The graduate programs in the Biology and Molecular Biology Department are designed to enable a student to develop his or her preparation for a career in biological fields requiring advanced training or for the teaching profession.

Research facilities of the Biology and Molecular Biology Department are maintained in Science Hall and include specialized equipment for molecular biology, electron microscopy, botany, microbiology, immunology, aquatic biology, tissue culture, animal behavior, and cell physiology. Additionally, the facilities at the New Jersey Marine Sciences Consortium, New Jersey School of Conservation, and other departments in the College of Science and Mathematics are available for cooperative graduate research. Faculty research interests include aquatic and terrestrial ecology, developmental biology, parasitology, microbiology, immunology, cell physiology, molecular biology, plant physiology, entomology and evolutionary mechanisms. The Biology and Molecular Biology Department has recently established a state-of-the-art molecular biology laboratory for teaching both introductory and advanced courses in molecular biology and biotechnology.

The Biology and Molecular Biology Department offers thesis and non-thesis students opportunity for graduate research under faculty supervision in selected areas of biology. Original research should not exceed 8 credits for thesis students and 5 credits for non-thesis students. Students must complete a minimum of 26 credits in biology, 9 credits of required courses, a minimum of 5 credits of research and a maximum of 18 hours of electives.

The MS in Biology with a concentration in Biology Science Education is intended for certified Biology teachers interested in enhancing and updating their content expertise, exploring and conducting research on biology learning, and expanding their insights into pedagogy. Students will complete 32 credits of coursework in biology, biology education, and curriculum and teaching and/or educational foundations. Students must take a minimum of 20 credits in biology and 6 credits in College of Education and Human Services and can take a maximum of 6 credits outside the department including BIOL courses taken as a non-matriculated student, courses taken in other MSU departments, and courses transferred from other institutions. Students must receive a B or better in these courses and the credits can not have counted toward another degree.

This is a non-thesis program that can include graduate research under faculty supervision. Introduction to Biological Research (BIOL 599) as well as Research in Biological Literature (BIOL 597) within this concentration will focus on science education as it applies to Biology. Original research (BIOL 599) should not exceed 4 credits.

The MS in Biology with a concentration in Molecular Biology addresses the needs of Biology educators, other Biology professionals and those wishing to re-tool their job skills. This program helps to meet the challenges of improving science literacy and implementing new science curriculum standards, and to meet the needs of surrounding biotechnology and pharmaceutical companies. Hands-on experience is emphasized and real world problems are presented to the students. Students also get a firm grounding in molecular biology theory.

Admissions
Prior to matriculation for the Master of Science degree in biology, the student should have completed a subject matter of at least 24 credits in biology and have adequate preparation in college chemistry, mathematics and physics.

In cases where there has been a weak undergraduate program in the major and/or collateral fields, prerequisite courses, which will not count towards graduate credit, may be assigned.

The matriculation program for MS candidates is prepared in consultation with the biology Graduate Program Coordinator. Changes in the program can be made only with the written approval of the Graduate Program Coordinator. It is the responsibility of the student to keep the coordinator informed of progress in the program.

In addition to these requirements listed for the MS in Biology, candidates for admission to the Biology Science Education Concentration must have teaching certification in Biology.

Program Requirements

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 570</td>
<td>Ecology</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 580</td>
<td>Evolutionary Mechanisms</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 592</td>
<td>Graduate Colloquium</td>
<td>1</td>
</tr>
<tr>
<td>BIOL 571</td>
<td>Physiological Plant Ecology</td>
<td>3-4</td>
</tr>
<tr>
<td>or BIOL 579</td>
<td>Physiological Ecology of Animals</td>
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</table>

Select one of the following: 3-4

- AQUA 551 Advanced Aquatic Biological Processes
- BIOL 572 Wetland Ecology
- BIOL 573 Shoreline Ecology

Electives

Select 10-14 credits from the following: 10-14

- BIMS 564 Benthic Ecology
- BIOL 520 Plant Physiology
- BIOL 521 Field Studies of Flowering Plants
- BIOL 532 Advanced Entomology
- BIOL 547 Molecular Biology I
- BIOL 548 Molecular Biology II
- BIOL 574 Behavioral Ecology
- BIOL 576 Biology of Extreme Habitats
- BIOL 586 Selected Advanced Topics in Biology
- BIOL 595 Conservation Biology: The Preservation of Biological Diversity
- EAES 545 Paleoeology
- EAES 563 Natural Resource Management
- STAT 541 Applied Statistics
- STAT 546 Non-Parametric Statistics
- STAT 547 Design and Analysis of Experiments
- STAT 548 Applied Regression Analysis

Culminating Experience

Research in Biological Literature

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 597</td>
<td>Research in Biological Literature</td>
<td>1</td>
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</tbody>
</table>
**Thesis or Non-Thesis Option**

Select one of the following: 4-6 credits

**Thesis - Complete for 6 credits**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>BIOL 698</td>
<td>Master's Thesis</td>
</tr>
</tbody>
</table>

Submit the completed Thesis original and one copy to the Graduate Office. See Thesis Guidelines for details.

**Research and Comprehensive Examination**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 599</td>
<td>Introduction to Biological Research</td>
</tr>
<tr>
<td>GRAD CMP</td>
<td>Comprehensive Examination</td>
</tr>
</tbody>
</table>

In the term that you will sit for exam, register for the section which matches your major & advisor. Successfully pass exam.

**Total Credits** 32