

Ph.D. in Biology

Course Requirements

General Credit/Course Distribution

Three Biology Graduate Program Core Courses	9
Two or three Track Specific Core Courses, dependent on track	6-9
Two Semester Long Laboratory Rotations	6
Four or five Elective Courses, dependent on track	12-15
Total Required Research Credits	24
Total Credits	60

Commented [BD1]: Reduced from 36

Ph.D. in Biology (Track: Cell and Molecular Biology)

Commented [BD2]: No changes to course curriculum

Program Core Courses		
R120 560	College Teaching	3
BIOL 630	Critical Thinking for the Life Sciences	3
MATH 615	Approaches to Quantitative Analysis in the Life Sciences ¹	3
Track Core Courses		
R120 524	Cell, Molecular and Developmental Biology	3
R120 515	Molecular Biology of Eukaryotes	3
R160 581	Biochemistry	3
Electives		
Approved electives ²		12
Two Lab Rotations		
R120 509/510	Advanced Problems in Biology	3
BIOL 725/726	Independent Study	3
Required Research		
Research		24
Total Credits		60

¹Equivalent course may be substituted if approved.

²Elective courses can be any graduate level courses offered by the program, including track core courses from the other tracks. In addition, courses may be taken from a variety of graduate level offerings in different programs at Rutgers University-Newark, NJIT, Rutgers NJMS, Rutgers University-Camden, Rutgers University-New Brunswick, and others. Enrollment in courses offered by graduate programs outside of the Graduate Program in Biology requires permission from the program.

Ph.D. in Biology (Track: Ecology and Evolution)

Commented [BD3]: Only two track core courses, "Ecophysiology" was removed. One more elective instead.

Program Core Courses		
R120 560	College Teaching	3
BIOL 630	Critical Thinking for the Life Sciences	3
MATH 615	Approaches to Quantitative Analysis in the Life Sciences ¹	3
Track Core Courses		
R120 523	Scales of Biodiversity (Ecology)	3

BIOL 622	Evolution	3
Electives		
Approved electives ²		15
Two Lab Rotations		
R120 509/510	Advanced Problems in Biology	3
BIOL 725/726	Independent Study	3
Required Research		
Research		24
Total Credits		60

¹Equivalent course may be substituted if approved.

²Elective courses can be any graduate level courses offered by the program, including track core courses from the other tracks. In addition, courses may be taken from a variety of graduate level offerings in different programs at Rutgers University-Newark, NJIT, Rutgers NJMS, Rutgers University-Camden, Rutgers University-New Brunswick, and others. Enrollment in courses offered by graduate programs outside of the Graduate Program in Biology requires permission from the program.

Ph.D. in Biology (Track: [Neurobiology](#))

Program Core Courses		
R120 560	College Teaching	3
BIOL 630	Critical Thinking for the Life Sciences	3
MATH 615	Approaches to Quantitative Analysis in the Life Sciences ¹	3
Track Core Courses		
BIOL 640	Cellular Neurophysiology	3
BIOL 641	Systems Neuroscience	3
MATH 635	Analytical and Computational Neuroscience ²	3
Electives		
Approved electives ³		12
Two Lab Rotations		
R120 509/510	Advanced Problems in Biology	3
BIOL 725/726	Independent Study	3
Required Research		
Research		24
Total Credits		60

¹Equivalent course may be substituted if approved.

²Appropriate course may be substituted for students with stronger interests in Cellular and Molecular Neuroscience or Neuroethology and Behavior.

³Elective courses can be any graduate level courses offered by the program, including track core courses from the other tracks. In addition, courses may be taken from a variety of graduate level offerings in different programs at Rutgers University-Newark, NJIT, Rutgers NJMS, Rutgers University-Camden, Rutgers University-New Brunswick, and others. Enrollment in courses offered by graduate programs outside of the Graduate Program in Biology requires permission from the program.

Commented [BD4]: Changed from “Computational Neuroscience”

Commented [BD5]: New Track Core Course, replacing MATH 637 Foundations of Mathematical Biology

Commented [BD6]: More acceptable options, previously it was only MATH 636 Systems Computational Neuroscience that could be substituted.

Grade Requirements

Students are expected to successfully complete all of the Core and Elective credits taken within the Graduate Program. Course work provides the formal foundation upon which a successful research project and Dissertation Defense is built. To remain in good standing, a GPA of 3.0 or better must be maintained for all courses taken as part of the graduate course of study. Courses cannot be repeated in order to improve on poor performance. Furthermore, while in the program, a student can receive grades of C or C+ in a maximum of two courses, only one of which may be in the Program and Track Core courses.

Biology Colloquium

The Biology Colloquium is held weekly during the semester and consists of research presentations by invited speakers, students, and faculty, as well as professional development/career advice events and organizational meetings. All students, including post-qualifying students, are required to attend while being matriculated in the program.

Mentoring Semester

Every incoming student will be assigned to a “Mentor Lab” for their first semester in the program. During this time, each student is required to actively participate in lab meetings, journal clubs, and other general lab activities. Additionally, the student must participate in some minimal form of research work as determined by agreement with the Faculty Mentor.

Laboratory Rotations

Laboratory rotations provide opportunities for laboratory research and independent study with Graduate Faculty members. Students are required to complete two semester-long rotations. The main objective of the lab rotations is to identify a lab in which to complete dissertation work. Additional anticipated outcomes of the rotations include the development of laboratory and/or computational research skills, development of analytical and critical thinking skills, and appreciation of a specific research field.

Selection of Dissertation Lab

Following completion of the laboratory rotations, students must select a Graduate Faculty member who will serve as their Dissertation Advisor during the research phase of the doctoral program. Once completed, the student will commence developing a project and accumulating preliminary data for the dissertation. The program accommodates joint or interdisciplinary projects supervised by two or more faculty members. One faculty member serves as the Primary Advisor and provides the work space for the student, others can serve as Co-Advisors.

Qualifying Exam

Following the successful completion of all course requirements, rotations, and identification of the Dissertation Advisor, each student must pass a Qualifying Exam to remain in the program. After successful completion of the Qualifying Exam, the student becomes a Ph.D. candidate. The exam is typically held in June of the second year, unless the coursework was completed earlier. The exam will be administered by a Qualifying Exam Committee of three Graduate Faculty members. The overall purpose

Commented [BD7]: All following entries have been shortened from the prior version, but not changed in specific content.

of the Qualifying Exam is to assess the student's preparation and ability to plan an original, scholarly scientific investigation. The Qualifying Exam consists of a written research proposal and an oral exam.

Dissertation Committee

Within 9 months of the completion of the Qualifying Exam, the student assembles a Dissertation Committee, under the guidance of the Dissertation Advisor. The Dissertation Committee will be composed of the student's Dissertation Advisor, one external member from outside the NJIT-Rutgers scholarly community, and three members of the Biology Graduate Faculty. It is the primary advisory group responsible for supervision and guidance of the Student during the research phase of the dissertation. The Dissertation Committee also serves as the examination committee for the Dissertation Defense. The Dissertation Committee regularly meets with the student in 6-12 months intervals to discuss research progress, experimental challenges, and potential changes to the original plan. The ultimate charge of the Dissertation Committee before the Dissertation Defense is to ensure that the student is making appropriate progress towards a timely and successful defense.

Thesis Proposal

Within a year of the Qualifying Exam, the student presents and defends the Thesis Proposal (the dissertation research proposal) to the Dissertation Committee. The written Thesis Proposal should follow the format of NIH or NSF postdoctoral fellowship applications. The Thesis Proposal meeting is an oral exam that will determine the student's ability to conceive, design, and conduct the proposed research project. It is a required milestone in the program, and approval by the Dissertation Committee should be viewed as a statement that the scope and originality of the proposal is sufficient to earn a Ph.D. degree upon successful completion.

Dissertation Defense

Completing the program and earning a doctoral degree requires a written Thesis, a public Dissertation Defense, and an oral examination by the Dissertation Committee. Approximately six months prior to the planned Dissertation Defense, the Dissertation Committee will evaluate if sufficient progress has been made to warrant final preparation of a thesis and to establish an approximate timetable for the thesis public presentation and private defense. The completed Thesis document must be submitted to all members of the Dissertation Committee at least one month prior to the scheduled Dissertation Defense. The Dissertation Defense must be advertised in advance, with a minimum of 10 days' notice, and open to anyone wishing to attend.