

MICROBIOLOGY

Microbiology is a fundamental biological science concerned with bacteria, viruses and other microbes. Some of the most important scientific discoveries have been made by microbiologists. Since 1910, approximately one-third of the Nobel Prizes in medicine and physiology have been awarded to microbiologists. The discipline covers a wide spectrum of specialized interest areas that show how microbes affect human and animal health, agriculture, our environment, food technology and safety, and the biotechnology industry. Microbiology prepares students for a wide range of important career opportunities. In recent years, the field of microbiology has had a major impact on virtually all other scientific disciplines.

High School Preparation/Transfer Students

Students will find courses in science and mathematics, such as algebra, biology, physics and chemistry, to be very helpful in preparing for a major in microbiology. Transfer students are strongly advised to take transferable introductory biology and chemistry courses in preparation for upper level science courses at NDSU.

The General Microbiology Curriculum

During the first year, students in microbiology take basic college courses in English, chemistry, biology, and mathematics. The curriculum over the next three years includes advanced courses in microbiology and the life sciences. These courses include pathogenic microbiology, virology, immunology, parasitology, microbial genetics, food microbiology, microbial ecology and microbial physiology. Students majoring in microbiology can enhance their understanding of applied microbiology and infectious disease by taking courses or minoring in biotechnology, epidemiology and food safety offered through other programs.

Pathways to Success

The department of Microbiological Sciences offers several Pathways to Success. Depending on your career goals, you may find one of these pathways will enhance your education to meet that goal. We currently have Pathways to Success in: General Microbiology, Health/Veterinary careers, Honors, Master of Public Health (3+2 option), and Entrepreneurship.

The Faculty and Facilities

The teaching faculty offer expertise and experience in nearly all areas of microbiology. Additionally, faculty are active researchers and devoted research mentors. Our undergraduates frequently have opportunities to perform cutting edge research in nationally-funded laboratories.

The Department of Microbiological Sciences, located in Van Es Hall, has well-equipped teaching and research laboratories. Several courses are taught in the dedicated STEM education building, A. Glenn Hill Center.

Qualified upper-class students majoring in microbiology may pursue individualized study and research under the supervision of one of the faculty members.

Post Graduate Opportunities

Pre-Professional. The microbiology major is excellent preparation for professional school including medical, veterinary, dental, optometry, and physician assistant programs.

Graduate School. The microbiology major emphasizes experiential learning in coursework and research laboratories that provides the foundation to be successful in graduate school.

Career Opportunities

Graduates may seek employment in the health sciences, biomedical industries, biotechnology, agricultural biosystems, food industries, pharmaceutical industries and government agencies. In these careers, graduates may identify new emerging diseases; develop diagnostic tests, new medicines and vaccines; work in departments of public health or hospital laboratories to ensure a safe food supply, or work in academic or private research laboratories. Microbiologists work in government agencies such as the National Institutes of Health and the Environmental Protection Agency. Many microbiologists are teachers and professors.

Microbiology Plan of Study

Please note this is a sample plan of study and not an official curriculum. Actual student schedules for each semester will vary depending on start year, education goals, applicable transfer credit, and course availability. Students are encouraged to work with their academic advisor on a regular basis to review degree progress and customize an individual plan of study.

| First Year | | | |
|--|-----------|---|-----------|
| Fall | Credits | Spring | Credits |
| AGRI 189 Skills for Academic Success | 1 | BIOL 151 General Biology II | 3 |
| CHEM 121 General Chemistry I | 3 | BIOL 151L General Biology II Laboratory | 1 |
| CHEM 121L General Chemistry I Laboratory | 1 | CHEM 122 General Chemistry II | 3 |
| BIOL 150 General Biology I | 3 | CHEM 122L General Chemistry II Laboratory | 1 |
| BIOL 150L General Biology I Laboratory | 1 | ENGL 120 College Composition II | 3 |
| ENGL 110 College Composition I | 4 | Gen Ed Wellness | 2 |
| MATH 105 Trigonometry (107 Precalculus or 146 Applied Calculus I also acceptable) | 3 | Gen Ed Social & Behavioral Sciences/Gen Ed Global Perspectives | 3 |
| | 16 | | 16 |
| Second Year | | | |
| Fall | Credits | Spring | Credits |
| COMM 110 Fundamentals of Public Speaking | 3 | MICR 352 General Microbiology II | 3 |
| CHEM 341 Organic Chemistry I | 3 | MICR 352L General Microbiology Lab II | 2 |
| CHEM 341L Organic Chemistry I Laboratory | 1 | PLSC 315 Genetics | 3 |
| STAT 330 Introductory Statistics | 3 | PLSC 315L Genetics Laboratory | 1 |
| MICR 350 General Microbiology | 3 | CHEM 342 Organic Chemistry II | 3 |
| MICR 350L General Microbiology Lab | 2 | Gen Ed Social & Behavioral Sciences/Gen Ed Global Perspectives | 3 |
| | 15 | | 15 |
| Third Year | | | |
| Fall | Credits | Spring | Credits |
| BIOC 460 Foundations of Biochemistry and Molecular Biology I | 3 | PHYS 212 College Physics II | 3 |
| BIOC 460L Foundations of Biochemistry I Laboratory | 1 | PHYS 212L College Physics II Laboratory | 1 |
| PHYS 211 College Physics I | 3 | BIOC 461 Foundations of Biochemistry and Molecular Biology II | 3 |
| PHYS 211L College Physics I Laboratory | 1 | Microbiology Elective | 6 |
| Microbiology Elective | 3 | Gen Ed Humanities & Fine Arts/Gen Ed Cultural Diversity | 3 |
| Gen Ed Humanities & Fine Arts/Gen Ed Cultural Diversity | 3 | | |
| | 14 | | 16 |
| Fourth Year | | | |
| Fall | Credits | Spring | Credits |
| MICR 354 Scientific Writing | 3 | MICR 480 Bacterial Physiology | 3 |
| MICR 482 Bacterial Genetics & Phage | 3 | MICR 486 Capstone Experience in Microbiology- Research Project | 3 |
| Microbiology Electives | 9 | Microbiology Elective | 3 |
| | 15 | Free Elective | 4 |
| | | | 13 |
| Total Credits: 120 | | | |

View NDSU equivalencies of transfer courses at: www.ndsu.edu/transfer/equivalencies

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