(BY) BIOLOGY

Courses

BY 104. Principles of Biology. 3 Hours.
Principles of Biology is an introductory biology course with an integrated lab, intended primarily for non-science majors. This course enables the student to become aware of the complex biological systems in and around us. Students learn about core biological concepts such as cells, metabolism, genetics, and evolution, as well as introductions to plant biology, animal biology and microbiology.

BY 120. Functional Anatomy and Physiology. 3 Hours.
Functional Anatomy and Physiology is a one semester, 3 credit lecture with a separate laboratory course designed to give the non-science major knowledge of the human body and its relationship with the environment. Topics covered include the chemical basis of life, the anatomy & physiology of all organ systems.

BY 131. Human Genetics. 3 Hours.
This course is designed for nonscience majors to support the natural interest of most people in those human physical, behavioral, and social characteristics that have a hereditary basis. Lectures, discussions and the solving of simple genetic and statistical problems are used to form a basis for the consideration of current social issues with genetic implications.

BY 191. General Biology I. 3 Hours.
General Biology I focuses on biological principles that are fundamental to all of biology. This course covers the diversity of life and the commonalities of all living things including: molecular structure, cell structure and function, metabolism, cell division, heredity, and genetics. This course will also review the scientific process and the evaluation of scientific information. This course will prepare students for future courses in anatomy and physiology, cell biology, microbiology, biochemistry, genomic biology, and other biological specialties. This course is limited to students in programs requiring this course or are intending to take further biology courses.

BY 192. General Biology II. 3 Hours.
General Biology II is the continuation of a two-semester series in general biology for science majors. This course is designed to provide a thorough introduction to biology and prepare students for further study of evolution and ecology in BY 240. The goal of the course is to emphasize the diversity of species and for students to understand their relationship to, and their place in, the natural world. General Biology II is an introduction to the systematics, anatomy and physiology of the plant and animal kingdoms. This course will examine the structure and function of plant and animal organ systems in the framework of the evolution of adaptations. The course also concludes with an introduction to ecological systems.

BY 195. Introduction to Life Science. 3 Hours.
This integrated lecture and lab science course provides a comprehensive introduction to the foundational concepts in biology and chemistry while exploring their applications in the context of modern medicine, medical humanities, sustainability, global, community, and individual health. Through inquiry-based learning, students develop a deep understanding of the key elements that underlie life sciences and their importance in various aspects of health and medicine.

BY 221. Anatomy and Physiology I. 3 Hours.
This course provides an in-depth understanding of the structures and functions of the human body and its parts. It begins with the organization of the human body and descriptive terminology relating to various segments of the body. Cellular anatomy and physiology and study of tissues lead to the study of the organ systems. Topics included in the course are skin, the skeletal system, joints, the nervous system, and muscle. Prerequisite(s): BY 191 or BY 195.

BY 222. Anatomy and Physiology II. 3 Hours.
This course is a continuation of Anatomy and Physiology I. The course will provide a thorough understanding of structure-function relationships down to the molecular level. The semester will cover the special senses, blood, the cardiovascular system, lymphatics, the respiratory system, the digestive system, the urinary system, the endocrine system, and reproduction. Prerequisite(s): BY 221.

BY 240. Ecology. 3 Hours.
This course explores the interaction of biotic and abiotic components in functioning ecosystems. It will examine topics in population distribution and dynamics, major terrestrial and aquatic habitats, community interactions such as competition and predation, nutrient cycling, energy flow, and ecosystem succession. The concurrently run lab will train students in identifying local flora and fauna, as well as collection and analysis of field data. Prerequisite(s): BY 191 or BY 192.

BY 241. Microbiology for the Health Sciences. 3 Hours.
This course provides a broad understanding of both beneficial and harmful microorganisms and their roles in human welfare, with an emphasis on pathogens. Topics will include the structure, physiology, and control of human pathogens, particularly bacteria and viruses. The associated laboratory course (SL241) provides experience in important techniques of culturing, identifying, and controlling microorganisms. Prerequisite(s): BY 195 or (BY 191 and (CH 180 or CH 182)) and (MS 141 or MS 180 or MS 181 or MS 182).

BY 263. Biology for Elementary Educators. 3 Hours.
Science is best taught by experiencing it so this course is designed to give students the biology content they need to teach to the science standards in grades K - 8. Students will learn the content and how to design age appropriate labs to do in schools. Students will work on developing labs that can be used to teach science and math standards as well. Students will practice teaching the content as well as setting up and doing the labs with their peers.

BY 291. Cell Biology. 3 Hours.
This course is a detailed exploration of cell structure and function with an emphasis on the cytoplasm and extracellular matrix. Topics in membrane structure, transmembrane transport, vesicle trafficking, cytoskeletal organization, and macromolecular assembly processes are considered. Cell to cell communications and the role of the extracellular matrix in tissue level processes are also explored. Superficial examination is given to the structure and organization of the nucleus, chromosomes and gene expression to prepare students for the companion course entitled Genomic Biology. Prerequisite(s): BY 191.

BY 322. Epidemiology. 3 Hours.
The Introduction to Epidemiology covers basic concepts of field, practical and analytical epidemiology. The course examines methods for identification of factors influencing health and disease in human populations. Considerations are centered on physical, biological, and cultural factors in relation to infectious and noninfectious diseases; interactions between agent, host, and environmental factors as determinants of health and disease; application of the epidemiologic approach to health services; and retrospective and prospective analysis of morbidity data. Instruction is by lecture and in-class exercises.

BY 333. Pathophysiology. 3 Hours.
Pathophysiology is the study of abnormal, diseased physiological processes. The course begins with an examination of altered cell functioning, injury and death. The course continues with pathophysiology of the body systems and inability of diseased systems to maintain homeostasis. Also included are topics in inflammation, immunity, neoplasia, and adaptations of the body to stress. Although aging is not considered a disease, some aspects of aging will be discussed. Prerequisite(s): BY 221 and BY 222.

BY 334. General Genetics. 3 Hours.
This class reviews the basic mechanisms of inheritance (Mendelian genetics) and molecular mechanisms of gene expression. The course covers how DNA is organized in chromosomes and how chromosomes behave as cells progress through the cell cycle. Students also examine complex hereditary phenomena such as gene linkage, recombination and epistasis, and explore the sources and consequences of mutation as well as DNA repair mechanisms that normally operate in organisms. Additional topics include how gene expression is regulated, both in prokaryotes and eukaryotes. Students then present on a variety of topics related to genetics. Prerequisite(s): BY 191 and CH 181.

BY 336. Evolution. 3 Hours.
This course provides an overview of the current field of evolutionary biology. In this course students develop a basic understanding of the major topics in evolutionary biology, including: the theory of evolution by natural selection, the history of evolutionary thought, population genetics, sexual and kin selection, evolutionary trees/ phylogenies, how new species arise, and how scientists explain the origin of life on earth and human evolution. In addition, students come to understand how evolution provides a framework for the broader field of biology and how evolutionary theory can be used to address some social issues. Prerequisite(s): BY 191 and BY 192 and BL 191 and BL 192 and BY 334.

BY 435. Advanced Principles of Physiology. 3 Hours.
Physiology is the foundation for the understanding of biological and medical sciences. The purpose of this class is to examine advanced concepts of physiology and how perturbations both physical, chemical and environmental affects systems and connections between systems. Prerequisite(s): BY 221 and BY 222 and BY 291.