Course Descriptions

BIO-Biological Science

BIO103 - Contemporary Issues in Biology
Basic biological principles are applied to the understanding of current social-biological problems and how these relate to an individual's personal life. Topics included are human sexuality, nutrition, health and disease, evolution, behavior, and the diversity of life. Three lecture-hours weekly. This course is designed for students not majoring in biology.

BIO112 - Biology of Sexually Transmitted Diseases
A comprehensive review of the biology of sexually transmitted diseases. The course will cover the principles of disease and epidemiology, the biology and ecology of the microbial agents that cause STDs, the host response to disease, treatments, and preventative measures.

BIO117 - Introduction to Human Biology
This course is intended as an introduction to the human body systems and the disease states associated with these systems. Students will be introduced to each of the body's systems through a description of the structures that make up the organ system followed by a rudimentary explanation of its physiology and examples of diseases associated with that system. Emphases will be placed on homeostasis and the interrelatedness of the body systems.

BIO120 - General Zoology
A comprehensive phylogenetic survey of the animal kingdom, with emphasis on evolutionary changes and the interrelationships of animals with their environment. Laboratory studies will examine representative members of the major phyla. Three lecture hours and three laboratory hours weekly.

BIO125 - General Botany
An introductory survey of form and function of the major plant groups as well as the bacteria, algae, water molds, slime moulds, and fungi within the overall framework of a modern phylogenetic system of classification. Three lecture hours and three laboratory hours weekly.

BIO130 - Biological Illustration: Form and Function
An introductory course in biology and drawing with an emphasis on the relationship between form and function. Working with plants and animals, and using a combination of macroscopic and microscopic specimens, students will focus on the careful observation and interpretation of biological forms. Drawing instruction will focus on a variety of techniques commonly used in the biological sciences. Biology instruction will introduce students to basic scientific methodology, the diversity of living forms, the variety of ecological strategies related to those forms and their scientific classification. This is a team-taught lecture and studio course, with the class in biology lecture one day, and in studio/lab instruction the second day.

BIO201 - Survey of Biotechnology
A survey of the scientific principles, research methods, commercial applications, societal impact, and business environment that influence and define biotechnology. Students will learn how genes, proteins and cells work, how biotechnologists study and manipulate living organisms, and how these methods are used to solve problems and create products in medicine, agriculture, industry, criminal justice, and the environment. They will examine ethical, social and economic issues affecting the use of biotechnologies, and the business and regulatory environment in which biotechnology companies operate. The course provides an overview of biotechnology's impact on industry, society, and the human condition.

BIO215 - Introduction to Cellular and Molecular Biology
This course is designed to introduce the student to the basic concepts of cell chemistry and biology as well as introduce the concepts and skills of molecular biology. It will cover topics such as cellular organization in both prokaryotic and eukaryotic cells including subcellular structures, metabolism, and genome organization. It will explore Mendelian and molecular genetics and gene expression. The lab portion will consist of exercises and experiments designed to demonstrate these topics.
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BIO218 - Genetics
Genetics plays an important role in all aspects of biology, acting on molecules, cells, organisms and populations. Genetic analysis also provides a powerful approach to address biological questions, and its methodologies are employed in fields as diverse as biotechnology, forensics, medicine and conservation. This course introduces students to the principles of classical and molecular genetics. Emphasis is placed on understanding the basic concepts of genetics and on using genetic analysis to study biological problems, developing analytical and problemsolving skills. BIO 218 will provide students with a strong background in genetics, which will be useful for those interested in pursuing a career in the life sciences, conservation and population biology, health sciences, biotechnology or medical professions.

BIO226 - Basic Microbiology
This course provides a survey of the prokaryotic and eukaryotic world of microorganisms. The medically important concepts of microbiology including microbial control, acquisition of disease, disease prevention and control will be presented.

BIO230 - Anatomy and Physiology I
This course is a general survey of the basic anatomical terms of position and direction, relevant scientific units, chemical components of living organisms, homeostasis, animal cytology, histology, the integumentary system, rudiments of neurology, the skeletal system, and the cardiovascular system.

BIO232 - Fundamentals of Biological Anthropology
An introduction to the field of biological anthropology, this course includes the study of evolutionary theory, human evolution and the fossil record, modern human populations, and the behavior and ecology of nonhuman primates. Three hours weekly, combining lecture and laboratory.

BIO248 - General Ecology
Ecology presents the biology or environmental science student with a holistic approach to the study of the biological environment. Emphasis is on the natural environments of organisms, particularly as biotic assemblages of these organisms interact with their environments from the concrete levels of organization up to the regional and biome levels.

BIO260 - Anatomy and Physiology II
A general survey of the basic structure of the peripheral and autonomic nervous systems, sensory receptors and special sense organs, the endocrine system, the cardiovascular system, the lymphatic system, the respiratory system, the digestive system, the urinary system, the reproductive system, human embryonic development, and metabolism. Three lecture-hours and three laboratory-hours weekly.

BIO305 - Comparative Vertebrate Anatomy
A comparative study of the vertebrate organs and organ systems of animals in the phylum chordata, this course places emphasis on evolutionary changes.

BIO306 - Human Anatomy
A basic study of the structure of the human body, this course includes discussion of the 11 fundamental systems. Each system is described in terms of its gross anatomy, with some discussion of histology and physiology where appropriate. Three lecture-hours and three laboratory-hours weekly.

BIO307 - Plant Anatomy
A detailed study of the form and function of the various cell and tissue types found in higher plants, along with a survey of how scientific knowledge of plant anatomy is applied within a diverse range of fields, including: ecology, forensic science, archeology, climatology, the arts, and engineering.

BIO325 - Animal Histology
The study of cellular differentiations in tissue, tissue identification, and special functions, especially in the mammals. Three hours lecture and three laboratory hours weekly.
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BIO326 - General Microbiology
A detailed study of bacteria and viruses, with less emphasis on fungi, algae, and protozoans. Special emphasis on medical, ecological aspects, along with virology and immunology. The cytology, physiology, microbiology, and culture of microbes are pursued in the laboratory.

BIO327 - Parasitology
A comprehensive review of the biology of parasites and their interactions with their hosts and vectors. The course will cover principles of disease and epidemiology, the biology and ecology of the eukaryotic parasites causing disease in animals, the host response to infection, treatments, and preventive measures. Three lecture-hours and three laboratory-hours weekly.

BIO328 - Human Physiology
The functions of the human body are covered. Basic physiological phenomena are studied with considerable emphasis on clinical and practical application.

BIO335 - Plant Physiology
This course will examine and explore the link between the form and function in plants. Plant Physiologists are people interested in learning about what plants do, and what chemical and physical factors cause plants to respond as they do in their environment. This course will explore several important processes which allow plants to survive in their environment and we will examine the ecological implications of the physiological processes under investigation. We will primarily examine this relationship at the whole organism level. Laboratory experiments will reinforce the lecture topics.

BIO336 - Plant Taxonomy
A study of relationships among the vascular plants, their classification and methods of identification. Plant families native to Western Pennsylvania are stressed.

BIO337 - Ornithology
The study of bird life, the course covers classification, anatomy, ecology, behavior and recognition of birds, with emphasis on local species and their relationships to people and the ecological balance with other organisms.

BIO338 - Human Physiology
The functions of the human body are covered. Basic physiological phenomena are studied with considerable emphasis on clinical and practical application.

BIO350 - Mammalogy
This course will provide an overview of the Class Mammalia. The lecture portion of the course will cover the evolution and classification of mammals, some basic physiology and behavior, and the ecology and conservation of mammals around the world. The lab portion of the class will involve a more in-depth study of mammal identification, focusing on the mammals of Pennsylvania. Three lecture hours and three laboratory hours weekly.

BIO357 - Mycology
A detailed examination of mushrooms, molds, and human mycoses, including an introduction to fungal ecology and assessment of fungal classification, as well as molecular systematics and an overview of medical significance. The course utilizes hands-on, student-driven, inquiry-based practices. Students will use scientific processes and procedures, data analysis, and research tools to investigate fungal morphogenesis, molecular diagnostics, culture techniques, ecological relationships, and human pathogenesis.

BIO410 - Developmental Biology
This course provides an introduction to developmental biology. It will explore different modes of embryogenesis in invertebrates and vertebrates and examine the cellular and molecular mechanisms of animal development using a variety of model organisms and experimental techniques. Emphasis will be placed on the connection between development and disease, between developmental biology and evolution, and on the experimental approaches that have been used to shed light on developmental mechanisms. Current issues surrounding developmental biology, such as stem cells and reproductive technology, will also be discussed.

BIO414 - Plant Ecology
A consideration of the plant communities (and associated populations) which are influenced by both biotic and physical factors. The emphasis in this course is on the vegetation of Pennsylvania and the broader region.
Laboratory work provides the student with the opportunity to become familiar with modern methods of vegetation analysis and community sampling.

**BIO418 - Biological Research Investigations**
This course is intended for advanced undergraduate students who wish to develop an independent research project within the biological and environmental sciences. Emphasis is placed on the use of various scientific instruments and biological procedures necessary for research investigations. Each research project is unique, and the data collected should ultimately be presented and or published.

**BIO425 - Neurobiology**
An examination of the structure and function of the nervous system. The course is designed to develop a detailed understanding of the nervous system structure and function from the molecular level to the level of complex circuits such as learning and memory. While the primary emphasis is the human nervous system, a central theme is the comparison of the neurological circuits across phyla to identify basic organizational principles.

**BIO433 - Herpetology**
A consideration of the Amphibia and Reptilia from taxonomic, morphological, evolutionary, behavioral, ecological and physiological viewpoints, emphasizing ecological relationships.

**BIO435 - Ichthyology**
An introduction to the morphology, taxonomy, ecology, and distribution of the major groups of freshwater fishes, with emphasis on the northeastern U.S. fauna.

**BIO441 - Ethology**
Ethology examines animal behavior within the framework of evolutionary biology, using the comparative methods (in both lecture and the laboratory) to examine similarities and differences in ecology, anatomy and physiology, genetics, and development patterns.

**BIO442 - Forest Ecology and Dendrology**
A study of the forest, and its ecology and management to include the identification of the major woody plants, their growth, structure, and natural history. An emphasis is given to the forest communities and tree and shrub species common to the eastern United States.

**BIO445 - Entomology**
A specialized study of insects: identification and classification, development phases, physiological characteristics, economic importance, disease vectors.

**BIO446 - Freshwater Invertebrate Zoology**
This course will examine the diversity of freshwater invertebrates, with an emphasis on their evolution, ecology, taxonomy and practical uses. Students will learn how to collect invertebrates in the field and will use specimens collected from local habitats to develop basic taxonomic skills. During class field trips, students will learn how to design and conduct field surveys designed to evaluate ecosystem health using aquatic invertebrates as biological indicators.

**BIO450 - Immunology**
A detailed study of the immune system of animals covering non-specific and specific host responses to foreign materials, the interaction between cells of the specific immune response, the nature and diversity of the immune response, the practical applications of the immune response, and disorders associated with the immune response.

**BIO460 - Pathophysiology**
This course introduces students to understanding how the body responds to diseases resulting from homeostatic imbalances. After completing this course, students will understand how a loss of homeostasis results in pathologies, how pathophysiological changes in the body progress, and how the body responds to those changes.
both at a local and systemic level. Topics include diseases and disorders related to cells and cell proliferation, as well as the nervous, endocrine, cardiovascular, respiratory, digestive, urogenital, and muscular systems.

**BIO478 - Evolution**
An advanced, writing intensive course, that examines the mechanisms resulting in biological evolution. Emphasis is placed on how these mechanisms operate at a variety of levels, from individual genes to distantly related species, and thereby produce the diversity of life observed on earth. The origin of life, speciation and hominid evolution are also studied in detail.

**BIO480 - Cell Biology**
The course covers the biology of the cell, with emphasis on the relationship of structure and function. It is a study of cell organelles, growth, division, macromolecules, membranes, synthesis and regulation.

**BIO486 - Comparative Animal Physiology**
A comparative approach to the study of physiological systems in the kingdom Animalia. Emphasis is on vertebrate organisms, but invertebrate examples are used where appropriate.

**BIO488 - Water Pollution Biology**
The purpose of this course is to convey a broad understanding of our freshwater aquatic ecosystems and the effects of the various types of environmental pollutants on these systems. We will review the basic concepts of limnology, freshwater ecology and freshwater biology covering both lotic and lentic systems with application to water quality, pollution, and aquatic system management and restoration. Aquatic system response will be analyzed in a lecture/laboratory format.

**BIO492 - Biological and Environmental Science Internship**
Student interns are placed with an organization or institution, which most nearly approximates their goals for employment. The intent of the internship is to provide students with practical work experience in an environment in which they will be dealing with practical problems requiring real solutions in a relatively short-time frame. Advisor and department chairperson approval is required before course enrollment. Students may take a maximum of 12 credits; 4 credits may be counted toward their major in their area of concentration/related electives, and the remainder as free electives. This is also a Special Experience course. This course is graded on a Pass-Fail basis.