Microbiology, BS

Microbiology is an excellent major for undergraduate students who want a strong general education with an emphasis on an important and interesting branch of biological sciences.

Requirements

The Bachelor of Science with a major in microbiology requires a minimum of 120 s.h., including 60–65 s.h. of work for the major and in all UI courses for the major. Courses for the major may not be taken pass/nonpass. Students also must complete the College of Liberal Arts and Sciences GE CLAS Core.

Students must complete at least 12 s.h. of the required 18-19 s.h. in Department of Microbiology and Immunology courses at the University of Iowa.

The major in microbiology can be pursued on either a pre-medicine or a scholar track.

Students in the pre-medicine track complete admission requirements for the Carver College of Medicine and for most colleges of medicine as an integral part of the completion of their major requirements. This track is recommended for pre-medical, pre-dental, and pre-pharmacy students.

Students in the scholar track pursue a curriculum with streamlined organic chemistry and physics requirements and expanded microbiology and immunology courses, including advanced laboratory and global health studies coursework. The scholar track is recommended for students interested in pursuing graduate training or in developing a career as a microbiologist.

Students may shift from one track to the other during their program of study.

The BS with a major in microbiology in the pre-medicine or the scholar track requires the following coursework.

Pre-Medicine Track

Students in the pre-medicine track complete the following coursework.

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supporting Coursework</td>
<td>42-43</td>
</tr>
<tr>
<td>Microbiology and Immunology Courses</td>
<td>18</td>
</tr>
<tr>
<td>Advanced Elective Coursework</td>
<td>3</td>
</tr>
</tbody>
</table>

Pre-Medicine Track: Supporting Coursework

<table>
<thead>
<tr>
<th>Course #</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL:1411-1412</td>
<td>Foundations of Biology - Diversity of Form and Function</td>
<td>8</td>
</tr>
<tr>
<td>BMB:3120 &amp; BMB:3130</td>
<td>Biochemistry and Molecular Biology I-II</td>
<td>6</td>
</tr>
<tr>
<td>CHEM:1110 &amp; CHEM:1120</td>
<td>Principles of Chemistry I-II</td>
<td>8</td>
</tr>
<tr>
<td>CHEM:2210 &amp; CHEM:2220</td>
<td>Organic Chemistry I-II</td>
<td>6</td>
</tr>
</tbody>
</table>

One of these:

- BIOS:4120 Introduction to Biostatistics | 3 |
- MATH:1460 Calculus for the Biological Sciences | 4 |
- MATH:1550 Engineering Mathematics I: Single Variable Calculus | 4 |
- MATH:1850 Calculus I | 4 |
- STAT:3510/IGPI:3510 Biostatistics | 3 |

One of these sequences:

- PHYS:1511-1512 College Physics I-II | 8 |
- PHYS:1611-1612 Introductory Physics I-II | 8 |

Pre-Medicine Track: Microbiology and Immunology Courses

Students earn a minimum of 18 s.h. in Department of Microbiology and Immunology courses from the following.

<table>
<thead>
<tr>
<th>Course #</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICR:2157</td>
<td>General Microbiology (required with a grade of C or higher)</td>
<td>3</td>
</tr>
<tr>
<td>MICR:2158</td>
<td>General Microbiology Laboratory (required with a grade of C or higher)</td>
<td>2</td>
</tr>
<tr>
<td>MICR:3147</td>
<td>Immunology and Human Disease</td>
<td>3</td>
</tr>
<tr>
<td>MICR:3150</td>
<td>Eukaryotic Pathogens and Human Disease</td>
<td>2</td>
</tr>
<tr>
<td>MICR:3159</td>
<td>Bacteria and Human Disease</td>
<td>3</td>
</tr>
<tr>
<td>MICR:3168</td>
<td>Viruses and Human Disease</td>
<td>3</td>
</tr>
<tr>
<td>MICR:3170</td>
<td>Bacterial Genetics</td>
<td>3</td>
</tr>
</tbody>
</table>

Students fulfill the remainder of the 18 s.h. with additional microbiology and immunology courses (prefix MICR) selected from the following.

<table>
<thead>
<tr>
<th>Course #</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICR:3145</td>
<td>Honors in Microbiology Thesis Preparation (required for honors in microbiology)</td>
<td>1</td>
</tr>
<tr>
<td>MICR:3165</td>
<td>Genetics of Bacterial Pathogens Lab and Discussion</td>
<td>3</td>
</tr>
<tr>
<td>MICR:3177</td>
<td>Virology Discussion</td>
<td>2</td>
</tr>
<tr>
<td>MICR:3178</td>
<td>Virology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>MICR:4161</td>
<td>Undergraduate Research in Microbiology</td>
<td>arr.</td>
</tr>
<tr>
<td>MICR:4171</td>
<td>Honors Undergraduate Research in Microbiology</td>
<td>arr.</td>
</tr>
<tr>
<td>MICR:4175</td>
<td>Topics in Parasitism</td>
<td>1</td>
</tr>
<tr>
<td>MICR:5218</td>
<td>Microscopy for Biomedical Research</td>
<td>arr.</td>
</tr>
<tr>
<td>MICR:5264</td>
<td>Directed Study in Microbiology</td>
<td>arr.</td>
</tr>
</tbody>
</table>
A maximum of 4 s.h. earned in either MICR:4161 Undergraduate Research in Microbiology or MICR:4171 Honors Undergraduate Research in Microbiology may be counted toward the major. However, students earning honors in the major must complete 6 s.h. in MICR:4171 Honors Undergraduate Research in Microbiology; see Honors [p. 3] in this section of the catalog.

Pre-Medicine Track: Advanced Elective Coursework

Course #  | Title                                      | Hours
---        | ------------------------------------------|------
Up to 3 s.h. from these:
BIOL:2723  | Cell Biology                               | 3
BIOL:3172  | Evolution                                  | 4
BIOL:3212/ IGPI:3212 | Bioinformatics for Beginners | 3
BIOL:3314/ IGPI:3314 | Genomics                                  | 3
BIOL:4213/ GENE:4213/ IGPI:4213 | Bioinformatics | 2,4
BMB:3310/ CBIO:3310/ MMED:3310 | Practical Data Science and Bioinformatics | 3
CPH:2230   | Finding Patient Zero: The Exploration of Infectious Disease Transmission and Pandemic Threats | 3
GHS:2000/ ANTH:2103 | Introduction to Global Health Studies | 3
GHS:2320/ ANTH:2320 | Origins of Human Infectious Disease | 3
PCOL:3101 | Pharmacology I: A Drug's Fantastic Journey | 3

Additional microbiology and immunology courses (prefix MICR) numbered MICR:3145 or above, excluding MICR:3164

Scholar Track

Students in the scholar track complete the following coursework.

Requirements  | Hours
---            |------
Supporting Coursework | 35-40
Microbiology and Immunology Courses | 19
Advanced Elective Coursework | 6

Scholar Track: Supporting Coursework

Course #  | Title                                      | Hours
---        | ------------------------------------------|------
All of these:
BIOL:1411- BIOL:1412 | Foundations of Biology - Diversity of Form and Function | 8
BMB:3120 & BMB:3130 | Biochemistry and Molecular Biology I-II | 6
CHEM:1110 & CHEM:1120 | Principles of Chemistry I-II | 8
CHEM:2210 | Organic Chemistry I | 3
One of these: PHYS:1400 | Basic Physics | 4

PHYS:1400 & PHYS:1409 | Basic Physics - Basic Physics Lab (PHYS:1400 taken for 3 s.h. and PHYS:1409 taken for 1 s.h.) | 4
PHYS:1511- PHYS:1512 | College Physics I-II | 8

One of these:
BIOS:4120 | Introduction to Biostatistics | 3
MATH:1460 | Calculus for the Biological Sciences | 4
MATH:1550 | Engineering Mathematics I: Single Variable Calculus | 4
MATH:1850 | Calculus I | 4
STAT:3510/ IGPI:3510 | Biostatistics | 3

One of these:
GHS:2000/ ANTH:2103 | Introduction to Global Health Studies | 3
GHS:2320/ ANTH:2320 | Origins of Human Infectious Disease | 3

In addition, this course may be recommended for some students:
CNW:2680/ ENGL:2730 | The Art and Craft of Creative Nonfiction | 3

Scholar Track: Microbiology and Immunology Courses

Students earn a minimum of 19 s.h. in Department of Microbiology and Immunology courses from the following.

Course #  | Title                                      | Hours
---        | ------------------------------------------|------
Both of these:
MICR:2157 | General Microbiology (required with a grade of C or higher) | 3
MICR:2158 | General Microbiology Laboratory (required with a grade of C or higher) | 2

One of these:
MICR:3165 | Genetics of Bacterial Pathogens Lab and Discussion | 3
MICR:3178 | Virology Laboratory | 2
MICR:4161 | Undergraduate Research in Microbiology (must be taken for at least 2 s.h.) | arr.
MICR:4171 | Honors Undergraduate Research in Microbiology (must be taken for at least 2 s.h.) | arr.

At least three of these (8-9 s.h.): MICR:3147 | Immunology and Human Disease | 3
MICR:3150 | Eukaryotic Pathogens and Human Disease | 2
MICR:3159 | Bacteria and Human Disease | 3
MICR:3168 | Viruses and Human Disease | 3
MICR:3170 | Bacterial Genetics | 3

Students fulfill the remainder of the 19 s.h. with additional microbiology and immunology courses (prefix MICR) selected from the following.
Coursework

Scholar Track: Advanced Elective Coursework

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University of Iowa Honors Program

In addition to honors in the major, students have opportunities for honors study and activities through membership in the University of Iowa Honors Program. Visit Honors at Iowa to learn about the university’s honors program.

Membership in the UI Honors Program is not required to earn honors in the microbiology major.

Career Advancement

Graduates find employment opportunities in government, hospitals, public health laboratories, research laboratories, and industrial laboratories (food, dairy, chemical, pharmaceutical, and biotechnology companies). Those who pursue advanced degrees have more advanced career opportunities in these same areas, with greater responsibilities and higher salaries, as well as in college and university teaching.

The Pomerantz Career Center offers multiple resources to help students find internships and jobs.

Academic Plans

Four-Year Graduation Plan

The following checkpoints list the minimum requirements students must complete by certain semesters in order to stay on the university’s Four-Year Graduation Plan. Courses in the major are those required to complete the major; they may be offered by departments other than the major department.

Before the third semester begins: BIOL:1411 Foundations of Biology, CHEM:1110 Principles of Chemistry I, CHEM:1120 Principles of Chemistry II, and an approved calculus or biostatistics course.

Before the fifth semester begins: BIOL:1412 Diversity of Form and Function, CHEM:2210 Organic Chemistry I, MICR:2157 General Microbiology, and MICR:2158 General Microbiology Laboratory.

Before the seventh semester begins: seven more courses in the major and at least 90 s.h. earned toward the degree.

Before the eighth semester begins: another 10–12 s.h. of coursework.
During the eighth semester: enrollment in all remaining coursework in the major, all remaining required GE CLAS Core courses, and a sufficient number of semester hours to graduate.

Sample Plans of Study

Sample plans represent one way to complete a program of study. Actual course selection and sequence will vary and should be discussed with an academic advisor. For additional sample plans, see MyUI.

Microbiology, BS

• Pre-Medicine Track [p. 4]
• Scholar Track [p. 4]

Pre-Medicine Track

This sample plan is being reviewed and will be added at a later date.

Scholar Track

This sample plan is being reviewed and will be added at a later date.