratory exercises will focus on a field project requiring sampling and analysis of water chemistry, bacteria, phytoplankton, zooplankton, and macroinvertebrates. Students must expect to spend extra time outside of class on the collection and analysis of laboratory project data. Two hours of lecture and one four-hour laboratory session per week.

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**BIOL 422 Biological Evolution (3 credits)†**

*Prerequisite: BIOL 321 or consent of the instructor*

This course covers the theory of evolution and the operation of evolutionary forces as related to modern taxonomy, with emphasis on such topics as mutation, variation, hybridization, ployploidy, isolation, natural selection and population genetics. Three hours of lecture weekly. *Offered alternate years, spring semester*

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**BIOL 423 Biological Invasions (3 credits)**

*Prerequisite: BIOL 122 or consent of instructor*

This course will examine the spread of invasive organisms. It will focus on the biology of organisms that alter ecosystems; endanger public health, local economies, and traditional cultures; and their vectors of dispersal, and management. Three hours of lecture weekly. *Spring semester*

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**BIOL 428 Microbiology (4 credits)**

*Prerequisite: BIOL 200 and BIOL 321 and one of the following: BIOL 225, BIOL 320, or BIOL 341 or consent of instructor*

An introduction to the diversity of microorganisms with emphasis on bacterial growth and metabolism, microbial ecology, and host/microbe interactions including infectious disease. Three hours of lecture and one two-hour laboratory period weekly. *Spring semester (CW RM)*

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**BIOL 430 Embryology (4 credits)†**

*Prerequisite: BIOL 121-122 or equivalent; CHEM 131-132 or CHEM 141-142; or consent of the instructor*

A study of developmental processes at different levels of organization with emphasis on animal development. Topics include gametogenesis, fertilization, early embryonic development, organogenesis, differentiation, growth and regeneration. Three hours of lecture and one two-hour laboratory period weekly. *Offered alternate years, spring semester*

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**BIOL 434 Biological Electron Microscopy (3 credits)†**

*Prerequisite: BIOL 200 or consent of the instructor*

An introduction to the techniques of tissue preparation including fixation, dehydration and embedment procedures, followed by sectioning and staining, practical use of the electron microscope and interpretation of electron photomicrographs. Basic principles of tissue preparation and applications of electron microscopy will be stressed. One hour of lecture and one four-hour laboratory period weekly. *Spring semester*

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**BIOL 436 Mammalian Reproductive Physiology (3 credits)**

*Prerequisite: BIOL 121-BIOL 122; BIOL 200; plus one of the following: BIOL 251, BIOL 252, BIOL 280, BIOL 373; or consent of instructor*

This course is designed to introduce mammalian reproduction from a physiological perspective. The goal is to provide a functional understanding of the physiological bases for reproductive events in vertebrates, emphasizing mammals. Two hours lecture and two hours laboratory per week.

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**BIOL 450 Virology (3 credits)†**

*Prerequisite: BIOL 200; CHEM 131-132 or CHEM 141-142*

This course is an introduction to the study of viruses including bacteriophages and animal viruses. Viral structure and mechanisms of action are considered at the molecular level, and emphasis is placed on viral replication strategies. Three hours lecture weekly.

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**BIOL 472 Human Genetics (3 credits)†**

*Prerequisite: BIOL 321 or consent of the instructor*

The general principles of genetics as applied to humans. Emphasis will be placed on human genome analysis, pedigree construction and analysis, diagnosis and treatment of genetic diseases, gene mapping, cytogenetics of normal and aberrant genomes and population genetics. Three hours lecture weekly. *Offered every third year*

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**BIOL 475 Parasitology (4 credits)†**

*Prerequisite: BIOL 121 and BIOL 122, or equivalent; BIOL 200; or consent of instructor*

The relationships between parasitic microorganisms and their hosts will form the basis for this course. We will study both protozoal and multicellular parasites of animals and humans, mechanisms of disease, host defenses, and public health aspects of control and treatment with strong emphasis on the medical/veterinary and global public health aspects of this area of biology. The course will include student independent investigation of the biochemical and immunologic advances of the last three decades through reading of the primary literature, and oral presentation of a topic based on this investigation. Three hours of lecture and one two-hour laboratory per week. *Offered every other year*

†May be taken for graduate level credit.

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**BIOL 485 Honors Thesis (3 credits)**

*Prerequisite: Open to Commonwealth and Departmental Honors students*

One-hour weekly meetings with the thesis director will culminate in an honors thesis. With the consent of the Departmental Honors Committee and the thesis director, this course may be extended into a second semester for three additional credits depending upon the scope of the project. Whether the final version of the thesis qualifies the student to graduate with honors will be determined by the Departmental Honors Committee. *Either semester*

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**BIOL 490 Special Topics in Biology (1- 3 credits)†**

*Prerequisite: BIOL 121-122, other prerequisites may be required*

Various specialized or experimental offerings in biology will be offered from time to time as either three-credit courses or short courses of one or two credits. Each course may be lecture, laboratory, or combined lecture and laboratory as appropriate. Biology majors may combine three short courses to equal one Biology elective.

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**BIOL 497 Undergraduate Biological Research (3 credits)**

*Prerequisite: Sophomore, junior or senior standing and acceptance by the supervising faculty member*

Students who are accepted by a faculty member as a participant in an undergraduate laboratory or field research project enroll in this course. Projects entail substantial research in the faculty member's biological subdiscipline and are publicized as student research positions become available. Students are extensively involved in experimental planning, execution, analysis and reporting, and present their results to the biology department. *Offered every semester*

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**BIOL 498 Internship in Biology (3-15 credits)**

*Prerequisite: Consent of the department*

Internships include research, laboratory or occupational experience in industrial, allied health, educational, medical, governmental, recreational, regulatory or other organizations outside of the college. No more than six credits may be used toward the biology major electives. Graded on a (P) Pass/(N) No Pass basis. *Either semester*

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**BIOL 499 Directed Study in Biology (1-3 credits)**

*Prerequisite: Consent of the department; formal application required*

Open to juniors and seniors who have demonstrated critical and analytical abilities in their studies and who wish to pursue a project independently. May be taken twice for a maximum of six credits. Graded on a (P) Pass/(N) No Pass basis. *Either semester*

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**BIOL 502 Research (credit to be arranged)**

*Prerequisite: Consent of the department; formal application required*

Original research undertaken by the graduate student in their field. For details, consult the paragraph entitled "Independent Study" in the "School of Graduate Studies" section of this catalog. This course may be repeated.

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**BIOL 503 Directed Study (credit to be arranged)**

*Prerequisite: Consent of the department; formal application required*

Designed for the graduate student who desires to study selected topics in a specific field. For details, consult the paragraph entitled "Independent Study" in the "School of Graduate Studies" section of this catalog.

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**BIOL 504 Advanced Seminar in Selected Modern Biological Topics (3 credits)**

A study of significant recent work in a specific area of biological research. Students will be expected to do considerable library research, make oral presentations, and present a satisfactory written summary of their work.

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**BIOL 561 Special Topics in Biology (3 credits)**

*Prerequisite: BIOL 121-122 or equivalent and graduate standing*

A special topics course which will allow specialized and one-time offerings in the field. Designed to allow experimental courses of special interest to biology majors.

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**BIOL 580 Foundations of Biological Education (3 credits)**

An exploration of the historical underpinnings of biological education and the integration of modern philosophical foundations of biological education with classroom practice.

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**Other Approved Courses:**

BIOL 104 Animal Morphology  
 BIOL 106 Introductory Plant Science  
 BIOL 109 Introduction to Human Disease  
 BIOL 113 Fundamentals of Biology  
 BIOL 114 Horticulture  
 BIOL 116 Drugs of Plant Origin  
 BIOL 118 Evolution  
 BIOL 135-136 Freshman Honors Colloquium  
 BIOL 211 Landscaping  
 BIOL 212 Plant Propagation  
 BIOL 240 Plant Morphology  
 BIOL 241 Plant Anatomy  
 BIOL 286-287 Sophomore Honors Colloquium  
 BIOL 324 Microscopical Technique  
 BIOL 370 Vertebrate Zoology  
 BIOL 390 Introduction to Pharmacology  
 BIOL 401 Ecology of Aquatic Insects  
 BIOL 410 Techniques of Molecular Biology  
 BIOL 421 Seminar in Biology  
 BIOL 425 Population Ecology  
 BIOL 426 Biomonitoring  
 BIOL 433 Cytology  
 BIOL 435 Problem Solving with the Computer in Biology  
 BIOL 444 Biology of the Fungi  
 BIOL 480 Tropical Field Ecology  
 BIOL 482 Neurobiology  
 BIOL 506 Advanced Cell Biology  
 BIOL 507 Mechanisms of Development  
 BIOL 508 Advanced Population Biology  
 BIOL 509 Advanced Physiology  
 BIOL 521 Advanced Cellular & Molecular Technique  
 BIOL 523/BIOL 524 Marine Mammal Science for the  
     Grades 5-8 Teacher  
 BIOL 532 Ultrastructure  
 BIOL 538 Intertidal Biology  
 BIOL 550 Modern Developments in Biology  
 BIOL 551 Advanced Mycology  
 BIOL 560 Special Topics in Biology Education  
 BIOL 573 Advanced Vertebrate Biology  
 BIOL 581 Mammalogy  
 BIOL 584 Ethology  
 BIOL 585 Advanced Ichthyology

*Note: This section is arranged in course number order. See course prefix key for assistance in locating department sections.*

*Note: See Catalog Web Addenda at [www.bridgew.edu/catalog/addenda/](http://www.bridgew.edu/catalog/addenda/) as that information supersedes the published version of this catalog.*