

MCB - MOLECULAR AND CELL BIOLOGY

MCB Class Schedule (<https://courses.illinois.edu/schedule/DEFAULT/DEFAULT/MCB/>)

Courses

MCB 100 Introductory Microbiology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/100/>)

Introduction to the principal activities and properties of microorganisms, including bacteria, yeasts, molds, and viruses; consideration of the role of natural processes, such as photosynthesis; and man's use and control of microorganisms in the production of antibodies and vaccines in industrial fermentations, in sanitation and public health, and in agriculture. Credit is not given for both MCB 100 and MCB 300. Prerequisite: There are no prerequisites for MCB 100, but some chemistry is recommended.

This course satisfies the General Education Criteria for:

Nat Sci Tech - Life Sciences

MCB 101 Intro Microbiology Laboratory credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/101/>)

Laboratory introduction to the techniques employed in the investigation of microbial activities and properties; experiments designed to familiarize the student with the handling, identification, and characterization of microorganisms and their activities, particularly those of interest to man. Credit is not given for both MCB 101 and MCB 301. Prerequisite: Credit or concurrent registration in MCB 100.

MCB 150 Molec & Cellular Basis of Life credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/150/>)

Introductory course focusing on the basic structure, metabolic, and molecular processes (including membranes, energy metabolism, genes) common to all cells. Emphasis on unique properties that differentiate the major sub-groups of organisms (Archaea, Bacteria, plants, and animals), and will discuss how cells are integrated into tissues and organs in multicellular organisms.

This course satisfies the General Education Criteria for:

Nat Sci Tech - Life Sciences

MCB 151 Molec & Cellular Laboratory credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/MCB/151/>)

Introductory laboratory course focusing on basic techniques in molecular and cellular biology. Credit is not given for MCB 151 for students majoring in Molecular and Cellular Biology, or Integrative Biology; Credit is not given for both MCB 151 and MCB 251. Prerequisite: Concurrent enrollment in MCB 150.

MCB 170 Society and the Brain credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/170/>)

Presents recent findings concerning the brain-society interaction. The facts will span many levels, from molecular and cellular interactions, to the functions of specific brain regions, and on to the behaviors of individuals, groups and societies. Intended to bring a broad range of neurobiological data and ideas into an interesting and relevant context.

This course satisfies the General Education Criteria for:

Nat Sci Tech - Life Sciences

MCB 198 Internship credit: 0 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/198/>)

Full-time or part-time internship at another University or an off-campus medical facility, research institute or other approved institution. Approved for S/U grading only. May be repeated. Prerequisite: For MCB and Biochemistry majors only.

This course satisfies the General Education Criteria for:

UIUC: Ugrad Zero Credit Intern

MCB 199 Undergraduate Open Seminar credit: 1 to 5 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/199/>)

Approved for letter and S/U grading. May be repeated to a maximum of 10 hours.

MCB 244 Human Anatomy & Physiology I credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/244/>)

Organ system biology with an emphasis on normal human anatomy and physiology, physiological processes and associated disease processes of the following systems; skeletal, muscle, nervous, sensory, and endocrine. Prerequisite: Credit or concurrent enrollment in CHEM 101, CHEM 102, or equivalent; or consent of instructor.

MCB 245 Human Anat & Physiol Lab I credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/245/>)

Laboratory exploration of normal human anatomy and physiology and relevant disease processes for the following systems: tissue, skeletal, nervous, muscular, sensory, and endocrine. Previously dissected human cadavers are an important part of the learning experience in this course, but students will not dissect human cadavers. Neither animal dissection or animal use are elements of this course. Prerequisite: Credit or concurrent enrollment in CHEM 101, CHEM 102, or equivalent; or consent of instructor.

MCB 246 Human Anatomy & Physiology II credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/246/>)

Organ system biology with an emphasis on normal human anatomy and physiology, physiological processes and associated disease processes of the following systems: digestion, cardiovascular, respiratory, renal, and reproductive. Prerequisite: MCB 244 and credit or concurrent enrollment in CHEM 101, CHEM 102, or equivalent or consent of instructor.

MCB 247 Human Anat & Physiol Lab II credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/247/>)

Laboratory exploration of normal human anatomy and physiology and relevant disease processes for the following systems: digestive, cardiovascular, respiratory, renal, and reproductive. Previously dissected human cadavers are an important part of the learning experience in this course, but students will not dissect human cadavers. Neither animal dissection or animal use are elements of this course. Prerequisite: MCB 245 and credit or concurrent enrollment in CHEM 101, CHEM 102, or equivalent; or consent of instructor.

MCB 250 Molecular Genetics credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/250/>)

Fundamentals of molecular biology including structure of DNA, RNA and proteins, mechanisms of DNA replication, transcription and translation, gene organization, genetic variation and repair, and regulation of gene expression in Bacteria, and Eukarya. Students who enter the University Fall 2011 or later are responsible for additional course-based tuition of \$300 unless they are already paying differential tuition during the term of course enrollment. Additional fees may apply. See Class Schedule. Prerequisite: MCB 150, CHEM 102 and CHEM 104, or equivalents or consent of instructor.

MCB 251 Exp Techniqs in Molecular Biol credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/251/>)

Laboratory course emphasizing a range of molecular biology questions, and the experimental approaches and methodologies needed to answer these questions. Lectures will accompany labs to explain theoretical background and experimental rationale. Students who enter the University Fall 2011 or later are responsible for additional course-based tuition of \$300 unless they are already paying differential tuition during the term of course enrollment. Additional fees may apply. See Class Schedule. Credit is not given for both MCB 251 and MCB 151. Prerequisite: Concurrent or prior enrollment in MCB 250 or consent of instructor.

MCB 252 Cells, Tissues & Development credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/252/>)

Functional organization and physiology of cells and tissues, including cellular signaling, cellular interactions, and developmental processes. Students who enter the University Fall 2011 or later are responsible for additional course-based tuition of \$300 unless they are already paying differential tuition during the term of course enrollment. Additional fees may apply. See Class Schedule. Prerequisite: MCB 250 or equivalent with consent of instructor.

MCB 253 Exp Techniqs in Cellular Biol credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/253/>)

Laboratory course emphasizing experimental techniques in cellular biology, cellular physiology, and developmental biology. Students who enter the University Fall 2011 or later are responsible for additional course-based tuition of \$300 unless they are already paying differential tuition during the term of course enrollment. Additional fees may apply. See Class Schedule. Credit is not given for both MCB 253 and MCB 151. Prerequisite: Concurrent or prior enrollment in MCB 252 or consent of instructor.

MCB 290 Undergraduate Research credit: 1 to 5 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/290/>)

Students assist in and/or conduct research under faculty supervision in an MCB research laboratory. The topics and nature of the work will vary but will be defined as work conducted in MCB research laboratories. For each hour of course credit in fall and spring terms, the student will be expected to complete 5 hours of work in the lab as directed. 75-80 total hours would be the expectation for 1 credit hour during 15-16 week terms. May be repeated to a maximum of 10 hours. Prerequisite: Consent of instructor.

MCB 292 Experiential Learning in MCB credit: 1 or 2 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/292/>)

Supervised experiential learning activity related to the major or career development within Molecular and Cellular Biology. Requires an Experiential Learning Proposal prior to the term, a minimum time commitment of 75 documented hours per credit hour within the term, regular documentation and reflection within the term, and a final culminating project at the end of the term. Approved for S/U grading only. Prerequisite: Restricted to declared undergraduates in any School of MCB major.

MCB 297 MCB Honors Discussion credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/MCB/297/>)

Honors discussion section associated with MCB 250, MCB 252, and MCB 354. Concurrent enrollment in the appropriate lecture course is required. May be repeated in separate terms to a maximum of 3 hours.

MCB 298 MCB Honors Lab Discussion credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/MCB/298/>)

Discussion section associated with the Honors lab sections of MCB 251 and MCB 253. Concurrent enrollment in the appropriate Honors lab section is required. May be repeated in separate terms to a maximum of 2 hours.

MCB 299 MCB Merit Program Discussion credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/MCB/299/>)

Provides the extra earned credit hours for students enrolled in the Merit Program in MCB 250, MCB 252, or MCB 354. Approved for letter and S/U grading. May be repeated up to 6 hours in a semester, to a maximum of 10 total hours. Prerequisite: Consent of instructor.

MCB 300 Microbiology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/300/>)

Emphasizes fundamental concepts of microbiology, including nutrition, physiology, genetics, molecular biology, ecology and evolution of microorganisms, and their role in nature, human health and disease. Credit is not given for both MCB 300 and MCB 100. Prerequisite: MCB 250 and credit or concurrent registration in MCB 252 or consent of instructor.

MCB 301 Experimental Microbiology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/301/>)

Laboratory emphasizing the fundamentals of microbiology. Topics include growth, isolation, and identification of bacteria; restriction endonuclease analysis of DNA, genetic cloning, and gene transfer. Computer methods are used for the identification of microorganisms and for the analysis of recombinant DNA molecules. Prerequisite: MCB 250 and 251 and credit or concurrent registration in MCB 300, or consent of instructor.

MCB 314 Introduction to Neurobiology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/314/>)

Introduction to functional and organizational principles of the mammalian nervous system. Topics include the function of nerve cells, neural signaling, sensory and motor systems, learning and memory, attention, motivation, emotions, language, neural development and neurological disorders. A general introduction appropriate for all majors. Same as NEUR 314. Prerequisite: Junior or senior standing.

MCB 316 Genetics and Disease credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/316/>)

Introduction of the structure, expression, and regulation of genes of higher eukaryotes with an emphasis upon animal cells. Specific topics will include chromatin structure and its relation to gene expression, regulation of gene expression during development, recombination, molecular genetic technologies, gene replacement therapy, and the molecular genetics of cancers. Credit is not given for both MCB 316 and MCB 317. Prerequisite: MCB 150 and credit or concurrent registration in MCB 250 or consent of instructor.

MCB 317 Genetics and Genomics credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/317/>)

Study of genetics as a discipline, genetic analysis as a tool to understand biology and the role of genome sciences in biology. Credit is not given for both MCB 317 and MCB 316. Prerequisite: MCB 250, MCB 251, MCB 252, and MCB 253; or consent of instructor.

MCB 320 Mechanisms of Human Disease credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/320/>)

The advent of molecular biology and the Human Genome Project has dramatically increased our understanding of the mechanisms of human disease. The underlying molecular causes for many diseases have been elucidated. This course examines how abnormalities that occur at the molecular and cellular level manifest as pathologies affecting the structure and function of human tissues and organs. In addition, this course focuses on the pathophysiology of common human diseases and the environmental, genetic and epigenetic causes of specific disease types. Prerequisite: MCB 252 or consent of instructor.

MCB 354 Biochem & Phys Basis of Life credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/354/>)

Introduction to biochemistry and structural biology emphasizing the physical and chemical properties of macromolecules. Credit is not given for both MCB 354 and MCB 450. Prerequisite: CHEM 232 or CHEM 236, and MCB 250 and MCB 252, or consent of instructor.

MCB 364 Eukaryotic Cell Biology Laboratory credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/364/>)

Laboratory course emphasizing biochemical, immunological and molecular biological techniques used to probe the molecules and processes of eukaryotic cells. Special emphasis will be given to the cell cycle, intracellular trafficking, and cellular differentiation. Students will also learn proper data handling and reporting techniques. Prerequisite: MCB 252 and MCB 253 or consent of instructor. Priority is given to undergraduate MCB and Biochemistry majors.

MCB 400 Cancer Cell Biology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/400/>)

Principles of eukaryotic cell biology with an emphasis on cancer cell biology; consideration of molecular and fine structural components of the cell with an emphasis on experimental analysis of the relationship of structure to function of gene, membrane, cytoskeleton, and extracellular matrix. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 250, MCB 251, MCB 252, MCB 253, and credit or concurrent registration in MCB 354 or MCB 450 or consent of instructor.

MCB 401 Cellular Physiology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/401/>)

Foundational principles of cellular physiology. Topics include solute/water transport, membrane bio electricity, action potentials, ion channel physiology, neuromuscular transmission, muscle physiology, and central neurophysiology and plasticity. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 252 or consent of instructor.

MCB 402 Sys & Integrative Physiology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/402/>)

Examines human systems physiology. Topics to be covered include the nervous and endocrine systems, muscle physiology, cardiac physiology, respiratory physiology, blood and immune homeostasis, renal physiology, and gastrointestinal physiology and energy homeostasis. Special emphasis is on homeostatic control and integration of body systems in both health and disease. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 252 or consent of instructor.

MCB 406 Gene Expression & Regulation credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/406/>)

Provides in-depth and up-to-date coverage of gene expression and regulation. Lectures are centered on the principles of regulating gene expression in eukaryotic cells. The course covers macromolecule structure and function in gene expression; molecular mechanisms of the key gene expression events including transcription, RNA processing, localization and translation. Applications of these principles in medicine and therapeutics such as aging, cancer and drug design are also discussed. Same as BIOC 406. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 354 or consent of instructor.

MCB 408 Immunology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/408/>)

Introduction to fundamentals of immunology with emphasis on biological application; basic background for understanding immunological responses and techniques applicable to biological research. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 250, MCB 251, MCB 252, MCB 253, and MCB 354; or consent of instructor.

MCB 410 Developmental Biology, Stem Cells and Regenerative Medicine credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/410/>)

Survey of molecular and cellular mechanisms involved in development and growth of animals, as well as recent advancement in stem cell and Regenerative medicine research. Topics to be covered include fertilization and early cell lineage, body axis formation, gastrulation, neural induction and patterning, segmentation, and other aspects of pattern formation including organogenesis and limb development, as well as embryonic stem cells, induced pluripotent stem cells, adult stem cells, regeneration and regenerative medicine. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 252 or consent of instructor.

MCB 413 Endocrinology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/413/>)

Physiology and biochemistry of the endocrine system and its hormones with special reference to vertebrates and to human endocrine disorders. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 252 or consent of instructor. One semester of biochemistry is recommended.

MCB 419 Brain, Behavior & Info Process credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/419/>)

Exploration of the neural basis of animal behavior. Emphasis on the information processing problems that animals face in complex natural environments and how nervous systems have evolved to solve these problems. Introduction to the use of computer modeling and simulation techniques for exploring principles of nervous system design and function. Current literature in computational neurobiology and neuroethology will be incorporated in readings and class discussion. Same as BIOP 419 and NEUR 419. 3 undergraduate hours. 3 graduate hours. Prerequisite: CS 101; and PHYS 102 or PHYS 212; and MCB 252; or equivalent or consent of instructor.

MCB 421 Microbial Genetics credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/421/>)

Prokaryotic microbial genetic systems; emphasis on typical data analyses, together with the basic classes of genetic phenomena. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 300 or consent of instructor.

MCB 424 Microbial Biochemistry credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/424/>)

Examines the biochemical ecology of diverse microbial groups with emphasis on anaerobic systems. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 250 and MCB 354 or MCB 450, or consent of instructor.

MCB 426 Bacterial Pathogenesis credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/426/>)

Emphasizes prokaryotes that cause important diseases in humans and other animals; host-parasite bacteriology; and chemistry and genetics of mechanisms of pathogenesis. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 300 and MCB 354, or consent of instructor.

MCB 428 Microbial Pathogens Laboratory credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/428/>)

Laboratory study of methods of recognition and differentiation, diagnostic tests, and mechanisms of bacterial and viral pathogenesis. Topics include infections of the urinary tract, respiratory tract, gastrointestinal tract, and sexually transmitted diseases. 2 undergraduate hours. 2 graduate hours. Prerequisite: MCB 300 and MCB 301 or consent of instructor.

MCB 430 Molecular Microbiology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/430/>)

Modern contributions to the science of microbiology; emphasizes the structure, function, and synthesis of informational macromolecules and on the role microorganisms have played in molecular biology. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 300 and credit or concurrent registration in MCB 354, or consent of instructor.

MCB 431 Microbial Physiology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/431/>)

Examines bacterial physiology, including discussions of energetics, regulation of metabolism, and cell structure. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 300 or equivalent; credit or concurrent registration in a biochemistry course.

MCB 432 Computing in Molecular Biology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/432/>)

Examination of computational aspects of biology with an emphasis on the relationships between biological questions and their recastings as mathematical or logical problems. Topics are drawn from biochemistry, genetics, molecular sequence analysis, and molecular structure. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 250, MCB 252, MCB 354, and calculus I (MATH 220 or MATH 221), and calculus II (MATH 231) or biostatistics (STAT 212); or consent of instructor.

MCB 433 Virology & Viral Pathogenesis credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/433/>)

Same as PATH 433. See PATH 433.

MCB 434 Food & Industrial Microbiology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/434/>)

Same as FSHN 471. See FSHN 471.

MCB 435 Evolution of Infectious Disease credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/435/>)

Understanding the evolution and ecology of the microbial world is of great importance to human health and the health of our planet. Students will explore the ecology and evolution principles that apply to viruses, microbial eukaryotes, archaea and bacteria. The primary literature on historical and emerging infectious diseases will be used to illustrate critical applications of these basic principles. Examples include applying genomics tools to understand the evolutionary basis for antibiotic resistance, the spread of emerging pathogens, and the ecology of probiotics and the human microbiome. The objective of this class is to better understand how humans shape the diversity and dynamics of the microbial world living in and around us every day. Same as IB 442. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 300 or consent of instructor.

MCB 436 Global Biosecurity credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/MCB/436/>)

Designed to provide students with broad coverage of key areas of scientific, legal, social, ethical, and political aspects of biosecurity, emphasizing current problems and research in the areas of biodefense, emerging infectious diseases, synthetic biology, and other topics. In combination with related reading assignments, the weekly special topics-based seminar will integrate knowledge of modern biomedical research, advances in biotechnology, and natural and manmade biological threats with the skills to analyze and develop public policies and strategies for enhancing global biosecurity. 1 undergraduate hour. 1 graduate hour. Prerequisite: MCB 150 or the equivalent or consent of instructor.

MCB 442 Comparative Immunobiology credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/442/>)

Same as ANSC 450 and PATH 410. See ANSC 450.

MCB 446 Physical Biochemistry credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/446/>)

Same as CHEM 472 and BIOC 446. See BIOC 446.

MCB 450 Introductory Biochemistry credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/450/>)

Chemistry and metabolism of carbohydrates, lipids, proteins, nucleic acids, vitamins, and coenzymes and their relation to the regulation and processes of organisms, cells, and subcellular components. Students who enter the University Fall 2011 or later are responsible for additional course-based tuition of \$300 unless they are already paying differential tuition during the term of course enrollment. Additional fees may apply. See Class Schedule. 3 undergraduate hours. 3 graduate hours. Credit is not given for both MCB 450 and MCB 354. Prerequisite: CHEM 232 or CHEM 236, or equivalent, or consent of instructor. Not intended for students in the MCB or biochemistry curricula.

MCB 460 Neuroanatomy Laboratory credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/460/>)

Laboratory course emphasizing the fundamentals of neuroanatomy. The major sensory, motor, and integrative neural systems of the human brain are explored. Based on an understanding of normal neural connections and brain function, the anatomical and physiological bases for multiple neurological disorders are also discussed. Primary literature and clinical case studies will inform discussions throughout the course. 2 undergraduate hours. 2 graduate hours. Prerequisite: MCB 314 or consent of instructor.

MCB 461 Cell & Molecular Neuroscience credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/461/>)
 Designed as an in-depth foundation course for graduate and undergraduate students with strong neuroscience interests. Covers up-to-date cellular and molecular neurobiology (including basic principles of neuronal function, signaling, and plasticity) and introductory brain anatomy that underlie brain function and animal behaviors. Pathogenic mechanisms of neurological diseases and disorders from the latest research will be heavily explored. Same as NEUR 461. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 252, MCB 250 or equivalent, or consent of instructor. May be taken concurrently with MCB 462.

MCB 462 Integrative Neuroscience credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/462/>)
 Employs integrative, multi-level systems approaches to nervous system and behavior. Focuses on neural circuits in sensory integration, pattern generation, the integration of sensation, internal states and learning in behavioral decision, the neuronal natures of pain, sleep, and biological rhythms, neuroeconomics, new vistas in neural modeling and interfacing brain and machine. Students are presented in neuroethological contexts of evolution and the economics of behavior and physiology. Same as NEUR 462. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 252 or consent of instructor. May be taken concurrently with MCB 461.

MCB 465 Human Metabolic Disease credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/465/>)
 Examination of the molecular and physiological basis of human metabolic disease. Disruption of metabolic and energy homeostasis plays key roles leading to metabolic disorders. We will examine how lipid/glucose levels and energy balance are controlled in health and how they are abnormally regulated in disease states. In addition, we will cover current topics related to control of metabolism including aging and circadian rhythms. Methodologies leading to scientific discoveries and potential preventive and therapeutic agents will also be discussed. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 250, MCB 252, or consent of instructor.

MCB 466 Neuro & Molecular Pharmacology credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/466/>)
 Introduction to fundamental principles of pharmacology that provides a comprehensive understanding of the principles and concepts applied to modern pharmacology, including pharmacokinetics, pharmacodynamics, neuropharmacology, toxicology, drug development and clinical trials, and drugs targeting various diseases. Emphasis is placed on the mechanisms of action. The course will cover several classes of drugs, including anti-infective agents, autonomic/central nervous system modulators, neuropharmacology, anti-cancer therapeutics and drugs targeting the major organ systems of the body. In an active learning style, case studies and sample MCAT questions will be used to bring relevance to covered topics. This course is ideal for those interested in pharmacology, neuropharmacology, pharmacy, medicine, veterinary medicine, nursing, kinesiology, or graduate school in the life sciences. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 252 and MCB 354, or consent of instructor.

MCB 471 Cell Structure and Dynamics credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/471/>)
 Molecular basis of cellular organization focusing on how cells secrete, move, adhere, divide, communicate, and die. Material will emphasize critical analysis of experiments, current controversies and hypothesis testing. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 250 and MCB 252 or consent of instructor. Prior or concurrent enrollment in MCB 354 desirable.

MCB 474 Genetic Disorders & Counseling credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/474/>)
 Addresses key issues in human genetics at an advanced level and is designed for future pre-health care professionals. The course covers basic principles of medical ethics, chromosomes, complex disorders like autism and Alzheimer's disease, gene therapy, and emerging technologies like CRISPR. Relevance to counseling individuals with these disorders will be discussed throughout the course, including calculations of recurrence risk for each disorder. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 317 or equivalent, or consent of instructor.

MCB 480 Eukaryotic Cell Signaling credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/480/>)
 General principles of molecular signaling regulating membrane, cytoplasmic, and nuclear events in eukaryotic cells with emphasis on mammalian systems. Contemporary methods of investigation and the principles of identifying and solving problems related to signal transduction will be emphasized. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 252 or consent of instructor.

MCB 492 Senior Thesis credit: 3 to 5 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/492/>)
 Research conducted under the direction of a faculty member in the School of Molecular and Cellular Biology. Normally, the student enrolls in MCB 492 during the last semester on campus prior to graduation. In the semester preceding enrollment, interested students should consult with their faculty advisors concerning enrollment procedures. A minimum of 3 credit hours is required, and a thesis must be presented for credit to be received. Successful completion of MCB 492 is required in order to be eligible for graduation with distinction in MCB. 3 to 5 undergraduate hours. No graduate credit. Prerequisite: Two consecutive semesters of at least 2 credit hours of MCB 290 under the guidance of the same faculty member, or consent of instructor.

MCB 493 Special Topics Mol Cell Biol credit: 1 to 4 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/493/>)
 Discussion of current topics of interest within the broad domain of molecular and cellular biology; seminar or lecture format. Topics vary. May be repeated to a maximum of 12 hours. Prerequisite: Junior standing and consent of instructor.

MCB 501 Advanced Biochemistry credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/501/>)
 Focuses upon structure-function analyses of biomolecules and the chemical and evolutionary foundations of metabolic networks. Emphasis is on research methodology and current problems.

MCB 502 Advanced Molecular and Cell Biology credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/502/>)
 An advanced course in molecular and cell biology. Emphasis is on research methodology and current problems. 4 graduate hours. No professional credit.

MCB 509 Curr Topics Mol & Int Physiol credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/509/>)
 Advanced seminars in current physiological research. May be repeated once for credit. Prerequisite: Consent of instructor.

MCB 511 Mol Bio of Microbe-Plant Inter credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/511/>)
 Same as PLPA 509. See PLPA 509.

MCB 520 Advanced Molecular Biology credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/MCB/520/>)
Advanced graduate level, primary literature-based discussion course on molecular microbiology. Graduate level companion course for MCB 430. Prerequisite: Concurrent registration in MCB 430 or consent of instructor.

MCB 521 Advanced Microbial Genetics credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/MCB/521/>)
Advanced level, primary literature-based discussion course on microbial genetics. Graduate level companion course for MCB 421. Prerequisite: Concurrent or prior enrollment in MCB 421 or consent of instructor.

MCB 526 Adv Bacterial Pathogenesis credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/MCB/526/>)
Advanced primary literature-based discussion course on bacterial pathogenesis. Graduate level companion course for MCB 426. Prerequisite: Concurrent or prior enrollment in MCB 426 or consent of instructor.

MCB 529 Special Topics in Cell and Developmental Biology credit: 1 to 4 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/529/>)
Discussion of current topics of interest in higher eukaryotic cellular and molecular biology, development, neurobiology; seminar or lecture format. Topics vary. 1 to 4 graduate hours. No professional credit. Approved for Letter and S/U grading. May be repeated if topics vary, to a maximum of 8 hours. Prerequisite: Consent of instructor.

MCB 530 Reproductive Physiol Seminar credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/MCB/530/>)
Presentation and discussion of current literature as well as graduate student and staff research proposals and findings in reproductive physiology. May be repeated to a maximum of 4 hours. Prerequisite: Consent of instructor.

MCB 532 Advanced Microbial Physiology credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/MCB/532/>)
Advanced primary literature-based discussion course on microbial physiology. Graduate level companion course for MCB 431. Prerequisite: Concurrent or prior registration in MCB 431 or consent of instructor.

MCB 533 Repro Physiology Lab Methods credit: 1 to 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/533/>)
Same as ANSC 533 and CB 533. See ANSC 533.

MCB 534 Advanced Microbial Metabolism credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/MCB/534/>)
Advanced primary literature-based discussion course on microbial metabolism. Graduate level companion course for MCB 424. Prerequisite: Concurrent or prior enrollment in MCB 424 or consent of instructor.

MCB 539 Advanced Cellular Microbiology credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/MCB/539/>)
Advanced primary literature-based discussion course on cellular microbiology and underlying infectious diseases. Graduate level companion course for MCB 429. Prerequisite: Concurrent or prior enrollment in MCB 429 or consent of instructor.

MCB 540 Scientific Writing credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/540/>)
Study of scientific communication, geared toward biologists. Topics include writing mechanics, grammar and sentence structure, abstracts for different audiences and purposes, grant writing, manuscript preparation, figure construction, oral presentations, and the grant-review process. Class consists of both lectures and time working in small groups to revise writing assignments. Assignments include weekly writing exercises, a full NIH-style grant proposal and grant reviews for a mock study section. 3 graduate hours. No professional credit.

MCB 542 Interdisciplinary Approaches to Neuroscience I credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/542/>)
Same as NEUR 542 and PSYC 542. See NEUR 542.

MCB 543 Interdisciplinary Approaches to Neuroscience II credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/543/>)
Same as NEUR 543 and PSYC 543. See NEUR 543.

MCB 545 Functional Genomics in Principle and Practice credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/545/>)
Experimental and analytical foundations of functional genomics, tailored to experimental biologists who are using high-throughput sequencing technologies to analyze function in animal genomes. Lectures cover experimental methods and tools available for bioinformatics analysis; students will gain experience in the use of online or command-line bioinformatics tools through weekly assignments. Advanced knowledge in eukaryotic molecular genetics is needed but bioinformatics skills are not required. 3 graduate hours. No professional credit. Students must have access to a networked computer on which they can load software in order to complete required assignments for the course. Prerequisite: MCB 502 or equivalent or consent of instructor.

MCB 550 Biomolecular Physics credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/550/>)
Same as BIOP 550 and PHYS 550. See PHYS 550.

MCB 553 Enzyme Reaction Mechanisms credit: 3 or 4 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/553/>)
Same as CHEM 572. See CHEM 572.

MCB 555 Anlys Biochemical Literature credit: 2 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/555/>)
Discussions of current research and literature. Required of all graduate students whose major is biochemistry. Same as BIOC 555. Prerequisite: Second year graduate standing in biochemistry or consent of instructor.

MCB 561 Mechanisms Viral Pathogenesis credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/561/>)
Same as PATH 519. See PATH 519.

MCB 571 Bioinformatics credit: 4 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/571/>)
Same as ANSC 543, CHBE 571, and STAT 530. See CHBE 571.

MCB 580 Res Ethics & Responsibilities credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/MCB/580/>)
Lecture/discussion course focusing on research ethics and a variety of related issues that can influence success in graduate school in the biological sciences, including scientific integrity and compliance with regulations for laboratory research. Approved for letter and S/U grading. Prerequisite: Consent of instructor.

MCB 581 Laboratory Rotation I credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/581/>)
Laboratory research methods; familiarization of first-year graduate students with experimental methods used in molecular and cellular biology research. Required of all first-year students entering MCB. Meets first five weeks of each term. Approved for S/U grading only. Prerequisite: First-year graduate status and consent of MCB graduate programs; concurrent registration in MCB 582.

MCB 582 Laboratory Rotation II credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/582/>)
 Laboratory research methods; familiarization of first-year graduate students with experimental methods used in molecular and cellular biology research. Required of all first-year students entering MCB. Meets second five weeks of each term. Approved for S/U grading only. Prerequisite: First-year graduate status and consent of MCB graduate programs; concurrent registration in MCB 581.

MCB 583 Laboratory Rotation III credit: 3 Hours. (<https://courses.illinois.edu/schedule/terms/MCB/583/>)
 Laboratory research methods; familiarization of first-year graduate students with experimental methods used in molecular and cellular biology research. Required of all first-year students entering MCB. Meets third five weeks of each term. Approved for S/U grading only. Prerequisite: First-year graduate status and consent of MCB graduate programs; concurrent registration in MCB 581 and MCB 582.

MCB 585 Current Topics in Microbiology credit: 1 Hour. (<https://courses.illinois.edu/schedule/terms/MCB/585/>)
 Discussions, reviews, and appraisal of special topics in microbiology and molecular biology; seminar or lecture. Topics vary. 1 graduate hour. No professional credit. Approved for S/U grading only. May be repeated to a maximum of 2 hours. Prerequisite: Consent of instructor.