

# BACHELOR OF SCIENCE IN BIOLOGY

## University Requirements

### General Education

The UMKC General Education Core (<http://catalog.umkc.edu/undergraduate-academic-regulations-information/general-education-requirements>) is the university-wide curriculum that all undergraduate students will complete. The 30-credit hour core curriculum includes three course types designated as Anchor, Discourse and Focus and is detailed in the General Education (<http://catalog.umkc.edu/undergraduate-academic-regulations-information/general-education-requirements>) section of the catalog.

### Constitution Course

Every undergraduate student must take a course covering the United States Constitution and the Missouri State Constitution before graduation. Course options are included in the program requirements section below.

### RooWriter Assessment

Candidates for all baccalaureate degrees must complete the online UMKC RooWriter Writing Assessment after they have passed Discourse 200 (or its equivalent) but before they have attained 90 credit hours. Incoming transfer students with more than 90 credit hours must complete the RooWriter by the end of their first semester of enrollment or within one semester after passing Discourse 200 (or its equivalent). Students who have not completed the RooWriter Writing Assessment within two semesters after passing Discourse 200 (or its equivalent) will be blocked from enrollment until they successfully complete the RooWriter. Additional information is available in the Undergraduate Academic Regulations and Information (<http://catalog.umkc.edu/undergraduate-academic-regulations-information/roowriter>) section of the catalog.

### Exit Examinations

Information on exit examinations and/or major field exams is available in the Undergraduate Academic Regulations and Information (<http://catalog.umkc.edu/undergraduate-academic-regulations-information/graduation/exitexams>) section of the catalog.

## Student Learning Outcomes

Students graduating from this program will:

- Identify fundamental concepts in the biological sciences, including the relationship between structure and function at all levels of biological organization, evolution and the role of natural selection in the process, ecological relationships between organisms and their environment.
- Describe cellular structure and explain the major biochemical processes that occur in cells.
- Describe and explain the mechanisms of heredity and the flow of genetic information.
- Apply knowledge in basic mathematics, chemistry, and physics to solve biological problems.
- Employ techniques and procedures commonly used in modern biology laboratories.
- Analyze and critically evaluate scientific data.
- Write clearly about topics in the biological sciences for a peer or professional audience.

The B.S. degree program is a rigorous curriculum designed for students interested in preparing for graduate studies or a professional school, or pursuing entry level employment in a science-related field.

Students interested in pursuing undergraduate degree programs offered by the School of Biological Sciences are admitted through the UMKC Office of Admissions (<http://www.umkc.edu/admissions>). Transfer and Readmitted students should contact the University admissions office and the School of Biological Sciences for information about transfer admissions and evaluation of transfer coursework. Transfer admission eligibility includes an overall grade-point average of at least 2.0 for all college-level coursework attempted at previous institutions, an overall GPA of at least 2.0 in courses used to fulfill School of Biological Sciences major requirements, and a University of Missouri Biology GPA of at least 2.0.

## Program Requirements

### Program Specific Recommendations for UMKC General Education Core (<http://catalog.umkc.edu/undergraduate-academic-regulations-information/general-education-requirements>) Coursework

Code	Title	Credits
Anchor I <sup>1</sup>		3
Anchor II <sup>1</sup>		3
Anchor III <sup>1</sup>		3
DISC 100	Discourse I: Reasoning and Values (Speech and Writing)	3
DISC 200	Discourse II: Culture and Diversity (Writing and Speech)	3
DISC 300	Discourse III: Civic and Community Engagement (Speech and Writing)	3

Focus A <sup>1</sup>	3
Focus B (Satisfied in program requirements below)	
Focus C (May be satisfied by the Constitution course requirement below)	
Focus Elective (Satisfied in program requirements below)	

<sup>1</sup>Total credits' in this section indicates the number of General Education Core credit hours that are not met by the degree specific requirements outlined below.

Total Credits	21
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<sup>1</sup> See the UMKC General Education Core (<http://catalog.umkc.edu/undergraduate-academic-regulations-information/general-education-requirements>) section of the catalog for available Anchor and Focus course options.

## Constitution Course Requirement

Section 170.011.1 of the Missouri Revised Statutes, 2015, states that all candidates for a degree issued by a college or university in the state of Missouri must have "satisfactorily passed an examination on the provisions and principles of the Constitution of the United States and of the state of Missouri, and in American history and American institutions."

Courses at UMKC that satisfy this state requirement are:

Code	Title	Credits
Choose one of the following:		
CJC 364	The Supreme Court And The Criminal Process	3
HISTORY 101	U.S. History to 1877 (Focus C) <sup>1</sup>	
HISTORY 102	U.S. History Since 1877 (Focus C) <sup>1</sup>	
HISTORY 360R	Constitutional History of the United States	
HONORS 230	Honors American Government (Focus C) <sup>1</sup>	
POL-SCI 210	American Government (Focus C) <sup>1</sup>	
Total Credits		3

<sup>1</sup> Course may satisfy both the UMKC General Education Core (Focus C) and Constitution requirements.

There are a few other ways this requirement can be satisfied for students transferring to UMKC:

- Take an equivalent course from the list above at a regionally accredited institution.
- Earn credit for one of the above courses through AP, IB, or CLEP.
- Take a course that directly satisfies the Missouri Constitution Requirement at another Missouri institution.
- Have a previous bachelors degree (or higher) from a regionally accredited institution.
- Have an Associate of Arts degree from a regionally accredited institution.
- Complete the 42 Hour Core at a Missouri institution and have it listed on the official transcript.

## Major Requirements

### Biology Course Requirements

The following core courses are required:

Code	Title	Credits
BIOLOGY 108	General Biology I (Focus B)	3
BIOLOGY 108L	General Biology I Laboratory	1
BIOLOGY 109	General Biology II (Focus B)	3
BIOLOGY 109L	General Biology II Laboratory	1
BIOLOGY 202	Cell Biology	3
BIOLOGY 206	Genetics	3
LS-BIOC 441	Biochemistry	3
Total Credits		17

### Biology Lab Requirements

Two of the following laboratory courses are required. One of these courses must be a Writing Intensive (WI) course. The second may be taken using the non-WI option.

Code	Title	Credits
Select two of the following:		5
BIOLOGY 302L	Ecology Laboratory	
BIOLOGY 312WL	Laboratory in Developmental Biology, Genetics and Cell Biology	
LS-MCRB 313WL or LS-MCRB 313L	Laboratory in Microbiology (WI) Laboratory in Microbiology	
BIOLOGY 328WL or BIOLOGY 328L	Laboratory in Histology and Cellular Ultrastructure (WI) Laboratory in Histology and Cellular Ultrastructure	
BIOLOGY 338L	Comparative Vertebrate Anatomy Laboratory	
LS-BIOC 360WL or LS-BIOC 360L	Laboratory in Biochemistry and Molecular Biology (WI) Laboratory in Biochemistry and Molecular Biology	
LS-ANATO 218L	Introductory Anatomy Laboratory	

**Biology Synthesis requirement:**

Code	Title	Credits
Select from the following for a total of three credit hours:		3
BIOLOGY 498WI	Critical Analysis of Biological Issues (WI)	
LIFE-SCI 499A	Undergraduate Research-Bioinformatics	
LIFE-SCI 499B	Undergraduate Research-Genetics	
LIFE-SCI 499C	Undergraduate Research-Microbiology	
LIFE-SCI 499D	Undergraduate Research-Physiology	
LIFE-SCI 499E	Undergraduate Research-Biochemistry	
LIFE-SCI 499F	Undergraduate Research- Biophysics	
LIFE-SCI 499G	Undergraduate Research-Cell Biology	
LIFE-SCI 499H	Undergraduate Research-Neuroscience	
LIFE-SCI 499I	Undergraduate Research-Botany	
LIFE-SCI 499J	Undergraduate Research-Zoology	
LIFE-SCI 499K	Undergraduate Research-Ecology	
LIFE-SCI 499L	Undergraduate Research-Biological Sciences	
LIFE-SCI 499M	Undergraduate Research-Biological Sciences Honors	
LIFE-SCI 499P	Undergraduate Research-Biotechnology	
LIFE-SCI 497A	Directed Studies-Bioinformatics	
LIFE-SCI 497B	Directed Studies-Genetics	
LIFE-SCI 497C	Directed Studies-Microbiology	
LIFE-SCI 497D	Directed Studies-Physiology	
LIFE-SCI 497E	Directed Studies - Biochemistry	
LIFE-SCI 497F	Directed Studies - Biophysics	
LIFE-SCI 497G	Directed Studies-Cell Biology	
LIFE-SCI 497H	Directed Studies - Neuroscience	
LIFE-SCI 497I	Directed Studies-Botany	
LIFE-SCI 497J	Directed Studies-Zoology	
LIFE-SCI 497K	Directed Studies - Ecology	
LIFE-SCI 497L	Directed Studies - Biological Sciences	
LIFE-SCI 497P	Directed Studies - Biotechnology	
LIFE-SCI 497BB	Directed Studies: Behavioral Biology	

Total Credits 3

Students must complete additional biology majors coursework for a total of 42 credit hours of biology courses with grades of C- or better. 26 of these hours must be 300- or 400-level. A minimum of 21 credit hours of biology courses must be taken from the School of Biological Sciences. The UM Biology GPA Must be at least 2.0.

Code	Title	Credits
<b>Additional Biology Coursework Options</b>		<b>17</b>
BIOLOGY 201	Preparing for Careers in Biology	
BIOLOGY 302	General Ecology	
BIOLOGY 303	Invertebrate Zoology	
BIOLOGY 305	Marine and Freshwater Biology	
BIOLOGY 308	Vertebrate Zoology	
BIOLOGY 314	Entomology	
BIOLOGY 319	Global Health: New and Emerging Infectious Diseases	
BIOLOGY 322	General Parasitology	
BIOLOGY 326	Biological Conservation	
BIOLOGY 327	Biogeography and Biodiversity	
BIOLOGY 328	Histology	
BIOLOGY 329	Endocrinology	
BIOLOGY 346	Plant Biology	
BIOLOGY 350	Assisting Undergraduate Learning in Biology	
BIOLOGY 385	Special Topics	
BIOLOGY 405	Introduction to Evolution	
BIOLOGY 409	Developmental Biology	
BIOLOGY 442	Neurobiology	
BIOLOGY 445	Evolutionary Ecology	
BIOLOGY 485	Special Topics	

#### Physical Sciences and Mathematics Course Requirements

The following courses must be completed with grades of C- or better.

Code	Title	Credits
MATH 120	Precalculus	5
MATH 216	Calculus for Biological Sciences	4
or MATH 210	Calculus I	
Select one of the following:		3-4
MATH 226	Biomath II: Statistics and Modeling	
MATH 220	Calculus II	
STAT 235	Elementary Statistics	
PHYSICS 210	General Physics I	4-5
or PHYSICS 240	Physics For Scientists and Engineers I	
PHYSICS 220	General Physics II	4
or PHYSICS 250	Physics For Scientists and Engineers II	
CHEM 211	General Chemistry I	4
CHEM 211L	Experimental General Chemistry I	1
CHEM 212R	General Chemistry II	4
CHEM 212LR	Experimental General Chemistry II	1
CHEM 321	Organic Chemistry I	3
CHEM 321L	Organic Chemistry Laboratory I	1
CHEM 322R	Organic Chemistry II	3
CHEM 322L	Organic Chemistry Laboratory II	1
Total Credits		38-40

<sup>1</sup> Students may choose LIFE-SCI 401 as an alternative to PHYSICS 250.

Code	Title	Credits
<b>General Electives</b>		<b>16</b>

A maximum of 12 hours for a combination of 399, 497, and 499 coursework may be applied toward with major with only 4 credit hours at the 400-level.

**Minimum GPA: 2.0** (*UM cumulative; UM Biology*)

**Total Credit Hours: 120**

## Tools for Planning and Fulfilling Academic Requirements

UMKC's Major Maps (<https://cf1.umkc.edu/majormaps>) are detailed, semester by semester plans that lead a student to complete all degree requirements within four years. Plans include benchmarks and critical courses by term that assist a student's evaluation of progress and major "fit". In order to ensure that the appropriate courses are taken, students are encouraged to consult with the undergraduate advisor for this major.

UMKC's Degree Audit System (<https://www.umkc.edu/registrar/majors-degrees/planmydegree.asp>) provides an individual evaluation of all degree requirements (General Education Core, Degree Specific, Major Specific, etc.) for student's officially recorded (Office of Registration and Records) and "what if" plans of study. This evaluation is used to certify all graduation requirements.

UMKC's Transfer Guides (<https://www.umkc.edu/transferguides>) provide detailed guidance on recommended transfer coursework, plans of study, transfer timelines, and transfer contact information. To ensure a seamless transfer experience, students are encouraged to work with both their community college advisor and a UMKC advisor when planning their coursework.