

# BIOLOGY

## Degree Requirements

### Master of science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Policies. (<http://gradschool.psu.edu/graduate-education-policies/>)

A minimum of 30 credits at the 400, 500, 600, or 800 level is required, with least 18 credits at the 500 and 600 level, combined. Students are required to write a thesis, and at least 6 credits in thesis research (BIOL 600 or BIOL 610) must be taken in conjunction with completing the thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense. The master's program in Biology is usually completed within two years.

Four Biology courses are curricular requirements for all master's students, as is the successful completion of ethics training administered by the Collaborative Institutional Training Initiative (CITI). Additional course work is tailored to the student's research interests after advance consultation with their adviser, and specific courses may be required by the adviser depending on the student's background and research plans.

Code	Title	Credits
<b>Required Courses</b>		
BIOL 590	Colloquium	2
BIOL 592	Critical Evaluation of Literature in Biology	1
BIOL 893	Experiential Teaching in Biology	2
BIOL 400	Teaching in Biology	1
<b>Total Credits</b>		<b>6</b>

The culminating experience for the Master of Science degree is a research-based thesis that generally results in a peer-reviewed publication. The student will present and defend the thesis to a committee of three tenured or tenure-line Graduate Faculty members, consisting of the adviser and two other members of the Graduate Faculty. At least two members of the committee, including the adviser, must be members of the Graduate Faculty in the Biology graduate program.

### Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Policies. (<http://gradschool.psu.edu/graduate-education-policies/>)

The doctoral program in Biology is first and foremost a research-oriented program. The single most important component is the successful completion and defense of an original research project – the dissertation. Additionally, the Biology graduate program and Graduate Council policies require that students meet certain residency requirements, maintain satisfactory scholastic performance, demonstrate competency of the English language, and successfully pass qualifying, comprehensive, and final oral examinations, outlined in the link above. To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the Ph.D. committee, the head of the graduate program, and the Graduate School.

Four Biology courses are curricular requirements for all doctoral students, as is the successful completion of ethics training administered by the Collaborative Institutional Training Initiative (CITI). Although doctoral

students are required to complete 4 credits of BIOL 602 Supervised Experience in College Teaching, these 4 credits cannot be counted towards the degree requirements.

Code	Title	Credits
<b>Required Courses</b>		
BIOL 590	Colloquium	4
BIOL 592	Critical Evaluation of Literature in Biology	1
BIOL 893	Experiential Teaching in Biology	2
BIOL 602	Supervised Experience in College Teaching	4
<b>Total Credits</b>		<b>11</b>

Additional course work is tailored to the student's research interests after advance consultation with their adviser and Ph.D. committee, and specific courses may be required by the adviser and/or Ph.D. committee depending on the student's background and research plans. All doctoral students must pass a written and oral qualifying examination that is usually administered during their third semester of study. After a student has completed all of their course work and made substantial progress on the design and execution of their dissertation research, a comprehensive examination is administered by their Ph.D. committee. The dissertation must represent a significant original contribution suitable for publication, and will usually require between two and four years of laboratory and/or field research. When complete the dissertation must be defended before the student's Ph.D. committee (the final oral examination). The defense is normally immediately preceded by a public presentation of the thesis research by the student.

### Molecular Evolutionary Biology Option

The department awards graduate degrees in Biology covering the full spectrum of subjects represented by our diverse faculty in the base degree programs described above. If desired, a student may also elect to pursue the following option as part of his/her program of study.

1. The student must meet the criteria for the M.S. or Ph.D. in Biology.
2. The student's research adviser must be a member of the Graduate Faculty in the Biology graduate program and/or a full member of the Institute of Molecular Evolutionary Genetics. Other committee members may be chosen as needed providing that a majority of the committee is associated with the IMEG.
3. In addition to the normal Biology program requirements, the student must take (for both an M.S. or Ph.D. in Biology):

Code	Title	Credits
<b>Required Courses</b>		
BIOL 591	Molecular Evolutionary Biology Seminar	3
9 credits from among the following courses (selected in consultation with the student's committee):		9
BIOL 405	Molecular Evolution	
BIOL 422	Advanced Genetics	
BIOL 427	Evolution	
BIOL 428	Population Genetics	
BIOL 514	Topics in Systematics and Evolution	
<b>Total Credits</b>		<b>12</b>

4. The student must complete any other course work or training deemed appropriate by the student's committee.