

BIOLOGICAL SCIENCES (BIOE, BIOF, BIOL)

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.

BIOE 512 Advances in Biological Science (3 or 4 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 three-five 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.

BIOE 513 Advances in Cell/Molecular Biology (3 or 4 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*

BIOE 514 Advances in Biomedical/Physiological Biology (3 or 4 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*

BIOE 515 Advances in Ecological/Environmental Biology (3 or 4 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*

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

This course is designed to accommodate one-credit modules, three-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.

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)*

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)*

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)*

BIOL 111 Human Heredity (3 credits)

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

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 of lecture weekly. (CNSN)

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)*

BIOL 117 Environmental Biology (4 credits)

Ecological relationships and current environmental issues are explored in class with a focus on how biological systems function and what impacts humans have had on global biodiversity. Class discussions and short video clips from Nature, CNN and CBC news explore the human impact on harvesting renewable and nonrenewable resources, biogeochemical cycles, human population growth, threats to endangered species, global climate change, sustainable use of renewable resources and local impacts on global biodiversity. Class discussions, laboratory exercises and team projects highlight examples taken from outside the United States and particularly case studies drawn from Canada and regions of Southeast Asia. Laboratory exercises emphasize making observations and using quantitative reasoning to study effects of environmental factors on organisms; using computer models to study harvest impacts on world fisheries; and case studies to examine water use and world health issues. Three hours of lecture and one two-hour laboratory weekly. (CNSL)

BIOL 119 The Botanical World (3 credits)

This course is 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)

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 three-hour laboratory weekly. *Fall semester (CNSL)*

BIOL 122 General Biology II (4 credits)

Prerequisite: BIOL 121 with a minimum grade of "C-" or BIOL 100 or BIOL 102 with a minimum grade of "B-"; or equivalent

This course is a survey of the major groups of organisms, their morphology, physiology, evolution and ecology. Three hours of lecture and one three-hour laboratory weekly. *Spring semester*

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. 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)

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)

BIOL 200 Cell Biology (4 credits)

Prerequisite: BIOL 121 with a minimum grade of "C-" or BIOL 100 or BIOL 102 with a minimum grade of "B-"; or equivalent; and CHEM 131 or CHEM 141; and CHEM 132 or CHEM 142 or concurrent enrollment; or consent of 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 three-hour laboratory period weekly. *Spring semester*

BIOL 225 Ecology (4 credits)

Prerequisite: BIOL 121 with a minimum grade of "C-" or BIOL 100 or BIOL 102 with a minimum grade of "B-"; or equivalent; and 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 are covered. 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. Three hours of lecture and one three-hour laboratory period weekly. *Fall semester*

BIOL 243 Systematic Botany (4 credits)

Prerequisite: BIOL 121 with a minimum grade of "C-" or BIOL 100 or BIOL 102 with a minimum grade of "B-"; or consent of instructor

This course includes 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. Three hours of lecture and one three-hour laboratory period weekly.

BIOL 251 Human Anatomy and Physiology I (4 credits)

Prerequisite: BIOL 100 or BIOL 102 with a minimum grade of "B-"; or BIOL 121 or BIOL 122 with a minimum grade of "C-"; or consent of instructor

This course is 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 three-hour laboratory per week. *Fall semester*

†May be taken for graduate-level credit

BIOL 252 Human Anatomy and Physiology II (4 credits)

Prerequisite: BIOL 251 or consent of instructor

This course is 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 three-hour laboratory per week. *Spring semester*

BIOL 284 Invertebrate Zoology (4 credits)

Prerequisite: BIOL 121 with a minimum grade of "C-" or BIOL 100 or BIOL 102 with a minimum grade of "B-"; and BIOL 122 with a minimum grade of "C-" or equivalent; or consent of instructor

This course covers 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. Three hours of lecture and three hours of laboratory weekly. *In alternate spring semesters, either BIOL 284 or BIOL 382 will be offered*

BIOL 293 Service-Learning in Biology (1 credit)

Prerequisite: Successful completion of at least two biology courses, and either a minimum GPA in biology of 2.5 or an overall GPA of 2.5 and consent of the department

Service-learning includes community based experiences such as laboratory or occupational experience in conservation with state or local agencies as well as industrial, allied health, educational, medical, governmental, recreational or regulatory experience with other organizations outside of the college. This course is a pre-internship experience designed to combine field work with service for a total of 40 hours. Students will meet periodically with the course instructor to reflect on experiences and connect with curriculum content. No more than three credits may be used toward the biology major electives. Graded on a (P) Pass/(N) No Pass basis.

BIOL 297 Biometry (4 credits)

Prerequisite: MATH 100 or MATH 141 or MATH 151; and BIOL 225 with a minimum grade of "C-" taken previously or concurrently; or consent of instructor

This course is an introduction to the general principles and use of statistical analyses in the biological sciences. Topics include probability theory, characterization of data with descriptive statistics, sampling error, elements of experimental design, and hypothesis testing, emphasizing the philosophy and assumptions of statistical analysis as well as the mechanics. The course uses SPSS as a computing tool and will require a final project. Three hours of lecture and one three-hour laboratory period weekly. (CQR)

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 aca-

ademic 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)

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)

BIOL 320 Biochemistry (3 credits)

Prerequisite: BIOL 200 with minimum grade of "C-"; 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

This course is 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.

BIOL 321 Genetics (4 credits)

Prerequisite: BIOL 121 with a minimum grade of "C-" or BIOL 100 or BIOL 102 with a minimum grade of "B-"; and BIOL 122 with a minimum grade of "C-" or equivalent; and BIOL 200 with a minimum grade of "C-" or equivalent; and CHEM 131-132 or CHEM 141-142; or consent of instructor

This course presents an 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 three-hour laboratory period weekly. *Fall semester*

BIOL 325 Ichthyology (4 credits)

Prerequisite: BIOL 121 with a minimum grade of "C-" or BIOL 100 or BIOL 102 with a minimum grade of "B-"; and BIOL 225 with a minimum grade of "C-"; and CHEM 131 or CHEM 141 taken previously or concurrently; or consent of instructor

†May be taken for graduate-level credit

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. Three hours of lecture and one three-hour laboratory per week.

BIOL 326 Marine Biology (4 credits)

Prerequisite: BIOL 122 with a minimum grade of "C-"; and BIOL 225 with a minimum grade of "C-" or equivalent; or consent of instructor
This course is 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. Three hours of lecture and three hours of laboratory weekly. Offered once in three years

BIOL 327 Wetlands Biology (4 credits)

Prerequisite: BIOL 225 with a minimum grade of "C-" or consent of instructor
This course considers the values, functions, protection and recognition of wetlands. Field trips allow students to investigate wetlands of Southeastern Massachusetts. Three hours of lecture and one three-hour laboratory period weekly. Offered alternate fall semesters

BIOL 328 Stream Ecology (4 credits)

Prerequisite: BIOL 225 with a minimum grade of "C-"; and CHEM 131 or CHEM141 taken previously or concurrently; or MATH 100 and MATH 141 or MATH 151 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 GIS to investigate aquatic communities of a local river. Three hours of lecture and one three-hour laboratory per week. Offered every other year in the fall semester (CWRM)

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

Prerequisite: Open to Commonwealth and Departmental Honors students
Special topics in biology are presented. Three hourly meetings weekly. BIOL 338 fall semester, BIOL 339 spring semester

BIOL 341 Plant Physiology (4 credits)

Prerequisite: BIOL 121 with a minimum grade of "C-" or BIOL 100 or BIOL 102 with a minimum grade of "B-"; and BIOL 122 with a minimum grade of "C-"; and BIOL 200 with a minimum grade of "C-"; and CHEM 131-132 or CHEM 141-142; or consent of instructor
This course covers the growth and function of plants including cellular physiology, water relations, respiration, photosynthesis, nutrition, growth regulation and the influence of environment. Three hours of lecture and one three-hour laboratory period weekly. Fall semester

BIOL 350 Molecular Biology (4 credits)

Prerequisite: BIOL 200 with a minimum grade of "C-"
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. Six hours of lecture/laboratory weekly. Fall semester

BIOL 371 Histology (4 credits)

Prerequisite: BIOL 200 with a minimum grade of "C-"
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 three-hour laboratory period weekly.

BIOL 372 Animal Behavior (3 credits)

Prerequisite: BIOL 121 with a minimum grade of "C-" or BIOL 100 or BIOL 102 with a minimum grade of "B-"; and BIOL 122 with a minimum grade of "C-"; or equivalent or consent of 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.

BIOL 373 Animal Physiology (4 credits)

Prerequisite: BIOL 121 with a minimum grade of "C-" or BIOL 100 or BIOL 102 with a minimum grade of "B-"; and BIOL 122 with a minimum grade of "C-"; and CHEM 131-132 or CHEM 141-142; or equivalents or consent of instructor
Physiological principles concerned in irritability, contraction, circulation, gas exchange, excretion and hormonal regulation are studied. 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. Three hours of lecture and one three-hour laboratory period weekly. Alternate spring semesters

BIOL 375 Immunology (3 credits)

Prerequisite: BIOL 200 with a minimum grade of "C-"; and BIOL 321 with a minimum grade of "C-"
The immune system and its components, including their structure, function, genetics and ontogeny are covered. Three hours of lecture weekly. Offered alternate fall semesters

BIOL 376 General Endocrinology (3 credits)

Prerequisite: BIOL 200 with a minimum grade of "C-"
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 of lecture weekly.

BIOL 382 Comparative Chordate Anatomy (4 credits)

Prerequisite: BIOL 121 with a minimum grade of "C-" or BIOL 100 or BIOL 102 with a minimum grade of "B-"; and BIOL 122 with a minimum grade of "C-" or equivalent; or consent of instructor

An ontogenetic and phylogenetic survey of chordate gross anatomy, supplemented by laboratory dissections of representative species is presented. Emphasis is placed on ecomorphology and the 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 three-hour laboratory period weekly. *In alternate spring semesters, either BIOL 382 or BIOL 284 will be offered*

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.

BIOL 408 The Biology of Marine Mammals (3 creditst)

Prerequisite: BIOL 122 with a minimum grade of "C-" or equivalent; or consent of instructor

This is 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 of lecture weekly.

BIOL 420 Limnology (4 creditst)

Prerequisite: BIOL 121 with a minimum grade of "C-" or BIOL 100 or BIOL 102 with a minimum grade of "B-"; and CHEM 132 or CHEM 142, MATH 100 or MATH 141 or MATH 151; 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.

BIOL 422 Biological Evolution (3 creditst)

Prerequisite: BIOL 321 with a minimum grade of "C-" or consent of 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, ploidy, isolation, natural selection and population genetics. Three hours of lecture weekly. *Offered alternate years, spring semester*

BIOL 423 Biological Invasions (3 credits)

Prerequisite: BIOL 122 with a minimum grade of "C-" 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*

BIOL 425 Population Ecology (4 credits)

Prerequisite: BIOL 122 with a minimum grade of "C-" or equivalent; and BIOL 225 with a minimum grade of "C-"; and BIOL 321 with a minimum grade of "C-"; or consent of instructor

The dynamics and evolution of populations are examined. Topics to be covered include models in population biology, population growth, density dependent and density independent growth, population genetics, evolution of life histories, species interactions, competition, predator-prey interactions, host-parasitoid interactions, disease and pathogens, and population growth and regulation. Three hours of lecture and three hours of laboratory weekly. *Either semester*

BIOL 428 Microbiology (4 credits)

Prerequisite: BIOL 200 with a minimum grade of "C-"; and BIOL 321 with a minimum grade of "C-"

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

BIOL 430 Embryology (4 creditst)

Prerequisite: BIOL 200 with a minimum grade of "C-"

This course is 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 three-hour laboratory period weekly. *Offered alternate years, spring semester*

BIOL 434 Biological Electron Microscopy (3 creditst)

Prerequisite: BIOL 200 with a minimum grade of "C-" or consent of 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 is provided. 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*

BIOL 436 Mammalian Reproductive Physiology (4 credits)

Prerequisite: BIOL 200 with a minimum grade of "C-"; plus one of the following: 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 func-

tional understanding of the physiological bases for reproductive events in vertebrates, emphasizing mammals. Three hours of lecture and three hours of laboratory per week.

BIOL 450 Virology (3 creditst)

Prerequisite: BIOL 200 with a minimum grade of "C-"; and 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 of lecture weekly.

BIOL 472 Human Genetics (3 creditst)

Prerequisite: BIOL 321 with a minimum grade of "C-" or consent of instructor

The course investigates 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 of lecture weekly. *Offered every other year*

BIOL 475 Parasitology (4 creditst)

Prerequisite: BIOL 428 with a minimum grade of "C-" 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 three-hour laboratory per week. *Offered every other year*

BIOL 482 Neurobiology (4 creditst)

Prerequisite: BIOL 200 with a minimum grade of "C-"; and BIOL 251 or BIOL 373; or equivalent or consent of instructor

Nervous system ultrastructure, and the chemical and physiological properties of mammalian nerve cells will be discussed. Topics will include an examination of cell types, membrane potentials, synaptic transmission, embryonic development, growth and aging. Sensory and motor functions of nerves; reflex mechanisms; autonomic nervous functions; and central nervous system functions such as emotions, learning and memory, regulation of biological clocks and autonomic functions will be covered. Three hours of lecture and three hours of laboratory weekly. *Offered every third year*

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*

BIOL 490 Special Topics in Biology (1-3 creditst)

Prerequisite: BIOL 121 with a minimum grade of "C-" or BIOL 100 or BIOL 102 with a minimum grade of "B-"; and BIOL 122 with a minimum grade of "C-"; 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.

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*

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*

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

Prerequisite: Consent of the department; formal application required

Directed study is 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*

BIOL 502 Research (credit to be arranged)

Prerequisite: Consent of the department; formal application required

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

BIOL 503 Directed Study (credit to be arranged)

Prerequisite: Consent of the department; formal application required

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

BIOL 581 Mammalogy (4 credits)

Prerequisite: Matriculation in the MAT in Biology or consent of instructor

This course covers the classification, distribution, life histories, techniques of collection and preservation, evolution, ecology, behavior, economic importance and techniques of field study of mammals. Three hours lecture and one three-hour laboratory period per week. *Offered spring semester*

Other Approved Courses

BIOF 501 Characteristics of Organisms
BIOF 502 Diversity and Adaptation of Organisms
BIOF 503 Heredity, Reproduction and Development
BIOF 504 Ecosystems and Organisms
BIOF 505 The Biology of Fresh Waters
BIOF 506 Applied Biology for the Laboratory
BIOF 507 Special Topics in Elementary Life Science
BIOL 135-136 Freshman Honors Colloquium
BIOL 280 Human Physiology
BIOL 286-287 Sophomore Honors Colloquium
BIOL 390 Introduction to Pharmacology
BIOL 480 Tropical Field Ecology
BIOL 504 Advanced Seminar in Selected Modern Biological Topics