BIOLOGY (BIOLOGY)

Courses

BIOLOGY 102 Biology and Living Credits: 3
Introduction to structural organization and functional processes of living systems. For non-biology majors only. Does not count toward biology degree.
BIOLOGY 102 - MOTR BIOL 100L: Essentials in Biology with Lab

BIOLOGY 102L Biology and Living Laboratory Credit: 1
Exploration of basic biological concepts through laboratory activities requiring data collection and analysis. For non-majors only; does not count toward Biology degree requirements.
Corequisite: BIOLOGY 102 (or prerequisite).

BIOLOGY 102L - MOTR BIOL 100L: Essentials in Biology with Lab

BIOLOGY 108 General Biology I Credits: 3
Fundamental studies in biology emphasizing the unity and diversity of life. Topics include the basic chemistry of biological processes, cell types and organelles, energy harvesting and energy producing pathways, cell and life cycles, genetics, DNA structure, genes, transcription, translation, natural selection, population genetics, speciation, and phylogenetic analysis.
BIOLOGY 108 - MOTR BIOL 150: Biology

BIOLOGY 108L General Biology I Laboratory Credit: 1
Basic laboratory studies in Biology emphasizing the unity and diversity of life. Structure, function, heredity, development, ecology and evolution will be explored.
Co-requisites: BIOLOGY 108.

BIOLOGY 108L - MOTR BIOL 150L: Biology with Lab

BIOLOGY 109 General Biology II Credits: 3
Fundamental studies in biology emphasizing the unity and diversity of life. Topics include prokaryotes, fungi, invertebrate-vertebrate zoology and phylogeny, human evolution, plant structure and development, animal development and physiology, ecology (population and ecosystems).

BIOLOGY 109L General Biology II Laboratory Credit: 1
Basic laboratory studies in Biology emphasizing the unity and diversity of life. Structure, function, heredity, development, regulation of growth and evolution will be explored.
Co-requisites: BIOLOGY 109.

BIOLOGY 112 Microbiology and Living Credits: 3
Lectures and demonstrations concerning the cell structure, genetics and physiology of microorganisms and the role microorganisms play in the world around man with an emphasis on medical and clinical aspects of the significance of various groups of bacteria, viruses fungi and other microorganisms. This course is intended for nursing and other allied health students and for non-biology majors interested in life sciences and does not count toward Biology major requirements.

BIOLOGY 115 First Year Seminar Credit: 1
This course is designed to provide students with the skills necessary to achieve success at the university. The curriculum includes time management, study, reading, note-taking and test-taking strategies, health and wellness, and student support services. Additional emphasis will include career exploration, including professionalism, writing a resume, and developing plan of study for degree completion.

BIOLOGY 122 Human Genetics Credits: 3
This is a non-majors biology course in human genetics designed for those with little classroom training in the sciences. The focus will be on the nature of human genetic variation and how variation shapes and affects our lives. This includes the structure and function of genes and how genes create traits. The discussion will focus on how genes function in human development through sex determination. The inclusion of human genomic sequencing technology and personal genomics will emphasize several issues related to knowledge and privacy.
BIOLOGY 122 - MOTR LIFS 100G: Essentials in Human Biology - Gene

BIOLOGY 125L Guided Research in Biology Credits: 2
An introduction to basic principles and methods of scientific research in the biological sciences. Students will engage in experimental design, use of bioinformatic tools, molecular graphics, and specialized tools related to different biology disciplines to characterize a specific gene or cell system under the guidance of a faculty member. Recommended preparation: BIOLOGY 108.

BIOLOGY 199L Methods in Biological Research Credits: 2
The course will provide an introduction to laboratory safety and common research methods used in modern biological research. It is intended for students that wish to gain research experience in the School or a career in research.
Prerequisites: BIOLOGY 108 or BIOLOGY 109.

BIOLOGY 202 Cell Biology Credits: 3
Basic concepts of cellular and subcellular structure and function, including supramolecular and organelle structure and organization, bioenergetics, cell growth and cellular communication.
Prerequisites: (BIOLOGY 108 (or MOTRBIOL 150L), and CHEM 212R) OR (CHEM 212R, LS-ANATO 219, LS-ANATO 219L, and LS-MCRB 121).

BIOLOGY 206 Genetics Credits: 3
A modern approach integrating molecular and organismal studies of the general genetics of lower and higher organisms. Chromosomal structure and function, gene transmission, heredity, plasticity and population genetics will be discussed.
Prerequisites: BIOLOGY 108 (or MOTRBIOL 150L), BIOLOGY 109 (or MOTRBIOL 150LZ or MOTRBIOL 100LZ), and CHEM 212R or LS-ANATO 219.

BIOLOGY 217L Human Physiology Laboratory Credit: 1
This course is designed to illustrate the important principles of human physiology in a laboratory setting. Using an organ systems approach, the course will feature microscopic work, audio-visual presentations, and student experiments when possible. For non-majors only; does not count toward biology degree requirements.
Prerequisites: LS-PHYS 117.

BIOLOGY 218 Introductory Anatomy Credits: 3
Description and discussion of the cells, organs, organ systems and basic tissues of vertebrates with special emphasis on their interrelationships in functional anatomy.
Prerequisites: BIOLOGY 102 or BIOLOGY 108 or BIOLOGY 109.

Co-requisites: BIOLOGY 218L.

BIOLOGY 218L Introductory Anatomy Laboratory Credits: 2
Laboratory investigation of cells, tissues, and organs with special emphasis on their interrelationship in vertebrates.
Co-requisites: BIOLOGY 218.

BIOLOGY 250 Careers in Biological & Chemical Sciences I Credit: 1
This course will introduce students to a variety of careers in the biological and chemical sciences. Guest speakers will share information including day-to-day activities on the job, educational requirements, career advancement, and necessary interests and abilities.

BIOLOGY 251 Careers in Biological & Chemical Sciences II Credit: 1
This course will help students prepare for their post-undergraduate future. Topics will include communication, skills identification and marketing, how to find employment or internship opportunities, a review of the application process for graduate education and the role of undergraduate research.

BIOLOGY 285 Special Topics Credits: 1-3
In depth exploration of a topic in biology

BIOLOGY 302 General Ecology Credits: 3
Introduction to the study of populations, communities, and ecosystems by examining the interrelationships between living organisms and their environments. The role of natural selection and evolution will also be considered. Prerequisites: BIOLOGY 108 (MOTR 150L), BIOLOGY 109 (MOTR 150LZ), or BIOLOGY 102 (MOTR 100L).
Prerequisites:

BIOLOGY 302L Ecology Laboratory Credits: 2
This course provides laboratory and field experience in ecology. The course will cover topics including statistical analysis and data presentation, terrestrial and aquatic sampling, experimental design and scientific writing.
Co-requisites: BIOLOGY 302.

BIOLOGY 303 Invertebrate Zoology Credits: 3
Taxonomy, evolutionary relationships, behavior, reproduction, morphology and ecology of the invertebrates. Recommended preparation: BIOLOGY 108, BIOLOGY 109, and CHEM 212R.

BIOLOGY 304 Biostatistics 1 Credits: 3
Introduction to the concepts of probability, statistical reasoning, and experimental design in the biological sciences. The course emphasizes the application of inferential statistics to biological experiments including the use of relevant statistical computer packages.
Prerequisites: MATH 110 or STAT 235; or ACT Math sub-score of 28 or higher; or SAT Math sub-score of 660 or higher; or ALEKS Score of 61 or higher; or MyMathTest College Algebra score of 70% or higher.

BIOLOGY 305 Marine and Freshwater Biology Credits: 3
Introduction to the study of marine ecology, deep-sea biology, oceanic nekton, inter-tidal ecology, estuaries, mangroves and salt marshes, as well as ecology of rivers, lakes, streams, wetlands and human impact on aquatic habitats.
Prerequisites: BIOLOGY 108, BIOLOGY 109, CHEM 211.

BIOLOGY 306 From Bench to Bedside: Translational Research Credits: 3
This course explores the interplay between basic biological research and bedside clinical practice, delving into the topic “what is translational research?” By engaging with people from the community involved at all levels of translational research, students will gain an appreciation for the civic issues behind medical research, the interdisciplinary nature of research, and the part that Kansas City institutions play in regional life and health sciences.
Prerequisites: BIOLOGY 108 OR BIOLOGY 102.

BIOLOGY 308 Vertebrate Zoology Credits: 3
Taxonomy, evolutionary relationships, behavior, reproduction, morphology and ecology of the vertebrates.
Prerequisites: BIOLOGY 108, BIOLOGY 109, CHEM 212R.

BIOLOGY 310 Herpetology Credits: 3
The study of amphibians and reptiles, focusing on physiology, ecology, and taxonomy.
Prerequisites: BIOLOGY 109 or BIOLOGY 102.

BIOLOGY 312L Laboratory in Genetics and Developmental Biology Credits: 3
Experimental studies in the genetics, development, and cell biology using eukaryotic model systems with an emphasis on the basic methods of molecular and cellular biology.
Co-requisites: BIOLOGY 409.

BIOLOGY 312WL Laboratory in Developmental Biology, Genetics and Cell Biology Credits: 3
Experimental studies of genetics and development in selected eukaryotic model organisms with an emphasis on the molecular and cellular mechanism of inheritance.
Prerequisites: ENGLISH 225 and BIOLOGY 441.

Co-requisites: BIOLOGY 409.

BIOLOGY 313 Microbiology Credits: 3
Fundamental and applied aspects of microbial structure, metabolism, genetics and diversity. Experimental approaches to studying the microbial world will be emphasized.
Prerequisites: BIOLOGY 202, BIOLOGY 206.

BIOLOGY 313L Laboratory in Microbiology Credits: 3
General microbiological procedures plus advanced work in the areas of microbial physiology and genetics, pathogenic microbiology, virology, applied microbiology and biotechnology.
Co-requisites: BIOLOGY 313.

BIOLOGY 313WL Laboratory in Microbiology Credits: 3
General microbiological procedures plus advanced work in the areas of microbial physiology and genetics, pathogenic microbiology, virology, applied microbiology, and biotechnology.
Prerequisites: ENGLISH 225.

Co-requisites: BIOLOGY 313, BIOLOGY 441.

BIOLOGY 314 Entomology Credits: 3
Anatomy, physiology and identification of insects with emphasis on their environmental adaptations.
Prerequisites: BIOLOGY 109 (or LS-ANATO 219).

BIOLOGY 316 Principles of Physiology Credits: 3
Physiological functions and processes of animals at the organ and organ systems levels, including concepts of integrated and homeostatic mechanisms. The relationship between organ function and underlying cellular mechanisms in vertebrates will be emphasized.
Prerequisites: BIOLOGY 202.

BIOLOGY 316L Principles Of Physiology Laboratory Credits: 2
This course is designed to illustrate the important principles of human physiology in a laboratory setting. Using an organ systems approach, the course will feature audio-visual presentations and student experiments both during and outside the lab period.
Co-requisites: BIOLOGY 316.

BIOLOGY 319 Global Health: New and Emerging Infectious Diseases Credits: 3
This course will discuss infectious diseases that are newly identified, or increasing in prevalence throughout the world. Several aspects of each disease will be discussed, including transmission, symptoms, treatment, prevention, and diagnosis. The course is meant for students interested in a health-related career (medicine, dental, pharmacy, public health), but other students with a basic biology background are welcome.
Prerequisites: BIOLOGY 108, BIOLOGY 109 (or BIOLOGY 102).

BIOLOGY 322 General Parasitology Credits: 3
Parasitic protists, worms and arthropods and the disease states they may induce, will be examined in relationship to human, animal and plants hosts.
Prerequisites: BIOLOGY 109 (or LS-ANATO 219).

BIOLOGY 326 Biological Conservation Credits: 3
Applications of ecology and genetics to the conservation of communities and individual species, including discussion of the Endangered Species Act, extinction processes, and the effects of habitat fragmentation.
Prerequisites: BIOLOGY 108, BIOLOGY 109.

BIOLOGY 327 Biogeography and Biodiversity Credits: 2
Evolutionary and climatological effects on the geographic distribution of organisms, including areas of endemism as well as preservation of biodiversity.
Prerequisites: BIOLOGY 108, BIOLOGY 109.

BIOLOGY 328 Histology Credits: 3
Animal tissues and their specialization in the organism, with major emphasis on higher organisms.
Prerequisites: BIOLOGY 202.

BIOLOGY 328L Laboratory in Histology and Cellular Ultrastructure Credits: 3
Examination of structure/function relationships at the subcellular, cellular and organ levels. Both plants and animals will be examined with emphasis on vertebrates.
Co-requisites: BIOLOGY 328.

BIOLOGY 328WL Laboratory in Histology and Cellular Ultrastructure Credits: 3
Examination of structure/function relationships at the subcellular, cellular and organ levels. Both plants and animals will be examined with emphasis on vertebrates.
Prerequisites: ENGLISH 225.

Co-requisites: BIOLOGY 328.

BIOLOGY 329 Endocrinology Credits: 3
Study of the physiological functions and controls in human and related mammalian systems, with emphasis on endocrine-directed processes that underlie normal and abnormal metabolic and clinical conditions. The course will be presented in traditional lecture format, and focus on the molecular, chemical, membrane and cellular basis of metabolic homeostatic processes in cells, cytoplasmic compartments and primary organ systems.
Prerequisites: BIOLOGY 202.

Co-requisites: BIOLOGY 316.

BIOLOGY 331 Reproductive Biology Credits: 2
Comprehensive overview of current concepts and knowledge regarding male and female reproductive processes, from gametogenesis through early placentation. Includes structural, developmental, physiological and pathophysiological aspects of reproduction.

BIOLOGY 333 Invasive Species Credits: 3
Students will study the biological traits that contribute to successful invasions, the ecological and economic impacts of invasive species, and the legal and cultural responses to invasions. Students will develop critical analysis and communication skills by analyzing scientific literature, discussing implications, and presenting arguments in written and oral platforms.
Prerequisites: BIOLOGY 108 and BIOLOGY 109; or BIOLOGY 102.

BIOLOGY 338L Comparative Vertebrate Anatomy Laboratory Credits: 3
This class explores anatomical similarities and differences that exist between the major vertebrate groups and relates aspects of anatomy to evolutionary history and function. Students will gain hands-on experience of anatomy through dissection and examination of several model vertebrates. Recommended preparation: BIOLOGY 108, BIOLOGY 109, and BIOLOGY 109L.

BIOLOGY 346 Plant Biology Credits: 3
An integrative study of growth, development, and reproduction of plants, including structure and function of plant tissues and organs, as well as a survey of the recent advances in genetic engineering, plant defense mechanisms, and medical botany and the usefulness of plants to humans.
Co-requisites: BIOLOGY 202.

BIOLOGY 350 Assisting Undergraduate Learning in Biology Credits: 1-3
This course addresses current issues and pedagogy of teaching biology and providing instructional support for designated undergraduate courses in Biological Sciences. Students meet weekly with the course instructor and assist in the classroom, studio, or laboratory.
Prerequisites: BIOLOGY 108, BIOLOGY 109, BIOLOGY 202, BIOLOGY 206.

BIOLOGY 360L Laboratory in Biochemistry and Molecular Biology Credits: 3
Laboratory studies in biochemistry and molecular biology with an emphasis on modern techniques and quantitative relationships.
Prerequisites: BIOLOGY 441.

BIOLOGY 360WL Laboratory in Biochemistry and Molecular Biology Credits: 3
Laboratory studies in biochemistry and molecular Biology with an emphasis on modern techniques and quantitative relationships.
Prerequisites: ENGLISH 225 and BIOLOGY 441.

BIOLOGY 370L Biological Research Techniques II Credits: 3
This project-based learning course will instruct students on how to employ the scientific method to address biological questions. Students will make observations, propose hypotheses, design and conduct experiments, analyze data, and report conclusions. Additionally, this course will instruct students on the proper usage and maintenance of equipment commonly utilized in research, medical labs, and life sciences industries.
Prerequisites: BIOLOGY 199L.

BIOLOGY 385 Special Topics Credits: 1-3
In depth exploration of a topic in biology. Repeatable toward the major only when the topic changes.

BIOLOGY 397 Experience Based Education Credits: 1-3
This course will allow students to earn credit for experience gained through educational experiences such as service, shadowing, leadership, employment and study abroad.

BIOLOGY 404 Biostatistics 2 Credits: 3
An advanced study of inferential statistics. The course will introduce correlation, linear and categorical regression, and emphasize model selection and multi-model inference. The use of statistical computer software also will be emphasized.
Prerequisites: BIOLOGY 304 or STAT 235.

BIOLOGY 405 Introduction to Evolution Credits: 3
Discussion of the biological processes that produce organic diversity through phyletic change, including variation, mutation, adaptation, population genetics, natural selection, genetic drift, gene flow, and macroevolution.
Prerequisites: BIOLOGY 206.

BIOLOGY 409 Developmental Biology Credits: 3
Principles of development and differentiation of structure during embryology in animals. Molecular, cellular and organismal level concepts and mechanisms will be considered.
Prerequisites: BIOLOGY 202, BIOLOGY 206.

BIOLOGY 415 Pathophysiology Credits: 3
Pathophysiology will focus on the physiological basis of cellular and tissue function, and the consequences of dysregulated metabolic/cellular expression on essential homeostatic processes in cells, cytoplasmic compartments and primary organ systems.
Prerequisites: BIOLOGY 316.

BIOLOGY 430 Molecular Biology and Genetic Engineering Credits: 3
Molecular aspects of gene structure and function, including macromolecular synthesis, gene regulation, genetic transfer and biotechnology will be discussed in prokaryotes and eukaryotes.
Prerequisites: BIOLOGY 202, BIOLOGY 206.

Co-requisites: BIOLOGY 441.

BIOLOGY 431 Virology Credits: 3
Survey of the molecular biology of animal, plant, and bacterial viruses. The course will emphasize the molecular mechanisms of virus replication, viral pathogenesis, and the use of virus as model systems to study mammalian cells.
Prerequisites: BIOLOGY 202 and BIOLOGY 206.

Co-requisites: BIOLOGY 441.

BIOLOGY 435 Immunology Credits: 3
A study of the cellular and humoral aspects of the immune response, with emphasis upon the mechanisms involved and the relationship of this response to disease processes.
Prerequisites: BIOLOGY 441.

BIOLOGY 441 Biochemistry Credits: 3
One semester course covering the properties of organic compounds important to biological systems. Structures, characterization and reactions of common compounds and their relationship to the building blocks of biological systems will be discussed.
Prerequisites:BIOLOGY 202, CHEM 320 (or CHEM 321).

BIOLOGY 442 Neurobiology Credits: 3
Neurobiology will consist of the presentation of theory and data concerning cellular and molecular fundamentals of the nervous system, synaptic mechanisms, sensory-motor systems, and higher-order functions of the nervous system.
Prerequisites: BIOLOGY 202 and BIOLOGY 206

BIOLOGY 445 Evolutionary Ecology Credits: 3
This class explores the scientific concepts and methods underpinning modern understanding of evolutionary ecology as it relates to organisms. Students will gain hands-on experience using techniques that are central to quantitative and qualitative studies of organismal evolutionary ecology.
Prerequisites: BIOLOGY 302, BIOLOGY 405.

BIOLOGY 452 Bioinformatics Credits: 3
Study of the acquisition, storage, retrieval, analysis, modeling, and distribution of information in biomolecular databases. Recent developments in genomics and proteomics and how these databases are used in modern biological research will be emphasized.
Co-requisites: BIOLOGY 441.

BIOLOGY 485 Special Topics Credits: 1-3
In depth exploration of a topic in biology. Repeatable toward the major only when the topic changes.

BIOLOGY 498WI Critical Analysis of Biological Issues Credits: 3
Reading and analysis of scientific literature, including original papers, on a topic of broad biological interest. Critical discussion of experimental methods and results. Writing of scientific reviews and a term paper.
Prerequisites: ENGLISH 225.

Co-requisites: BIOLOGY 441.