Bachelor of Science in Biotechnology

The Bachelor of Science in Biotechnology is grounded in biological sciences, chemistry and advanced technology, and employs biological systems to solve scientific challenges that impact society. This program requires selecting one of 3 minors (Discovery and Innovation in Biotechnology, Forensic Science, or Pre-Health Professions) and prepares students for diverse career options such as:

- developing drugs and therapies for humans, pets, and agricultural animals (Discovery and Innovation)
- producing or manufacturing biological materials like vaccines (Discovery and Innovation)
- engaging in basic research into living systems (Discovery and Innovation, Pre-Health Professions)
- working in food science such as in a local brewery (Discovery and Innovation, Pre-Health Professions)
- assisting in law enforcement by analyzing crime scene evidence (Forensic Science)

In this unique program, students will be assessed by their ability to reference facts and integrate data to solve problems. No matter which minor a student chooses, they will have the opportunity to work in a laboratory environment through hands-on training with the equipment, instruments, and techniques found in biotechnology related careers.

Students seeking this degree typically take lower-level courses at a community college or at the KU Lawrence Campus and complete the upper-level courses at the Edwards Campus in Overland Park, KS. This is a transfer friendly program, where students have completed most of their freshman and sophomore coursework or earned an associate's degree and then enter the biotechnology program as a junior to complete a four-year bachelor's degree.

Students in this major are required to choose one of the 3 minors associated with the degree. These minors are:

- **Discovery and Innovation in Biotechnology**: this minor is ideal for students who want to focus on research and working in a laboratory to develop and explore biological solutions to real-world problems. This includes drugs and therapies related to the health of humans and animals, work on commercial plant and agricultural products, as well as environmental bioremediation and testing. This minor focuses on laboratory experiences to train students to go directly into industry after graduation or to enter graduate school on an academic research track.
- **Forensic Science**: this minor is ideal for students who want to focus on the techniques that can be used to identify suspects, solve criminal investigations, and support the science behind these processes. Courses focus on the application of these techniques in the legal system such as evidence handling in an active investigation and expert testimony in the courtroom. Students who chose this minor will be prepared for career opportunities such as forensic scientists or crime scene investigation positions with law enforcement agencies and crime laboratories.
- **Pre-Health Professions**: this minor is ideal for students who want to focus on health-related careers where they are the primary care provider. This minor includes content knowledge and coursework required for pre-medical, pre-dental, pre-physicians' associate/assistant, and related professional schools as well as the support classes and systems to help prepare students to be successful applicants to these institutions. This minor includes the biology background that would be considered a traditional biology degree and students selecting this minor would also be prepared for graduate school in an academic setting.

The Bachelor of Science in Biotechnology follows university admission requirements for transfer students. First-year students apply for admission through the College of Liberal Arts & Sciences.

This program offers flexible pathways for students to complete their degree. Students can take foundational courses at community colleges or the KU Lawrence Campus, and complete upper-level coursework through the School of Professional Studies.

Upper-level course requirements for the major are offered in-person at the Edwards Campus in Overland Park, KS, with a few select courses available online.

The School of Professional Studies strongly encourages students to contact an academic advisor prior to applying for admission to develop a personalized degree completion plan. To schedule an appointment, please call 913-897-8539.

Transfer students with an associate's degree or equivalent:

Students with an associate's degree or equivalent, after meeting with an advisor and developing a degree completion plan, can typically begin taking junior and senior-level courses in their major.

Transfer students with 24-59 credit hours:

- Students with 24-59 credits, after meeting with an advisor and developing their plan, may still need to complete prerequisite and lower-level courses.
- Please note that online lower-level courses are limited, and no lower-level courses are offered at the Edwards Campus.
- Students may find more lower-level course availability in-person at the Lawrence Campus or at a community college.
- Schedule an appointment with an advisor and create a personalized plan, contact 913-897-8539.

First-year students:

Incoming first-year students wanting to pursue this major apply through the College of Liberal Arts & Sciences. An academic advisor will guide you through lower-level course selections and help you declare Biotechnology as your academic major when you are ready to begin junior and senior level courses.

First-year students should select the following options on the KU admission application:

Program: College of Liberal Arts & Sciences
Plan: Deciding
Subplan: Science and Technology

Code	Title	Hours
Core 34 General Education		**34**
General Science Requirements		
BIOL 150	Principles of Molecular and Cellular Biology	3
or BIOL 151	Principles of Molecular and Cellular Biology, Honors	
CHEM 130	General Chemistry I	5
CHEM 135	General Chemistry II	5
CHEM 330	Organic Chemistry I	3
CHEM 331	Organic Chemistry I Laboratory	2
PHSX 114	College Physics I	4
One 100+ Biology	Related Course	3
MATH 101	College Algebra: _____	3
MATH 107	Introductory Statistics	3
or MATH 365	Elementary Statistics	
or BIOL 370	Introduction to Biostatistics	
Biotechnology Core Curriculum		
BSCI 315	Exploring Careers in Biological and Health Sciences	1
BSCI 350	Genetics	4
or BIOL 350	Principles of Genetics	
BSCI 400	Microbiology	3
BSCI 415	Career Readiness in Biological and Health Sciences	2
BSCI 600	Biochemistry	3
or BIOL 600	Introductory Biochemistry, Lectures	
BTEC 300	Research Methods in Biotechnology	3
BTEC 305	Molecular and Microbiological Techniques	4
BTEC 310	Scientific Communications	3
or COMS 310	Advanced Organizational Communication	
or COMS 330	Effective Business Communication	
BTEC 494	Selected Topics in Biotechnology: _____ Course is taken twice, once in junior year and once in senior year.	1
BTEC 494	Selected Topics in Biotechnology: _____ Course is taken twice, once in junior year and once in senior year.	1
BTEC 501	Biotechnology Ethics and Responsible Conduct of Research	3
Required Minor		**21**
Students must choose one of the following minors: Discovery and Innovation in Biotechnology; Pre-Health Professions; or Forensic Science. If the chosen minor is less than 21 credits, additional elective hours are required.		
Capstone Requirements		
BTEC 540	Biotechnology Capstone I	3
or BSCI 540	Biology Capstone I	
BTEC 640	Biotechnology Capstone II	3
or BSCI 640	Biology Capstone II	
Total Hours		**120**

Major Hours & Major GPA

While completing all required courses, majors must also meet each of the following hour and grade-point average minimum standards:

Major Hours in Residence

Satisfied by a minimum of 15 hours of KU resident credit in the major.

Major Junior/Senior Hours

Satisfied by a minimum of 45 hours from junior/senior courses (300+) in the major.

Major Junior/Senior Graduation GPA

Satisfied by a minimum of a 2.0 KU GPA in junior/senior courses (300+) in the major. GPA calculations include all junior/senior courses in the field of study including F's and repeated courses. See the Semester/Cumulative GPA Calculator (https://sis.ku.edu/gpa-calculator/).

Below is a sample 4-year plan for students pursuing the BS in Biotechnology.

Freshman

Fall	Hours	Spring	Hours
BIOL 150	3	CHEM 135	5
CHEM 130 (Core 34: Natural and Physical Science (SGE)*, General Science Requirement)[040]	5	Biology Related Course (General Science requirement):	3
MATH 101 (Core 34: Math and Statistics (SGE)*, General Science Requirement)[030]	3	Core 34: English (SGE)[010]	3
Core 34: English (SGE)[010]	3	Core 34: Arts and Humantities (SGE)[060]	3
		Elective	3
	14		**17**

Sophomore

Fall	Hours	Spring	Hours
CHEM 330	3	PHSX 114 (General Science Requirement)	4
CHEM 331	2	Core 34: Social and Behavioral Sciences (SGE)[050]	3
Core 34: Communications (SGE)[020]	3	Core 34: Global Culture (SGE)[070]	3
Core 34 Social and Behavioral Sciences (SGE)[050]	3	Core 34: US Culture (SGE)[070]	3
Core 34: Arts and Humantities (SGE)[060]	3	MATH 107 or 365 (General Science Requirement)	3
	14		**16**

Junior

Fall	Hours	Spring	Hours
BTEC 300	3	BTEC 494	1
BTEC 305	4	BSCI 400	3
BTEC 310	3	BSCI 415	2
BSCI 315	1	BSCI 600	3
BSCI 350	4	Required Minor Course or Elective	3
		Required Minor Course or Elective	3
	15		**15**

Senior

Fall	Hours	Spring	Hours
BTEC 501	3	BTEC 494	1

BTEC 540 or BSCI 540	3	BTEC 640 or BSCI 640	3
Required Minor Course or Elective	3	Required Minor Course or Elective	3
Required Minor Course or Elective	3	Required Minor Course or Elective	3
Required Minor Course or Elective	3	Elective	4
	15		**14**

Total Hours 120

* This course is a Required major course and is also part of Core 34: Systemwide General Education. If this course is not taken to fulfill the Core 34:SGE requirement, it must be taken in place of elective hours.

At the completion of this program, students will be able to:

- Have the foundational content knowledge expected by secondary educational, commercial, governmental, and/or medical institutions to which students aspire to join and progress in their careers. This includes the core principles of genetics, biochemistry, cell biology, and microbiology.
- Implement laboratory skills routinely used across all bioscience sectors (i.e., fundamental laboratory skills); identify and implement appropriate protocols for proper usage; and identify signs of inaccurate application of the skill. This includes working in groups, using shared equipment space, and being independently responsible for carrying out the skills and reporting results.
- Leverage information in service of an argument, including selecting appropriate sources in line with target audiences; identify sources of information and weigh their relative merits; and synthesize across different sources of information. This includes appropriate use of the scientific method, experimental design, and critical analysis of data.
- Functionally operate in the working world (including the workplace and graduate programming) by operationalizing career readiness skills, including navigating diverse barriers-to-entry, professional development, and working within larger institutions to collaboratively achieve goals.