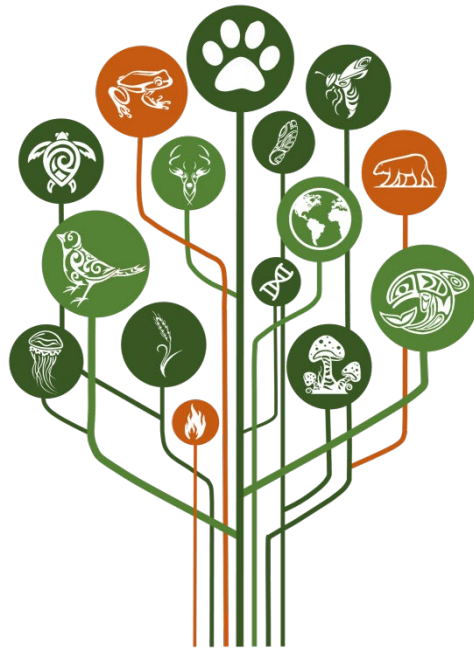


# Intercollege Graduate Degree Program in Ecology

## PENN STATE



## ECOLOGY

### Handbook

### 2018/2019



The Pennsylvania State University

<https://www.huck.psu.edu/graduate-programs/ecology>

## CONTACTS

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*Contact for: Minisymposium, Seminars, expense queries*

**Lost and Found: 101 Huck Life Sciences Building**

**Booking a Huck Institutes Room:** <https://25live.collegenet.com/psu>

If a graduate student has issues or complaints concerning their advisor, the student may speak in confidence to Jason Kaye ([jpk12@psu.edu](mailto:jpk12@psu.edu), 863-1614), Troy Ott, Associate Director of Graduate Education in the Huck ([tlo12@psu.edu](mailto:tlo12@psu.edu)) or contact the Graduate School Dean's Office (865-2516).

**The Graduate School current student information:** [www.gradschool.psu.edu/current-students](http://www.gradschool.psu.edu/current-students)

**Graduate student policies:** <http://www.gradschool.psu.edu/current-students/student>

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## SECTION I

### GENERAL POLICIES

#### A. **Mission Statement:**

The mission of the Intercollege Graduate Degree Program in Ecology is to educate and train scientists with respect to both basic and applied aspects of ecology. Research and teaching in the program focus primarily on interactions between organisms and their environments, ranging from the molecular to the biosphere level.

#### B. **Ecology as an Intercollege Program**

An intercollege program is characterized principally by the fact that the faculty members participating in the program reside in several departments and colleges, and that the students in the program draw significantly upon the resources of several departments – their courses, faculties and facilities. For each intercollege program, a Program Chair is appointed by the Dean of the Graduate School with the concurrence of the appropriate deans and departmental heads/directors.

The Ecology Program is part of the Huck Institutes of the Life Sciences which is dedicated to encouraging new perspectives across disciplinary boundaries. The Huck Institutes catalyze innovation and excellence in interdisciplinary research and education in the life sciences at Penn State.

Each program is the responsibility of the participating departments and an intercollege graduate faculty with academic background, interest and demonstrated scholarship in areas pertaining to the program. In matters concerning the Intercollege Graduate Degree Program, the Chair reports to the Dean of the Graduate School.

#### C. **Responsibilities of the Student, Thesis Advisor and Student's Committee**

Students are expected to assume responsibility for knowing the regulations and requirements of the Graduate School and the Ecology Program as described in:

- (1) Graduate Degree Programs Bulletin: <http://bulletins.psu.edu/bulletins/whitebook/>
- (2) Thesis Guide: <http://www.gradschool.psu.edu/current-students/etd/>
- (3) This Ecology Program Handbook
- (4) Ecology Program Requirements <https://www.huck.psu.edu/graduate-programs/ecology/degree-requirements/required-courses>

Thesis advisors and graduate committees have a responsibility for judicious timing of events to avoid prolonging degree programs. For example, in the initial months of residence, students may become preoccupied with course work. At this time, a student should also be outlining the entire program, choosing a thesis topic, and drawing up research plans. Delays may result in time added to degree completion or

under-accomplishment of thesis research. The leadership efforts of thesis advisors and committee members are needed to forestall such delays.

## SECTION II

### STUDENT-FACULTY RELATIONSHIPS AND GRADUATE STUDENT COMMITTEE

Office and research space, course work and research plans will be arranged through the student's advisor and cooperating department. A graduate committee should be appointed early enough in the student's tenure to be involved in the course and research planning. The graduate student's committee is responsible for approving a student's program and promoting communication between the graduate student, the committee chair (or advisor), and the members of the committee, and more generally, for helping to ensure successful completion of a student's program. Informal meetings of the student with individual committee members and with the committee as a group are encouraged as a means of aiding the student in thesis research and of keeping the faculty aware of the student's progress. The student should arrange to have the committee meet at least once per year, to receive guidance, finalize and approve the research proposal, assess the quality and progress of the research and discuss programmatic issues and course requirements. **A committee should be formed by the end of the first year for M.S. students and by the end of the 2<sup>nd</sup> year for PhD students.**

The committee is chosen by the student with guidance from an advisor. The student should meet with the desired faculty members and determine if they are willing to serve. After getting verbal commitments, the student should contact the Huck Graduate Program Office so that the necessary paperwork can be prepared. When you receive the appointment sheet from the Huck Graduate Programs Office, you should sign it and then gather the signature of each of your committee members. It is your responsibility to obtain the signatures, and the appointments cannot be made until the sheet is fully signed. The appointment sheet must then be returned to the Huck Graduate Programs Office for final processing. The Graduate School will make the formal appointment of the committee members for Ph.D. students. This will take a minimum of three weeks after the Graduate School has received all the necessary documents. **Note that the committee must be formally appointed by the Graduate School before a Comprehensive Exam can be scheduled.**

#### Changes in Committee Membership

For various reasons, it may occasionally become necessary to make changes in committee membership. To make any changes to an appointed committee, contact the Huck Graduate Programs Office.

To add a member, the student must inform the Office of the name of the person and in what capacity he or she will serve. A revised appointment sheet must be prepared, and

signatures will be needed from the new member, the Program Chair, and the student. This sheet must be returned to the Office for final processing.

To remove a member, a revised appointment sheet must also be prepared and signed by the student and the Program Chair. In order to maintain the required committee membership, it is likely that a new member will need to be added to replace the member being removed.

It will take a minimum of two weeks after the Graduate School has received all the documents before changes in committee membership become finalized.

**A. Doctoral committee:** A doctoral committee consists of at least 4 members of the Graduate School Faculty

<https://secure.gradsch.psu.edu/gpms/index.cfm?facultySearch=1>:

- a chair (typically the advisor)
- one or more additional members of the Ecology faculty  
<https://www.huck.psu.edu/graduate-programs/ecology/people/faculty>
- an outside FIELD member. This person may or may not be a member of the Ecology faculty but must represent a field outside the student's major field of study. Please contact the Program Office for advice on selecting an outside field member
- an outside UNIT member. This person must have a primary appointment in a different administrative unit than the advisor (and co-advisor, if applicable). Please contact the Program Office for advice on selecting an outside unit member
- at least half of the members must be from the Ecology Program
- guidelines regarding doctoral committees can be found at the Graduate School's policy website: <http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/doctoral-dissertation-committee-formation/>

**B. Master's committee:** Master's students are not required to report their committee members to the Graduate School. Instead, the committee is reported to the Ecology Program office on the academic course plan available from the Program Office. A Master's committee consists of:

- a Chair (typically the advisor)
- two other faculty members
- at least two members must be from the Ecology Program faculty and as many as three may be members of the program.

## SECTION III

### DEGREE REQUIREMENTS

#### A. Ecology Course Requirements\* and SARI (Scholastic and Research Integrity)

**1a) Advances in Ecology (ECLGY 515)** All Ph.D. and Master's students need to successfully complete Advances in Ecology. Advances in Ecology must be taken during the first fall semester of enrollment in order to fulfill the SARI instructional module.

**1b) SARI online module** All Ph.D. and Master's students need to successfully complete the online component of the SARI course during their first semester of study.

First year students should complete the online CITI RCR course as soon as possible in the fall semester. To register, go to the Penn State CITI website <http://citi.psu.edu/> where you will find instructions. Select your campus, then select Pennsylvania State University Courses and register for the CITI Biomedical Sciences course. Students must work on their own to complete the course modules and pass the on-line quizzes. All modules must be completed by the beginning of the first Fall semester; and a copy of the student's Completion Report must be submitted to the ECLGY 515 instructor and the Program administrative office by the first day of classes of the fall semester.

**2) Classical Ecology (ECLGY 510)** All Ph.D. students need to successfully complete Classical Ecology. Classical Ecology is offered in the fall semester and should be taken during the first year of study. Master's students may take Classical Ecology at the recommendation of their advisor and with the approval of the course instructor on a space available basis.

**3) All Ph.D. and Master's students need to successfully complete a total of 2 core courses (6 credits) from the list below. It is recommended, for breadth of knowledge, that these 2 courses come from different categories. \***

#### Core Course List

##### **Category 1. Molecular, Physiological, Behavioral, and Evolutionary Ecology**

- BIOL 406 Symbiosis (spring)
- BIOL 446 Physiological Ecology (spring)
- ENT 539 Chemical Ecology of Insects (fall, even)
- ERM 444 Environmental Biophysics (fall, even)
- FOR 409 Tree Physiology (spring, odd)
- HORT 445 Plant Ecology (fall)
- HORT/PLBIO 514 Modern Techniques and Concepts in Plant Ecophysiology (spring)
- HORT 517 Ecology of Plant Roots (fall, odd)
- SOILS 512 Environmental Microbiology (spring)



## Category 2. Population and Community Ecology

- AGRO 510 Ecology of Agricultural Systems (spring)
- BIOL 412 Ecology of Infectious Diseases (fall)
- BIOL 482 Coastal Biology (spring)
- BIOL 519 Ecological and Environmental Problem Solving (spring, even)
- ENT 420 Introduction to Population Dynamics (fall, odd)
- FOR 508 Forest Ecology (spring, even)
- W F S 560 Population Estimation and Modeling

## Category 3. Ecosystem, Landscape, and Global Ecology

- ERM 435/W F S 435 Limnology (fall)
- GEOG 411W Forest Geography (fall, odd)
- GEOG 414 Landscape Ecology (spring)
- GEOG 497A Global Change Ecology
- GEOG 510 Tropical Forest Dynamics (spring)
- GEOG 550 Wetland Ecology and Management (spring)
- SOILS 571 Ecosystem Nutrient Cycles (fall, even)
- WFS 585 Applied Spatial Ecology (spring)

Other Ecology related courses that students have found helpful can be found on the Ecology website at: <https://www.huck.psu.edu/graduate-programs/ecology/degree-requirements/required-courses>

All graduate students are required to be registered for **9 credits** per semester to be considered full-time while on a fellowship or assistantship. Some of these 9 credits can be ECLGY 600 credits (see section III.I below). It is not recommended to register for more than 12 credits per semester.

### B. Statistics Requirement\*

1. For the Master's student, at least one advanced course (400 – 500-level) or an equivalent course from a previous institution beyond an introductory statistics course (e.g. STAT 451 is not appropriate).
2. For the Ph.D. student, at least two advanced courses (400-500-level) or equivalent courses from a previous institution beyond an introductory statistics course (e.g. STAT 451 is not appropriate).

*\*Note that one or more of these course requirements can be waived if a course of equivalent material was taken at an approved institution. Decisions are made on a case-by-case basis by petitioning the Curriculum Committee and supplying the syllabus of the course wishing to be substituted.*

### C. Colloquium Requirement

Colloquium is a 1-credit seminar class intended to provide Ecology graduate students an opportunity to present their research to their peers. All presentations need to have some type of ecological context. Goals of the class are: (1) to provide practice and feedback for communicating research in a scientific forum and (2) allow for critique of research ideas and results in a constructive fashion.

All students are expected to participate regularly in Colloquium regardless of official registration. Communication with colleagues is an essential part of the scientific process.

1. Master's students must register for 2 semesters of Ecology Colloquium (ELCGY 590). Registered students will be scheduled to present their research at one of the weekly Colloquium seminars.
2. Ph.D. students must register for 4 semesters of Ecology Colloquium (ECLGY 590). The first 2 semesters of Colloquium should be taken for credit prior to taking the Comprehensive Exam, normally in the first 2-3 years of the program. Registered students will be scheduled to present their research at one of the weekly seminars. The remaining semesters of Colloquium can be taken for audit after the Comprehensive Exam, typically in the semester of a presentation at a national or international meeting and in the semester of the final public thesis defense. (Students presenting or defending during the summer should register for Colloquium in the Fall or Spring semester closest to their presentation or defense date.)

### D. Defense Seminar and Mini-symposium Requirements

Each student will be required to present a formal **Defense seminar** on their research before degree certification. This seminar immediately precedes the final oral examination. The seminar is open to the public and is often 30-40 minutes (discuss the length with your advisor).

In addition, a short talk should be arranged with the Program Office as part of the **Mini-Symposium**. It is the student's responsibility to notify the Program Office prior to the Fall or Spring Mini-Symposium, to be included in the program.

### E. Teaching Experience

The purpose of this requirement is to provide the Ph.D. student a meaningful teaching experience and to develop teaching techniques. Master's students are not required to fulfill a teaching requirement.

1. *Setting up the supervised teaching experience:* Discuss the teaching requirement ahead of time with the advisor and consider which course is appropriate to obtain this experience. Students should be familiar with course subject material, and the course instructor must be willing to supervise the teaching experience. Contact the course instructor ahead of

time and discuss the expectations and activities which will provide a meaningful teaching experience. Register for ECLGY 602 during the semester of the supervised teaching experience. A minimum of 1 credit of supervised teaching is required, but depending on involvement, up to 3 credits may be registered.

2. *Can this requirement be met through regular TA assignments?* Yes. If the teaching experience is part of the teaching assistantship assignment, request assignment to the course where supervised teaching is to be conducted.
3. *Guidelines:* Students should have direct teaching experience. This means involvement in several types of activities crucial to teaching. Examples include designing, setting up, and/or running laboratory sessions, writing and presenting a couple of lectures, designing quizzes or questions for exams and grading them, leading discussion sessions, and helping develop modifications of the course. An assignment involving only the grading of tests, taking attendance, and cleaning labs is contrary to the purpose of this experience. An important aspect of a quality teaching experience is constructive feedback from the mentor(s). The responsibility for this feedback rests with the supervisor (instructor for the course). The instructor can use student evaluations and/or their own evaluations and observations as sources of information. Ideally, the supervisor will provide suggestions on how to improve performance. Upon completion of the teaching experience, the instructor will assign a letter grade in ECLGY 602 or equivalent departmental class.

Training opportunities for teaching experience are available. The student will need to register for teaching assistant training (e.g. a departmental course such as BIOL 598 (Experiential Teaching in Biology) or the New Instructor Orientation Course offered by the Schreyer Institute for Teaching Excellence: <http://www.schreyerinstitutione.psu.edu/Events/NIO/>). A Teaching Certificate may also be earned through the Graduate School: <http://www.gradschool.psu.edu/current-students/tacert/>.

## **F. Graduate Academic Course Plan**

Each Ph.D. and Master's graduate student in consultation with his or her research advisor and thesis committee must submit a graduate Academic Course Plan to the Program Office. This form is available from the Program Office.

## **G. Examinations**

### **1. Both Master's and Ph.D. Students**

Each student must pass a final oral **thesis defense** before degree certification. The final oral examination for the Ph.D. student must be scheduled by the Program Office with the Graduate School at least two weeks in advance of the exam date. Therefore, the student should contact the Program Office at least three weeks before the requested defense date in order to have the proper forms completed. The Ph.D. student's advisor must inform the

Graduate School and the Program Office about the outcome of the final oral thesis defense using the form provided by the Graduate School via the Program Office.

The Master's student's advisor must inform the Program Office in writing about the outcome of the final oral thesis defense using the form provided by the Program Office. This form should be requested from the Program Office at least 2 weeks prior to the defense date.

## 2. Ph.D. Students only

- a) A **qualifying examination** is required of all Ph.D. students. (For details see "Guidelines for Doctoral Qualifying Examinations," p. 19 of this handbook). The examining committee is appointed by the Program Chair. The Qualifying Exam consists of both a written and an oral component. The Chair of the Qualifying Examination Committee must inform the Program Office in writing about the outcome of the Qualifying Exam. The outcome of the Qualifying Exam is sent by the Program Office to the Graduate School.

The exam should be taken in the second or third semester of the Ph.D. program. It is the responsibility of the graduate student to contact the Chair of the Qualifying Examination Committee to schedule their exam. When requested by the Chair of the Qualifying Examination Committee, the student shall provide the following information: name, advisor's name, campus address, telephone number, e-mail address, date of entry into the program and a copy of the semester course schedule. If a dual-title student is taking the exam, a representative of the dual-title program must be present on the Qualifying Examination Committee for that exam.

- b) The **Comprehensive Examination** for the Ph.D. will be a rigorous examination administered by the student's committee as early as possible in the student's tenure but after the Qualifying Exam. An oral examination is required. The committee may also choose to require a written examination. The Comprehensive Exam should cover aspects of advanced ecology and related disciplines necessary to the student's field of specialization. The focus of a comprehensive exam varies and it is reasonable for students to ask committee members (months ahead of time) to discuss expectations for this exam. The Comprehensive Examination must be scheduled by the Program Office with the Graduate School at least two weeks in advance of the exam date. Therefore, the student should contact the Program Office at least three weeks before the requested defense date in order to have the proper forms completed. The student must be registered during the semester of the Comprehensive Exam, including summer.

## H. English Competency Policy for Ph.D. Students

Ph.D. students are required to demonstrate a high level of competence in the use of the English language. Written and speaking competence in English will be assessed by the Qualifying Examination Committee at the Ph.D. Qualifying Exam.

All entering international students are required to take the American English Oral Communicative Proficiency Test (AEOCPT) which is administered by the University's Department of Applied

Linguistics. Given at the beginning of fall and spring semesters, international students are required to pre-register for the AEOCPT. The test scores from the AEOCPT are posted on the University's Administrative Information System (AIS) computer. A score above 250 on the AEOCPT satisfies the Department's requirement; students scoring under 250 must take courses to improve their spoken language and retake the test before being allowed to teach, as prescribed by the Graduate School.

Students who are required to enroll in English as a Second Language (ESL) must complete the ESL requirement by the end of the second semester. Students who fail this requirement may be terminated from the respective graduate program at the discretion of the Program Director.

## **I. Thesis Research – Grade Reporting**

Students can be assigned letter grades for thesis research (ECLGY 600 on campus, ECLGY 610 off campus) credits for a total number of 6 credits for Master's and 12 credits for Doctoral candidates. Any research credits over this number must be assigned an R grade.

## **J. Thesis Preparation**

After Doctoral students have passed the Comprehensive Examination, met the two-semester residence requirement (see checklist for Ph.D. candidates, p. 18), and completed their coursework, they should register for special non-credit thesis preparation (ECLGY 601 full-time, ECLGY 611 part-time.) Students can still audit Colloquium or any classes up to 3.0 credits while they are taking ECLGY 601.

## **K. Registration near Completion of a Program**

A Master's candidate is **not** required to register for the final semester in order to graduate or in order to make minor revisions to the thesis and/or to take a final examination for the degree.

A Ph.D. candidate is required to register continuously (spring/fall) for each semester from the time the comprehensive examination is passed and the two-semester residence requirement is met until the thesis is accepted by the doctoral committee, including the semester of the comprehensive exam and the semester of the final oral exam, regardless of whether work is being done on the thesis during this interval. **A doctoral student must register for at least one credit if they plan to take the final exam during the summer semester.**

## **L. Thesis Copy Requirements**

**Master's and Ph.D. students must submit a properly formatted electronic copy of the thesis to the Graduate School Thesis Office by the deadlines for the semester in which they intend to graduate (see pg. 19/20 of this handbook for more details). In addition, an electronic copy of the thesis must be submitted to the Ecology Program Office where it will be kept on file after the student has received the degree. The Ecology Program does not require a **hard-bound** copy of the thesis but the student's major advisor may wish to receive a bound copy. Therefore, the student should check with the advisor when ordering hard-bound copies.**

#### **M. Exit Survey**

All Ecology Program students are required by the Program to complete an exit survey before leaving Penn State, and to schedule a short interview with the Program Chair. The exit survey form is available from the Program Office. The Graduate School also offers an exit survey: <http://www.gradschool.psu.edu/faculty-and-staff/forms/ges/>.

#### **N. Resume Study/Change of Graduate Degree or Major**

Master's students in Ecology who are interested in continuing on for a Ph.D. in Ecology must submit an application for permission to resume graduate study. An application must be filed from the Graduate School's website: <http://gradschool.psu.edu/prospective-students/how-to-apply/current-students/>.

A similar application is used by Ph.D. students who need to change their degree to M.S. Approval by the Program Chair and major advisor is required before making this change.

Current Penn State graduate students may use the application to change their degree or major to Ecology upon approval of the Ecology Admissions Committee.

#### **O. Options in Ecology**

A Dual-title Ph.D. Degree program in Biogeochemistry and other specialized Program Options are available to Ecology graduate students. Please see the Ecology website for current Program Options: <https://www.huck.psu.edu/graduate-programs/ecology/degree-requirements/options-and-dual-titles/about-options-and-dual-titles>.

## IV. ADDITIONAL INFORMATION

### A. Academic Integrity Policy

According to Penn State's Code of Conduct (Faculty Senate Policy 49-20), "all students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts." Students should not "engage in or tolerate acts of falsification, misrepresentation or deception. Acts of dishonesty violate the ethical principles of the University community and compromise the worth of work completed by others". Academic dishonesty, cheating, and plagiarism will not be tolerated in the Ecology Graduate Program and will result in disciplinary sanctions including dismissal from the program. University Policies for handling student misconduct are available at: <http://undergrad.psu.edu/aappm/G-9-academic-integrity.html>.

### B. Safety Training

Within the first semester of residence, all students are required to take and pass the laboratory safety and chemical waste disposal training sessions. For information and links regarding the Environmental Health & Safety office, go to: <http://ehs.psu.edu/laboratory-and-research-safety>.

### C. Annual Graduate Student Activity Report

Annual Evaluations are an integral part of the student's professional development. The thesis advisor should conduct annual evaluations of the student's progress and overall performance and provide guidance with regard to future goals. While students and their advisors should meet regularly over the course of a year, the annual evaluations ensure that at least one meeting has been held to specifically look at the student's progress and performance. Continued financial support of each student will be dependent on satisfactory progress as stated in admission offer letters.

A link to the online Annual Graduate Student Activity Report (GSAR), [https://apps.science.psu.edu/grad\\_activity/](https://apps.science.psu.edu/grad_activity/), will be sent to all Huck graduate students at the end of each spring semester from the Huck Institutes Graduate Programs Office. This online evaluation must be completed and approved by August 15 each year. Each component of the report also has a deadline.

Each student, in consultation with their advisor, will describe their research progress and plans according to the prompts that appear on the online form under the section "Progress and Future Plans":

- 1) Please provide a brief description of the current status of your research project.
- 2) Please describe your research accomplishments over the past year.
- 3) Please provide a description of your research plans for the upcoming year.

In addition to this information, each student should provide all of the requested information such as publications, meetings attended, etc. The online system is self-explanatory but the Huck Graduate Education Office will be happy to assist as necessary. Completed student reports will be reviewed by the Program Chair and, when appropriate, by the Associate Director for Graduate Education in the Huck.

#### **D. Vacation and Sick Days – Leaves of Absence**

In general, vacation time should not exceed a total of 10 days (2 weeks) per year, exclusive of the 11 designated University holidays. Days at scientific meetings or training conferences are not vacation time (extra days before or after the meeting would count as vacation). Students may take more than the regularly allocated vacation time in any given calendar year for special travel or activities if they have the **consent of their research advisor** and they take correspondingly fewer vacation days in the preceding and/or following years.

Students must inform their research advisor (or the Graduate Program Chair if a research advisor has not yet been assigned) of their vacation plans at least 15 days before the first day of their vacation. The student should submit their vacation request in writing and obtain written approval from their advisor (an email will suffice). While advisor/Program Chair will usually approve most reasonable requests, requests can be denied if there are circumstances that warrant such a denial. Such denials should not, however, impede a student from using all of their annual vacation time in a reasonable fashion.

These recommended guidelines are advisory and reflect those suggested by government agencies such as National Science Foundation and National Institutes of Health for training grant fellows. Students should consult with their advisor regarding any absences that affect other group members in the advisor's lab. Common sense policies and procedures should apply. Note that vacation time should be planned to avoid interference with specific duties including teaching.

#### **E. Scholarship Policy**

Students are required to have a minimum grade-point average of 3.0 for the doctoral qualifying examination, admission to the comprehensive examination, thesis defense, and graduation. One or more failing grades, a cumulative grade-point average below 3.0, or failing any of the required examinations are considered evidence of unsatisfactory scholarship and are grounds for dismissal from the University (see <http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-800/procedures-termination-unsatisfactory-scholarship/>).

#### **F. Huck Institutes Resources**

##### *1. The Huck Institutes Travel Award*

The Huck Institutes of the Life Sciences provide Travel Awards to Ph.D. students enrolled in all Huck graduate programs who will give poster and/or oral presentations at domestic or international conferences. To apply for this travel award, submit a request form at <https://wiki.vpr.psu.edu/display/HUCKGPA/Graduate+travel+award+requests>. The application will be sent to the Chair for review and approval. The maximum award for domestic travel is \$750, and the maximum award for international travel is \$1,500. These funds may be used for transportation, lodging, and meeting registration fees; meals and per diem charges are not allowed. Students are eligible to receive this award twice during their study at Penn State (for 2 domestic or 1 domestic and 1 international meeting).

##### *2. Huck Graduate Student Advisory Committee*

This Graduate Student Advisory Committee represents all graduate students in the Huck Institutes of the Life Sciences. Its mission is to promote graduate student interests, facilitate communication



among students and faculty, and help guide students in their career plans. More information is available at:

<https://www.huck.psu.edu/resources/students/graduate-students/graduate-student-involvement/student-leadership/huck-graduate-student-advisory-committee>

### *3. Career Development Resources*

To provide graduate students with the resources necessary to be successful in obtaining and securing a satisfying and rewarding career, the Huck Institutes offer a variety of resources including seminars, conferences, and workshops. See the following website for more details:

<https://www.huck.psu.edu/resources/students/graduate-students/professional-development/professional-development-overview>

### *4. Individual Development Plan*

Students should register at myIDP (<http://myidp.sciencecareers.org/>) and use the resources there to set their career goals. This website provides:

- Exercises to examine your skills, interests, and values
- A list of 20 scientific career paths with a prediction of which ones best fit your skills and interests
- A tool for setting strategic goals for the coming year, with optional reminders to keep you on track

### *5. Huck Institutes Graduate Network on LinkedIn*

Students who may be interested in jobs in industry are encouraged to join the Penn State Huck Institutes Graduate Network on LinkedIn: <https://www.linkedin.com/groups/Penn-State-Huck-Institutes-Graduate-8278299/about> LinkedIn is no longer just a place for business- and marketing-oriented networking – scientists in both industry and academia are beginning to catch on to the benefits of on-line networking.

## SECTION V. APPENDICES

### APPLICATION PROCEDURES AND ADMISSION CRITERIA

#### A. Application Procedures

A pre-application form can be found on the Ecology Program website at:

<https://www.huck.psu.edu/graduate-programs/ecology/applications/pre-application>

Complete the **online Penn State Graduate School application form** at

<http://www.gradschool.psu.edu/admissions/> (you may want to open this link in a new window).

A graduate degree in Ecology is only available at the University Park campus.

Make sure you pay the **application fee. Applications without fee payment cannot be processed.** You can pay the fee online by credit card (follow the instructions associated with the online Graduate School application form). If you are unable to pay online, see the instructions to send payment by check or money order on the Application Fee Form (<http://gradschool.psu.edu/faculty-and-staff/forms/ges/appfee/>).

#### B. Selection of Students

Students will be selected by an Admissions Committee on the basis of overall promise for graduate work.

Requirements for admission shall be:

- (1) A minimum undergraduate grade point average of 3.0 for combined junior and senior years.
- (2) A strong background in at least two of the following areas: Quantitative Science, Physical Science, Life Science, Earth Science, Behavioral Science.
- (3) Satisfactory Graduate Record Examination scores. GRE scores on the verbal and quantitative sections should average in the 50th percentile or higher. The Advanced Biology Test is optional.
- (4) At least three letters of recommendation.
- (5) A statement of educational and career goals.
- (6) **English Proficiency**--The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System). The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 20 on the speaking section for the internet-based test. The minimum composite score for the IELTS is 6.5.
- (7) A commitment from an Ecology faculty member to be the student's advisor.

#### C. Undergraduate Deficiencies

Candidates should have a strong background in basic science and mathematics, including chemistry through organic chemistry, mathematics through calculus, physics, and biology. However, some deficiencies can be addressed in the student's program of study.

# EXPECTATIONS AND MILESTONES

## Expectations of Master's candidates

- Motivation, curiosity and enthusiasm for science
- General understanding of science in area of concentration including methods and techniques, philosophy and state of knowledge
- Be able to use basic statistics, sampling and experimental design
- Be able to communicate well in either written or oral format

## Suggested Milestones for Master's (should be discussed with advisor)

- Course work plan – 1<sup>st</sup> semester
- Research plan – 2<sup>nd</sup> semester; present in Colloquium
- Maintain steady progress on research. Try to reach milestones for remaining year.
- Leave at least 1 full semester for data analysis and writing
- Plan to submit at least one paper for publication at the time of graduation with a second close to submission.

## Expectations for Ph.D. candidates

- Motivated to become a professional scientist
- Broad knowledge of philosophy, history and present state of knowledge in discipline
- Have a broad understanding of ecological techniques, especially in specialty but basic understanding of 'standard' techniques as well
- Expert in specialty. Student may know more than advisor in specific area of dissertation.
- Must have well-developed ability to think clearly, critically and creatively

## Suggested Milestones for a Ph.D. candidate (should be discussed with advisor)

- Coursework plan developed by end of first semester
- Research proposal by end of second semester. If appropriate, submit proposal for funding.
- Qualifying exam taken in 2<sup>nd</sup> or 3<sup>rd</sup> semester
- Comprehensive exam taken in 4<sup>th</sup> or 5<sup>th</sup> semester
- Maintain steady progress on research
- Submission of one paper for publication before graduation with at least two more near time of graduation. Often a review paper can be submitted as well. If the opportunity presents itself, should try to have at least one co-authored paper.

## Expectations of graduate advisor

- Be interested in student's education, welfare, areas of interest and abilities
- Challenge student to achieve but be perceptive to obstacles and handicaps
- Provide broader perspective of science including publishing, grantsmanship, interacting with colleagues, teaching and manuscript review.
- Provide financial support to the extent possible including funds for stipend, tuition, research and travel to meetings and workshops

# GUIDELINES FOR DOCTORAL QUALIFYING EXAMINATIONS

## University Guidelines: (excerpts)

The qualifying examination is administered by the Graduate Faculty in the major program and should be taken early in the student's program. For the Ph.D. student the examination may be given after at least 18 credits have been earned in the graduate courses beyond the baccalaureate. The examination must be taken within three semesters of entry into the doctoral program. The student must be registered as a full or part-time degree student for the semester in which the qualifying examination is taken.

## Ecology Guidelines:

*Goals.* The qualifying examination is given to evaluate the student's general level of knowledge, to evaluate the intellectual capability for the study of ecology at the doctoral level, and to identify weaknesses in the student's preparation. The examination will assess the student's oral and written communication skills—their ability to clearly convey ecological concepts in both spoken and written formats. The examination also will evaluate the student's abilities in problem solving, such as experimental design and interpretation of experimental results, critical thinking, and basic scientific knowledge. Subject areas to be covered include, but are not restricted to, the contents of basic textbooks in biology, ecology and statistics.

*Qualifying Examination Committee.* The Program Chair will appoint a four-member Qualifying Examination Committee to administer the examination. If a dual-title student is taking the exam, a representative of the dual-title program must be present on the Qualifying Examination Committee for that exam. The Qualifying Examination Committee will develop written questions covering the general content specified above. An examinee's advisor shall not participate in the administration of the oral examination or the marking of written examinations. However, before a final decision is made regarding qualification, the advisor will have an opportunity to give input to the Committee.

*Examination.* The examination will occur in two parts, a written and an oral. The written examination will consist of questions in general biology (e.g. anatomy, physiology, evolution, botany, zoology, microbiology), general ecology, basic statistics, and questions that require some synthesis (e.g. experimental design, explanation of experimental results). This examination will require 3-4 hours of writing time on 6-8 questions. (A laptop computer is recommended.)

The written portion of the examination will be read and graded by the Qualifying Examination Committee. Each student will then be given the oral portion of the examination. The student's responses on the written portion of the examination may serve as the basis for initial oral questioning.

*Schedule.* Qualifying examinations will be scheduled twice each year. In the fall semester, the written portion of the exam will be scheduled for the last week of October and the oral portion for the second week of November. In the spring semester, the written portion of the exam for the third week of March and the oral portion for the first week of April.

For students entering with a master's degree or a strong background in ecology from their undergraduate institution, the qualifying examination is recommended to be taken during the second semester of study. For students entering with a baccalaureate degree with only one or two courses in ecology as an undergraduate, the examination will normally be taken during the third semester of study.

*Results.* The Committee will assign grades based on majority opinion (3 of 4 members) using both the written and oral examination results. Grades will be pass, unsatisfactory (fail with opportunity to retake), or fail. A student who receives a grade of unsatisfactory may be offered an opportunity to retake the qualifying examination at the next scheduled examination time. For the second examination, only grades of pass or fail will be given. Failure results in the student not being permitted to continue in the Ph.D. program. Typically the student will receive a M.S. degree. Students receiving a passing grade will be advanced to Ph.D. candidacy.

The examining committee may recommend to the student's advisory committee specific courses or readings based on evidence of weaknesses in the student's preparation. The student's advisory committee will have responsibility for determining the program of study and the content of the comprehensive examination.

## **CHECKLIST OF REQUIREMENTS FOR MASTER'S STUDENTS**

Graduate School Guidelines for Master's students can be found at the following link: <http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/degree-requirements-research-masters/>.

In summary, in order to graduate, Master's students are required to:

- have at least 30 credits
- have 18 credits at the 500 & 600 level
- have 12 credits in courses in the major (not counting 600/610 courses)
- have no missing or deferred grades
- have at least 6 thesis credits (600 or 610)
- have no more than 6 thesis credits with a letter grade other than "R"
- submit an electronic copy of the thesis to the Program Office and a hard-bound copy to the advisor, if required by the advisor. (These copies are in addition to the electronic submission required by the Grad School; <http://www.gradschool.psu.edu/current-students/etd/>)

## CHECKLIST OF GRADUATE SCHOOL REQUIREMENTS FOR PH.D. STUDENTS

Following is a summary of requirements that Ph.D. students must meet before the Graduate School may approve their graduation. Please use this summary as a guide for advising your students. For more detailed information on these and other requirements, please refer to the Graduate School's Graduate Education Policies (<http://gradschool.psu.edu/graduate-education-policies/>).

- **Residence requirement.** Over some twelve-month period during the interval between admission to the Ph.D. program and completion of the Ph.D. program, the student must spend at least two semesters (summer sessions are not included) as a registered full-time student engaged in academic work at the University Park campus. Students should note that 601 cannot be used to meet the full-time residence requirement.
- A Ph.D. student must have satisfied the departmental communication and foreign language requirement before taking the comprehensive examination. For Ecology students this requirement is met when the qualifying exam is passed.
- Three or more months must have elapsed between the passing of the comprehensive examination and the scheduling of the final oral examination.
- The final oral examination must be held within six years of the date the comprehensive examination was passed. If more than six years have passed, a second comprehensive examination must be given before scheduling the final oral examination.
- **Continuous registration requirement.** Students must be registered continuously each semester (excluding summers) beginning with the semester of the comprehensive examination and continuing each semester until the final oral examination is passed.
- **Time limitation.** All requirements including submission of the thesis must be completed within eight years of the qualifying exam date.
- Students **MUST** be registered the semester of both the oral comprehensive examination and the final oral examination – even if taken during the summer session.
- No missing or deferred grades can appear on a student's transcript when the oral comprehensive examination or the final oral examination is scheduled.
- Students must have at least a 3.0 grade point average to schedule an oral comprehensive examination or final oral examination and to graduate.
- Doctoral candidates can be assigned quality letter grades for thesis research (600 on campus, 610 off campus) for a total number of 12 credits. Any credits over this maximum must be assigned as/changed to 'R' before a student will be permitted to graduate.
- Students cannot register for thesis preparation (601/611) until they have passed the comprehensive examination and have met the two-semester residence requirement.

THESE CHECKLISTS DESCRIBE **GRADUATE SCHOOL REQUIREMENTS ONLY**. ADDITIONAL SPECIFIC PROGRAM REQUIREMENTS ARE DETAILED IN SECTION III ABOVE.

## How to Submit a Master's Thesis

- (1) Become familiar with the thesis format requirements by reading the Thesis/Dissertation Guide carefully (<http://www.gradschool.psu.edu/current-students/etd/>)
- (2) Apply for graduation in LionPATH (<https://www.lionpath.psu.edu>) during the semester in which you plan to graduate. Go to <http://www.gradschool.psu.edu/current-students/etd/thesisdissertationperformance-calendar/> for deadlines.
- (3) Upload a draft of your thesis for format review to the eTD Web site (<http://www.gradschool.psu.edu/current-students/etd/format-review/>) by the specified deadline. Corrections and detailed instructions will be returned to you by e-mail within two weeks. (Note: the format review can be done either before or after the oral defense, as long as the deadline is met.)
- (4) Make any changes required by thesis advisor and/or readers. Receive approval in the form of signatures on the Master's Signatory Page <http://www.gradschool.psu.edu/current-students/etd/>.
- (5) Review the thesis one final time to be sure that no further changes are needed. It will not be possible to make corrections after final approval by the Graduate School. Convert the file into a pdf for eTD submission.
- (6) Go to the eTD Web site (<https://etda.libraries.psu.edu>) and upload the final eTD; submit master's approval page to the Office of Theses and Dissertations and pay \$25 thesis fee (payable at <https://secure.gradsch.psu.edu/paymentportal/>).
- (7) Await verification of thesis approval by email. If further changes are required, you will be notified. Your eTD will be accessible on the eTD Web site immediately after graduation unless you have chosen restricted access.
- (8) If bound copies are needed, contact any Multimedia & Print Center on campus (<http://www.multimediaprint.psu.edu/>) or you may use an off-campus source. All copies are the author's responsibility. The Graduate School does not provide copies.

## How to Submit a Doctoral Thesis

- (1) Become familiar with the thesis format requirements by reading the Thesis/Dissertation Guide carefully (<http://www.gradschool.psu.edu/current-students/etd/>).
- (2) Apply for graduation in LionPATH (<https://www.lionpath.psu.edu>) during the semester in which you plan to graduate. Go to <http://www.gradschool.psu.edu/current-students/etd/thesisdissertationperformance-calendar/> for deadlines.
- (3) Upload a draft of your dissertation for format review to the eTD Web site (<http://www.gradschool.psu.edu/current-students/etd/format-review/>) by the specified deadline. Corrections and detailed instructions will be returned to you by email within two weeks. (Note: the format review can be done either before or after the oral defense, as long as the deadline is met.)
- (4) Defend the dissertation and make any changes required by your committee. Receive approval from the committee in the form of signatures on the Doctoral Signatory Page <http://www.gradschool.psu.edu/current-students/etd/>.
- (5) Review the dissertation one final time to be sure that no further changes are needed. It will not be possible to make corrections after final approval by the Graduate School. Convert the file into a pdf for eTD submission.
- (6) Go to the eTD Web site (<http://etda.libraries.psu.edu>) and upload the final eTD; submit the supporting materials to the Office of Theses and Dissertations (Note: It does not matter if you upload first or submit the materials first). Supporting materials are: signed Doctoral Signatory Page, ProQuest/UMI Agreement, Survey of Earned Doctorates, and \$95 fee (the fee can be paid at and all forms can be found at <https://secure.gradsch.psu.edu/paymentportal/>).
- (7) Await notification of eTD approval by email. If changes are required, you will be notified. Your eTD will be accessible on the eTD Web site immediately after graduation unless you have chosen restricted access.
- (8) If bound copies are needed, contact any Multimedia & Print Center (<http://www.multimediaprint.psu.edu/>) or you may use an off-campus source. All copies are the author's responsibility. The Graduate School does not provide copies.



## Guidelines for Advisor-Student Interactions

Effective mentoring, open communication, and ethical professional conduct are essential for a high quality graduate education and research environment. Effective mentoring must be based on a commitment to provide every student access to supportive guidance on a range of professional, ethical and collegial issues. A productive mentorship requires that students are treated respectfully and fairly, and that the mentor serves as a role model - upholding the highest ethical standards. These guidelines embody many of the best practices used by the majority of our faculty here and elsewhere. They are intended to provide a heightened awareness of the need to consciously establish an effectual mentorship based on trust, courtesy, and shared expectations.

### Faculty Advisors/Mentors will:

- provide an environment that is intellectually stimulating, emotionally supportive, safe, and free of harassment;
- be supportive, equitable, accessible, encouraging, and respectful;
- recognize and respect the cultural backgrounds of students;
- be sensitive to the power imbalance in the student-advisor relationship;
- avoid assigning duties or activities that are outside students' academic responsibilities or are detrimental to the timely completion of their degrees;
- respect students' needs to allocate their time among competing demands, while maintaining timely progress towards their degree;
- advise graduate students on the selection of a thesis topic with realistic prospects for successful completion within an appropriate time frame;
- assist students on selecting and forming a thesis committee;
- set clear expectations and goals for students regarding their research and thesis;
- discuss policies and expectations for work hours, vacation time and health contingencies;
- meet regularly and individually with students to provide feedback on research progress and expectations (weekly meetings are recommended);
- provide students with training and oversight in the design of research projects, development of necessary skills, use of rigorous research techniques, and all other aspects of research;
- arrange for the on-campus supervision and advisement of graduate students during extended absences as well as regular contact (e.g. by phone) when possible;
- provide and discuss clear criteria for authorship at the beginning of all collaborative projects;
- encourage participation in professional meetings and try to secure funding for such activities;
- provide career advice, help with interview and application preparation, and write letters of recommendation in a timely manner;
- ensure students receive training in the skills needed for a successful career in their discipline, including oral and written communication and grant preparation;
- schedule at least one meeting each semester to discuss topics other than research, like professional development, career objectives and opportunities, climate, laboratory personnel relations, etc;
- be a role model by acting in an ethical, professional, and courteous manner toward students, staff, and faculty.

**Graduate Students will:**

- acknowledge that they bear the primary responsibility for the successful completion of their degree;
- exercise the highest ethical standards in all aspects of their research, including collection, storage, analysis, and communication of research data;
- complete to the best of their abilities all tasks assigned by the program, including teaching duties;
- be informed about regulations and policies governing graduate studies at the program and graduate school levels and take responsibility for meeting program and graduate school deadlines;
- set up meetings with their mentor and communicate regularly with their thesis committees;
- prepare progress reports and request feedback from their full committee annually;
- be considerate of time constraints and other demands imposed on faculty and staff;
- take an active role in identifying and pursuing professional development opportunities;
- be proactive about improving their research skills, including written and oral presentation skills;
- inform faculty mentors of potential and or existing conflicts and work toward their resolution;
- seek mentoring and support resources beyond their faculty advisor, including other faculty mentors, peers, and organizations;
- consult outside help from graduate program chairs, ombudsmen, or other faculty if conflicts arise with your advisor;

- be aware that if they feel compelled to change advisors or research direction, they may have options and should consult with their program chair;
- always act in an ethical, professional, and courteous manner toward other students, staff, and faculty.

**Programs will:**

- provide students with up-to-date information that includes policies, practices, degree requirements, and resources;
- guide students through lab rotations (when applicable), assist students with selection of their advisor and resolution of student-advisor conflicts
- provide students with contacts and resources for potential conflict resolution in addition to the Program Chair (e.g. ombudsperson, director of graduate studies);
- provide pedagogical training and regular assessment of the teaching activities;
- monitor graduate student progress towards their degrees and professional development, including mentoring meetings, committee meetings, exam completions and other benchmarks appropriate to their discipline;
- provide and monitor training in the ethical conduct of research;
- provide appropriate infrastructure to allow students to complete their education and research in a timely and productive manner;
- establish and communicate policies for emergencies and unplanned situations that may disrupt the work of students and/or faculty;
- encourage and monitor student and faculty adherence to these guidelines.

These Guidelines are endorsed by the **Huck Institutes of the Life Sciences Graduate Education Office** and were adapted from guidelines recommended by the **Eberly College of Science Climate and Diversity Committee**.