Master of Science

Biology with a Concentration in Microbiology and Immunology (MS)

Piotr Kraj, Graduate Program Director

The Department of Biological Sciences provides a broad selection of course offerings. The degree program in biology allows for the selection of elective subjects most suited to the individual's vocational interests.

The curriculum for the Master of Science program is developed around one's interests such as:

- botany,
- ecology,
- immunology,
- infectious diseases,
- marine biology,
- microbiology,
- physiology,
- biomechanics,
- environmental pollution,
- marine benthic ecology,
- systematic biology, and
- zoology.

In addition, there are specially designed concentration areas in:

- Microbiology and Immunology
- One Health

Facilities and Equipment in the Department of Biological Sciences include:

- microscopy: electron, fluorescence and confocal,
- animal care facilities: terrestrial and aquatic,
- spectroscopy,
- cell culture,
- DNA sequencing: Sanger and Next-Generation,
- GIS (Geographic Information System),
- digital imaging,
- a greenhouse,
- herbarium,
- zoological museum, and
- field science wet laboratories.

In addition, excellent opportunities exist for research and instruction off-campus at field research sites including:

- Blackwater Ecological Preserve,
- Virginia Coast Reserve-Long Term Ecological Research Site,
- Virginia Institute of Marine Sciences Eastern Shore Marine Laboratory, and
- other regional agencies and facilities.

The Microbiology and Immunology concentration is designed to enable the student to learn basic skills related to Microbiology and Immunology with the flexibility to develop a curriculum in their area of interest such as infectious diseases or immunology.

Admission Information

Students who wish to enter this program should apply to the Master of Science in biology program and indicate their proposed field of study in the Statement of Interest, a required component of the application. Applications for admission can be obtained via the Internet at http://www.odu.edu/admission/graduate (http://www.odu.edu/admission/graduate/) or from:

Office of Graduate Admissions
Old Dominion University
Norfolk, VA 23529-0050
(757) 683-3685

Requirements for regular admission to the master's program in biology are:

1. a bachelor's degree in biology or a related field from an accredited college or university;
2. a grade point average of at least 3.00 on a 4.00 scale;
3. two letters of recommendation;
4. an essay describing the area of biology of interest for graduate study, professional goals and motivation for graduate study in biology; and
5. written acknowledgment from a Department of Biological Sciences faculty member agreeing to serve as the student's major advisor, if the student is accepted.

The Test of English as a Foreign Language (TOEFL) is required of all applicants whose native language is not English: minimum scores are 550 for the paper-based test, 213 for the computer-based or 79 on internet-based test.

Deadlines for application to the program are:

- February 1 for summer admission, early fall admission and consideration for a graduate teaching assistantship;
- June 1 for fall semester admission; and
- October 1 for spring semester admission.

Curriculum Requirements

Two degree options are available — thesis and non-thesis. A minimum of 32 semester hours of graduate credit is required; three-fifths of these credits must be at the 600-level or above and 20 credits must be Biology department coursework. Students must pass a course with a grade of C (2.0) or better for the course to count towards the 32 degree required hours.. Research (BIOL 698) is required of all students. All students must deliver a scientific presentation in an appropriate public forum; for thesis students, the presentation should be at a scientific meeting. Coursework will include 5 core courses; the remaining credits are selected according to the interest of the student, with the guidance and approval of the student's faculty advisory committee. A substantial research project and a defense of the written thesis (BIOL 699) are required of students selecting the thesis option. Thesis students will complete a thesis defense (final oral exam) covering the research and appropriate coursework. Non-thesis students will complete a comprehensive written and/or oral examination on the program of study.

Biology Core

Many pertinent graduate courses are offered for the Master of Science in Biology programs that can be applied toward the degree requirements. A program of study is developed by the student with approval of advisory committee and the Graduate Program Director.

A set of five core courses is required:

RCR Course		
BIOL 747/847	Responsible and Ethical Conduct of Research	3
Statistics Course *		
BIOL 757/857	Statistics in Biology	4
Fundamentals Course		
Select one of the following:		3
BIOL 523	Cellular and Molecular Biology	
BIOL 524	Comparative Animal Physiology	

BIOL 759	Foundations and Principles in Ecology	
Data Analysis Course		
Select one of the following:		3
BIOL 701	Practical Computing for Biology	
BIOL 772	Modeling and Simulation in the Life Sciences	
BIOL 732	GIS in the Life Sciences	
Research Course **		
BIOL 698	Research in Biology	3
Total Credit Hours		**16**

* BIOL 757/BIOL 857 is the recommended statistics course for this program. However, depending upon your area of research/concentration, another course may be approved by your graduate program director.

** No more than three credits of BIOL 698 can be applied to the total number of credits required.

Microbiology and Immunology Concentration

All students in the MS in Biology – Microbiology and Immunology concentration will complete at least 31 credits, consisting of the set of five core courses and at least an additional 12 credits selected from the following:

RCR Course		
BIOL 747	Responsible and Ethical Conduct of Research	3
Statistics Course		
BIOL 757	Statistics in Biology	4
Fundamentals Course		
BIOL 523	Cellular and Molecular Biology	3
Data Analysis Course		
Select one of the following:		3
BIOL 701	Practical Computing for Biology	
BIOL 772	Modeling and Simulation in the Life Sciences	
BIOL 732	GIS in the Life Sciences	
Research Course *		
BIOL 698	Research in Biology	3
Microbiology & Immunology Concentration Courses		
Select four of the following:		12
BIOL 503	Medical Microbiology	
BIOL 516	Clinical Immunology	
BIOL 525	Cancer Biology	
BIOL 530	Microbial Pathogenesis	
BIOL 536	Infectious Disease Epidemiology	
BIOL 537	One Health: People, Animals and the Environment	
BIOL 540	Methods in Immunological Research	
BIOL 557	General Virology	
BIOL 562	Microbial Genetics	
BIOL 563	Cell Signaling in Host Pathogen Interactions	
BIOL 565	Biotechnology	
BIOL 570	Diseases that Changed our World	
BIOL 582	Human and Veterinary Parasitology	
BIOL 640	Microbial Toxins	
BIOL 702	Biomedical Sciences Journal Club	
BIOL 705	Advanced Microbiology	
BIOL 730	Emerging Infectious Diseases	
BIOL 740	Vaccinology	
BIOL 745	Advanced Immunology	
BIOL 748	Functional Genomics and Proteomics in Animal Models	
BIOL 771	Vector-Borne Diseases	
Elective Courses **		
Select 4 credits of electives		4
Total Credit Hours		**32**

* No more than three credits of BIOL 698 can be applied to the total number of credits required.

** Remaining credits are elective, based on student interests, with guidance and approval of the student's faculty advisory committee. Students choosing the thesis option will need to take BIOL 699. Additional core courses, beyond the five required, can be used as elective credits.