

# Microbiology- M.S., Ph.D.

For information, contact:  
 Director of Graduate Studies  
 Department of Microbiology  
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## Research and Support Facilities

The department provides excellent research facilities and modern instrumentation that supply resources for flow cytometry, DNA sequencing and analysis, bioinformatics, microarrays, computer facilities, high performance liquid chromatography, fluorescence microscopy, and access to confocal microscopy and scanning and transmission electron microscopy.

## Admission Requirements

Admission is based on evaluations of each applicant by the department graduate studies committee and faculty approval. You must provide the admission committee with:

1. an academic record of undergraduate and graduate performance,
2. scores of the Graduate Record Examination (GRE),
3. three letters of recommendation, and
4. a one to two page statement describing research and career goals.

A personal interview is encouraged for M.S. and Ph.D. applicants. The department accepts students with a good background of college study in the biological sciences and chemistry with a foundation in microbiology.

Research opportunities and facilities are available in the major areas of these disciplines: microbial genetics, immunology, pathogenic microbiology, microbial physiology, microbial ecology, molecular biology, bioinformatics, and animal virology.

## Microbiology- Master of Science Program Requirements

(30 semester hours)

The Master of Science in Microbiology requires a minimum of 30 semester hours in graduate credits.

### Thesis Option

Upon graduation, M.S. students pursuing the thesis option will have fulfilled the following requirements:

- Completed four courses chosen from groups I-III below, representing each group.
- Completed additional courses in groups I-IV below and/or Research for Master's Thesis (MBI 700) as deemed appropriate by the advisor and thesis committee.
- Enrolled in Graduate Seminar (MBI 690) each semester.
- Passed an oral defense of a thesis proposal, approved by a thesis committee of graduate faculty.
- Conducted a research project approved by the thesis committee and present the project as a written dissertation and in a public seminar.

### Non-Thesis Option

Upon graduation, M.S. students pursuing the non-thesis option will have fulfilled the following requirements:

- Completed four courses chosen from groups I-III below, representing each group.
- Completed additional courses in groups I-IV below to complete the 30 semester hours.
- Enrolled in MBI 690 each semester.
- Passed a final examination based on one's graduate courses.

### Group I - Molecular Biology, Structural Biology, and Bioinformatics

Code	Title	Credit Hours
MBI 525	Microbial Physiology	4
MBI 545	Microbial Genetics	3
MBI 564	Human Viruses	3
MBI 585	Bioinformatics Principles	3

### Group II - Medical Microbiology, Microbial Ecology, and Cellular Microbiology

Code	Title	Credit Hours
MBI 505	Medical Bacteriology	4
MBI 514 or MBI 515	Immunology Principles Immunology Principles and Practice	3-4
MBI 535	Medical Mycology	3
MBI 575	Microbial Ecology: Exploration of the Diverse Roles of Microorganisms in Earth's Ecology	4
MBI 595	Bacterial Cellular and Developmental Biology	3

### Group III - Advanced Courses

Code	Title	Credit Hours
MBI 605	Advanced Molecular Biology	3
MBI 606	Advanced Cell Biology	3
MBI 672	Ecosystem and Global Ecology	4

### Group IV - Electives

Code	Title	Credit Hours
BIO 581	Theory of Electron Microscopy	3
BIO 582	Scanning Electron Microscopy Laboratory	2
BIO 583	Transmission Electron Microscopy Laboratory	3
CHM 532	Fundamentals of Biochemistry	4
CSE 564	Algorithms	3
MBI 566	Bioinformatics Computing Skills	3
MBI 677	Independent Studies (Up to six credit hours would count towards the degree)	0-6
MBI 750	Advanced Topics in Microbiology	1-3
STA graduate level courses		1-3

## **Microbiology- Doctor of Philosophy Program Requirements**

The degree of Doctor of Philosophy in Microbiology requires a minimum of 60 semester hours in graduate credits beyond the M.S. degree or its equivalent.

Upon graduation, doctoral students will have fulfilled the following requirements:

- Completed 3 courses from groups I and II, representing both groups, and 2 courses from group III.
- Completed additional courses in groups I-IV and/or Research for Doctoral Dissertation (MBI 850) as deemed appropriate by the advisor and dissertation committee.
- Enrolled in Graduate Seminar (MBI 690) or Molecular Biology Seminar (MBI 650) each semester.
- Enrolled in a literature-intensive course each academic year.
- Passed a written and oral comprehensive examination administered by a committee of graduate faculty.
- Passed an oral defense of a dissertation proposal, approved by a dissertation committee of graduate faculty.
- Conducted a research project approved by the dissertation committee, presented the project as a written thesis and in a public seminar, and submitted a manuscript based on the project for publication in a refereed journal.
- Passed an oral examination by the dissertation committee in defense of your dissertation.

Doctoral students entering with an M.S. may bypass some or all of the requirements from courses in groups I-IV by demonstrating proficiency in them.

For Ph.D. students interested in strengthening their teaching credentials, the department offers the opportunity for Ph.D. candidates to teach one semester of an introductory lecture course in microbiology under the supervision of a member of the microbiology faculty. This experience can also count towards the Certificate Program in College Teaching.