

**Rensselaer Polytechnic Institute – Biology Department**  
**GRADUATE STUDENT HANDBOOK**  
**FOR THESIS-BASED DEGREES**

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**STATEMENT OF PHILOSOPHY**

*On the premise that a vital, active graduate program is essential to the function of this department, in terms of meeting both its research and educational goals, the faculty and staff continually monitor and modify the graduate program with the objective of keeping it healthy. This handbook is intended to provide formal communication between the faculty and students about what is expected and required of each other, and to serve as a guide to help students to find their way through the program. It is also intended to be a living document that will change and grow with the Biology Department Graduate Programs.*

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## **I. INTRODUCTION AND PROFESSIONAL CONDUCT**

### **INTRODUCTION**

The objective of the Biology Department Graduate Program is to educate students in modern biology so that they can enter careers as professional biologists. The Department recognizes that the career objectives of its graduates reflect the wide variety of opportunities available to persons with advanced degrees in the biological sciences, and therefore offers a flexible but rigorous training program. This handbook is intended to acquaint students with, and refresh faculty about, Department and Institute procedures and policies affecting the program, and to outline the requirements and typical schedule for obtaining the M.S. and Ph.D. degrees in Biology at Rensselaer.

### **PROFESSIONAL CONDUCT**

The objectives of both graduate students and faculty overlap in that both are engaged in a search for fundamental new knowledge about the world and in the communication to undergraduates of not only some facts about biology, but also an understanding and appreciation of the scientific method. The faculty will generally expect graduate students to strive to become colleagues, and will show this expectation by treating students as if they already are colleagues as much as possible. Graduate students must therefore quickly learn to take on for themselves the essential rules of conduct that make science work. They must practice the strictest professional honesty and demand the same of others. Without a solid foundation of mutual trust and respect, science cannot succeed as a human enterprise. This requirement for honesty extends to the free and open discussion of published literature and data presented at seminars, lab meetings, journal clubs, etc. These discussions must be able to occur with high standards and without degenerating into personal attacks; it is everyone's job to see that this atmosphere of interaction is maintained. In order to participate, students must devote considerable energy and effort to exploring the scientific literature not only within their own specialty, but broadly enough to help this diverse department function with intellectual unity.

A full-time maximum effort is expected of every student. Most successful graduate students are extremely focused on their academic and research activities. It is not unusual for graduate students at most institutions to work evenings and weekends when needed, and to arrange their schedules around their research. Full-time graduate students with departmental support may not have employment outside the program without the consent of both their mentor and the department chair.

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## **II. INSTITUTE RULES AND REQUIREMENTS**

This section summarizes the Institute rules for the M.S. and Ph.D. degrees; the newest version of the Rensselaer Catalog should be consulted for more details.

### **GENERAL REQUIREMENTS**

The minimum average of all grades used toward a graduate degree is 'B'; more specific grade requirements for the Biology Department are described below. In addition to maintaining high grades, each graduate student must otherwise make 'satisfactory progress' toward the completion of the degree, which is determined as described in more detail below. Each student should prepare and submit a Plan of Study, as described in the Catalog, with both their research advisor's and the Chair of the Biology Graduate Admissions and Evaluation Committee's signature.

### **MASTER OF SCIENCE**

The Master of Science degree requires 30 hours beyond the bachelor's degree. Less than half of these credits may be from 400 level courses (none may be from below the 400 level), and 6 to 9 should be for the master's thesis research project. A minimum of 24 of these credit hours must be completed at the Troy campus, where the student must be registered for at least two terms. All of these requirements must be met within 2 1/2 years of registration for the first credits applied toward the degree.

Among other things, during the term in which a student intends to graduate, the Graduate School requires that the student 1) file a degree application with the Registrar's Office by the official Institute deadline, 2) present the thesis to their advisor for review at least two weeks before the end of the term, 3) deposit the thesis at the Graduate School with advisor's approval at least one week before the end of classes; and 4) make the required presentation by the official Institute deadline.

The Graduate School may initiate an investigation of the suitability of any student accumulating more than 36 hours towards a Master's degree to continue the program.

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**DOCTOR OF PHILOSOPHY**

The Ph.D. requires 90 hours beyond the bachelor's degree. No more than 21 of these may be from 400 level courses (none may be from below the 400 level), and two-thirds of the total credit hours, excluding those for the thesis research project, must be at the 600 level. Until a student has been advanced to candidacy, they may accumulate no more than 75 credit hours except at a rate of one credit per term. A minimum of 45 of these credit hours must be completed at the Troy campus. All of these requirements must be met within 7 years of registration for the first credits applied toward the degree and within 3 years of advancement to candidacy.

Once a student has identified an advisor, they must form a doctoral committee of at least four full-time tenure-track Rensselaer faculty members. One of these four must be from outside the student's department, or a fifth member from outside the university may be appointed. The Graduate School requires that a candidacy exam be passed, a single-author thesis be completed, and a public defense and final exam be passed.

Among other things, during the term in which a student intends to graduate, the Graduate School requires that the student 1) file a degree application with the Registrar's Office by the official Institute deadline, 2) present the thesis to their advisor for review at least one month, and to their committee members at least one week, before the final exam is scheduled (and by the official Institute date for the term), and 3) deposit the thesis at the Graduate School with the advisor's approval after the final exam and at least two weeks before the end of classes.

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### **III. DEPARTMENTAL RULES AND REQUIREMENTS**

#### **GRADUATE ADMISSIONS AND EVALUATION COMMITTEE**

The Biology Department has a standing Graduate Admission and Evaluation Committee (GAEC) that is responsible for making admissions decisions and tracking the progress of each graduate student in the program.

#### **CORE COURSES**

Each new graduate student is required to take four core graduate courses (1) Cell and Developmental Biology, (2) Molecular Biology, (3) Biochemistry and Biophysics, and (4) Research Design. These courses provide essential material that we believe is needed for success in our graduate program. The QPA for these courses must be at least 3.5 for the student to continue in the Biology Graduate Program. Students not meeting this goal may continue only if they take and pass a written exam in the area of deficiency at the end of the first academic year, to be supervised by the GAEC and the instructor of the course in question. Students who have already taken these courses or their equivalent may opt, with the approval of their advisor and the instructor of these courses, not to take them and to substitute other courses essential for their planned research activities. Students must also register for and attend the weekly Departmental Seminar. Beginning in the second year, each student will be expected to give a 30-minute seminar on their research activities at the Departmental Seminar every year.

#### **OTHER COURSES**

Because the research interests of the department are so diverse, other particular coursework requirements will be left to the discretion of each student and their advisor, with a few restrictions. At least 21 credit hours from regular courses taken at the 600 level must be accumulated. Any readings courses a student undertakes with their advisor for more than a total of 3 credit hours must fill gaps in the regular curriculum and be approved by the GAEC. The overall QPA must be at least 3.25 in courses counted toward the graduate degree.

Graduate students must develop, in consultation with their advisors, and file with the GAEC and the Institute a Plan of Study (the form is available at <http://www.rpi.edu/dept/grad/gradschool.html>) that conforms to all the specific Institute and Departmental requirements. This plan of study will be reviewed by the GAEC each year as a means of ensuring that progress toward degree completion is sufficient.

#### **TEACHING**

Each Ph.D. student must teach for at least two semesters before graduating, and each M.S. student must teach for at least one semester before graduating.

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## **RESEARCH**

The M.S. and Ph.D. degrees offered by the department are thesis-based degrees; as such, the performance of original research and presentation of the results in a thesis are essential components of the program. The standards for the two degrees differ mainly in the extent of the work and the independence that must be demonstrated to earn them.

## **LABORATORY ROTATIONS**

Students complete three laboratory rotations with different advisers as part of their research training during the first year of study. Students are required to sign up for Research Rotation I (2 credits), in the Fall and Research Rotation II and III, 2 credits each in the spring semester. They should also submit the research rotation form to the department for each rotation (Appendix I). The faculty member will fill out a research evaluation at the end of each rotation using the ANNUAL BIOLOGY GRADUATE STUDENT EVALUATION, Section II and III only (Appendix II).

**First rotation: October-December**

**Second rotation: January-March**

**Third rotation: April-June**

Once a student and potential mentor come to a mutual agreement on beginning a formal advisor/advisee relationship, that faculty member will become the student's regular advisor. This generally occurs during the third rotation in the spring semester of the first year. It is not an irrevocable decision, and a student and/or mentor may make different arrangements if and when the need arises. The GAEC coordinator will function as mentor until that time.

## **EVALUATIONS**

All students will be evaluated annually (at the beginning of the Spring term) by the GAEC in consultation with the full faculty; these evaluations will comprise a written record of each student's progress. (See Appendix II)

## **QUALIFYING EXAM**

During the Spring semester of the first year, each graduate student wanting to earn either an M.S. or Ph.D. degree (or both) must take and pass the departmental qualifying exam course BIOL XXX BIOLOGY QUALIFYING COURSE (1 credit) and the exam given in June. This exam is intended to ensure a basic level of biological knowledge among graduates of the program, and will be used to help determine which students should continue toward a graduate degree. The exam will be preceded by a class, taken in the spring of the first year, during which a selection of papers from which the exam questions will be drawn will be studied under the guidance of faculty specializing in each area. Students failing the exam will not be permitted to proceed toward earning either advanced degree (M.S. or Ph.D.). Students passing the exam will be permitted to continue to pursue either the M.S. alone or both the M.S. and Ph.D. degrees. If the first

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attempt at the Qualifying Exam does not result in passage, another attempt will be permitted.

**ADVANCEMENT TO CANDIDACY**

A student wishing to pursue the Ph.D. degree must first pass the Qualifying Exam and then take the Candidacy exam during the second year. The Candidacy exam is comprised of both oral and written components which are designed to test the student in both general biology relevant to their interests and in knowledge specific to their proposed research project. First, the student must write a full NSF-style proposal describing their proposed thesis work. This proposal must be submitted to the student's Candidacy Exam Committee (which may or may not be the same as the eventual thesis committee) before the beginning of the Spring semester of the second year. Each thesis committee member will then give the student a question to answer in written form, and the committee and student will agree on the timing and format in which the questions must be answered. After the student has answered these questions, the student will give a public oral presentation describing the thesis proposal, which will be followed by a closed session with the committee in which committee members may ask the student anything appropriate to determine whether the student should be advanced to Candidacy and allowed to proceed toward the Ph.D. degree. Students will not receive departmental support for the Fall of the third year and beyond unless they have been advanced to candidacy.

**M.S. THESIS DEFENSE**

Students passing the Qualifying Exam who either a) choose to terminate their efforts at the M.S. degree or b) fail the Candidacy Exam must present a public Thesis Defense to earn the M.S. degree. Within the Institute rules, the student must present a draft of the thesis to their advisor and present a public seminar on the Troy campus describing the thesis work.

**PH.D. THESIS DEFENSE**

The Thesis Defense will follow a similar format to the Candidacy Exam. Within the Institute rules, the student must present a draft of the thesis to each committee member, then present a public seminar on the Troy campus describing the thesis work, and pass a closed-door session with the committee after the seminar. The department also requires that each student have at least one manuscript accepted for publication in a peer-reviewed journal before the Thesis Defense can be passed.

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#### **IV. TIMELINE OF MILESTONE EVENTS**

The time spent in a graduate program can vary widely among students for real and important reasons. The basic reason is that the awarding of a M.S. or Ph.D. degree constitutes Rensselaer, the Biology Department, and the advisor's certification that the student meets minimum standards of intellectual and practical capabilities, and not all students will reach these goals at the same rate. Hence students should be given time to develop as scientists within reasonable limits, and be assured that they will be told sooner rather than later if they appear unlikely to succeed. However, graduate school is expected to be a time of intensive study, so the department must provide a framework and official pressure for students to reach certain milestones at certain times. What follows is the path the faculty have found to be reasonable for successful students to follow in their career at Rensselaer.

##### **MASTER OF SCIENCE**

###### **Year 1:**

*Fall semester:* Take one or two departmental core courses; begin search for a mentor by beginning research rotation I by October.

*Spring semester:* Take remainder of department core courses; continue research rotations II and III. Choose mentor by the end of June and file Plan of Study. Take Qualifying Exam in June. GAEC evaluates progress in March and recommends for or against continuation to a meeting of the full faculty.

###### **Year 2:**

Complete supplemental coursework. Give first research seminar presentation during the second year. The thesis research should be completed and the thesis written, defended, and submitted in year two. GAEC evaluates progress each spring and recommends for or against continuation.

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**PH.D.:**

**Year 1:**

*Fall semester:* Take one or two departmental core courses; begin search for a mentor by beginning research rotation I by October.

*Spring semester:* Take remainder of department core courses; continue research rotations II and III. Choose mentor by the end of June and file Plan of Study. Take Qualifying Exam in June. GAEC evaluates progress in March and recommends for or against continuation to a meeting of the full faculty.

**Year 2:**

Take supplemental coursework. Give first research seminar presentation during the year. Take Candidacy Exam. GAEC evaluates progress after proposal defense and recommends for or against continuation.

**Years 3 and 4:**

Continue coursework and research, give seminars each year, and submit work for publication. Candidate completes thesis research, writes thesis and undergoes public defense. GAEC evaluates progress each spring and recommends for or against continuation.



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**APPENDIX II:**

ANNUAL BIOLOGY GRADUATE STUDENT EVALUATION  
(to be submitted annually (February) to GAEC committee )

Date \_\_\_\_\_

Student Name (last name, first name) \_\_\_\_\_

RIN # \_\_\_\_\_

Program Start Date (Term/yr) \_\_\_\_\_

Advisor Name (last name, first name) \_\_\_\_\_

**PART I**

Please meet with your advisor to discuss your progress toward the following:

|   | Date Completed or<br>Completion forecast date |
|---|---|
| Plan of Study (new or revised)                    |   |
| Coursework/Thesis registration                    |   |
| Qualifying Exam                                   |   |
| Doctoral Committee<br>(date approved by Grad Ed.) |   |
| Candidacy Exam<br>(date approved by Grad Ed.)     |   |
| Paper published                                   |   |
| Date of Graduation                                |   |

1. The student has met expectations for all items above

2. The student has not met expectations for some of the items. A forecast date has been entered next to each item and a remediation plan follows.

Remediation plan, if necessary:

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During the past year:

|                      | Above average | Good | Needs Improvement |
|----------------------|---------------|------|-------------------|
| Academic Performance |               |      |                   |
| Research             |               |      |                   |
| Teaching             |               |      |                   |

Dept. Seminar this academic year?                      Yes                       No

Presentation at meeting this academic year?                      Yes                       No

**Part II** (to be filled out by faculty supervisor)

1. Describe the specific duties of the research assignment.
  
2. Were the specific duties of these assignments explained to the graduate student?
3. Does the graduate student spend a sufficient amount of time in the lab?
4. Has the graduate student accomplished goals set? Be specific.
  
5. Does the graduate student show reasonable lab skills?
  
6. Is the graduate student intellectually involved in the project? Can the graduate student work independently?
7. If applicable, did you give specific training for research procedures?
8. How did the graduate student interact with others in the lab?
9. Did the graduate student complete required tasks on time?
10. Overall, the graduate student
  - (a) Exceeded the performance requirements of the assignment
  - (b) Satisfactorily met the performance requirements of the assignment
  - (c) Marginally met the performance requirements of the assignment
  - (d) Failed to meet the performance requirements of the assignment

11. Other comments:





**Department of Biology**  
**DEPARTMENTAL EVALUATION OF TA PERFORMANCE**

*Part II (to be filled out by graduate teaching assistant)*

TA Name: \_\_\_\_\_ Course: \_\_\_\_\_ Semester/Year: \_\_\_\_\_

1. Were the specific duties of this assignment adequately explained to you?
2. Was this the first time you had this assignment? If not, how many times have you had it?
3. Do you feel you had adequate background/experience for this assignment? If not, explain.
4. Do you feel your training (if needed) for this assignment was adequate? If not, explain.
5. Approximately how many hours did you spend on this assignment per week?
6. Do you agree with your performance evaluation for this assignment? If there are points with which you disagree, please comment on those.

7. Other comments:

Grad Student Signature: \_\_\_\_\_ Date: \_\_\_\_\_