MICROBIOLOGY (PH.D.)

https://colsa.unh.edu/molecular-cellular-biomedical-sciences/program/phd/microbiology

Description

The Ph.D. in Microbiology combines a dynamic curriculum in a broad range of areas with interdisciplinary research opportunities at the frontiers of microbiology, host-microbe interactions, and environmental microbiology. Graduates of the program are equipped for leadership positions in biotechnology and pharmaceutical companies, academic and government research laboratories, and successful careers in teaching and research at the college and university level.

Distinctive Features of the Program

- Research opportunities are available in many cutting-edge microbiology research areas
- Emphasis on interdisciplinary research training
- Well-equipped research laboratories and core facilities on the UNH campus
- Laboratory rotations upon entry to the program to become familiar with different research laboratories
- Weekly graduate student seminar presentations, as well as a departmental seminar series of invited speakers
- Opportunities to gain teaching experiences as a Graduate Teaching Assistant

Research Opportunities

- Host-microbe interactions, parasitology, and immunology
- Environmental microbiology
- Signal transduction pathways
- Molecular microbiology
- Genomics and bioinformatics
- Microbial ecology and evolution
- Biotechnology

Financial Support

- Students admitted to the Ph.D. Program are typically supported by Research Assistantships or Teaching Assistantships
- Intramural summer and academic year fellowships are available to students on a competitive basis

Career Prospects

- Research scientists in biotechnology and pharmaceutical industries
- Lab managers in academic research labs and research institutes, state and federal government agencies
- Academic preparation for future teaching and research roles in a college or university environment

Admission Requirements

- Completion of foundational courses in biology, chemistry (including organic chemistry), physics, genetics, and mathematics
- Otherwise well-qualified applicants can correct academic deficiencies with enrollment in appropriate courses or independent study during the first year of graduate studies
- Graduate Record Examination (GRE) scores (taken within the past five years)
- International applicants living outside the U.S.A. should first complete a free online application
- Applicants from non-English speaking countries must provide Test of English as a Foreign Language (TOEFL) scores
- Three letters of recommendation
- Personal statement, including research interests and names of two or three potential Microbiology faculty thesis advisors.

Requirements

Ph.D. Degree Requirements

Students with appropriate academic training at the baccalaureate or master’s level may be considered for admission to the doctoral program. Students admitted to the Ph.D. program are required to conduct an independent research project in conjunction with a Microbiology graduate program faculty adviser. Specific coursework is determined in conjunction with the graduate committee. Advancement to candidacy requires the successful completion of the following:

1. All courses required by the graduate committee
2. A written qualifying exam administered by the graduate program coordinator and graduate faculty
3. An independent research proposal developed in conjunction with a faculty adviser
4. An oral defense of the research proposal

Students enrolled in the doctoral program are required to complete one semester of teaching and successfully complete and defend a dissertation based on their research proposal. The acceptance of the dissertation is contingent on its approval by the doctoral committee and evidence that at least two manuscripts based on the thesis research have been submitted to a peer-reviewed journal appropriate to the topic.

All graduate students are required to enroll in and attend MCBS 997 Seminar each semester and present one seminar each year.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 804</td>
<td>Plant-Microbe Interactions</td>
<td>3</td>
</tr>
<tr>
<td>MICR 805</td>
<td>Immunology</td>
<td>3</td>
</tr>
<tr>
<td>GEN 804</td>
<td>Genetics of Prokaryotic Microbes</td>
<td>5</td>
</tr>
<tr>
<td>GEN 813</td>
<td>Microbial Ecology and Evolution</td>
<td>4</td>
</tr>
<tr>
<td>GEN 817</td>
<td>Molecular Microbiology</td>
<td>5</td>
</tr>
<tr>
<td>NR 806</td>
<td>Soil Ecology</td>
<td>4</td>
</tr>
</tbody>
</table>

Additional non-disciplinary courses to consider:

- ANFS 933  Design, Analysis, and Interpretation of Experiments  4
- BIOL 811  Experimental Design & Analysis  4
- BIOL 902  Writing and Publishing Science  2
- BIOL 903  Scientific Communication  2
- BCHM 825  Cell Phenotyping and Tissue Engineering Laboratory  4
- BCHM 853  Cell Culture  5
- BCHM 854  Molecular Biology Research Methods  5
- GEN 812  Programming for Bioinformatics  5
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRAD 891</td>
<td>National Science Foundation Graduate Research Fellowship Preparation</td>
<td>0</td>
</tr>
<tr>
<td>GRAD 930</td>
<td>Ethics in Research and Scholarship</td>
<td>2 or 3</td>
</tr>
<tr>
<td>LSA 900</td>
<td>College Teaching</td>
<td>2</td>
</tr>
<tr>
<td>MATH 835</td>
<td>Statistical Methods for Research</td>
<td>3</td>
</tr>
<tr>
<td>MATH 859</td>
<td>Introduction to the R software</td>
<td>1</td>
</tr>
<tr>
<td>MCBS 901</td>
<td>Introduction to Research in the Life Sciences</td>
<td>2</td>
</tr>
<tr>
<td>MCBS 913</td>
<td>Applied Bioinformatics</td>
<td>3</td>
</tr>
<tr>
<td>MCBS 997</td>
<td>Seminar</td>
<td>1</td>
</tr>
<tr>
<td>NR 905</td>
<td>Grant Writing</td>
<td>2</td>
</tr>
<tr>
<td>NR 909</td>
<td>Analysis of Ecological Communities and Complex Data</td>
<td>4</td>
</tr>
</tbody>
</table>