

Microbiology

Doctor of Philosophy Degree

To earn a PhD in Microbiology, students are required to complete the required coursework and perform laboratory research. Along the way, students learn to communicate their science, by writing research manuscripts and grant applications and by making oral presentations to an expert scientific audience. The students also develop skills such as teaching and mentoring that would be useful in an academic career.

Course requirements:

The Microbiology program requires a total of 90 credit hours. Of these, 24 credit hours come from course work including the Core Program, and at least 3 credit hours from Advanced Course work or from other coursework approved by the Microbiology Program Director. In the first year, each student takes a common Core Program. In the fall, the students take a course each in Biochemistry, Genetics, Bioinformatics and Critical Analysis of Scientific Literature. In the Spring, students take courses in Prokaryotic Biology, Microbial pathogenesis, and Virology. While some advanced courses are taught each year, many advanced course offerings change from year to year, to provide breadth in topics covered. Most Advanced Courses are half-semester 1.5-credit hour courses in areas requested by students. Each student must also take Grant Writing during year 2, and a Research Ethics and Career Development course during year 3.

In addition to the courses, the students complete three 5-week research rotations in the first semester of graduate school. Following completion of rotations, the students select a research advisor and laboratory. Together with his/her advisor, the student also selects 3-4 faculty members appropriate to the student's intended degree to serve on their advisory committee. This advisory committee guides and monitors the student's research and course work.

The courses that make up the 24 credit hours for the Microbiology major are indicated below. Other appropriate courses may be substituted in their place with permission from the Microbiology Graduate Program Director.

L585	Genetics	3.0 cr
Z620	Bioinformatics to Go	1.5 cr
L523	Critical Analysis of Scientific Literature	1.5 cr
B501*	Integrated Biochemistry	3.0 cr
B511*	Duplicating and expressing the genome	3.0 cr
T508*	Theory and Application of Biotechnology	3.0 cr
M541	Microbial pathogenesis and Virology	3.0 cr
M511	Molecular Biology of Prokaryotes	3.0 cr
Z620	Grant Writing	1.5 cr
Z620	Ethics and Career Development	1.5 cr
M500	Research rotations	3.0 cr

* Only one these three courses need to be completed for the major

Preliminary exam

The Microbiology program has a two part preliminary exam. In part 1, the students are examined on a set of primary literature papers. These papers test the breadth of student knowledge in each area of microbiology. The students are expected to understand the concepts and technology within the papers, critically evaluate the experiments, and appreciate their relevance to the field. In part 2 of the exam, the students write and defend a thesis proposal to their advisory committee. Both exams are completed prior to beginning their third year in graduate school. Students who pass both stages of the examination and have met all course requirements are admitted to formal candidacy for the Ph.D.

Thesis defense

The final requirement of the program is a dissertation defense. The dissertation defense comprises of two parts. It begins with a public presentation (i.e. a seminar), which must be announced in advance; the University Graduate School requires that a one-page summary and announcement of the dissertation be submitted 30 days prior to the scheduled defense. Following the presentation, the candidate meets with the thesis committee and is examined on the contents of the dissertation. Dissertations may be accepted in their current form, rejected, or accepted pending revision. Once a dissertation meets the committee's standards and the University's format requirements, the committee and research advisor certify its acceptance to the Graduate School and recommend that the Ph.D. degree be awarded.

Microbiology minor

The Graduate school also requires students to complete a minor. Each student must select a minor degree that is distinct from their major degree. The student has the option to select any minor in consultation with their advisor and the Microbiology Graduate Program Director. The minor may be from within biology or from other units on campus. The requirements for the minor are decided by the minor-granting program.

Students interested in a Microbiology minor must complete 6 credit hours of requirements. The students may select from the following courses that are taught regularly. Other appropriate courses may be substituted in their place with permission from the Microbiology Graduate Program Director.

M440	Medical Microbiology	3.0 cr
M480	Microbial and Molecular Genetics	3.0 cr
M550	Microbiology	3.0 cr
M511	Molecular Biology of Prokaryotes	3.0 cr
M525	Microbial Biochemistry and Physiology	3.0 cr
M541	Microbial Pathogenesis and Virology	3.0 cr
M430	Virology	3.0 cr
M460	Microbial Evolution	3.0 cr
Z620	Medical Microbiology and Immunology	3.0 cr

Master of Science Degree

Course Requirements

A total of 30 credit hours, of which at least 12 credit hours must be courses from the core biology curriculum, not including M500 rotation credits or M800 research credits. The

courses must be approved by the student's advisory committee and the Microbiology Graduate Program Director

Thesis defense

The students are required to prepare a research based thesis that must be approved by the student's advisory committee and must meet the guidelines of the graduate school. The final exam includes a public research seminar and an oral defense of the thesis before the advisory committee.

Master of Arts Degree

Course Requirements

A total of 30 credit hours, of which at least 12 credit hours must be courses from the core biology curriculum, not including M500 rotation or M800 research credits. The courses must be approved by the student's advisory committee and the Microbiology Graduate Program Director.

Thesis defense

The students are required to prepare thesis that must be approved by the student's advisory committee and must meet the guidelines of the graduate school.

The thesis will be written on a non-experimentally based project approved by the student's advisory committee. The final exam includes an oral defense of the thesis before the advisory committee.