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 180 Human Reproduction & Society credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/MCB/180/) Lectures and discussions on topics in human reproduction where technological and clinical advances are having economic, social, and ethical consequences. 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 215 Foundation in Mol & Cell Bio credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/MCB/215/) Online course that will provide transfer students with the essential bases in Molecular and Cellular Biology needed to succeed in the MCB core curriculum, when entering it at the sophomore level. Students will be exposed to the major concepts and the experimental aspects of MCB and be presented with an integrated view of a cell and its inner workings. In addition, a strong peer mentoring program will help students transitioning from their previous institutions by introducing them to the complex setting of a large undergraduate campus. Prerequisite: Successful completion of two semesters of college biology. Credit or concurrent enrollment in CHEM 101, CHEM 102, or equivalent, or consent of instructor.

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 nor 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.
Information listed in this catalog is current as of 01/2024

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 270 Medical Genetics  
credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/MCB/270/)
Addresses key issues in medical genetics, defined as human genetics for pre-health care professionals. The course covers basic principles of medical ethics, modes of inheritance, the molecular basis of genetic disorders, treatment approaches, gene therapy and emerging technologies like whole genome sequencing. Prerequisite: MCB 252 or equivalent 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 251 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 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 403 Cell & Membrane Physiology Lab credit: 1 or 2 Hours. (https://courses.illinois.edu/schedule/terms/MCB/403/)
Experimental investigation of cellular functions common to most eukaryotic cells; emphasis on biochemical, electrical, and mechanical recording techniques. Some animal dissection and the use of animal tissues are required in this course. Alternatives are not available. Inquiries concerning the use of or the dissection of animal tissues can be directed to the Instructor or Head of the Department. 2 undergraduate hours. 1 graduate hour. Prerequisite: Credit or concurrent registration in MCB 401 and previous biology laboratory experience.

MCB 404 Sys & Integrative Physiol Lab credit: 1 to 2 Hours. (https://courses.illinois.edu/schedule/terms/MCB/404/)
Experimental investigation of organ systems of vertebrates with emphasis on biochemical, electrical and physical recording techniques. Some animal dissection and the use of animal tissues are required in this course. Alternatives are not available. Inquiries concerning the use of, or the dissection of animal tissues can be directed to the instructor or Head of the Department. 2 undergraduate hours. 1 graduate hour. Prerequisite: Credit or concurrent registration in MCB 402 and previous biology laboratory experience.

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 430 - Molecular Microbiology
credit: 3 Hours (https://courses.illinois.edu/schedule/terms/MCB/430)
Undergraduate hours. 3 graduate hours. Prerequisite: MCB 300 or consent of instructor.

This course surveys the molecular biology of microbial systems. It includes an exploration of microbial genomics, microbial evolution, and the roles of microorganisms in fundamental biological processes such as metabolism, information processing, and cell biology. The course also covers the impact of genetics and genomics on drug development and disease prevention.

### MCB 431 - Microbial Physiology
credit: 3 Hours (https://courses.illinois.edu/schedule/terms/MCB/431)
Undergraduate hours. 3 graduate hours. Prerequisite: MCB 250 and MCB 300 or consent of instructor.

This course focuses on the physiology of microorganisms, including the structure, function, and synthesis of informational macromolecules such as DNA, RNA, and proteins. It covers the regulation of metabolism, cell structure, and gene expression in microorganisms, and explores the role of microorganisms in the natural environment.

### MCB 432 - Computing in Molecular Biology
credit: 3 Hours (https://courses.illinois.edu/schedule/terms/MCB/432)
Undergraduate hours. 3 graduate hours. Prerequisite: MCB 250 or equivalent, or consent of instructor.

This course introduces the use of computational tools in molecular biology. It covers the basics of bioinformatics, including data analysis, sequence alignment, and modeling of biological systems. The course also explores the role of computational methods in the study of microorganisms and their interactions with other organisms.

### MCB 433 - Viral & Fungal Pathogenesis
credit: 3 Hours (https://courses.illinois.edu/schedule/terms/MCB/433)
Undergraduate hours. 3 graduate hours. Prerequisite: MCB 300 or equivalent, or consent of instructor.

This course examines the molecular mechanisms by which viruses and fungi cause disease in humans and other organisms. It covers topics such as viral replication, protein secretion, and fungal cell wall synthesis, and explores the use of molecular tools for the diagnosis and treatment of viral and fungal infections.

### MCB 434 - Food & Industrial Microbiology
credit: 3 Hours (https://courses.illinois.edu/schedule/terms/MCB/434)
Undergraduate hours. 3 graduate hours. Prerequisite: MCB 300 or equivalent, or consent of instructor.

This course focuses on the role of microorganisms in food production and industrial processes. It covers topics such as food spoilage, enzyme production, and the use of microorganisms in the production of biofuels and other chemicals.

### MCB 435 - Evolution of the Microbial World
credit: 3 Hours (https://courses.illinois.edu/schedule/terms/MCB/435)
Undergraduate hours. 3 graduate hours. Prerequisite: MCB 250 or equivalent, or consent of instructor.

This course explores the evolution of microorganisms, their roles in our planet's history, and their interactions with other organisms. It covers topics such as the origin of life, microbial evolution, and the impact of microorganisms on the environment and human health.

### MCB 436 - Bacterial Pathogenesis
credit: 3 Hours (https://courses.illinois.edu/schedule/terms/MCB/436)
Undergraduate hours. 3 graduate hours. Prerequisite: MCB 250 or equivalent, or consent of instructor.

This course focuses on the molecular mechanisms by which bacteria cause disease in mammals. It covers topics such as bacterial invasion, pathogen-host interactions, and the use of molecular tools for the diagnosis and treatment of bacterial infections.

### MCB 437 - Virology
credit: 3 Hours (https://courses.illinois.edu/schedule/terms/MCB/437)
Undergraduate hours. 3 graduate hours. Prerequisite: MCB 250 or equivalent, or consent of instructor.

This course covers the basic principles of virology, including the structure and replication of viruses, and the use of molecular tools for the diagnosis and treatment of viral diseases. It explores the role of viruses in human health and disease, and their potential use in biotechnology.

### MCB 438 - Microbial Pathology
credit: 3 Hours (https://courses.illinois.edu/schedule/terms/MCB/438)
Undergraduate hours. 3 graduate hours. Prerequisite: MCB 250 or equivalent, or consent of instructor.

This course focuses on the pathogenic potential of microorganisms, their interactions with the host, and the role of the immune system in the host-pathogen interaction. It covers topics such as bacterial and fungal infections, and the use of molecular tools for the diagnosis and treatment of infectious diseases.

### MCB 439 - Cellular Microbiology & Disease
credit: 3 Hours (https://courses.illinois.edu/schedule/terms/MCB/439)
Undergraduate hours. 3 graduate hours. Prerequisite: MCB 250 or equivalent, or consent of instructor.

This course examines the molecular mechanisms by which microorganisms cause disease in the human body. It covers topics such as bacterial and fungal infections, and the use of molecular tools for the diagnosis and treatment of infectious diseases.

### MCB 440 - Developmental Biology, Stem Cells and Regenerative Medicine
credit: 3 Hours (https://courses.illinois.edu/schedule/terms/MCB/440)
Undergraduate hours. 3 graduate hours. Prerequisite: MCB 300 or consent of instructor.

This course explores the molecular mechanisms by which animals develop from the single-celled zygote to a complex organism. It covers topics such as embryonic development, stem cell biology, and regenerative medicine, with a focus on the role of microorganisms in these processes.
MCB 436 Global Biosecurity credit: 1 Hour. ([courses.illinois.edu/schedule/terms/MCB/436/](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. ([courses.illinois.edu/schedule/terms/MCB/442/](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. ([courses.illinois.edu/schedule/terms/MCB/446/](https://courses.illinois.edu/schedule/terms/MCB/446/))

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

MCB 450 Introductory Biochemistry credit: 3 Hours. ([courses.illinois.edu/schedule/terms/MCB/450/](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 458 Basic Human Pathology credit: 3 Hours. ([courses.illinois.edu/schedule/terms/MCB/458/](https://courses.illinois.edu/schedule/terms/MCB/458/))

Introduction to the basic mechanisms of human disease with a focus on the building blocks of pathological processes at the sub-organismal and organismal level. Basic biological processes will be stressed including tissue adaptation, injury, inflammation, repair and neoplasia. Pathology synthesizes cellular and molecular biology, biochemistry and immunology holistically so as to understand the body’s limited responses to the cornucopia of experienced physiological insults. 3 undergraduate hours. No graduate credit. Prerequisite: MCB 354 or equivalent, or consent of instructor. For MCB and Biochemistry undergraduate majors only.

MCB 460 Neuroanatomy Laboratory credit: 2 Hours. ([courses.illinois.edu/schedule/terms/MCB/460/](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. ([courses.illinois.edu/schedule/terms/MCB/461/](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. ([courses.illinois.edu/schedule/terms/MCB/462/](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. ([courses.illinois.edu/schedule/terms/MCB/465/](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. ([courses.illinois.edu/schedule/terms/MCB/466/](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/cenral 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. ([courses.illinois.edu/schedule/terms/MCB/471/](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 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 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/](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/](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/](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/](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/](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/](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/](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/](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/](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/](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/](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.

MCB 586  Concepts/Topics Immunology credit: 2 Hours. ([https://courses.illinois.edu/schedule/terms/MCB/586/](https://courses.illinois.edu/schedule/terms/MCB/586/))  
Same as PATH 518. See PATH 518.

MCB 595  MCB Graduate Seminar credit: 1 Hour. ([https://courses.illinois.edu/schedule/terms/MCB/595/](https://courses.illinois.edu/schedule/terms/MCB/595/))  
Advanced seminars on current topics of interest in molecular and cellular biology. Approved for S/U grading only. May be repeated in separate terms to a maximum of 4 hours. Prerequisite: Consent of instructor.