

## DOCTOR OF PHILOSOPHY IN BIOLOGY

### Upon joining the PhD program:

- A. Research advisor and area of study: Each student must meet with their advisor prior to registration each semester. If a new student does not yet have an advisor, the student should meet with the Director of Graduate Studies (DoGS), another member of the Committee on Graduate Affairs (CGA), or their designee to discuss recommended coursework.

By the end of the first semester, each student is expected to have identified a major area of study and to have selected a research advisor. These selections are revocable: the student may subsequently change area of study, advisor, or both without embarrassment to themselves or the advisor.

The research advisor is responsible for guiding the student in the selection of courses and other activities, such as seminars and journal clubs, appropriate for their training. The student, however, is free to – and encouraged to – consult with other faculty members for aid in course selection or with their research project, as the student deems helpful.

It is expected that each student will be involved in a research project during their first year in the PhD program. It is the responsibility of the advisor to mentor the student in this research.

- B. Annual progress review: Each student's progress through the program will be reviewed by the DoGS on an annual basis. The purpose of this review is to support the student with regular and timely feedback on their progress toward degree completion and their professional goals. Every year, each student will be asked to submit a written progress report to the DoGS. Every student will also be asked to schedule an annual one-on-one meeting with the DoGS or their designee to discuss the report, their progress, and any questions or concerns.
- C. Coursework requirements: The required coursework is different for students entering directly into the PhD program with a Bachelors degree, versus those entering with a prior Masters degree:
- Students entering with a Bachelors degree* (but no Masters degree) must complete 36 credit hours of study before the Qualifying Examination. The bulk of these credits will come from formal, graduate-level coursework. No more than 6 credits of BIOL 601 Research can be used toward the required 36 credits.
  - Students entering with a Masters degree* must complete 18 credit hours of study before the Qualifying Examination. No more than 3 credits of BIOL 601 Research can be used toward the required 18 credits.

*For all students (with or without prior MS degree):* Any plans to take courses at the 300-level or lower, or to take non-BIOL courses that are relevant to the area of study, should be discussed with the advisor and the DoGS or program staff to determine if/how these courses can be counted toward the coursework requirement. If a course is offered at both the 300- and 400-level, the 400-level version must be taken.

A normal full-time course load is 9 credits per semester.

There is no limit on the number of BIOL 599 Advanced Independent Study for Graduate Students credits that can be used, but BIOL 599 should typically only be taken when formal coursework appropriate to the student's area of study is not available. Registration in BIOL 599 is by permission only and requires a course proposal form (available on the Biology Department website and the Graduate Programs canvas site) to be submitted and approved before the add/drop deadline.

PhD students should not take BIOL 651 Thesis MS research credits. If a student begins in the MS track and transfers to the PhD before finishing the MS degree, they should work with graduate program staff to discuss how any BIOL 651 credit hours already completed will be counted.

Students are strongly encouraged to make an oral presentation (outside of the qualifying exam proposal seminar) at a colloquium, journal club, class, etc., and are encouraged to do so more than once.

- D. Academic standards: Any students whose course performance is not satisfactory may be terminated. A student's scholastic performance will be considered unsatisfactory if they do not maintain at least a B average (3.0 GPA or above on a 4.0 scale). In addition, any grade of F, or the receipt of 6 or more credits of C or below, will result in automatic termination.

A student may appeal decisions made on the basis of these regulations. Such appeals will be heard by the CGA and the student's advisor. Decisions are made by a majority vote of the CGA and advisor.

- E. Teaching requirement: Teaching experience, typically as a Graduate Teaching Assistant, is a required part of the PhD. Teaching duties are assigned by the Graduate/Undergraduate Assignment Committee (GUAC), taking into account both the specialized areas of interest and expertise of each student and their professional development goals. Four semesters of teaching are required for the PhD degree. (Note that some types of financial aid will require additional teaching beyond this programmatic requirement of four semesters.)
- F. Summer research: Academic coursework and graduate teaching typically take place during the Fall (August-December) and Spring (January-May) semesters. Graduate students are expected to be involved in full-time research during the summers throughout their entire time in graduate school.
- G. Qualifying examination: Formal admission to the PhD program as a PhD Candidate is contingent upon the student passing a qualifying exam. This exam is normally taken during the semester in which the student will complete all required coursework, and must be completed by the end of their fourth semester of graduate study. The student will be examined in their general knowledge of biology and ability to articulate and defend an original research project.

The examination committee will consist of the student's advisor and 3 additional faculty members from within or outside the department, including those at affiliate organizations; tenured, tenure-track, adjunct, or secondary appointments; instructors; or others approved by the CGA. An additional non-voting faculty member, typically a member of the CGA, will chair the exam.

The steps for completing the qualifying examination are:

- a. *Approval of abstracts and committee composition:* At least 2 months prior to the qualifying exam, the student should submit by email to the chair of the CGA: 3 brief abstracts on topics suitable for the research proposal for the qualifying exam, and the names of all four voting members of the examination committee (the CGA will assign the non-voting member). Abstracts should be submitted using the form available on the Biology Department website or the Graduate Programs canvas site. The submitted abstracts must not be directly related to the student's current dissertation research topic.

As soon as the examination committee is approved by the CGA, the student should schedule an informal meeting with the whole committee, including the non-voting CGA representative. At this meeting, the format of the exam will be reviewed and each committee member will define the focus area on which they will ask questions during the comprehensive part of the exam. If possible, times and dates for both parts of the oral exam and the seminar should be scheduled at this meeting.

- b. *Written research proposal:* After CGA approval of the abstracts and committee, the student will select one approved abstract for development into a detailed proposal. The proposal should include the rationale behind the proposed study, techniques, specific experiments or tasks, potential conclusions, and significance of the proposed work. While it is important to motivate the proposed work based on the broader scientific context, the major emphasis of the written proposal is to be on the proposed research itself, rather than literature review or other background material.

The written proposal must be approved by the advisor then presented to the examining committee at least 10 days before the oral defense of the proposal.

- c. *Seminar:* Each student is required to present a seminar to the Department on the topic of the student's research proposal for the qualifying exam. The seminar must be presented before the student's oral defense of the proposal. Though not required, it is generally recommended that the seminar be scheduled before the written proposal is due to the committee, so that the student can incorporate any feedback received at the seminar into the written document.
- d. *Two-part oral exam:* These two sections of the qualifying examination should be scheduled on different days, and may be taken in either order. The two exam days should occur close together in time (ideally a week or less apart, if schedules allow, and certainly within the same academic term unless there are extenuating circumstances).

- i. *Oral defense of the proposal:* During this part of the oral exam, the student will be expected to answer questions about their research proposal, demonstrating that they can defend their ideas.

- ii. *Comprehensive oral exam:* During this part of the oral exam, the committee will ask the student questions to test their general knowledge of biology, based on the focus areas established during the planning meeting.

Examination results: The voting members of the examining committee will recommend one of the following courses of action, after all of the above steps are complete:

- Pass without conditions: The student will advance to PhD candidacy and proceed toward the PhD degree
- Pass with conditions: The student will advance to PhD candidacy after necessary conditions (established by the exam committee) are met to correct any deficiencies identified during the exam
- Re-examination on one or both portions of the oral exam: The student will need to repeat and pass one or both parts of the exam before advancing to PhD candidacy
- Permission, with or without conditions, to complete a Masters degree: The student will not advance to PhD candidacy but can remain as a graduate student in the department to complete an MS
- Failure: The student will not continue as a graduate student in the department

**After advancing to PhD candidacy:**

- H. Dissertation committee: Immediately after passing the PhD qualifying exam, each student should, with the help of their advisor, name a dissertation advisory committee and ask the CGA for approval of this committee. The committee should have four members: the advisor and three other members, at least two of whom have faculty appointments at CWRU and at least one of whose primary appointment is outside the Department of Biology. Inclusion of any non-CWRU committee member requires a petition explaining that no suitable examiner is available on campus, and is subject to approval by the CGA and the School of Graduate Studies (SGS).
- I. Committee meetings: Students should meet with their dissertation committee at least once per year after advancing to candidacy to discuss their progress in research. These meetings are a critical part of a student's development and are typically very constructive.
- J. Registration: After advancing to candidacy, students should register in BIOL 701 Dissertation PhD research credits. A minimum of 18 credits of 701 is required for all doctoral students. Students should fulfill this requirement by taking 9 credits of 701 in each of their first two semesters after advancing to candidacy. Students should then register for just 1 credit of 701 each semester thereafter (students enrolled in a single credit of 701 are still considered full-time students).
- K. Planning for graduation: Each semester, the university publishes its deadlines for graduation. It is the student's responsibility to be aware of and to meet all deadlines.
- Early in the semester in which a student plans to graduate (or in the preceding semester), and after consultation with their advisor, the student should notify the chair of the CGA of their planned graduation timing. A CGA representative to serve as the non-voting committee chair will be assigned at this time.
- L. Publication submission requirement: Each student is required to submit at least one manuscript to a respected, refereed scientific journal. The student should be first author and the paper must be on part of their dissertation work. The paper must be submitted at least 3 months prior to the dissertation defense, and any reviewer comments received must be made available to the committee members at the defense. (Note that this requirement

only states that the paper must be submitted; it is not required that the paper be accepted for publication prior to the student's defense and graduation, as the program recognizes that the pace of the peer review process is outside of the student's control.)

- M. Dissertation preparation: Before preparing a draft of the written dissertation, the student should obtain all necessary style information from the SGS. Ultimately, the dissertation must be approved for defense by the student's advisor, but the student should also seek review by other qualified readers, including their committee members, to improve the quality of the document.

The committee's expectations for content and composition of the dissertation should be established during the annual committee meetings leading up to the defense.

- N. Dissertation seminar: Prior to the defense, the student should present a seminar on their dissertation research to the university community. Students should notify department staff of the time, place, and title of the seminar so that it can be publicized.
- O. Oral defense: The student must defend their dissertation to their committee in an oral exam. The non-voting CGA representative will chair the exam and ensure that proper procedures are followed. Students should be aware of the university's deadline for submitting their final dissertation before they schedule their defense, and ensure that they leave enough time after the defense for any anticipated revisions that may be requested by the committee.
- P. Results of the defense: The dissertation will be accepted if, at the defense, at least three of the four voting committee members vote to accept it. The committee may request revisions to the written dissertation before final acceptance. In the event that the student's dissertation is not accepted, the committee shall recommend a course of action, including: failure with no repeat examination; or failure with re-submission and re-defense of the dissertation, with revisions that address the committee's basis for not accepting the current version. If the committee recommends re-examination, failure to pass the second time shall be final.

A student who passes the defense must submit all required forms and their final, formatted dissertation to SGS before the graduation deadline.