

# Microbiology

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## Department Information

- **Department Head:**  
John McEvoy, Ph.D.
- **Graduate Coordinator:**  
Danielle Condry, Ph.D.
- **Department Location:**  
Van Es Hall
- **Department Phone:**  
(701) 231-7512
- **Department Web Site:**  
[www.ndsu.edu/microbiology/](http://www.ndsu.edu/microbiology/) (<http://www.ndsu.edu/microbiology/>)
- **Application Deadline:**  
January 15 for fall
- **Credential Offered:**  
Ph.D., M.S.
- **English Proficiency Requirements:**  
TOEFL iBT 71, IELTS 6; Duolingo 105

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## Program Description

The Department of Microbiological Sciences offers graduate study leading to Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in Microbiology. Faculty in the department have expertise in microbiomes, microbial genomics, biotechnology, synthetic biology, molecular biology, virology, immunology, microbial physiology, and discipline-based education research. The M.S. in Microbiology emphasizes research methodology and laboratory techniques. The Ph.D. in Microbiology is an outcomes-based program focused on developing research project leaders.

## M.S. in Microbiology

The master's program in Microbiology emphasizes research methodology and laboratory techniques. Student research and academic programs support a strong foundation of knowledge in microbiology and are individually tailored to meet the needs and interests of each student. Graduates are prepared for positions in research or commercial laboratories or for further graduate study. Students select a major adviser by the end of the first semester in residence. By the end of the first year in residence, the student and major adviser will select a supervisory committee. Students can earn a M.S. in Microbiology by completing a research thesis under the advisement of a research faculty member or by completing a comprehensive research paper in the program.

Graduating master's students will be able to:

1. Adhere to ethical and professional standards in Microbiology.
2. Demonstrate foundational knowledge in Microbiology, including proficiency in a range of techniques.
3. Participates in scholarly inquiry relevant the field of study.
4. Collect and document reproducible and publishable quality data through completion of experiments using at least one technique.
5. Critically analyze, write high-quality technical documents, and communicate scientific content to a chosen audience. Contribute significantly (co-authorship) to scientific journal articles.
6. Participates in collaboration in ways that enhance the output of the project.
7. Display professional skills in personal effectiveness, including managing individual projects and being ready for the workplace.
8. Participate in activities that promote civic responsibility, citizenship, and inclusiveness.

## Ph.D. in Microbiology

The Ph.D. program in Microbiology encompasses many sub-disciplines, including plant-microbe and animal-microbe interactions, microbiome research, virology, vaccine development, soil microbiology, biofilm research, immunology, and discipline-based education research. The program trains students in the foundation of knowledge, process of inquiry, and philosophy of microbiology. It breaks with traditional programs by focusing training

on seven well-defined learning outcomes that can be attained with or without supporting coursework. This includes outcomes for professional, ethical, and civic development. Doctoral graduates are prepared for a variety of career paths including academic or industry research and academic teaching.

Graduating doctoral students will be able to:

1. Demonstrate professional and ethical behavior consistent with the expectations of the discipline.
2. Use and apply appropriate discipline knowledge, concepts, and theoretical frameworks.
3. Conduct scholarly inquiry relevant to societal challenges and the field of study.
4. Demonstrate proficiency with a variety of classical and modern techniques by collecting and documenting reproducible and publish quality data through completion of experiments.
5. Critically analyze, write high-quality technical documents, and communicate scientific content and research results to diverse audiences. Contribute significantly (first-authorship) to scientific journal articles.
6. Initiate and manage collaboration in ways that enhance the output of the project.
7. Display professional skills in personal effectiveness to be competitive in the job market.
8. Engage and initiate activities that display civic responsibility, citizenship and inclusiveness.

The program of study is customizable to each student's training needs. In the absence of didactic course requirements, the program holds students accountable for year-over-year progress toward the learning goals via annual assessments of student progress by the mentor and research advisory committee.