BACHELOR OF SCIENCE IN MICROBIOLOGY

Why study biology?
Study biology because undergraduates should have the opportunity to explore the breadth of biology that allows them to succeed in their chosen paths beyond the university.

Undergraduate Admission

Admission to KU
All students applying for admission must send high school and college transcripts to the Office of Admissions. Unless they are college transfer students with at least 24 hours of credit, prospective students must send ACT or SAT scores to the Office of Admissions. Prospective first-year students should be aware that KU has qualified admission requirements that all new first-year students must meet to be admitted. Consult the Office of Admissions (http://admissions.ku.edu) for application deadlines and specific admission requirements.

Visit the Office of International Student and Scholar Services (http://www.iss.ku.edu) for information about international admissions.

Students considering transferring to KU may see how their college-level course work will transfer on the Office of Admissions (http://credittransfer.ku.edu) website.

Admission to the College of Liberal Arts and Sciences
Admission to the College is a different process from admission to a major field. Some CLAS departments have admission requirements. See individual department/program sections for departmental admission requirements.

First- and Second-Year Preparation
Because biology study requires preparation in other sciences, students should begin meeting major requirements in the first year. It is particularly important to take CHEM 130 and CHEM 135 in the first year and, for several majors, to take CHEM 330, CHEM 331, CHEM 335, and CHEM 336 in the second year. Ideally, most majors should also take BIOL 150 and BIOL 152 during the first year, as well as BIOL 105. Students who have taken BIOL 100 and BIOL 102, have earned an A or B in both courses, and have decided to major in a biological science should consult a UBP advisor to request permission to substitute BIOL 100 and BIOL 102 for BIOL 150.

Majors and Concentrations
Bachelor's degree requirements in biology are modified as necessary. Current requirements are available in the UBP office and online (http://www.kuub.ku.edu). Major programs are offered in biochemistry, biology, human biology, and microbiology. Students may choose to concentrate in a range of specialties in the biological sciences, such as botany, cellular biology, developmental biology, environmental biology, ecology, entomology, genetics, marine biology, molecular biology, neurobiology, paleontology, physiology, systematics, or zoology (invertebrate or vertebrate).

Requirements for the B.S. Degree in Microbiology

General Education Requirements
In addition to degree and major requirements, all students must complete the KU Core.

Microbiology Course Requirements

General Science Requirements (51-55)
Majors must complete 51-55 hours of the following general science requirements that serve as foundational courses for this major.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 105</td>
<td>Biology Orientation Seminar</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 130</td>
<td>General Chemistry I</td>
<td>5</td>
</tr>
<tr>
<td>CHEM 135</td>
<td>General Chemistry II</td>
<td>5</td>
</tr>
<tr>
<td>CHEM 330</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 335</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 336</td>
<td>Organic Chemistry II</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 380</td>
<td>Organic Chemistry I, Honors</td>
<td></td>
</tr>
<tr>
<td>CHEM 385</td>
<td>Organic Chemistry II, Honors</td>
<td></td>
</tr>
<tr>
<td>CHEM 395</td>
<td>Foundations of Chemistry II, Honors</td>
<td></td>
</tr>
<tr>
<td>CHEM 331</td>
<td>Organic Chemistry I Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 335</td>
<td>Organic Chemistry II, Honors</td>
<td></td>
</tr>
<tr>
<td>CHEM 385</td>
<td>Organic Chemistry II, Honors</td>
<td></td>
</tr>
<tr>
<td>CHEM 395</td>
<td>Foundations of Chemistry II, Honors</td>
<td></td>
</tr>
<tr>
<td>CHEM 331</td>
<td>Organic Chemistry I Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 335</td>
<td>Organic Chemistry II, Honors</td>
<td></td>
</tr>
<tr>
<td>CHEM 385</td>
<td>Organic Chemistry II, Honors</td>
<td></td>
</tr>
<tr>
<td>CHEM 395</td>
<td>Foundations of Chemistry II, Honors</td>
<td></td>
</tr>
<tr>
<td>BIOL 150</td>
<td>Principles of Molecular and Cellular Biology</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 151</td>
<td>Principles of Molecular and Cellular Biology, Honors</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 350</td>
<td>Principles of Genetics</td>
<td>4</td>
</tr>
<tr>
<td>BIOL 360</td>
<td>Principles of Genetics, Honors</td>
<td></td>
</tr>
<tr>
<td>BIOL 570</td>
<td>Introduction to Biostatistics</td>
<td>3-4</td>
</tr>
<tr>
<td>MATH 365</td>
<td>Elementary Statistics</td>
<td></td>
</tr>
<tr>
<td>BIOS 210</td>
<td>Statistics in Psychological Research</td>
<td></td>
</tr>
</tbody>
</table>

Calculus. Satisfied by one of the following: 4-6

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 115</td>
<td>Calculus I</td>
</tr>
<tr>
<td>MATH 116</td>
<td>Calculus II</td>
</tr>
<tr>
<td>MATH 125</td>
<td>Calculus I</td>
</tr>
</tbody>
</table>

Physics. Satisfied by one of the following: 8-9

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 114</td>
<td>College Physics I</td>
</tr>
<tr>
<td>PHYS 115</td>
<td>College Physics II</td>
</tr>
</tbody>
</table>

Option 1: College Physics
Bachelor of Science in Microbiology

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
Satisfied by 35-36 hours of major courses.

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 12 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 (http://clas.ku.edu/undergrad/tools/gpa).

Below is a sample 4-year plan for students pursuing the B.S. in Microbiology. To view the list of courses approved to fulfill KU Core Goals, please visit the KU Core website (http://kucore.ku.edu/courses).

This degree plan assumes students will have the equivalent of MATH 101 or MATH 104, or equivalent prior to the freshman year, fall semester.

### Freshman

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Goal 2.1 Written Communication (First Course, 2 Crs Required) 3</td>
</tr>
<tr>
<td></td>
<td>CHEM 130 (Goal 1.2 Quantitative Literacy, General Science Requirement) 1</td>
</tr>
<tr>
<td></td>
<td>BIOL 150 or 151 (Goal 3 Natural Science, General Science Requirement) 2</td>
</tr>
<tr>
<td></td>
<td>BIOL 105 (General Science Requirement) 4</td>
</tr>
<tr>
<td></td>
<td>Elective (Total Hours) 2</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong> 15</td>
</tr>
</tbody>
</table>

### Sophomore

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Goal 4.2 Global Awareness 3</td>
</tr>
<tr>
<td></td>
<td>MATH 116 (General Science Requirement) 3</td>
</tr>
<tr>
<td></td>
<td>CHEM 330 (General Science Requirement) 3</td>
</tr>
<tr>
<td></td>
<td>CHEM 331 (General Science Requirement) 2</td>
</tr>
<tr>
<td></td>
<td>BIOL 400 or 401 (Major Requirement) 4</td>
</tr>
<tr>
<td></td>
<td>BIOL 402 (Major Requirement) 4</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong> 16-17</td>
</tr>
</tbody>
</table>

### Junior

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>PHSX 114 (or PHSX 211 &amp; 216, Goal 1.1 Critical Thinking, General Science Requirement) 4</td>
</tr>
<tr>
<td></td>
<td>BIOL 636 (General Science Requirement) 3</td>
</tr>
<tr>
<td></td>
<td>BIOL 416 (Major Requirement) 4</td>
</tr>
<tr>
<td></td>
<td>BIOL 518 (Major Requirement) 4</td>
</tr>
<tr>
<td></td>
<td>BIOL 519 (Major Requirement) 4</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong> 16-17</td>
</tr>
</tbody>
</table>

Option 2: General Physics

<table>
<thead>
<tr>
<th>Course Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSX 211 General Physics I &amp; PHSX 216 and General Physics I Laboratory</td>
</tr>
<tr>
<td>PHSX 212 General Physics II &amp; PHSX 236 and General Physics II Laboratory</td>
</tr>
</tbody>
</table>

Microbiology Course Requirements (29-30)

Satisfied by completing 29-30 hours from the following courses:

- Fundamentals of Microbiology. Satisfied by one of the following: 3-4
  - BIOL 400 Fundamentals of Microbiology
  - BIOL 401 Fundamentals of Microbiology, Honors
- Fundamentals of Microbiology Laboratory. Satisfied by:
  - BIOL 402 Fundamentals of Microbiology Laboratory 2
- Cell Structure & Function. Satisfied by one of the following:
  - BIOL 416 Cell Structure and Function 3
  - or BIOL 536 Cell Structure and Function (Honors) 3

Immunology. Satisfied by:
- BIOL 503 Immunology 3
- Immunology Laboratory. Satisfied by:
  - BIOL 504 Immunology Laboratory 2
- Bacterial Infectious Diseases. Satisfied by:
  - BIOL 506 Bacterial Infectious Diseases 3
- Pathogenic Microbiology Laboratory. Satisfied by:
  - BIOL 507 Bacterial Infectious Diseases Laboratory 2

General Virology. Satisfied by:
- BIOL 512 General Virology 3
- Virology Laboratory. Satisfied by:
  - BIOL 513 Virology Laboratory 2
- Microbial Genetics. Satisfied by:
  - BIOL 518 Microbial Genetics 3
- Microbial Genetics Laboratory. Satisfied by:
  - BIOL 519 Microbial Genetics Laboratory 2
- Senior Seminar - Current Progress in Microbiology. Satisfied by:
  - BIOL 599 Senior Seminar: _____ (Must be taken in senior year) 1

Microbiology Required Electives (6)

Satisfied by completing 6 hours of BIOL courses numbered 400 or higher, which must be selected in consultation with a microbiology advisor.

* Bachelor of Science in Microbiology

** Bachelor of Science in Microbiology, Honors

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Goals, please visit the KU Core website (http://kucore.ku.edu/courses).

Senior

Fall

<table>
<thead>
<tr>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>BIOL 506 (Major Requirement)³</td>
<td>3</td>
</tr>
<tr>
<td>Goal 3 Social Science</td>
<td>3</td>
<td>BIOL 507 (Major Requirement)³</td>
</tr>
<tr>
<td>2</td>
<td>BIOL 570, MATH 365, or PSYC 210 (General Science Requirement)⁵</td>
<td>1</td>
</tr>
<tr>
<td>Goal 3 Arts &amp; Humanities</td>
<td>3</td>
<td>BIOL 599 (Goal 6 Integration &amp; Creativity, Major Requirement)⁵</td>
</tr>
<tr>
<td>3</td>
<td>BIOL 503 (Major Requirement)³</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 504 (Major Requirement)³</td>
<td>2</td>
<td>Elective (Total Hours)</td>
</tr>
<tr>
<td>1-2</td>
<td>Elective (Total Hours)</td>
<td></td>
</tr>
<tr>
<td>14-15</td>
<td>13-14</td>
<td></td>
</tr>
</tbody>
</table>

Total Hours: 120-124

1. Requires MATH ACT scores of 26+, a comparable SAT or KU Math Placement Exam score, or credit for a MATH 101 or MATH 104 equivalent course. MATH 121 or MATH 125 can be taken instead of MATH 115 + MATH 116 to fulfill the BS Microbiology math requirement.
2. Concurrent or prior enrollment in CHEM 130 is required.
3. BIOL 512, BIOL 513, BIOL 506, BIOL 507, and BIOL 638 and CHEM 135, CHEM 335, and CHEM 336 are offered only in the spring.
4. BIOL 400/BIOI 401, BIOL 402, BIOL 416, BIOL 503, BIOL 504, BIOL 518, BIOL 519, BIOL 570, and BIOL 636 are offered only in the fall.
5. Microbiology major electives: 6 hrs of Biol courses 400+ level to be selected in consultation with a Microbiology advisor.
6. BIOL 599 is approved to fulfill Goal 6. This goal can also be fulfilled by completion of an approved education experience, or an approved integration of courses and/or experiences. See your advisor for more information.

Students majoring in Human Biology with Anthropology, Applied Behavioral Science, Psychology, or Speech-Language-Hearing concentrations will follow the honors requirements for their respective concentration department.

Specific guidelines and intent forms are available in the Undergraduate Biology Program office and online (http://www.kuub.ku.edu). Candidates must declare their intent to graduate with honors at least 2 semesters before graduation.

**Study Abroad**

Consult an advisor at least 4 months before undertaking study abroad. Consult the Office of Study Abroad (http://www.studyabroad.ku.edu), 108 Lippincott Hall, for information about study in one of the many countries (e.g., Scotland, Australia, Switzerland) with special arrangements with KU.