

Molecular Biosciences (MBS)

MBS 219L Introduction to Biochemical Laboratory Practices and Skills 2 Hours

Explore basic skills used by biochemists and an introduction to future career options. Examine basic biochemical concepts and laboratory, computational, and professional skills.

MBS 119S, 219S, 319S, 419S, 519S, 619S, 719S, 819S, 919S Topics in Molecular Biosciences 1-9 Hours

This course is used to record credit the student earns while enrolled at another institution in a program administered by the University's Study Abroad Office. Credit is recorded as assigned by the study abroad adviser in the Biology Instructional Office. University credit is awarded for work in an exchange program; it may be counted as coursework taken in residence. Transfer credit is awarded for work in an affiliated studies program.

MBS 320 Cell Biology 3 Hours

Explore principles of eukaryotic cell structure and function. Examine macromolecules, membranes, organelles, cytoskeleton, signaling, cell division, differentiation, motility, and experimental methodologies.

MBS 320L Cell Biology Laboratory 3 Hours

Explore the complex structures and functions of cells through direct observation and experimentation. Discuss regulation of gene transcription and translation, protein sorting, organelles and membrane trafficking, cytoskeletal dynamics, and cell division. Use a combination of modern molecular biology, biochemistry, and microscopy techniques, with a strong emphasis placed on hypothesis-driven approaches, proper experimental design, and clear scientific writing and presentation.

MBS 325T Human Genetics 3 Hours

Examine genomics, cancer genetics, identification and analysis of human disease genes, and monogenic and multifactorial traits in humans.

MBS 226L General Microbiology Laboratory 2 Hours

Introduction to microbiology laboratory techniques and experimental demonstration of principles of microbiology.

MBS 326M Introductory Medical Microbiology and Immunology 3 Hours

Designed primarily for nursing and pre-pharmacy students. Explore an overview of the structure, function, and genetics of bacteria, viruses, and fungi, with emphasis on the interactions between micro-organisms and the human host. Examine principles of microbial pathogenesis, the host's innate and adaptive immune responses to infection, epidemiology, laboratory diagnosis, and antimicrobial chemotherapy and vaccines.

MBS 326R General Microbiology 3 Hours

Examine an overview of the major areas of microbiological study, including cell structure and function, genetics, host-microbe interactions, physiology, ecology, diversity, and virology.

MBS 327D Emerging Infectious Diseases 3 Hours

Examine genomic and proteomic tools used to understand the causes of human infectious diseases. Discuss genome sequencing, community sequencing, proteomics, microarrays, and human polymorphism analysis; and how these technologies have been applied to the study of important human viral diseases. Explore extensive coverage of the molecular and clinical biology of these diseases.

MBS 327G Genomics 3 Hours

Examine genome structure, organization, and function of model organisms; theory and methodology of genetic and physical mapping; sequencing analysis and annotation; genome duplication and evolution; and ethics for biotechnology and cloning.

MBS 328 Introductory Plant Physiology 3 Hours

Examine general principles of the mineral nutrition, water relations, metabolic activities, growth, and development of green plants.

MBS 328D Discovery Laboratory in Plant Biology 3 Hours

Discuss methods of experimental design, data gathering, data interpretation, and data presentation, including original experiments relating to questions of current interest in plant physiology.

MBS 128L Laboratory Experiments in Plant Physiology 1 Hour

Introduction to experimental techniques used in the study of the mineral nutrition, water relations, metabolic activities, growth, and development of green plants.

MBS 129S, 229S, 329S, 429S, 529S, 629S, 729S, 829S, 929S Topics in Molecular Biosciences 1-9 Hours

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MBS 330 Molecular Biology of Animal Viruses 3 Hours

Examine mechanisms by which viruses replicate and kill or transform cells.

MBS 230L Virology Laboratory 2 Hours

Examine basic experimental techniques applied to selected bacteriophages and animal viruses.

MBS 331L Laboratory Studies in Molecular Biology 3 Hours

Explore molecular biology methods, experimental design, and analyses applicable to both research and fields such as healthcare, biotechnology, and genetic analyses. Conduct experiments in a research project format.

MBS 336 Tumor Biology 3 Hours

Discuss core aspects of cancer pathology, treatment, epidemiology, the discovery of oncogenes and tumor suppressors, and the molecular genetics underlying the characteristic features of malignant tumors (including metastatic behavior, genomic instability, angiogenesis, cell cycle regulation, and apoptosis). Examine the biochemical functions of cancer-related proteins and enzymes and therapeutic approaches based on our understanding of these proteins. Explore important experimental approaches that have influenced our current understanding of cancer.

MBS 137, 237, 337, 437 Topics in Biology 1-4 Hours

Examine recent developments and research methods in the biological sciences.

MBS 339M Bacterial Behavior and Signaling Mechanisms 3 Hours

Examine molecular, cellular, organismal, ecological, and evolutionary biology of bacteria. Focus on a large number of bacteria, both Gram-positive and Gram-negative from four major phyla, that live and survive both as free-living microbes, in groups, and in both beneficial and pathogenic associations with eukaryotic hosts. Explore evolution of organelles and behaviors, including receiving and transducing signals that produce a variety of outcomes such as chemotaxis and motility, morphogenesis and development, secretion and virulence, quorum sensing and biofilms, bacterial warfare, and antibiotic production and tolerance.

MBS 343 Advanced Cell Biology 3 Hours

Explore current research in eukaryotic cell biology including vesicle trafficking, cytoskeletal dynamics, cell movement and organization within tissues, and cellular signal transduction and information processing. Focus on experimental reasoning, quantitative methods for studying cells, and reading primary literature.

MBS 344 Molecular Biology 3 Hours

Examine molecular basis of cellular processes: gene structure and function, DNA replication, RNA and protein synthesis, viruses, molecular aspects of immunology and cancer, and recombinant DNA.

MBS 349L Experiments in Developmental Biology 3 Hours

Discuss methods and principles of developmental biology in a laboratory context, with emphasis on animal embryology using molecular techniques and microscopy.

MBS 350 Developmental, Stem Cell, and Regenerative Biology 3 Hours

Explore the principles and mechanisms of embryonic development and the processes guiding stem cell differentiation and tissue repair.

MBS 350M Plant Molecular Biology 3 Hours

Discuss the fundamentals of plant molecular biology, including structure and expression of the chloroplast and mitochondrial genomes.

MBS 355 Microbial Biochemistry 3 Hours

Study the function of bacterial proteins and their complexes, including their role in inter-bacterial interactions that shape multi-species communities.

MBS 356E Epigenetics and Epitranscriptomics 3 Hours

Explore epigenetic mechanisms that involve covalent modifications of the three major biomolecules: DNA, RNA, or proteins in the context of gene expression and genome stability. Examine how environmental and intrinsic factors regulate these mechanisms to impact normal and diseased cell functions, particularly as they relate to human health, aging, and behavior.

MBS 360K Immunology 3 Hours

Discuss the basic concepts of humoral and cell-associated immune phenomena, including innate immunity; the molecular basis of T cell and B cell antigen recognition; hematopoiesis and the development of lymphocytes; cellular and humoral immune responses; and the basics of immunodeficiency, autoimmunity, immunotherapy, and vaccination.

MBS 260L Immunology Laboratory 2 Hours

Examine current techniques in experimental cellular and humoral immunology.

MBS 361 Human Infectious Diseases 3 Hours

Examine etiology, pathogenesis, diagnosis, and immunobiology of the major microbial diseases, with emphasis on their prevention.

MBS 361L Clinical Bacteriology Laboratory 3 Hours

Discuss techniques required for independent work in diagnostic and epidemiological bacteriology.

MBS 366 Microbial Genetics 3 Hours

Examine molecular biology of nucleic acids. Explore biosynthesis of macromolecules, transfer of genetic material from cell to cell, recombination, mutagenesis, and regulatory mechanisms.

MBS 366R Molecular Genetics and Medicine 3 Hours

Discuss the implementation of molecular genetics techniques in medicine. Explore the application of diagnostic and therapeutic techniques for several genetic disorders and infectious diseases.

MBS 367C Cellular and Molecular Bases of Neural Development 3 Hours

Introduction to the principles by which the neural tube (brain and spinal cord) forms during embryonic development. Discuss the cellular and molecular mechanisms underlying the formation of a three-dimensional neural tube and its division into forebrain, midbrain, hindbrain, and spinal cord.

MBS 368C Supervised Literature Review 3 Hours

Conduct supervised literature review and written capstone thesis on a selected subject in biology by individual arrangement with the instructor.

MBS 368R Supervised Capstone Research 3 Hours

Conduct supervised independent research and written capstone thesis on a selected subject in Biology by individual arrangement with the instructor.

MBS 175C Capstone Seminar 1 Hour

Document and reflect on the capstone experience, present capstone work in a professional venue, and discuss plans for transitioning to post-graduation careers.

MBS 177, 277, 377 Undergraduate Research 1-3 Hours

Perform laboratory or field research in the various fields of biological science under the supervision of one or more faculty members.

MBS 379H, 679H Honors Tutorial Course 3,6 Hours

Conduct an original laboratory or field research project under the direction of a faculty mentor, leading to a thesis or research presentation for students in the honors program in biology.