



## Undergraduate Programs

Revised July 2021

### VISIT

Our Schools of Biology offer prospective student appointments and tours, during which you can meet one-on-one with an instructional program employee. During your visit, we will answer questions about our degree programs, curriculum, research and career options. To plan your visit, please call (217) 244-6239, preferably one week in advance of your visit, and identify yourself as a prospective freshman. If you would like to schedule a tour of our facilities or receive permission to sit in on a class, please be sure to specifically ask about that when you call. Tour schedules depend on staff availability. Prospective student visits will not be scheduled during university holidays or weekends. If you would like a general campus tour or need information on the admissions process, please contact the Office of Undergraduate Admissions. Thank you for your interest in our program. We hope to see you in Urbana-Champaign!

### ADMISSION

Incoming freshmen should apply for admission to the College of Liberal Arts & Sciences (LAS) and choose Biology as the intended major. Freshmen in Biology will take an introductory course in Integrative Biology (IB) and an introductory course in Molecular and Cellular Biology (MCB). Just prior to sophomore year, students will consult with an advisor and decide between Integrative Biology or Molecular and Cellular Biology for their final degree program. Students interested in teaching Biology at the high school level have the option of adding a Teacher Education minor in Secondary School Teaching, resulting in a teaching licensure for the state of Illinois.

By studying biology at Illinois, you'll experience a prestigious, highly customizable education that will allow you to follow your dreams. We'll prepare you for a competitive job market by developing your technical, research, and analytical skills both inside and beyond the classroom.

### DEGREE OPTIONS

**MOLECULAR AND CELLULAR BIOLOGY (MCB)** is the study of living organisms through the understanding of basic molecular and cellular structure and function, as well as the metabolic, genetic, and physiological processes common to all organisms. Made up of the departments of Biochemistry, Cell and Developmental Biology, Microbiology, and Molecular and Integrative Physiology, the MCB major offers courses that explore unique aspects differentiating living organisms; how cells are organized; how cells and organisms respond to each other and their environment; how cells communicate signals and regulate gene expression; and how these processes go awry during injury, infection, or genetic diseases. Our curriculum imparts not only basic principles of modern biology, but also the fundamental critical and analytical skills necessary for a successful career.

**INTEGRATIVE BIOLOGY (IB)** is the study of how the different components of life interact, from molecules through global cycles. Our courses and curricula focus on problem-solving, collaborative learning, and communication skills across the content areas. An IB major prepares students in genetics and evolution, anatomy and physiology of plants and animals, ecology and behavior, and molecular biology. After completion of the core 100 and 200-level sequence in IB, students complete the required additional approved coursework by either taking a variety of courses or specializing in such areas as health professions, biotechnology, biodiversity and conservation and environmental sciences. A student works with an IB advisor to plan this additional approved coursework.

### MCB OR IB PLUS TEACHING LICENSURE

Students who enjoy explaining ideas, have an interest in contributing to the improvement of our schools or getting others excited about biology may consider this program, which provides certification to teach biology at the high school level. Students complete the courses required for the degree program in MCB or IB, in addition to the requirements for a Teacher Education Minor in Secondary School Teaching. Students who complete this program historically have had a 100% job placement rate upon graduation.

### MAJOR IN INTEGRATIVE BIOLOGY

Integrative Biology is the study of how the different components of life interact, from molecules through global cycles. The Integrative Biology (IB) major provides a solid foundation of knowledge and skills in the biological sciences by preparing students in genetics, physiology and development, behavior, ecology, and evolution.

After completion of the introductory biology courses, students then complete four core courses, which provide a foundation for the advanced coursework that is taken during the junior and senior years. Students complete the required additional coursework by either taking a variety of courses or specializing in pre-health, ecology and conservation, or biodiversity and organismal biology.

**Degree Title:** Bachelor of Science in Liberal Arts and Sciences

**Requirements for the B.S. degree in Integrative Biology:**

Courses in Biology, Chemistry, Math & Physics

LAS General Education Courses (Gen Eds)

Language other than English

Composition I and Advanced Composition

Electives: Courses needed to complete the 120 hours required to graduate. These can be non-math/science courses.

**Minimum Hours Required for Graduation: 120 hours**

**Supporting Courses:**

MATH 220 (Calculus) <b>or</b> MATH 221 (Calculus I)	4-5	<b>28-34</b>
STAT 212 (Biostatistics)	3	
CHEM 102, 103, 104 & 105 (General Chemistry) <b>or</b> CHEM 202, 203, 204 & 205 (Accelerated Chemistry)	8-10	
CHEM 232 & 233 (Elementary Organic Chemistry & Lab) <b>or</b> CHEM 236 (Fundamental Organic Chem I) & CHEM 237 (Structure and Synthesis)	5-6	
PHYS 101 & 102 (College Physics) <b>or</b> PHYS 211, 212 (University Physics)	8-10	

**Introductory Biology Sequence:**

IB 150 Organismal and Evolutionary Biology	4	<b>8</b>
MCB 150 Molecular and Cellular Basis of Life	4	

**IB Core Courses:**

IB 202 Physiology (This course requires animal dissection and no equivalent alternative is available)	4	<b>16</b>
IB 203 Ecology (Advanced Composition)	4	
IB 204 Genetics	4	
IB 302 Evolution	4	

**Additional Courses**

Additional advanced courses totaling a minimum of 14 hours at the 300– to 400-level are required.

Course selection from the list of Courses for IB Major Advanced Hours must include:

- One course from two of the following three areas:
  - Area I: Organismal and Evolutionary Biology
  - Area II: Behavior, Ecology, and the Environment
  - Area III: Integrative Anatomy, Physiology, and Molecular Biology
- One course with a laboratory and/or field component.

**TOTAL** **66-75**

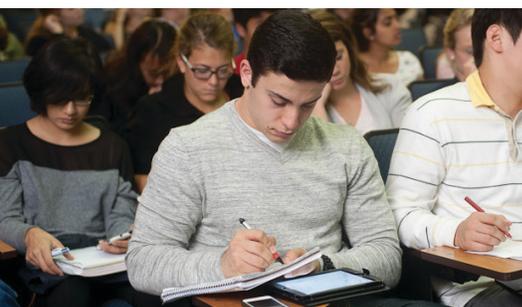
**Strongly Recommended:** Students are encouraged to gain research experience (IB 290, 390 or IB 490). Students may count no more than 10 elective hours of IB 390/490 credit toward graduation.

SCHOOL OF

# MOLECULAR & CELLULAR BIOLOGY

## Molecular and Cellular Biology Major

**As an MCB student**, you will explore fundamental questions about how organisms work at molecular, cellular, and systems levels and how these processes can go awry during injury, infections, and genetic diseases. You'll build a strong foundation in biological sciences, chemistry, physics, statistics, and math, and gain knowledge of core MCB subjects such as cell communication and gene expression. As you progress through the major, you will be able to customize the curriculum according to your interests. Our accomplished and dedicated faculty have designed a variety of advanced courses, from cancer cell biology to microbial biochemistry. As an MCB student, you will learn not only the basic principles of modern biology, but you will acquire the fundamental, critical, and analytical skills necessary for a successful career.



### A BRIGHT FUTURE

Our students are well-prepared for graduate schools as well as medical, dental, and other professional schools. Alumni go on to develop novel medicines at biotechnology companies, conduct research at national laboratories, teach at universities, or pursue a range of other careers in the following fields:

- Medicine
- Dentistry
- Pharmacy
- Veterinary medicine
- Biotechnology and pharmaceutical industries
- Bioinformatics
- Government agencies (CDC, FDA, NIH, USDA, DOE, DOD, NASA, EPA)
- Armed Forces
- Academic research
- Forensic science
- Genetic counseling
- Law
- Education
- Science writing

### DEPARTMENTS

The School of Molecular & Cellular Biology is comprised of the following departments:

**Biochemistry, Cell & Developmental Biology, Microbiology, Molecular & Integrative Physiology**

### MAJORS OFFERED

**Molecular and Cellular Biology**

(Including Honors Concentration and Teaching Licensure)

**Biochemistry, Specialized Curriculum**

### CONTACT INFORMATION

(217) 333-6774

[advising@mcb.illinois.edu](mailto:advising@mcb.illinois.edu)

[mcb.illinois.edu/undergrad/advising](http://mcb.illinois.edu/undergrad/advising)



## Molecular and Cellular Biology Major

**Degree:** Bachelor of Science in Liberal Arts & Sciences

**Major:** Molecular and Cellular Biology

**Minimum Requirements:** 67–72 hours, including 21 hours of 300- or 400-level courses (15 hours must be from approved list of advanced MCB courses and include one lab.

Visit: [go.illinois.edu/MCB-ApprovedAdvanced](http://go.illinois.edu/MCB-ApprovedAdvanced); 12 hours of advanced level courses in the major must be taken on the Urbana-Champaign campus.

**General Education Requirements:** MCB majors must complete all LAS degree requirements: [las.illinois.edu/students/requirements](http://las.illinois.edu/students/requirements)

**Minimum GPA Required for Graduation:** MCB majors are required to maintain a major GPA and cumulative GPA of 2.00 or better in order to graduate.

**Minimum Hours Required for Graduation:** 120 hours

**Graduation with Distinction:** Graduating seniors who have demonstrated excellence in research or academics may be considered for the following: Academic Distinction, Distinction for Research, High Distinction for Research; Highest Distinction for Research. Visit: [go.illinois.edu/MCB-Distinction](http://go.illinois.edu/MCB-Distinction)

CREDIT HOURS	REQUIREMENTS (67-72 hours total)
<b>Introductory Biological Science Courses (8 hours total)</b>	
4	IB 150: Organismal and Evolutionary Biology
4	MCB 150: Molecular and Cellular Basis of Life
<b>MCB Core Courses (13 hours total, taken sequentially)</b>	
3	MCB 250: Molecular Genetics (Lecture)
2	MCB 251: Experimental Techniques in Molecular Biology (Lab)
3	MCB 252: Cells, Tissues, and Development (Lecture)
2	MCB 253: Experimental Techniques in Cell Biology (Lab)
3	MCB 354: Biochemical and Physical Basis of Life (Lecture)
<b>Advanced Courses (15 hours total)</b>	
15	MCB majors choose at least four advanced MCB courses, including one lab course, from our approved list. Options include courses from Biochemistry, Microbiology, Cell & Developmental Biology, Molecular & Integrative Physiology, Biophysics and Neuroscience. For a complete list of approved advanced MCB courses, visit <a href="http://go.illinois.edu/MCB-ApprovedAdvanced">go.illinois.edu/MCB-ApprovedAdvanced</a> <i>Note: MCB 354 does not count toward the 15 advanced hours, as it is part of the Core Curriculum.</i>
<b>Supporting Courses (31-36 hours total)</b>	
4-5	MATH 220 <b>or</b> 221: Calculus I
3	MATH 231: Calc II <b>or</b> STAT 212: Biostatistics
8-10	Choose one of the following course sequences: CHEM 102, 103, 104 & 105: General Chemistry I & II with Lab <b>or</b> CHEM 202, 203, 204 & 205: Accelerated Chemistry I & II with Lab
6	Choose one of the following course sequences: CHEM 232 & 233: Elementary Organic Chemistry I with Lab <b>or</b> CHEM 236, 237 & 436: Fundamental Organic Chemistry I, Structure and Synthesis Lab & Fundamental Organic Chemistry II
10-12	Complete one of the following course sequences in its entirety: PHYS 101 & 102: College Physics <b>or</b> PHYS 211, 212, 213 & 214: University Physics



# Typical MCB Major Four-Year Plan of Study

## SCHOOL OF MOLECULAR & CELLULAR BIOLOGY

## Instructional Program



(217) 333-6774 | [advising@mcb.illinois.edu](mailto:advising@mcb.illinois.edu) | [mcb.illinois.edu/undergrad/advising](http://mcb.illinois.edu/undergrad/advising)

Revised July 2021

This plan is to be used only as a guide. Many factors may affect the sequence and timing of courses. Course selections are best made in consultation with an MCB Advisor. For an appointment call (217) 333-6774, or use our online scheduling system at <http://go.illinois.edu/mcbappt>.

FRESHMAN YEAR	
SEMESTER 1	SEMESTER 2
Intro Biology: MCB 150 or IB 150 (4 hrs) Chemistry: Begin gen CHEM sequence per placement (3-5 hrs) Math/Stat: Begin MATH sequence per placement (3-5 hrs) or Composition I: RHET, CMN, ESL or equiv. (3-4 hrs) First Year Enrichment Course: LAS 101 or 122 (1 hr) Options: Language, Gen Ed., or Elective (0-5 hrs)  TOTAL CREDIT HOURS: 14-16	Intro Biology: MCB 150 or IB 150 (4 hrs) Chemistry: Continue general CHEM sequence (4 hrs) Math/Stat: Begin MATH sequence per placement (3-5 hrs) or Composition I: RHET, CMN, ESL or equiv. (3-4 hrs) Options: Language, Gen Ed., or Elective (0-5 hrs)  TOTAL CREDIT HOURS: 14-16
SOPHOMORE YEAR	
SEMESTER 3	SEMESTER 4
Molecular Genetics & Lab: MCB 250 & MCB 251 (5 hrs)* Chemistry: Finish general CHEM or begin organic CHEM (4-6 hrs) Math/Stat: Begin or continue if necessary (3-5 hrs) Options: Language, Gen Ed., Elective, or Research (0-5 hrs)  TOTAL CREDIT HOURS: 14-16	Cells, Tissues & Develop. & Lab: MCB 252 & MCB 253 (5 hrs) Chemistry: Finish organic CHEM, if necessary (2-6 hrs) or Physics: PHYS 101 or 211, if CHEM complete (4-5 hrs) or Advanced MCB course: See approved list** (1-4 hrs) Options: Language, Gen Ed., Elective, or Research (0-5 hrs)  TOTAL CREDIT HOURS: 14-16
JUNIOR YEAR	
SEMESTER 5	SEMESTER 6
Biochemistry: MCB 354 (3 hrs) Physics: Begin or continue PHYS sequence (4-5 hrs) Choose 2-3 of the following: (6-9 hrs) <ul style="list-style-type: none"> <li>• Research: MCB 290</li> <li>• Continue CHEM, if necessary for minor or profession</li> <li>• General Education Course</li> <li>• Elective Course</li> </ul> TOTAL CREDIT HOURS: 14-16	Advanced MCB course or lab: See approved list** (1-4 hrs) Physics: Continue PHYS sequence, if necessary (4-5 hrs) Choose 2-3 of the following: (6-9 hrs) <ul style="list-style-type: none"> <li>• Research: MCB 290</li> <li>• Additional Advanced MCB Course</li> <li>• General Education Course</li> <li>• Elective Course</li> </ul> TOTAL CREDIT HOURS: 14-16
SENIOR YEAR	
SEMESTER 7	SEMESTER 8
2 Advanced MCB courses or lab: See approved list** (5-8 hrs) Choose 2 of the following: (6-8 hrs) <ul style="list-style-type: none"> <li>• Research: MCB 290</li> <li>• Additional Advanced MCB Course</li> <li>• General Education Course</li> <li>• Elective Course</li> </ul> TOTAL CREDIT HOURS: 14-16	2 Advanced MCB courses or lab: See approved list** (5-8 hrs) Choose 2 of the following: (6-8 hrs) <ul style="list-style-type: none"> <li>• Research or Senior Thesis: MCB 290 or MCB 492</li> <li>• Additional Advanced MCB Course</li> <li>• General Education Course</li> <li>• Elective Course</li> </ul> TOTAL CREDIT HOURS: 14-16

\* General Chemistry 1 and 2 lectures (CHEM 102 and CHEM 104) must be completed before beginning MCB 250.

\*\* Only courses taken from the approved advanced courses list, which can be found at <http://mcb.illinois.edu/undergrad/courses/advanced/> will count towards the MCB advanced hour requirement (15 hours needed, including 1 lab). Graduate level courses (500- or 600-level) will NOT count towards the advanced MCB requirement.

**IB MAJOR FOUR YEAR GUIDE****Semester 1**

IB150 **or** MCB 150 (4 hrs.)  
CHEM 102/103 (4 hrs.)  
MATH 220 (5 hrs.) **or** 221 (4 hrs.)  
**or** STAT 212 (3 hrs.) **or** RHET 105 (4 hrs.)  
Gen. Ed. **or** elective, **or** LOTE\* (3-4 hrs.)  
**Total 13-16 hrs.**

**Semester 3**

IB 203 – Ecology (advanced composition) (4 hrs.)  
IB 204 – Genetics (4 hrs.)  
CHEM 232 (3-4 hrs.)  
Gen. Ed. **or** elective, **or** LOTE\* (3-4 hrs.)  
**Total 15-16 hrs.**

**Semester 5**

Advanced IB course\*\* (3-4 hrs.)  
PHYS 101 (5 hrs.)  
Gen. Ed. **or** elective, **or** LOTE\* (3-4 hrs.)  
Gen. Ed. **or** elective, **or** LOTE\* (3-4 hrs.)  
**Total 14-16 hrs.**

**Semester 7**

Advanced IB course\*\* (3-4 hrs.)  
Advanced IB course\*\* (3-4 hrs.)  
Gen. Ed. **or** elective (3 hrs.)  
Gen. Ed. **or** elective (3 hrs.)  
**Total 12-14 hrs.**

**Semester 2**

IB150 **or** MCB 150 (4 hrs.)  
CHEM 104/105 (4 hrs.)  
MATH 220 (5 hrs.) **or** 221 (4 hrs.)  
**or** STAT 212 (3 hrs.) **or** RHET 105 (4 hrs.)  
Gen. Ed. **or** elective, **or** LOTE\* (3-4 hrs.)  
**Total 14-16 hrs.**

**Semester 4**

IB 202 – Physiology (4 hrs.)  
IB 302 – Evolution (4 hrs.)  
CHEM 233 (2 hrs.)  
Gen. Ed. **or** elective, **or** LOTE\* (3-4 hrs.)  
**Total 13-15 hrs.**

**Semester 6**

Advanced IB course\*\* (3-4 hrs.)  
PHYS 102 (5 hrs.)  
Gen. Ed. **or** elective, **or** LOTE\* (3-4 hrs.)  
Gen. Ed. **or** elective, **or** LOTE\* (3-4 hrs.)  
**Total 14-17 hrs.**

**Semester 8**

Advanced IB course\*\* (3-4 hrs.)  
Gen. Ed. **or** elective (3 hrs.)  
Gen. Ed. **or** elective (3 hrs.)  
Gen. Ed. **or** elective (3 hrs.)  
**Total 12-14 hrs.**

\*LOTE = Language Other Than English (formerly foreign language)

\*\* Selected from Lists of Area Courses and Additional Approved IB Courses

**MANY factors affect the sequencing of courses, including:**

- Research
- Pursuing a minor
- Beginning with CHEM 101 or Math 115
- Starting IB late

# Typical Pre-Med Four-Year Plan of Study



## SCHOOL OF MOLECULAR & CELLULAR BIOLOGY

## Instructional Program



(217) 333-6774 | [advising@mcb.illinois.edu](mailto:advising@mcb.illinois.edu) | [mcb.illinois.edu/undergrad/advising](http://mcb.illinois.edu/undergrad/advising)

Revised July 2021

This plan is to be used only as a guide. Many factors may affect the sequence and timing of courses. Course selections are best made in consultation with an MCB Advisor. For an appointment, call (217) 333-6774 or use our online scheduling system at <http://go.illinois.edu/mcbappt>.

FRESHMAN YEAR	
SEMESTER 1	SEMESTER 2
Intro Biology: MCB 150 or IB 150 (4 hrs) Chemistry: Begin gen CHEM sequence per placement(3-5 hrs) Math/Stat: Begin MATH sequence per placement* (3-5 hrs) or Composition I: RHET, CMN, ESL or equiv. (3-4 hrs) First Year Enrichment Course: LAS 101 or 122 (1 hr) Options: Language, Gen Ed.**, or Elective (0-5 hrs) TOTAL CREDIT HOURS: 14-16	Intro Biology: MCB 150 or IB 150 (4 hrs) Chemistry: Continue general CHEM sequence( 4 hrs) Math/Stat: Begin MATH sequence per placement* (3-5 hrs) or Composition I: RHET, CMN, ESL or equiv. (3-4 hrs) Options: Language, Gen Ed.**, or Elective (0-5 hrs) TOTAL CREDIT HOURS: 14-16
SOPHOMORE YEAR	
SEMESTER 3	SEMESTER 4
Molecular Genetics & Lab: MCB 250 & MCB 251 (5 hrs)*** Chemistry: Finish general CHEM or begin organic CHEM (4-6 hrs) Choose 1-2 of the following: (1-6 hrs) <ul style="list-style-type: none"> <li>• Math/Stat: Begin or continue if necessary*</li> <li>• Language: Begin or continue, if necessary</li> <li>• Research: MCB 290</li> <li>• General Education Course**</li> <li>• Elective</li> </ul> TOTAL CREDIT HOURS: 14-16	Cells, Tissues & Develop. & Lab: MCB 252 & MCB 253 (5 hrs) Chemistry: Finish organic CHEM, if necessary (2-6 hrs) or Physics: PHYS 101 or 211, if CHEM complete (4-5 hrs) or Advanced MCB course: See approved list**** (1-4 hrs) Choose 1-2 of the following: (1-6 hrs) <ul style="list-style-type: none"> <li>• Language: Begin or continue, if necessary</li> <li>• Research: MCB 290</li> <li>• General Education Course**</li> <li>• Elective</li> </ul> TOTAL CREDIT HOURS: 14-16
JUNIOR YEAR	
SEMESTER 5	SEMESTER 6
Biochemistry: MCB 354 (3 hrs) Physics: Begin or continue PHYS sequence (4-5 hrs) Choose 2-3 of the following: (5-9 hrs) <ul style="list-style-type: none"> <li>• General Education Course**</li> <li>• Anatomy &amp; Physiology: MCB 244 and/or MCB 245</li> <li>• Research: MCB 290</li> <li>• Elective course</li> </ul> TOTAL CREDIT HOURS: 14-18	Advanced MCB course or lab: See approved list**** (1-4 hrs) Physics: Continue PHYS sequence, if necessary (4-5 hrs) Choose 2-3 of the following: (5-9 hrs) <ul style="list-style-type: none"> <li>• General Education Course**</li> <li>• Anatomy &amp; Physiology: MCB 246 and/or MCB 247</li> <li>• Research: MCB 290</li> <li>• Elective course</li> </ul> TOTAL CREDIT HOURS: 14-18
SENIOR YEAR	
SEMESTER 7	SEMESTER 8
2 Advanced MCB courses or lab: See approved list**** (5-8 hrs) Choose 2-3 of the following: (6-9 hrs) <ul style="list-style-type: none"> <li>• General Education Course**</li> <li>• Anatomy &amp; Physiology: MCB 244 and/or MCB 245</li> <li>• Research: MCB 290</li> <li>• Elective course</li> </ul> TOTAL CREDIT HOURS: 14-16	2 Advanced MCB courses or lab: See approved list**** (5-8 hrs) Choose 2-3 of the following: (6-9 hrs) <ul style="list-style-type: none"> <li>• General Education Course**</li> <li>• Anatomy &amp; Physiology: MCB 246 and/or MCB 247</li> <li>• Research or Senior Thesis: MCB 290 or 492</li> <li>• Elective course</li> </ul> TOTAL CREDIT HOURS: 14-16

\* Statistics is highly recommended to prepare for the MCAT and medical school.

\*\* At least one course in psychology and sociology should be taken. Three social/behavioral science courses are recommended.

\*\*\* General Chemistry 1 and 2 lectures (CHEM 102 and CHEM 104) must be completed before beginning MCB 250.

\*\*\*\* Approved advanced courses can be found at <http://mcb.illinois.edu/undergrad/courses/advanced/>. Courses that may be of particular interest to pre-med students include, but are not limited to, cell biology, immunology, microbiology, neurobiology, and physiology.

**IB MAJOR FOUR YEAR GUIDE—PRE-HEALTH****Semester 1**

IB150 **or** MCB 150 (4 hrs.)  
CHEM 102/103 (4 hrs.)  
MATH 220 (5 hrs.) **or** 221 (4 hrs.)  
**or** STAT 212 (3 hrs.) **or** RHET 105 (4 hrs.)  
**PSYC 100 or SOC 100 (4 hrs.)**  
**Total 15-17 hrs.**

**Semester 3**

IB 203 – Ecology –**advanced composition** (4 hrs.)  
IB 204 – Genetics (4 hrs.)  
CHEM 232 (3-4 hrs.)  
Gen. Ed (3-4 hrs.)  
**Total 14-17 hrs.**

**Semester 5**

PHYS 101 (5 hrs.)  
Adv. IB course\*\* (3-4 hrs.) **e.g. IB 360**  
Elective **e.g. CHEM 332** (3-4 hrs.)  
Gen. Ed. **or** LOTE\* **or** elective (3-4 hrs.)  
**Total 14-15 hrs.**

**Semester 7**

Adv. IB course\*\* (3-4 hrs.) **e.g. IB 303**  
Adv. IB course\*\* Gen. Ed. **or** elective (3-4 hrs.)  
Gen. Ed. **or** elective (3-4 hrs.)  
Gen. Ed. **or** elective (3-4 hrs.)  
**Total 12-16 hrs.**

**Semester 2**

IB150 **or** MCB 150 (4 hrs.)  
CHEM 104/105 (4 hrs.)  
MATH 220 (5 hrs.) **or** 221 (4 hrs.)  
**or** STAT 212 (3 hrs.) **or** RHET 105 (4 hrs.)  
**PSYC 100 or SOC 100 (4 hrs.)**  
**Total 15-17 hrs.**

**Semester 4**

IB 202 – Physiology (4 hrs.)  
IB 302 – Evolution (4 hrs.)  
CHEM 233 (2 hrs.)  
STAT 212 **or** Gen. Ed (3-4 hrs.)  
**Total 13-16 hrs.**

**Semester 6**

PHYS 102 (5 hrs.)  
Adv. IB course\*\* (3 hrs.) **e.g. IB 361**  
Adv. IB course\*\* (3 hrs.) **e.g. MCB 450**  
Gen. Ed. **or** LOTE\* **or** elective (3-4 hrs.)  
**Total 14-15 hrs.**

**Semester 8**

Adv. IB course\*\* (3-4 hrs.) **e.g. IB 481**  
Adv. IB course\*\* (3-4 hrs.) **e.g. IB 432**  
Gen. Ed. **or** elective (3-4 hrs.)  
Gen. Ed. **or** elective (3-4 hrs.)  
**Total 12-16 hrs.**

**NOTE: Suggested courses for pre-health students highlighted in orange**

\*LOTE = Language Other Than English (formerly foreign language)

\*\* Selected from Lists of Area Courses and Additional Approved IB Courses

**MANY factors affect the sequencing of courses, including:**

- Research
- Pursuing a minor
- Beginning with CHEM 101 or Math 115
- Starting IB late



## Pre-Requisite Information

*Please note that it is the responsibility of the student to research individual medical school admission requirements. There are various ways medical schools view pre-requisite coursework: specific courses, credit hours in disciplines or competency based. Your academic advisor can discuss courses required for your major.*

<b>Biological Sciences</b>	<b>Courses</b>	<b>Required</b>	<b>Strongly Recommended</b>
General Biology (2 sem)	MCB 150 & MCB 151 IB 150 & IB 151	✓	
Anatomy & Physiology	MCB 244 & MCB 246 or IB 303 & IB 202		✓
Genetics	MCB 250 or IB 204		✓
<b>Physical Sciences</b>	<b>Courses</b>	<b>Required</b>	<b>Strongly Recommended</b>
General Chemistry (2 sem)	CHEM 102 & CHEM 103 CHEM 104 & CHEM 105	✓	
Organic Chemistry I Organic Chemistry II	CHEM 232 & CHEM 233 CHEM 332	✓	✓
Biochemistry (1 sem)	MCB 354 or MCB 450	✓	
General Physics (2 sem)	PHYS 101 & PHYS 102	✓	
<b>Behavioral Sciences &amp; Communication</b>	<b>Courses</b>	<b>Required</b>	<b>Strongly Recommended</b>
Psychology	PSYC 100		✓
Sociology	SOC 100		✓
Communication (2 sem)	Composition 1 Advanced Composition	✓	



## EXPERIENCES FOR MEDICAL SCHOOL

*Medical schools look for a variety of experiences. This is not an exhaustive list of the opportunities. Students can pursue many things to enhance their future application. It is important to have quality experiences over quantity!*

### Clinical Experience

- Healthcare Work Certification: CNA, EMT, CMA
- Hospital/Clinic Volunteering
- Medical Scribe

### Community Service

- Social Justice
- Get out in your campus community

### Leadership

- Training & Development
- Executive Board Position

### Research

- Undergraduate Research
- Summer Undergraduate Research Fellowship
- Research during gap year

## SCHOOL OF MOLECULAR & CELLULAR BIOLOGY

## Instructional Program



(217) 333-6774 | shawna@illinois.edu | <https://go.mcb.illinois.edu/honors>

March 2022



**The MCB Honors Concentration** is designed for exceptional MCB Majors who are motivated to explore a fuller complement of experiences in biology. MCB Honors students typically plan to enter graduate or professional programs to reach their career goals and want an intensive undergraduate education as preparation.

### Admission

Interested students must submit an application and letter of recommendation. Select students will be interviewed before final decisions are made.

#### *First-year students*

Applications are accepted in the spring semester from continuing first-year students. First-year students must have completed one full semester to apply.

#### *Second year and transfer students*

MCB Honors accepts applications in the fall and spring semesters from second-year students and transfer students. Applications from other students may be considered on a case-by-case basis.

“MCB Honors has been a remarkable journey filled with challenges that facilitated personal growth, friendships that have introduced perspectives never explored before, and interactions with professors that encouraged critical thinking.”

### Develop your skills in

- Reading scientific literature
- Analytical thinking and problem-solving
- Oral and written communication
- Teamwork and creativity

### Participate in discussion sessions that offer:

- Project-based learning
- Direct interactions with faculty
- Rigorous practical training

### For more information

Visit <https://go.mcb.illinois.edu/honors>

[Dr. Shawna Naidu](#), Senior Coordinator for Instruction – Honors, at [shawna@illinois.edu](mailto:shawna@illinois.edu)

## SCHOOL OF MOLECULAR & CELLULAR BIOLOGY

## Instructional Program



(217) 333-6774 | [advising@mcb.illinois.edu](mailto:advising@mcb.illinois.edu) | [mcb.illinois.edu/undergrad/advising](http://mcb.illinois.edu/undergrad/advising)

Revised July 2021

MCB provides students with a multitude of career options related to molecular genetics, cell biology, developmental biology, physiology, and biochemistry. Our curriculum is proven to successfully prepare students for biomedical careers, health professions, biotechnology careers, as well as academic research. MCB students have excellent opportunities to build competencies in critical thinking, communication, and leadership through our course work, research, and study abroad. These skills allow students to continue in diverse directions and pursue successful careers in many sectors of society.

### HEALTH RELATED CAREERS

- **MEDICINE, DENTISTRY, OPTOMETRY, PODIATRY, NURSING AND PHARMACY** and related health careers
  - Physician Assistant
  - Pathologist
  - Physician Research Scientist (M.D./Ph.D.)
  - Health Administration and Management
  - Clinical Ethicist
- **ALLIED HEALTH FIELDS**
  - Genetic Counseling
  - Physical Therapy or Occupational Therapy
  - Cytotechnologist
  - Pathologist Assistant
  - Anesthesiologist Assistant
  - Public Health: Behavioral Science/Health Education, Biostatistics, Environmental Health, Epidemiology

**VETERINARY MEDICINE:** Private practice, PhD vet bioscience, vet medicine specialties, e.g. dentistry, oncology, behavior

**INDUSTRY: BIOTECHNOLOGY, PHARMACEUTICAL, AGRICULTURAL, ENVIRONMENTAL:** Product design & development, diagnostics, management consulting, quality control, sales, public relations, customer support, regulatory compliance

### GOVERNMENT AGENCIES AND DEPARTMENTS

- Centers for Disease Control (CDC)
- Food and Drug Administration (FDA)
- National Institutes of Health (NIH)
- U.S. Department of Agriculture (USDA)
- Department of Energy (DOE)
- Department of Defense (DOD)
- National Aeronautics and Space Administration (NASA)
- Environmental Protection Agency (EPA)
- Federal Bureau of Investigation (FBI)
- National Security Agency (NSA) and Department of Homeland Security (DHS)

**NONPROFIT ORGANIZATIONS:** Global health care reform, medical centers and research institutes, health education councils, community health networks, global biotechnology development organizations

**FORENSIC SCIENCE:** Local, state and federal agencies, e.g. pathology, odontontology, toxicology

**ACADEMICS/EDUCATION:** K-12 education, lecturer, professor, university admin, research faculty, academic/career advisor

**BIOINFORMATICS:** Analysis, management and use of information in the biological sciences, predictive modeling

**SCIENCE AND RESEARCH POLICY:** Regulatory analysis, policy advising, international relations

**LAW:** Patent law, intellectual property, ethics

**SCIENCE WRITING, EDITING AND PUBLISHING:** Magazines, journals, textbooks, professional societies, nonprofit organizations, university, health organizations (medical scribe) and corporate communications

**ARTS AND HUMANITIES IN HEALTH:** Art therapy, medical history, medical illustration



# What can you do with a Biology degree?

*The sky's the limit!*



## Traditional Healthcare

Traditional healthcare (medicine, nursing, pharmacy) is not limited to being a practitioner. It also includes support roles, education, and clinical research.



## Research

Our alums conduct research in academia, as well as in government institutions, clinical settings, and for publicly- and privately-owned companies.



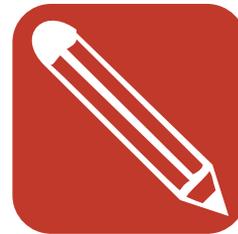
## Biotechnology

Biotechnology is the application of biological knowledge to develop products, across a variety of disciplines such as agriculture, healthcare, research, and diagnostics



## Non-traditional Healthcare (Allied Health)

The healthcare field extends far beyond traditional roles, such as analysis, consulting, medical products, and pharmaceuticals.



## Communication & Outreach

Biology alums engage with the public in many ways - through advertising, informal and formal education, and directing programs.

...policy, law, business, sustainability and conservation, and more!



**School of Molecular & Cellular Biology**

*Learn about these and other career options:*

[www.biology.illinois.edu/careers](http://www.biology.illinois.edu/careers)

**School of Integrative Biology**

**COURSES FOR IB MAJOR/MINOR ADVANCED HOURS** EFFECTIVE FALL '20**Area Courses****Area I: Organismal and Evolutionary Biology**

- IB 335 Plant Systematics\* (4)
- IB 360 Evolution and Human Health (3)
- IB 362 Marine Biology (3)
- IB 401 Introduction to Entomology\* (3 or 4)
- IB 461 Ornithology\* (Birds) (4)
- IB 462 Mammalogy\* (Mammals) (4)
- IB 463 Ichthyology\* (Fishes) (4)
- IB 464 Herpetology\* (Reptiles/Amphibians) (4)
- IB 471 General Mycology\* (Fungi) (4)

**Area II: Behavior, Ecology, and the Environment**

- IB 329 Animal Behavior (3)
- IB 361 Ecology and Human Health (3)
- IB 405 Ecological Genetics (3)
- IB 430 Animal Behavior Lab\* (3)
- IB 431 Behavioral Ecology (3)
- IB 432 Genes and Behavior (3)
- IB 439 Biogeography (3)
- IB 440 Plants and Global Change (3)
- IB 444 Insect Ecology\*\* (3 or 4)
- IB 451 Conservation Biology\* (4)
- IB 452 Ecosystem Ecology (3)
- IB 453 Community Ecology (3)
- IB 481 Vector-borne Diseases\* (4)
- IB 482 Insect Pest Management\* (4)
- IB 494 Theoretical Biology + Models\* (4)

**Area III: Anatomy, Physiology, and Molecular Biology**

- IB 303 Anatomy\* (4)
- IB 364 Genomics and Human Health (3)
- IB 420 Plant Physiology (3)
- IB 421 Photosynthesis (3)
- IB 426 Env and Evol Physl of Animals (3)
- IB 427 Insect Physiology\* (4)
- IB 434 Physical Principles in Biology \* (3)
- IB 435 Critical Evaluation of Herbal Remedies (3)

**Additional Approved Courses****(NOT approved for IB minor)**

- IB 348 Fish and Wildlife Ecology (3)
- IB 411 Bioinspiration (3)
- IB 416 Population Genetics (3)
- IB 436 Evolutionary Neuroscience (3)
- IB 442 Evolution of Infectious Disease (3)
- IB 467 Principles of Systematics\* (4)
- IB 468 Insect Classification and Evolution\* (4)
- IB 476 Applied GIS to Environmental Studies (3)
- IB 478 Advanced Plant Genetics (3)
- IB 483 Insect Pathology (3)
- IB 484 Paleoclimatology (4)
- IB 487 Math Modeling in Life Sciences (3 or 4)
- IB 491 Biological Modeling (3)
- IB 492 Science Communication Skills (2)
- MCB 300 Microbiology (3)
- MCB 314 Introduction to Neurobiology (3)
- MCB 450 Introductory Biochemistry (3)

( ) = number of credit hours

\* = course with laboratory and/or field component

\*\* = course may be taken with or without laboratory

Advanced courses from this list totaling a minimum of 14 hrs at the 300– to 400– level are required. Course selection must include:

- 1) One course from two of the following three areas:
  - Area I: Organismal and Evolutionary Biology
  - Area II: Behavior, Ecology, and the Environment
  - Area III: Integrative Anatomy, Physiology, and Molecular Biology
- 2) One course with a laboratory and/or field component.

**NOTE:** Students working toward a minor in IB are restricted to IB Area courses only for completing their advanced hour requirement

**Approved List of Advanced Courses for MCB Majors and Minors**  
Revised and Effective for Spring 2022

The MCB major requires at least 15 hours (minimum of 4 courses) at the 300- or 400-level *from this approved list*. One course with a laboratory component is required. Those courses, which count as an advanced laboratory course, are marked with an asterisk (\*). The College of LAS, for its Sciences and Letters Curriculum, requires each student to earn at least 21 hours in advanced courses (MCB advanced hours count toward this total). Please visit [www.las.uiuc.edu/students/requirements/minimum](http://www.las.uiuc.edu/students/requirements/minimum) for more information about the college requirements. *Only courses from this approved list will count for the MCB advanced hour requirement. Graduate level courses (500- or 600- level) will NOT count as advanced MCB hours.*

***This document was last updated on November 4, 2021***

***Note: schedule is subject to change***

Term (s) Offered	Course	Course Title	Cr Hrs	* Lab Course	Instructors (Coordinator)	Cross Listed Courses
FA, SP	MCB 300	Microbiology	3		Steven Blanke and Cari Vanderpool (R. Alt, Coord.)	
FA, SP	MCB 301	Experimental Microbiology	3	*	Jack Ikeda (Renee Alt, Coordinator)	
FA	MCB 314	Introduction to Neurobiology	3		Daniel Llano	NEUR 314
FA	MCB 316† See note below	Genetics and Disease	4		Mary Schuler	
SP, SU	MCB 317† See note below	Genetics and Genomics	4		David Rivier	
SP	MCB 320	Mechanisms of Human Disease	3		Eric Bolton	
FA, SP	MCB 364	Eukaryotic Cell Biology Laboratory	2	*	Lyne Levesque	
FA	MCB 400	Cancer Cell Biology	3		Supriya Prasanth	
FA	MCB 401	Cellular Physiology	3		Catherine Christian-Hinman	
SP	MCB 402	Sys & Integrative Physiology	3		Erik Nelson and Nien-Pei Tsai	
SP	MCB 406	Gene Expression & Regulation	3		Hong Jin	BIOC 406
FA	MCB 408	Immunology	3		Beth Stadtmueller	
SP	MCB 410	Developmental Biology, Stem Cells and Regenerative Medicine	3		Xin Li	
FA	MCB 413	Endocrinology	3		Milan Bagchi and Lori Raetzman	
SP	MCB 424	Microbial Biochemistry	3		William Metcalf	
SP	MCB 426	Bacterial Pathogenesis	3		Thomas Kehl-Fie	
FA	MCB 428	Microbial Pathogens Laboratory	2	*	Jack Ikeda	
SP	MCB 430	Molecular Microbiology	3		Raven Huang	
FA	MCB 431	Microbial Physiology	3		Paolo Mera	
FA	MCB 432	Computing in Molecular Biology	3		Mengfei Ho	
SP	MCB 435	Evolution of Infectious Disease	3		Rachel Whitaker	IB 442
FA	MCB 436	Global Biosecurity	1		B. Wilson, et al.	
SP	MCB 442	Comparative Immunobiology	4		A. Steelman	ANSC 450, PATH 410
FA	MCB 461	Cell & Molecular Neuroscience	3		Hee Jung Chung	NEUR 461
SP	MCB 462	Integrative Neuroscience	3		Martha Gillette and Rhanor Gillette	NEUR 462
SP	MCB 465	Human Metabolic Disease	3		Sayee Anakk	
SP	MCB 466	Neuro & Molecular Pharmacology	3		Erik Nelson and Nien-Pei Tsai	Over →

Term (s) Offered	Course	Course Title	Cr Hrs	* Lab Course	Instructors (Coordinator)	Cross Listed Courses
SP	MCB 466	Neuro & Molecular Pharmacology	3		Erik Nelson and Nien-Pei Tsai	
FA <small>(not offered FA21)</small>	MCB 471	Cell Structure and Dynamics	3		William Brieher	
SP	MCB 480	Eukaryotic Cell Signaling	3		Jie Chen	
FA, SP	MCB 493 APL	Advanced Physiology Lab	2	*	Chester Brown	
FA	MCB 493 EPI	Epigenetics	3		Andrew Belmont	
FA	MCB 493 GDC	Genetic Disorders and Counseling	3		Stephanie Ceman	
SP	MCB 493 NOS	Neurobiology of Senses	3		Benjamin Auerbach	
SP	MCB 493 REM	Research Experience in Microbiology	3		Asma Hatoum	
FA	MCB 493 VIR	Virology	3		Christopher Brooke	
FA	BIOC 440B†	Physical Chemistry Principles	4		Emad Tajkhorshid	CHEM 440B
SP	BIOC 446	Physical Biochemistry	3		Kai Zhang	MCB 446, CHEM 472
SP	BIOC 455	Techniques in Biochem & Biotech	4	*	Dustin Buntrock	
FA	BIOC 460 <small>Limited seats available</small>	Biochemistry Senior Seminar, Advanced Composition	3		David Shapiro	
FA	BIOP 401	Introduction to Biophysics	3		Nicholas Wu	
†See Below	NEUR 413†	This course has changed significantly, see below	3			PSYC 413
SP	NEUR 414	Brain, Learning, and Memory	3		James Hinman	PSYC 414

FA: Fall; SP: Spring

†MCB 316 and 317: Credit is not given for both MCB 316 and MCB 317. Students can take one or the other course, but not both.

†BIOC 440B: Only Section B is approved as an advanced MCB course.

†NEUR 413 has undergone significant content changes as well as a name change. Effective spring 2022, the course will no longer count as an approved advanced course in the MCB major or for the Neuroscience Certificate. Only students who took the course prior to spring 2022 may use it for advanced hours in the major and/or for the certificate.

**Note: graduate level courses (500- or 600- level) Will NOT count as advanced MCB hours, but students are welcome to enroll in them with permission from the instructor.**

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Schedule is subject to change***

**HONORS CONCENTRATION IN INTEGRATIVE BIOLOGY**

- ...small classes with outstanding faculty**
- ...cohesive group of students in a focused curriculum**
- ...open-ended investigation in the lab and field**
- ...an honors program, not just an honors section**

The **Honors Option** in the Integrative Biology major is a complete curriculum, not just special sections within very large courses - designed to offer outstanding, highly motivated students the chance to experience all that biology has to offer at the University of Illinois.

With enrollment limited to around 20 students per year and all classes and labs taught by outstanding professors, students are virtually assured the daily interactions with faculty that are critical to developing scientific techniques, critical thinking, and communication skills. Each year, participation in open-ended laboratory and field courses fosters cohesiveness among all the students in the program, creating a mutual support system unique among biology majors.

Three, semester-long core honors courses have one over-arching theme, the integration of biology at multiple levels of organization, from cells and molecules, to organisms, to ecosystems. Strong foundations in chemistry, the physical sciences, math, and statistics supplement advanced courses in biology. In addition, all IB Honors students participate in at least two semesters of independent research, often leading to graduation with distinction.

IB Honors students are among the best prepared students at the University, whether their career goals be professional schools (Medical, Veterinary, Dental or others), research, conservation, or industry. You'll have a firm grounding in a broad range of scientific techniques, enhanced critical thinking, and communication skills. Through the IB Honors program, you can achieve the knowledge that will separate you from the rest.

**Admission to the concentration**

Admission to IB Honors occurs in the spring semester of the Freshman year. Informational meetings will be held in late fall and early spring. Students desiring the Honors Experience are interviewed individually, and notified of acceptance in advance of registration for the fall semester. In exceptional circumstances students may be admitted at the end of the spring semester, freshman year.

To be accepted, students must have a 3.0 GPA by the end of their second semester, show evidence of success in math and science courses, and have a strong interest in biology. General chemistry should be completed before beginning IB Honors courses.

**For additional information:**

**Email:** [honors@sib.illinois.edu](mailto:honors@sib.illinois.edu)

**Phone:** 217-333-3044

**Webpage:** <http://sib.illinois.edu/undergraduate/programs/honors>

**Blog:** <http://ibhonors.weebly.com>