

BIOL 1010 (F/S) Human Anatomy and Physiology I. An introductory study of the structure and function of the human organ systems including the nervous, sensory, muscular, skeletal, and integumentary. This course, which is required for admission to some health science programs, can be used to meet the natural science core education requirement. Four hours of lecture, two hours of lab each week. 4 s.h.

BIOL 1020 (F/S) Human Anatomy and Physiology II. A continuing study of the structure and function of the human organ systems including the cardiovascular, respiratory, gastrointestinal, reproductive, renal, and endocrine. Four hours of lecture, two hours of lab each week 4 s.h.
Prerequisite: BIOL 1010

BIOL 1110 (S) Principles of Biology. Introductory biology for non-majors offered on all delivery platforms. This course is not appropriate for students who wish to pursue a career in the health or natural sciences. This course does not count toward major requirements in Biology, and Biology majors who receive credit for Biology 2110 cannot receive credit for this course. Topics include the hierarchical organization of life, cell structure and function, cellular metabolism, cell reproduction, transmission and molecular genetics, and diversity of organisms. Four hours of lecture, two hours of laboratory per week 4 s.h.

BIOL 2110 (F), 2120 (S) General Biology I & II. The first courses taken by all Biology majors and minors and by those preparing for a career in the health sciences. Topics include: molecules of living organisms, energetics, cell structure and function, survey of kingdoms, flowering plants, cell reproduction, ecological relationships, population dynamics, and evolutionary relationships. Four hours of lecture, two hours of laboratory each week 4 s.h.

BIOL 2500 (F) Microbiology and Immunology. The fundamental principles of morphology, physiology, virulence of microbes, and vertebrate immune responses. Laboratory experiments in pure culture techniques, classification, and epidemiology will be conducted. This course is not recommended for Biology majors. Four hours of lecture, two hours of laboratory each week 4 s.h.

BIOL 3100 (F) Plant Biology. This course explores topics unique to plants, including plant evolution, diversity, and domestication; physiological strategies that plants use to harvest light for energy, obtain and conserve water, and respond to various environmental cues; and the importance of plants to the local, national and global economies. Laboratory sessions consist of mostly outdoor sessions in plant identification and field trips to various local sites. Four hours of lecture, three hours of laboratory each week 4 s.h.
Prerequisites: BIOL 2110 & BIOL 2120; CHEM 2110.

BIOL 3130 (S) Ecology. This course is designed to introduce students to ecology using both animal and plant examples. Students will study the interactions of individual organisms with their abiotic environment, interactions within their own population, and interactions with other species. The course will primarily focus on individuals and populations; however, some community and ecosystem elements will be explored. Four hours of lecture, three hours of laboratory each week 4 s.h.
Prerequisites: BIOL 2110, 2120

BIOL 3200 (F) Histology. Histology is the study of tissues and organs at the microscopic level. This course focuses on understanding the microscopic anatomy of the human body with emphasis on structure/function relationships. All levels of organization from the cellular through the system level are incorporated into a holistic integration of microscopic anatomy with physiology. Special emphasis is placed on understanding the physiological and metabolic role of individual tissues, glands, and organs in regards to homeostasis, metabolism, and reproduction. The laboratory component uses both physical and virtual microscopy to integrate structure with function. Four hours lecture and three hours of lab..... 4 s.h.
Prerequisites: BIOL 2110, 2120

BIOL 3250 (S) Bioinformatics. This course introduces students to the cutting-edge field of bioinformatics, with emphasis on fundamental concepts of computational models and statistical analysis of high-throughput data. Students will become familiar with various DNA sequence analysis and alignment algorithms; and the application to genomic and phylogenetic analyses. Students will learn how to create and/or use algorithms, databases, systems, and web applications to solve problems in molecular biology. In addition, students will be introduced to the latest techniques in protein and microarray analysis 4 s.h.
Prerequisites: BIOL 2110

BIOL 3260 (S) Clinical Neuroanatomy. This course explores the relationship between the location of various neuroanatomical structures and their function within the nervous system. Students learn how to read and correctly interpret patient charts, basic neuro-radiology, and how various signs and symptoms help point to distinct locations in the brain and spinal cord. Highly anatomical in nature, the course begins with the basic anatomy of the brain and spinal cord, and quickly integrates clinical diagnostic tests and neural function. Furthermore, actual case studies are used to demonstrate the importance of taking detailed patient histories, and how to match signs and symptoms with their neuroanatomical correlates. Four hours of lecture, three hours of laboratory each week..... 4 s.h.
Prerequisites: BIOL 1010 and 1020, or BIOL 2110 and 2120

BIOL 3300 (F) Cell Biology. A study of the molecules of living systems, physical and chemical principles applicable to cells, enzymes, structure and function of eukaryotic organelles, membrane structure and function, transport mechanisms, cellular energetics, signal transduction pathways, and development of cancer. Four hours of lecture, three hours of laboratory each week..... 4 s.h.
Prerequisites: BIOL 2110, 2120; CHEM 2110

BIOL 3310 (F) Human and Vertebrate Comparative Anatomy. A study of the morphological and evolutionary relationships among various vertebrates. The laboratory involves dissection of a dogfish shark, an amphibian, and a mammal. Four hours of lecture, three hours of laboratory each week 4 s.h.
Prerequisites: BIOL 2120

BIOL 3600 (S) Human and Mammalian Physiology. Advanced study of the physiology of human and mammalian organ systems. Mechanisms are studied from the cellular, tissue, organ, and system levels. The laboratory emphasizes computer simulations, animal experiments, and experimental human physiology. Four hours of lecture, three hours of laboratory each week..... 4 s.h.
Prerequisites: CHEM 1110, 1120; BIOL 2110, 2120

BIOL 3640 (F) Neurophysiology. This course explores the various components of the nervous system, and how they coordinate to perform integrative functions. Highly neurophysiological in nature, the course begins with the basic neural function of neural tissues and principles of neuronal communication, and works towards the integrated activities of neurons. Four hours of lecture, three hours of laboratory each week..... 4 s.h.
Prerequisites: BIOL 1010 and 1020, and PSYC 1560; or BIOL 2110 and 2120

BIOL 3700 (S) Biochemistry. This class examines the structural and functional properties of carbohydrates, lipids, proteins and nucleic acids. Additional topics include pH in living systems, biosynthesis, and catabolism. Four hours of lecture, three hours of laboratory each week..... 4 s.h.
Prerequisites: CHEM 2110, 2120

BIOL 3750 (S) Research Methods in Biology. This course is designed to give students first-hand experience in biological experimentation. Students will work closely with Biology faculty members to learn about hypothesis formation, experimental design, data collection and analysis. By the end of the course, students will present their research to their peers. This course is also designed to prepare students for additional research opportunities, and is required for students who want to complete a senior thesis project..... 4 s.h.
Prerequisites: BIOL 2110, 2120, 3300, and permission of the instructor

BIOL 3760 (F) Genetics. Genetics is the science of heredity, from chromosomes to genes, to DNA. Emphasis in this course will be placed on classical Mendelian, non-Mendelian, complex and population genetics. Personal genomics, bioinformatics, and bioethics are also covered. Lectures, literature reading, group projects and laboratory exercises will be used to provide students with a foundation in classical and modern genetics. Four hours of lecture, three hours of laboratory each week 4 s.h.
Prerequisites: BIOL 2110

BIOL 3770 (S) Molecular Biology. This course is required for the Cell and Molecular Biology concentration and is an upper-level course that expands on most materials covered in the cell biology and genetics courses. It investigates the complex nature and mechanisms of biological macromolecules; and explores the control of genes and their expression in specifying physical traits, mutations, and genomic maintenance. This course emphasizes the comprehension and interpretation of experimental evidences in an array of molecular biology sub-topics; these include gene regulation, translation, editing and evolution. Most major laboratory techniques for DNA/RNA manipulation will be covered in lectures and will be selectively used in lab. Four hours of lecture, three hours of laboratory each week..... 4 s.h.
Prerequisites: BIOL 3760 or BIOL 3300

BIOL 3800/3830 (D) Internship/Cooperative Education. For a complete description of Internships and Cooperative Education, see the Off-Campus Internship section under Experiential Learning.

BIOL 3900 (D) Special Topics. For junior and senior Biology majors credit to be arranged

BIOL 4350 (F) Immunology. The fundamental principles of morphology, physiology, virulence of microbes, and vertebrate immune responses. Laboratory experiments in pure culture techniques, classification, and epidemiology will be conducted. This course is not recommended for Biology majors. Four hours of lecture, two hours of laboratory each week 4 s.h.

BIOL 4400 (S) Microbiology. This class focuses primarily on the diversity of prokaryotic organisms and viruses, including morphological/ultrastructural diversity, methods of culture and control, selected physiological and metabolic pathways, contributions of microbes to global biogeochemical cycles, the importance of microbes in relation to human disease, and the role of microbes in modern technology. The laboratory is focused on culturing and identifying medically important bacteria. Four hours of lecture, three hours of laboratory each week..... 4 s.h.
Prerequisites: BIOL 2110, 2120; CHEM 2110

BIOL 4670 (F) Mammalian Toxicology. This course introduces students to the basic concepts of toxicology, with a subsequent focus on environmental toxicants and their biological effects in mammals, particularly humans. Experimental design will be stressed as will potential mechanisms through which various toxicants can exert their effects. Four hours of lecture, three hours of lab each week..... 4 s.h.
Prerequisites: BIOL 3300 or 3600; CHEM 2110, 2120

BIOL 4690 (S) Systems Biology. This course provides an introduction to the field of Systems Biology by focusing on approaches to understand molecular mechanisms underlying the myriad phenotypes of living cells and organisms. Following the paradigm shift in the production of large scale biological data (also called ‘omics), Systems Biology has arisen as a new area of research that strives to make connections between metabolic, signaling and regulatory networks involved in cellular processes. Using a holistic rather than reductionist approach to understanding and controlling biological complexity, this course will introduce large-scale data sets used in genomics, proteomics, metabolomics and epigenetics. Techniques such as network analysis and modeling approaches will then be introduced, providing a framework for a systems view of the etiology of complex traits. This course is intended as a capstone course for Biology majors (especially those in the Bioinformatics track), who are interested in pursuing careers in graduate school, medical school or the biotech industry 4 s.h.
Prerequisites: BIOL 3760; BIOL 3770 or 3300.

BIOL 4700 (A/F-O) Evolutionary Biology. This course is a capstone for the biology major. Lectures, critical reading of primary literature, and a field trip will introduce students to fundamental evolutionary concepts, modern evolutionary biology research, and specific case studies of evolution in action. Discussions will be over a number of classical texts on evolution, especially those published during the formative years of the Theory of Evolution. Students will be trained to sharpen their scientific inquiry, hypothesis formation, evidence-based deduction, and general critical thinking. The course will cover the breadth of evolutionary biology: from the origins of life and investigation of fossil records, to studying the mechanisms of evolutionary changes that govern all living beings. Four hours of lecture each week 4 s.h.
Prerequisites: BIOL 3760

BIOL 4910, 4920 (F/S) Senior Thesis Research in Biology. This course is designed for biology majors, in their senior fall and spring semesters, who are pursuing original research projects with biology faculty with the intent of writing up their results as a senior thesis project. The course includes laboratory or field research, as well as literature research necessary for submitting a manuscript related to original research. Participation in this course will also allow students to work towards “Honors in Independent Study” in Biology2-4 s.h.
Prerequisite: A departmental committee must approve proposals.

BIOL 4990 Comprehensive Assessment. All candidates for a degree from King are required to demonstrate competency in their major field. Students with more than one major must demonstrate competency in each of their major fields. For a B.A. or B.S. in Biology, students must earn a passing grade on the Biology Major Field Achievement Test 0 s.h.