

Programs of Study in Biological Sciences

Microbiology Graduate Program

The graduate programs in Biological Sciences and Microbiology offer the MS and PhD degrees.

The Microbiology program offers specializations in:

- (1) Cellular and Physiological Microbiology
- (2) Microbial Genetics and Molecular Microbiology
- (3) Environmental Microbiology

Each student's program of study is supervised by his or her advisory committee and is tailored to the student's needs and aspirations. The master's degree (MS) requires 30 hours of credit (24 hours coursework, 6 hours thesis (BIOSC or MICRO 891 research)). A nonthesis option (Biological Sciences MS program only) requires 36 hours of coursework and is recommended as continuing education for public school educators. Requirements for the doctoral (PhD) degree include 18 hours of dissertation research (BIOSC or MICRO 991); there is no specific coursework required. Rather, a course of study appropriate to each student is designed by the advisory committee in consultation with the student.

The graduate program in Microbiology, offered through the Department of Biological Sciences, includes the MS and PhD degrees. The Microbiology program includes a wide variety of disciplines. These disciplines include Cellular and Physiological Microbiology, Microbial Genetics and Molecular Microbiology, and Environmental Microbiology. Each of the emphasis areas is outlined below.

Cellular and Physiological Microbiology

The study of cellular and physiological microbiology addresses fundamental questions such as: How do bacterial activities coordinate at higher levels than individual transcriptional units (whole cell regulation)? How do the hundreds of multigene networks in bacteria interact with each other? What genes are expressed during nutrient limitation and how do bacteria compensate during nutritional stress? What biochemical approaches are now available to facilitate the recognition of genes and their products that belong to various cell networks? These are just a few of the questions being asked by researchers at Clemson. The department of Biological

Cellular and Physiological Microbiology (continued)

Sciences at Clemson University has a growing number of faculty with research interests in this area who support graduate students in the area of Cellular and Physiological Microbiology.

Microbial Genetics and Molecular Microbiology

Scientists working in this area address questions such as: How are bacterial genes of significant biological importance organized in transcriptional units (operons) and expressed in bacteria? New students learn the techniques to clone entire bacterial genomes, probe for genes of interest, and sequence these genes using the latest molecular techniques. They also learn how to effectively use genetic tools such as transposon mutagenesis and a variety of cloning vectors to study genes expression. The department of Biological Sciences at Clemson University has a growing number of faculty with research interests who support graduate students in the Microbial Genetics and Molecular Microbiology emphasis area.

Environmental Microbiology

Scientist studying environmental microbiology ask questions such as: What role do microorganisms play in the metabolism of important environmental pollutants, some of which are extremely detrimental to plants and animals? How do microorganisms interact in microbial communities such as biofilms which are ubiquitous in nature? How do microbes function in important biochemical reactions designed to recycle nutrients in the environment? Other questions include how to control foodborne pathogens, a growing concern due to increased foodborne infections and bioterrorism. The department of Biological Sciences at Clemson has faculty with research interests in these areas who support graduate students in the environmental emphasis area.