BS in Microbiology

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Degree Program Description
From the Greek words mikros (small), bios (life), and logos (science), microbiology is the branch of science that studies microscopic forms of life, including bacteria, viruses, algae, fungi, protozoa, and parasites. Although most commonly thought of as causing infection and disease, microorganisms are often beneficial, with many uses in the pharmaceutical, biotech, food, and agricultural industries. A bachelor of science (BS) in microbiology provides direct entry into a number of employment opportunities in the private sector with medical, animal health, pharmaceutical, and biotechnology-based companies and with government laboratories such as the Center for Disease Control and Prevention (CDC), the National Institutes of Health, and the United States Department of Agriculture. A degree in microbiology provides a strong science background which can be beneficial for specialization in such diverse careers as journalism (science and public health reporting) and law (biotech, environmental, medical, and patent law). This degree also provides excellent preparation for professional schools (medical, veterinary, dental, and nursing) and for admission to masters and PhD degree programs in numerous areas of study.

The faculty in the Department of Veterinary Pathobiology has designed a comprehensive and challenging curriculum for this degree program. Subject matter to be covered includes microbial structure and physiology, genetics and genomics, pathogenic mechanisms, beneficial microbes, and the immune response. Supporting courses from other departments include mathematics, physics, chemistry, biology, and biochemistry. Numerous opportunities for undergraduate research are available. The microbiology courses are taught by faculty whose areas of expertise include bacteriology, immunology, parasitology, and virology.

Major Program Requirements
To earn a bachelor's degree in microbiology, all undergraduate students must complete the university's general education requirements, degree specific requirements set by the Department of Veterinary Pathobiology, and university total credit hour and writing intensive class requirements.

The following courses are required for the microbiology major. All courses must be taken for a letter grade (satisfactory/unsatisfactory grades will not count toward the major). A grade of C- or higher is required for each class and an overall GPA of 2.0 for these courses is also required.

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHYSICS 1210 or PHYSICS 2750</td>
<td>College Physics I or University Physics I</td>
</tr>
<tr>
<td>PHYSICS 1220 or PHYSICS 2760</td>
<td>College Physics II or University Physics II</td>
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<tr>
<td>BIO_SC 1500</td>
<td>Introduction to Biological Systems with Laboratory</td>
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<tr>
<td>MATH 1400</td>
<td>Calculus for Social and Life Sciences I</td>
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<tbody>
<tr>
<td>CHEM 1320</td>
<td>College Chemistry I</td>
</tr>
<tr>
<td>CHEM 1330</td>
<td>College Chemistry II</td>
</tr>
<tr>
<td>CHEM 2100</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>CHEM 2110 &amp; CHEM 2130</td>
<td>Organic Chemistry II and Organic Laboratory I</td>
</tr>
<tr>
<td>BIOCHM 3630 or BIOCHM 4270</td>
<td>General Biochemistry or Biochemistry</td>
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<tr>
<td>V_PBIO 2001 or BIO_SC 3750 &amp; BIO_SC 3760</td>
<td>Fundamentals of Microbiology and Microbiology Laboratory</td>
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<tr>
<td>MICROB 3200</td>
<td>Medical Microbiology and Immunology</td>
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<tr>
<td>V_PBIO 3345</td>
<td>Fundamentals of Parasitology (or V_PBIO 3354 Introduction to Virology)</td>
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<tr>
<td>V_PBIO 3551</td>
<td>Introduction to Immunology I</td>
</tr>
<tr>
<td>V_PBIO 3554</td>
<td>Introduction to Virology (or V_PBIO 3345:Fundamentals of Parasitology)</td>
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<tr>
<td>V_PBIO 3600</td>
<td>Bacterial Genetics and Genomics</td>
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<tr>
<td>V_PBIO 4970</td>
<td>Capstone Undergraduate Research in Microbiology (or V_PBIO 4980)</td>
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<tr>
<td>V_PBIO 4980</td>
<td>Capstone Senior Seminar (or V_PBIO 4970)</td>
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Microbiology Electives (15 credit hours selected from the following):
- BIOCHM 4272 | Biochemistry | 3 |
- BIO_SC 2300 | Introduction to Cell Biology | 4 |
- BIO_SC 4976 | Molecular Biology | 3 |
- ENV_SC 4312 | Environmental Soil Microbiology | 3 |
- F_S 2172 | Elements of Food Microbiology | 3 |
- F_S 4370 | Food Microbiology | 3 |
- F_S 4375 | Food Microbiology Laboratory | 2 |
- MICROB 4304 | Immunology | 3 |
- V_PBIO 3345 | Fundamentals of Parasitology | 3 |
- V_PBIO 3554 | Introduction to Virology | 3 |
- V_PBIO 3557 | Microbial Pathogenesis I | 3 |
- V_PBIO 3700 | Medical and Veterinary Entomology | 4 |
- V_PBIO 3560 | Microbial Physiology | 3 |
- V_PBIO 3658 | Public Health Microbiology | 3 |
- V_PBIO 3650 | Applied Microbiology and Biotechnology | 3 |
- ANTHRO 3560W | Plagues and Peoples - Writing Intensive | 3 |
- V_PBIO 3950W | Current Topics in Emerging Infectious Diseases | 3 |
- V_PBIO 3900W | Beneficial Microbes | 3 |
- V_PBIO 4950 | Advanced Undergraduate Research in Microbiology | 1-3 |

*One of these 2 courses must be taken as a major requirement; the other can be taken as a major elective.

**Can be repeated for a maximum of 6 credit hours.

If all degree requirements are met, microbiology majors who enroll in the MU College of Veterinary Medicine prior to receiving their baccalaureate degree will be eligible to receive the BSM degree at the end of their second year in the professional curriculum. The following course substitutions for required core courses will be accepted:

- V_PBIO 5552 Veterinary Bacteriology and Mycology I and V_PBIO 5553 Veterinary Bacteriology and Mycology II for MICROB 3200 Medical Microbiology and Immunology
- V_PBIO 5511 Veterinary Immunology 1 and V_PBIO 5512 Veterinary Immunology 2 for V_PBIO 3551 Introduction to Immunology
Degree Audits

The degree audit is an automated report reflecting a student’s academic progress toward the completion of a degree. Degree Audits are not available for all programs; however, please consult with the appropriate college or school for audit information.

**MU students** can request a degree audit by logging in to myDegreePlanner (https://mydegreeplanner.missouri.edu). Students may also access myDegreePlanner via myZou, in the Student Center, by clicking on the Request Degree Audit link. The audit automatically pulls in the student’s MU course work, transfer courses and courses in progress.

This is available to current students, admitted students, and those who last attended less than three terms ago.

**Past MU students** can request a degree audit by contacting the Academic Advising Unit of the division in which they were last enrolled at MU. For contact information, go to http://advising.missouri.edu/contact/.

**Prospective students**, can access a preliminary MU degree audit via https://www.transferology.com/index.htm. Information on the college credits already earned will have to be manually entered before it can be evaluated against current degree requirements.

For additional details on degree audits, go to http://registrar.missouri.edu/degree-audits/index.php.

Major and Career Exploration

The University of Missouri has many resources to assist you in exploring majors and career possibilities. For guidance, visit the Majors and Careers (https://career.missouri.edu/majors-careers) website or view specific resources below.

- **If you are considering a change of major or are exploring multiple majors**, schedule an appointment with an advisor in the Discovery Center (https://discoverycenter.missouri.edu) by calling (573)884-9700 or through MU Connect (https://mizzou.starfishsolutions.com/starfish-ops/dl/instructor/serviceCatalog.html?bookmark=service/3761489) Discovery Center service in your success network.

- **If you have decided on a major**, visit an academic advisor in the School or College that you are interested in to discuss the process of declaring the major (https://advising.missouri.edu/majors-minors/changing-major).

- **If you would like to learn more about your career interests, abilities, values and talents**, visit the MU Career Center (http://career.missouri.edu/connect). No Appointment is necessary to explore career options with one of our staff members.

- **If you would like information about MU majors and degree programs**, visit:
  - the Degrees, Majors (Degree Programs), Emphasis Areas, Minors and Certificates (http://catalog.missouri.edu/degreesanddegreeprograms) page in the catalog,
  - the MU Majors (https://majors.missouri.edu) website.

For additional major and career exploration resources, visit Major & Career Exploration (http://catalog.missouri.edu/majorcareerexploration) in the catalog.