

BACHELOR OF SCIENCE: BIOLOGY - CLINICAL LABORATORY SCIENCE EMPHASIS

University Requirements

General Education

UMKC Essentials is the university-wide curriculum that all undergraduate students will complete. The 30-credit hour program includes a First Year Experience course; three critical thinking courses in the areas of Arts & Humanities, Natural & Physical Sciences, and Social & Behavioral Sciences; a Culture and Diversity course; a Civic & Urban Engagement course; two courses in Written Composition and one course in Oral Communication; and a Math Pathway course. Transfer students entering UMKC will elect from the UMKC Essentials General Education Program or the Missouri Core 42 General Education Curriculum. Academic advisors will meet with incoming transfer students to determine which option best serves the student's educational needs. More information about General Education may be found here: <https://catalog.umkc.edu/undergraduate-academic-regulations-information/general-education-requirements/> (<http://catalog.umkc.edu/undergraduate-academic-regulations-information/general-education-requirements/>)

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.

Exit Examinations

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

Missouri Higher Education Civics Achievement Examination

In accordance with Missouri Senate Bill 807 (section 170.013.1), 'any student entering a public institution of higher education for the first time after July 2019 who is pursuing an associate's or bachelor's degree from such institution shall successfully pass an examination on the provisions and principles of American civics with a score of seventy percent or greater as a condition of graduation from such institution'. To satisfy this requirement at UMKC, students access the exam through the Canvas site. This requirement will be listed in the degree audit system as, 'Take State Mandated Missouri Higher Education Civics Achievement Examination', and listed on the transcript as 'Missouri Civics Examination'.

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.
- Differentiate among cellular structure and explain the major biochemical processes that occur in cells.
- 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.

Students interested in pursuing undergraduate degree programs offered by Division of Biological and Biomedical Systems are admitted through the UMKC Office of Admissions (<http://www.umkc.edu/admissions/>). Transfer or Readmitted students should contact the University admissions office and Division of Biological and Biomedical Systems 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 Biological Sciences major requirements, and a University of Missouri Biology GPA of at least 2.0.

Program Requirements

Division of Biological and Biomedical Systems offers a program leading to a BS degree in Biology with the Clinical Laboratory Science emphasis. The typical student spends the first three years on the UMKC campus completing the general education and basic science course requirements of the baccalaureate degree. A final 12 month course of clinical studies is completed in an affiliated hospital clinical program, which is approved by the Council on Medical Education of the American Medical Association and accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS). Affiliated clinical programs are located at North Kansas City Memorial and Saint Luke's hospitals. After completing the clinical program and earning a bachelor's degree, students are eligible to take a national certification board examination. Passing the certification examination is not a condition for receiving the BS degree in Biology with the Clinical Laboratory Science emphasis but is often required for employment in the field.

Acceptance into a hospital clinical program is competitive. Admission into the BS degree in Biology with the Clinical Laboratory Science emphasis at UMKC does not guarantee acceptance of the student by an affiliated hospital

clinical program. Clinical instruction in the hospital is a 12-month, full-time day program.

Application to the clinical program is made directly by the student to any (or all) of the affiliated hospitals. The student should apply during the summer or fall of his/her junior year. A list of program contacts is available from an SBC Advisor. Hospital programs differ in admission criteria, application deadlines and early admission options. Early application is advised.

UMKC Essentials

Code	Title	Credits
First Semester Experience Course (GEFSE)		3
Written Communication:		
ENGLISH 110	Introduction to Academic Prose	3
ENGLISH 225	English II: Intermediate Academic Prose	3
Oral Communication (choose one of the following):		3
COMM-ST 110	Fundamentals of Effective Speaking and Listening	
COMM-ST 140	Introduction to Communication	
COMM-ST 212	Argumentation And Debate (offered via dual credit only)	
COMM-ST 277	Interpersonal Communication	
Math Pathway (satisfied in major requirements below)		
Critical Thinking in Arts & Humanities (GECRT-AH)		3
Critical Thinking in Natural & Physical Sciences (GECRT-SC)		3
Critical Thinking in Social & Behavioral Sciences (GECRT-SS)		3
Culture & Diversity Course (GECDV)		3
Civic & Urban Engagement Course (GECUE)		3
Total Credits		27

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:		3
CJC 364	The Supreme Court And The Criminal Process	
HISTORY 101	U.S. History to 1877	
HISTORY 102	U.S. History Since 1877	
HONORS 230	Honors American Government	
POL-SCI 210	American Government	
Total Credits		3

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. Biology courses that fulfill the BS in Biology with the Clinical Laboratory Science emphasis requirements are listed below. A total of 32 credit hours of biology courses is required and at least 16 of these must be at the 300 or 400 level. A minimum of 16 credit hours of Biology courses must be earned from UMKC SBC. A grade of C- or better is required in each course used to fulfill these requirements.

The following courses are **required** of all students seeking the BS degree in Biology with the Clinical Laboratory Science emphasis.

Code	Title	Credits
BIOLOGY 108L & BIOLOGY 108 or MOTRBIOL 100LB or MOTRBIOL 150LB	General Biology I Laboratory and General Biology I MOTR Essential Biology w/ Lab - Botany MOTR Biology with Lab	4
BIOLOGY 109L & BIOLOGY 109 or MOTRBIOL 100LZ or MOTRBIOL 150LZ	General Biology II Laboratory and General Biology II MOTR Essential Biology with Lab MOTR Biology w/Lab	4
BIOLOGY 202	Cell Biology	3
BIOLOGY 206	Genetics	3
BIOLOGY 313	Microbiology	3
BIOLOGY 316	Principles of Physiology	3
BIOLOGY 313L	Laboratory in Microbiology	3
BIOLOGY 435	Immunology	3
BIOLOGY 441	Biochemistry	3
Total Credits		29

Code	Title	Credits
Choose Three or More Additional Hours in biology(one hour must be upper level)		3
Total Credits		3

Physical sciences and mathematics requirements. The following are required. A grade of C- or better is required in each course used to fulfill these requirements.

Code	Title	Credits
CHEM 211 or MOTRCHEM 150	General Chemistry I MOTR Chemistry I	4
CHEM 211L	Experimental General Chemistry I	1
CHEM 212R	General Chemistry II	4
CHEM 212LR	Experimental General Chemistry II	1
CHEM 320	Elementary Organic Chemistry	4
CHEM 320L	Experimental Organic Chemistry	1
CHEM 341WI	Analytical Chemistry I: Quantitative Analysis	4
MATH 120	Precalculus (satisfies Math Pathway and may be required based on placement)	5
MATH 210 or BIOLOGY 304 or STAT 235 or STAT 115 or MOTRMATH 110	Calculus I Biostatistics 1 Elementary Statistics Statistical Reasoning MOTR Statistical Reasoning	3-4
PHYSICS 210	General Physics I	4
PHYSICS 220	General Physics II	4
Total Credits		35-36

Satisfactory completion of a clinical program at an affiliated hospital. This will allow the student to earn 30 credit hours toward the bachelor's degree. Ten of the clinical hours are allowed as upper level biology toward the 42 hours required for the BS. Twenty of the clinical hours are allowed as upper level general science credit. Completion of the clinical program also fulfills the Biology Synthesis requirement.

Code	Title	Credits
Clinical Program		30

A total of **120** credit hours (minimum) is required; these may be taken from any area once other degree requirements have been met. For most students, more than 120 credit hours will be needed to meet all requirements.

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: 122-127

Tools for Planning and Fulfilling Academic Requirements

UMKC's Major Maps 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. Please see the tab above to view the major map for this program.

UMKC's Transfer Guides (<https://www.umkc.edu/transfer/transfer-credit/transfer-guides.html>) 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.

UMKC's PlanMyDegree 'Audit' (<https://www.umkc.edu/registrar/academic-programs/plan-my-degree.html>) degree audit system provides an individual evaluation of all degree requirements (General Education, Degree Specific, Major Specific, etc.) for students' officially recorded (Office of the Registrar) and "what if" exploratory plans of study. This evaluation is used to certify all graduation requirements.

UMKC's PlanMyDegree 'Plans' (<https://www.umkc.edu/registrar/academic-programs/plan-my-degree.html>) degree planning tool enables students to develop a personalized semester by semester plan of study towards completion of degree requirements for student's officially recorded (Office of the Registrar) and "what if" exploratory plans of study. Update and edit your full plan to degree completion each term and confirm accuracy each semester with your Academic Advisor(s).

Major Map

Four Year Graduation Plan - Courses & Critical Benchmarks for First Time College Students:

UMKC's Major Maps are detailed, undergraduate four-year course outlines that inform students on the classes they should take and when to take them. Outlines are updated yearly. Graduate students should visit their program's individual school for program outlines.

The following is a sample course of study. Your path to graduation may vary based on factors such as college credit you earned while in high school, transfer work from other institutions of higher learning, and placement in Mathematics. You are responsible for checking prerequisites to any courses. It is the Student's responsibility to ensure that all program requirements are met. This guide is not a substitute for academic advisement.

First Year

Fall Semester	Credits	Spring Semester	Credits
BIOLOGY 108 & 108L (or BIOLOGY 109 & 109L) ^{CC}	4	BIOLOGY 109 & 109L (or BIOLOGY 108 & 108L) ^{CC}	4
CHEM 211 & 211L ^{CC}	5	CHEM 212R & CHEM 212LR ^{CC}	5
GEFSE 101	3	ENGLISH 110	3
GECRT-SC 101, 102, or 103	3	GECRT-SS 101, 102, 104, 105, 106, 107, 108, or 111	3
	15		15

Second Year

Fall Semester	Credits	Spring Semester	Credits
BIOLOGY 202 or 206 ^{CC}	3	BIOLOGY 206 or 202 ^{CC}	3
STAT 235, 115, MATH 210, or BIOLOGY 304	3	CHEM 320 & 320L ^{CC}	5
PHYSICS 210	4	PHYSICS 220	4
COMM-ST 110, 277, or 140	3	GECRT-AH 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 112, 113, or 114	3
ENGLISH 225	3		
	16		15

Third Year

Fall Semester	Credits	Spring Semester	Credits	Summer Semester	Credits
BIOLOGY 441	3	BIOLOGY 435	3	Clinical Program at Affiliate Hospital	6
BIOLOGY 313	3	BIOLOGY 3XX/4XX Major Elective	3		
BIOLOGY 313WL	3	CHEM 341WI	4		
BIOLOGY 316	3	GECUE 201, 203, 204, 205, 206, or 272	3		
GECDV 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, or 211	3	HISTORY 101, 102, or POL-SCI 210	3		
	15		16		6

Fourth Year

Fall Semester	Credits	Spring Semester	Credits
Clinical Program at Affiliate Hospital	12	Clinical Program at Affiliate Hospital	12
	12		12

Total Credits: 122

CC Critical Courses provide feedback regarding major fit and help indicate likelihood of successful completion of chosen academic program and degree.

Recommendations to Maintain Progress toward 4-Year Degree Completion

- Completion of the First Semester Experience (FSE) course in first term.
- Early completion of Written Communication, Oral Communication, and Math Pathway requirements.
- Maintain the minimum GPA required for academic Good Standing for your degree program.
- Completion at least 15 credit hours toward degree each regular semester. (*Students may use the summer to ensure completion of 30 hours per academic year or to lighten Fall and Spring course loads.*)
- Enrollment in Critical Courses as listed on the Major Map is recommended in order to maintain timely progress and completion of prerequisite coursework.
- Regular consultation with Academic Advisor(s) for program(s) of study is strongly recommended and may be required for some degree programs..

Roo Advising (<http://catalog.umkc.edu/roo-advising/>)

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