The Molecular and Cellular Biology major provides students with a solid preparation in molecular biology, molecular genetics, microbiology, cellular biology, biochemistry, physiology, and structural biology. Students will also acquire a strong background in chemistry, math and physical sciences. After completion of the core curriculum in MCB, students may complete the required advanced course work by taking a variety of MCB courses or by selecting a more focused group of courses in any of the following areas: biochemistry, cells and tissues, developmental biology, infection and immunity, microbiology, genetics, neurobiology and physiology. The MCB Advising Program (MAP) staff is available to help students plan their combination of advanced courses.

The Molecular and Cellular Biology Honors Concentration is designed for students whose preparation and interests motivate them to desire a more intensive undergraduate biology experience and to prepare for graduate or professional school. The MCB Honors Concentration is based on the MCB major. Students must satisfy all of the requirements for the MCB major in addition to the requirements for the MCB Honors Concentration. Students interested in the MCB Honors Concentration should contact the MCB Honors Concentration coordinator during the freshman year for more information.

The School of Molecular and Cellular Biology also sponsors the Minor in MCB and the Biochemistry Specialized Curriculum.

The School of Molecular and Cellular Biology offers the following degree programs:

**For the Degree of Bachelor of Science in Liberal Arts and Sciences**

Students choose the Major in Molecular and Cellular Biology (http://catalog.illinois.edu/undergraduate/las/academic-units/molecular-cell-bio/molecular-cellular-biology-concentration) or the Major in MCB, Honors concentration (http://catalog.illinois.edu/undergraduate/las/academic-units/molecular-cell-bio/molecular-cellular-biology-honors-concentration)

**For the Degree of Bachelor of Science in Biochemistry**

Major in Biochemistry (Specialized Curriculum) (http://catalog.illinois.edu/undergraduate/las/academic-units/molecular-cell-bio/specialized-curriculum-biochemistry-major)

**Minor in Molecular and Cellular Biology**

The minor, administered by the School of Molecular and Cellular Biology, is designed to provide students with an understanding of foundational principles of physiology, cellular and developmental biology, microbiology, molecular genetics and biochemistry. A minor in Molecular and Cellular Biology will prepare students for training in medicine and other health sciences, graduate studies in related disciplines, as well as for employment opportunities in pharmaceutical and biotechnology industries.

Students must contact an MCB advisor (https://mcb.illinois.edu/undergrad/advising) for acceptance into the minor. MCB 150 must be completed or in progress before acceptance into the minor.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCB 244</td>
<td>Human Anatomy &amp; Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>or MCB 246</td>
<td>Human Anatomy &amp; Physiology II</td>
<td></td>
</tr>
<tr>
<td>MCB 250</td>
<td>Molecular Genetics</td>
<td>3</td>
</tr>
<tr>
<td>MCB 251</td>
<td>Exp Techniqs in Molecular Biol</td>
<td>2</td>
</tr>
<tr>
<td>MCB 252</td>
<td>Cells, Tissues &amp; Development</td>
<td>3</td>
</tr>
<tr>
<td>MCB 253</td>
<td>Exp Techniqs in Cellular Biol</td>
<td>2</td>
</tr>
<tr>
<td>MCB 354</td>
<td>Biochem &amp; Phys Basis of Life</td>
<td>3</td>
</tr>
<tr>
<td>or MCB 450</td>
<td>Introductory Biochemistry</td>
<td></td>
</tr>
</tbody>
</table>

Choose one additional 3-5 credit hour course from the approved list of 300- and 400-level courses for MCB majors.

**Total Hours** 19-21

**Biophysics Courses**

**BIOP 401** Introduction to Biophysics  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/BIOP/401)

Review of membrane and cell biophysics designed to introduce the theoretical and mathematical bases of bioelectricity, photobiology and biomolecular motors. 3 undergraduate hours. 3 graduate hours. Credit is not given for BIOP 401 and PHYS 475. Prerequisite: One year each of college-level mathematics and physics; one year each of college level biology and chemistry recommended.

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

Same as MCB 419 and NEUR 419. See MCB 419.

**BIOP 432** Photosynthesis  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/BIOP/432)

Same as CPSC 489 and IB 421. See IB 421.

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

**Molecular and Cell Biology 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
Molecular and Cellular Biology, School of

Molecular and Cellular Biology

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of

Molecular and Cellular Biology, School of
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. Credit is not given for both MCB 252 and MCB 151. Prerequisite: Concurrent or prior enrollment in 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 250 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 with 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, 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.
Mol Cancer Cell Biol, School of

MBC 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.

MBC 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.

MBC 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.

MBC 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.

MBC 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.

MBC 395 Special Topics in Human Physiology credit: 2 Hours. (https://courses.illinois.edu/schedule/terms/MCB/395)
This course consists of 2 components: (1) a journal club, in which students explore current advances in the diagnosis, treatment, and understanding of human diseases by reading, presenting and discussing primary research articles; and (2) instructional support for MCB 244, in which students hold open office hours and make brief (10-15 minute) instructional videos that highlight advanced topics covered in journal club. Prerequisite: MCB 244 and MCB 246 and instructor approval.

MBC 396 Special Topics in Human Health and Disease credit: 2 Hours. (https://courses.illinois.edu/schedule/terms/MCB/396)
This course consists of 2 components: (1) a journal club, in which students explore current advances in the diagnosis, treatment, and understanding of human diseases by reading, presenting and discussing primary research articles; and (2) instructional support for MCB 246, in which students hold open office hours and make brief (10-15 minute) instructional videos that highlight advanced topics covered in journal club. Prerequisite: MCB 244 and MCB 246 and instructor approval.

MBC 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.

MBC 401 Cell & Membrane Physiology credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/MCB/401)
Cellular and molecular basis of physiological process with an emphasis on phenomena taking place at the membrane of cells and organelles (e.g., signal transduction, ion transport, synaptic transmission, nerve conduction, bioelectricity, synaptic plasticity.) Structure and function of biological membranes through a quantitative lens. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 252 or consent of instructor.

MBC 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, cardiovascular 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.

MBC 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: MCB 252 or consent of instructor.

MBC 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 BIOL 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 250, MCB 251, MCB 252, MCB 253, and MCB 354; or consent of instructor.

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: MCB 252 or consent of instructor. One semester of biochemistry is recommended.

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 429  Cellular Microbiology & Disease  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/MCB/429)
Emphasizes cell biology of infectious diseases, using cellular, molecular, and animal models. Will stress molecular cross-talk that drives host-pathogen interactions, state-of-the art approaches for investigating host and microbial cell and molecular biology, latest paradigms in host cell biology, and, the evolutionary basis by which pathogens can manipulate host cell cytoskeleton, membranes, organelles, cell cycle, gene expression, and signaling in eukaryotic cells. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 300 and MCB 354 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 learn the history of the microbial world living in and around us every day. Same as IB 442.

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 biomedicine, 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 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 458  Basic Human Pathology  credit: 3 Hours. (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  Regeneration and Medicine  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/MCB/460)
A survey of regeneration biology and medicine at the organ, tissues, and cellular/genetic/molecular/levels. Basic concepts are presented with a focus on contemporary methods and seminal experiments. Students will learn to think critically and creatively about experimentation and analyses of three regenerate medicine strategies: stem cell transplantation, bioartificial tissues, and chemical induction of regeneration in vivo. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 410 or consent of instructor. Recommended: knowledge of vertebrate histology and anatomy.

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.
Molecular and Cellular Biology, School of

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 480  Eukaryotic Cell Signaling  credit: 2 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. 2 undergraduate hours. 2 graduate hours. Prerequisite: MCB 252 or consent of instructor.

MCB 481  Developmental Neurobiology  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/MCB/481)
Principles of vertebrate and invertebrate developmental neurobiology with emphasis on the molecular and cellular mechanisms controlling neuronal determination, axon pathfinding, synapse formation, and plasticity. Same as NEUR 481. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 400 or MCB 461 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.

NEUR Class Schedule (https://courses.illinois.edu/schedule/DEFAULT/NEUR)

Neuroscience Courses

NEUR 302  Applied Neuroscience  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/302)
Same as PSYC 302. See PSYC 302.

NEUR 314  Introduction to Neurobiology  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/314)
Same as MCB 314. See MCB 314.

NEUR 403  Memory and Amnesia  credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/403)
Same as PSYC 403. See PSYC 403.

NEUR 405  Cognitive Neuroscience  credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/405)
Same as PSYC 404. See PSYC 404.

NEUR 413  Psychopharmacology  credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/413)
Same as PSYC 413. See PSYC 413.

NEUR 414  Brain, Learning, and Memory  credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/414)
Same as PSYC 414. See PSYC 414.

NEUR 417  Neuroscience of Eating & Drinking  credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/417)
Same as FSHN 417 and PSYC 417. See PSYC 417.

NEUR 419  Brain, Behavior & Info Process  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/419)
Same as BIOP 419 and MCB 419. See MCB 419.

NEUR 421  Principles of Psychophysiology  credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/421)
Same as PSYC 421. See PSYC 421.

NEUR 432  Genes and Behavior  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/432)
Same as ANTH, IB 432, and PSYC 432. See IB 432.

NEUR 433  Evolutionary Neuroscience  credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/433)
Same as PHIL 433 and PSYC 433. See PSYC 433.

NEUR 445  Cognitive Neuroscience Lab  credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/445)
Same as PSYC 445. See PSYC 445.

NEUR 450  Cognitive Psychophysiology  credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/450)
Same as PSYC 450. See PSYC 450.

NEUR 451  Neurobio of Aging  credit: 0 to 4 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/451)
Same as PSYC 451 and KIN 458. See PSYC 451.

NEUR 453  Cog Neuroscience of Vision  credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/453)
Same as PSYC 453. See PSYC 453.

NEUR 461  Cell & Molecular Neuroscience  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/461)
Same as MCB 461. See MCB 461.

NEUR 462  Integrative Neuroscience  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/462)
Same as MCB 462. See MCB 462.

NEUR 481  Developmental Neurobiology  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/NEUR/481)
Same as MCB 481. See MCB 481.

Information listed in this catalog is current as of 10/2018