**Department of Plant Science**

**College of Agricultural Sciences**

**The Pennsylvania State University**

**Graduate Program in Agricultural and Environmental Plant Science (AEPS) Student Handbook**

#### Policies Effective January 1, 2023

This publication is available in alternative media on request.

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# INTRODUCTION AND GENERAL INFORMATION

This guide describes the requirements for completion of the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) graduate degrees in the Department of Plant Science at Penn State University. The purpose of this document is to help students become familiar with the graduate program in Agricultural and Environmental Plant Science (AEPS) as well as the policies and procedures students need to know in meeting the responsibilities and requirements on the way to achieving their degree.

***Programs of Study in Agricultural and Environmental Plant Science (AEPS)***

The Department of Plant Science in Penn State's College of Agricultural Sciences offers two graduate degree programs in AEPS leading to M.S. and Ph.D. degrees. The plan of study followed by a degree candidate is determined by the candidate's background and interests and is developed jointly by the student and the advisor, with the approval of the student's graduate committee. Department of Plant Science Graduate Faculty members strive to provide students with an academic environment that will foster scholarly and creative activities. Successful completion of a graduate program in AEPS requires demonstration of creativity and the ability to think independently. Students will have an opportunity to develop and display their individual abilities and talents through participation in courses, seminars, research activities, writing, and public speaking.

**The M.S.** is a research-oriented degree, requiring successful completion of a research project and thesis. This degree program is designed for individuals expecting to terminate their formal education with the M.S. degree or to proceed to a Ph.D. degree program. The M.S. degree is the normal prerequisite for the Ph.D. program in the Department of Plant Science. Whether terminal or Ph.D.-oriented, the objectives of M.S. studies are to enhance the student’s understanding of an area of plant science beyond the baccalaureate level and attain scientific research skills. Because most M.S. degree candidates are just beginning their research careers, they typically receive considerable guidance in choosing and executing their thesis research projects. However, upon completion of the M.S. degree, students are expected to have developed the capacity for independent research.

In addition to a thesis, the AEPS M.S. program requires completion of at least 30 course credits at the 400, 500, 600, or 800 level, with at least 18 credits at the graduate level (500 and 600, combined). A minimum of 12 credits in course work (400, 500, and 800 series) and at least 6 credits in thesis research (AEPS 600 or AEPS 610) must be included in the M.S. program. One credit of AEPS 602 ‘Supervised Experience in College Teaching’ is required for completion of the program but does not count towards the 30-course credit requirement for the degree. At least 20 credits must be earned at the University Park Campus.

**The Ph.D.** degree is awarded for creative scholarship and original research. Because this degree is considered essential training for a career in academic teaching and scholarly research, the Ph.D. candidate must demonstrate the ability to perform independent research. To earn the Ph.D. degree, the candidate must (i) satisfy the Penn State Graduate School’s two-semester residence requirement, (ii) complete coursework approved by the candidate’s Ph.D. advisory committee, (iii) accomplish the required research and prepare a dissertation embodying the research findings, and (iv) pass all examinations and complete the requirements prescribed by the AEPS graduate program and Graduate School. A student who has been admitted to the Graduate School and has been accepted into the AEPS Ph.D. program may begin working toward a Ph.D. degree. However, the student has no official status as a Ph.D. candidate until the qualifying examination has been passed. This examination is administered by a committee of faculty members chosen by the student and the student’s advisor and is given early in the student's program (before the end of the third semester of study).

### About the University

The Pennsylvania State University is the land-grant University of the Commonwealth of Pennsylvania. It was chartered in 1855 as the Farmers' High School. During the next century, the school evolved from the Agricultural College of Pennsylvania (1862) to the Pennsylvania State College (1874) and finally, in 1953, to The Pennsylvania State University. The original student body of 69 has grown to over 90,000 across 24 campuses, and full-time faculty has increased from 4 to over 7,000. Eleven undergraduate colleges offer 160 baccalaureate and more than 90 associate degree programs. The Graduate School, established in 1922, administers over 190 major programs. Approximately 4,100 advanced degrees are conferred annually, of which about 700 are doctorate degrees.

***Research Facilities***

The Department of Plant Science and Penn State’s College of Agricultural Sciences maintains numerous facilities for research, including laboratories equipped with the latest instrumentation and computer technology used for plant and soil-related research; state-of-the-art greenhouses; service laboratories for soil and plant analysis; diagnostic centers; as well as research farms for horticultural crops, agronomic crops, and turfgrass. An overview of Penn State’s College of Agricultural Sciences research facilities can be found at: <https://agsci.psu.edu/research/centers-facilities>.

***Housing***

Housing for students is available in private apartments and apartment complexes located in the State College area. Single and married graduate students and married graduate students with children may apply for apartments designated by the University for their use. For details see: <https://liveon.psu.edu/university-park/housing/white-course-graduate-family-apartments>

### State College Area

Penn State’s University Park Campus is located in the State College area (population approximately 42,000 not including students) in central Pennsylvania. Primarily a university town, State College offers many cultural, educational, recreational, and sports events. The area is rich in facilities for skiing, picnicking, hiking, biking, and swimming. State forest and game lands provide excellent venues for hunting and fishing. State College is within a 5-hour drive or bus ride of Washington DC and New York City and within 3 hours of Philadelphia and Pittsburgh. The University Park Airport is only a few miles from the University Park Campus.

### Contact Information for Graduate Program Coordinator and Directors:

Graduate Support Coordinator in Agricultural and Environmental Science

Dept. of Plant Science

11 Tyson Building

The Pennsylvania State University

University Park, PA 16802

Phone: (814) 863-7724

e-mail: slf5335@psu.edu

Dr. Peter Landschoot, Co-Director of Graduate Studies in Agricultural and Environmental Science

Dept. of Plant Science

413 Ag Sciences & Industries Building

The Pennsylvania State University

University Park, PA 16802

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Dr. Jonathan Lynch, Co-Director of Graduate Studies in Agricultural and Environmental Science

Dept. of Plant Science

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The Pennsylvania State University

University Park, PA 16802

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***GRADUATE ASSISTANTSHIPS***

Financing graduate education is an important topic for students who are enrolled at Penn State. There are numerous sources of support from inside the University and from external agencies that provide funding for graduate students.

With rare exception, students admitted to the AEPS graduate program receive a [teaching or research assistantship](https://gradschool.psu.edu/graduate-school-funding/funding/assistantships/) for the duration of their program, which includes a stipend and tuition remission (referred to as grant-in-aid or GIA). Graduate students receiving assistantships are called Graduate Assistants and are expected to support undergraduate instruction and/or undertake research projects under the supervision of their faculty advisor. Assistantship appointments are available only to graduate students who are registered for courses and enrolled in degree programs. Non-degree students and full-time Penn State employees are not eligible for assistantships. Students whose first language is not English will be required to demonstrate [a sufficient level of English language proficiency](http://aplng.la.psu.edu/programs/about-the-aeocpt) through the American English Oral Communication Test prior to receiving a teaching assistantship.

Graduate assistantship appointments in the Department of Plant Science are made for the spring and fall semesters. Although Penn State’s classes last 15 weeks per semester, graduate assistant appointments are for 18 weeks of activities per semester. Thus, the duties in an academic year appointment (36 weeks), as is normally provided for teaching and research assistants, will begin on the Monday following the last day of summer session final exams and continue until the last day of spring semester final exams, not including official University holidays, campus closures for inclement weather, and during spring break and the Thanksgiving holiday break. The summer stipend is provided by the faculty advisor or Department of Plant Science.

There may be exceptional circumstances, such as with specialized maintenance and/or data collection, where assistantship activities must be conducted during University holidays/closures and cannot be delegated to other individuals, or when an experimental protocol runs over months and cannot be interrupted or suspended to allow time away. In such circumstances, the graduate student should be made aware prior to the start of the assistantship appointment involving the affected period, and other time away should be arranged in exchange. Students should consult with their faculty advisor as needed to address any concerns about a request that assistantship activities span University holidays/closures. The Associate Dean for Graduate Student Affairs in the Graduate School serves as ombudsperson for Graduate Students and is available to discuss any student’s specific situation.

Continued assistantship appointment is based on the quality of the student’s performance. Unsatisfactory academic performance in any semester or summer session is sufficient cause for termination of the appointment at the end of that period. Unsatisfactory performance of assistantship duties is also sufficient cause for termination.

In circumstances when paid leave from the activities of a graduate assistantship is necessary, refer to the Graduate School’s Leave of Absence policy ([GSAD-906 Graduate Student Leave of Absence](https://gradschool.psu.edu/graduate-education-policies/gsad/gsad-900/gsad-906-graduate-student-leave-of-absence/)).

Assistantship appointments cover tuition and provide a monthly stipend. Appointments are made at one of several grades in consideration of experience and qualification of the individual. Assistantships are of three types:

Quarter Time: The student normally schedules 9 to 14 credits per semester for fall and spring semester, receives a stipend plus grant-in-aid, and performs tasks that, on the average, occupy approximately 10 hours per week.

Half Time: Most AEPS graduate students receive half-time assistantships. The student normally schedules 9 to 12 credits per fall and spring semester, receives a stipend plus grant-in-aid, and performs tasks that, on the average, occupy approximately 20 hours per week.

Three-Quarter Time: The student normally schedules 6 to 8 credits per fall and spring semester, receives a stipend plus grant-in-aid, and performs tasks that, on the average, occupy approximately 30 hours per week.

A graduate assistant may accept concurrent employment outside the University only with permission from the AEPS Graduate Program Head and the assistant’s graduate faculty advisor.

Graduate assistants must be enrolled at Penn State as graduate students. More specifically, because assistantships are provided as aids to completion of advanced degrees, assistants must be degree seeking and are expected to enroll for credit loads each semester that fall within the limits indicated in the table below. Maximum limits on permissible credit loads are indicated to assure that the student can give appropriate attention both to academic progress and assistantship responsibilities. These considerations give rise to the table of permissible credit loads below**.**

|  |
| --- |
| ***Permissible Credit Loads Per Level of Assistantship*** |
| Level of Assistantship | MinimumCredits Per Semester | Maximum Credits Per Semester |  |  |
| 1/4-time | 9 | 14 |
| 1/2-time | 9 | 12 |
| 3/4–time | 6 | 8 |

In most situations AEPS students do not have to be registered for courses or research credits in summer and receive summer stipends from their faculty advisor. However, Ph.D. students planning to graduate during summer (after the spring semester ends and before the fall semester begins) must be registered for research credits during that summer.

Maintenance of the established credit loads and responsibility for consequences of a graduate student’s change of course load rest with the student and faculty adviser. The course load is a factor in determining whether a graduate student is classified as a full-time or part-time student; has met residence requirements; and is eligible to hold a fellowship, traineeship, assistantship, or departmental or program appointment.

### ****Full-Time Academic Status****

Students holding fellowships, traineeships, or other awards based on academic excellence are required to carry 9 or more credits each semester (fall and spring). A graduate assistant whose semester credit load meets or exceeds the minimum requirements in the above credit table and whose assistantship duties are directly related to his or her degree objectives, is considered by the Graduate School to be engaged in full-time academic work for that semester. A post-comprehensive Ph.D. candidate who is registered for AEPS 601 also is so considered full time.

### ****Part-Time Academic Status****

A student who in any semester is registered for study but who does not meet the criteria for full-time status is considered engaged in part-time academic work for that semester. This includes students registered for AEPS 611.

### Grade Point and Research Progress Requirement for Graduate Assistants

Students on an assistantship must maintain a GPA of 3.0 (4.0 basis). In addition, as assessed during their annual performance evaluation, students must make satisfactory progress toward their degree to retain assistantship support.

### Responsibilities of Graduate Assistants

All graduate students receiving an assistantship within the program, regardless of funding source, are required to perform 20 hours (half-time assistants) or 10 hours (quarter-time assistants) of service per week, related to the functions of the department. This service may include the following:

* 1. General laboratory maintenance
	2. Support of farm and/or greenhouse operations
	3. Literature searches and other library work
	4. Field and laboratory assays for ongoing projects
	5. Data management and statistical analyses
	6. Assay development and preparation of laboratory protocols
	7. Assistance in preparation and grading of quizzes, examinations, and homework exercises
	8. Help in preparing and conducting teaching labs
	9. Assistance in other classroom activities
	10. Assistance in conducting Extension activities
	11. Help in preparation of documents for other Plant Science Department activities
	12. Help set up presentation materials for demonstration activities, such as Ag Progress Days
	13. Other professional activities requested by supervisor or Department Head.

### Academic Integrity

Unfortunately, as in all sectors of society, occasional instances of misconduct occur within the scientific community. Some cases receive more publicity than others, but all result in negative consequences for the perpetrator. Moreover, supervisors and colleagues who may have been completely unaware of the misdeed also suffer in terms of damaged reputations, retraction of published papers, etc. Therefore, all students should review the Academic Integrity section (Policy 49-20) of the “University Faculty Senate Policies and Rules for Undergraduate Students” [47-00, 48-00, and 49-00 Grades | University Faculty Senate (psu.edu)](https://senate.psu.edu/policies-and-rules-for-undergraduate-students/47-00-48-00-and-49-00-grades/#49-20) to familiarize themselves with the University policy concerning academic integrity. In addition to formal courses, these regulations apply to seminars, public presentations, and research-related endeavors. It is the collective responsibility of students and faculty to report suspected breeches of Policy 49-20 to the appropriate authorities.

### Termination for Unsatisfactory Scholarship

Termination of a graduate student’s support or program due to unsatisfactory scholarship or unsatisfactory progress in scholarship shall be provided to the student in advance by written notice. Furthermore, the written communication shall, in general terms, advise the student of the academic reasons for the termination according to the rules of the Graduate School. [GCAC-803 Procedures for Termination of the Degree Program of a Graduate Student for Unsatisfactory Scholarship (psu.edu)](https://gradschool.psu.edu/graduate-education-policies/gcac/gcac-800/gcac-803-procedures-termination-unsatisfactory-scholarship/).

##### *REQUIREMENTS OF THE AEPS GRADUATE PROGRAM*

The AEPS graduate program offers plans of study leading to the M.S. and Ph.D. degrees to students meeting the admission requirements established by the Graduate School and by the AEPS program. These plans are designed to provide the knowledge, training, and attitudes expected of holders of these degrees. Insofar as possible, the pattern of coursework and the area of thesis or dissertation research will be designed to meet the specific interests and needs of the student. These plans of study will be developed within the general procedures and regulations of the Graduate School.

## *Master of Science (M.S.) Degree*

The M.S. degree is oriented towards research and requires the successful completion of coursework as well as a research study and thesis. A student devoting half-time to graduate studies typically requires two years (six to seven semesters) of coursework and research to complete the M.S. degree. This degree program is designed for individuals expecting to terminate their formal education with the M.S. degree or to proceed to a Ph.D. degree program. The M.S. degree is the normal prerequisite for the AEPS Ph.D. program in the Department of Plant Science. Whether terminal or Ph.D.-oriented, the objectives of M.S. studies are to enhance the student’s understanding of an area of plant science beyond the baccalaureate level and attain scientific research skills. Because most M.S. degree candidates are just beginning their research careers, they typically receive considerable guidance in choosing and executing their thesis research projects. However, upon completion of the M.S. degree, the students are expected to have developed the capacity for independent research.

The plan of study followed by a M.S. degree candidate is determined by the candidate's background and interests and is developed jointly by the student and the advisor, with the approval of the student's graduate committee. Department of Plant Science Graduate Faculty members strive to provide students with an academic environment that will foster scholarly and creative activities. Successful completion of a graduate program in AEPS requires demonstration of creativity and the ability to think independently. Students will have an opportunity to develop and display their individual abilities and talents through participation in courses, seminars, research activities, writing, and public speaking.

In addition to a thesis, the AEPS M.S. program requires completion of at least 30 course credits at the 400, 500, 600, or 800 level, with at least 18 credits at the graduate level (500 and 600, combined). A minimum of 12 credits in course work (400, 500, and 800 series) and at least 6 credits in thesis research (AEPS 600 or AEPS 610) must be included in the M.S. program. One credit of AEPS 602 ‘Supervised Experience in College Teaching’ is required for completion of the program but does not count towards the 30-course credit requirement for the degree. At least 20 credits must be earned at the University Park Campus.

**Required core courses**

[AEPS 502](https://bulletins.psu.edu/search/?P=AEPS%20502) Current Issues in Agricultural Innovation 2 credits

AEPS 515 Professional Development for the Plant Sciences 3 credits

[AEPS 555](https://bulletins.psu.edu/search/?P=AEPS%20555) Effective Scientific Communications 3 credits

[AEPS 602](https://bulletins.psu.edu/search/?P=AEPS%20602) Supervised Experience in College Teaching\* 1 credit

[AEPS 590](https://bulletins.psu.edu/search/?P=AEPS%20590) Colloquium (Final Semester) 1 credit

\*Even though one credit of AEPS 602 is required, it cannot be counted towards fulfilling the course credit requirement for the degree.

[AEPS 502](https://bulletins.psu.edu/search/?P=AEPS%20502) ‘Current Issues in Agricultural Innovation’ is taught in the fall in alternate years; **thus, M.S. students should take this course during the first fall semester it is offered.**

**Electives:** Choose appropriate courses in statistical methods (minimum of one 3 credit course) at 400-800 level by the end of the third semester.

Choose from 400-800 level courses in AGRO, AEPS, BIOL, ENT, FOR, HORT, INTAD, PLBIO, PPATH, PPEM, SOILS, STAT, TURF, or related areas with approval of advisory committee.

**Research credits:** [AEPS 600](https://bulletins.psu.edu/search/?P=AEPS%20600) or [AEPS 610](https://bulletins.psu.edu/search/?P=AEPS%20610) Course numbers 600 (on campus) and 610 (off campus) are available for credit in thesis or dissertation research. No other course numbers may be used for thesis research work. The bursar assesses charges for these courses at the current rate of tuition according to the student’s status at the time of registration. A minimum of 6 thesis research credits (AEPS 600 or AEPS 610) must be included in the M.S. program and are typically assigned an “R” grade instead of a quality grade (A, B, or C). The Graduate Council has established limits on the total number of research credits that can be assigned quality grades in a student’s program (i.e., A, B, C; other than R): 6 credits for M.S. candidates and 12 credits for Ph.D. candidates.

**Teaching credits:** [AEPS 602](https://bulletins.psu.edu/search/?P=AEPS%20602) A teaching experience is required of all M.S. students in the Department. of Plant Science. This experience shall consist of one semester of classroom teaching assistance documented by at least **one credit** of AEPS 602. NOTE: Even though one credit of [*AEPS 602*](https://bulletins.psu.edu/search/?P=AEPS%20602) is required, it cannot be counted towards fulfilling the credit requirement for the degree. Equivalent teaching experience completed outside of the Department may be substituted for this requirement. An example of equivalent experience could involve development of a Cooperative Extension program that involves clientele-oriented oral presentations and assistance with publications. Students may waive the formal classroom teaching requirement only by written concurrence of the thesis adviser, Graduate Program Director, and Department Head.

**Scholarship and Research Integrity (SARI) training:** SARI is a responsible conduct of research (RCR) education program for graduate students, postdocs, and faculty at Penn State. The SARI program is designed to create an awareness of ethical principles and established professional norms in the performance of all activities related to scholarship and research. The goal of this program is to foster trust among scholars and researchers and to increase the public’s support for research.

All scholars confront ethical issues, and training can be beneficial to prepare graduate students to address ethical challenges that may arise in their work. Penn State requires RCR training for all graduate students to ensure the ethical conduct of research and scholarship at the University. In addition, funding agencies including [NIH](http://grants.nih.gov/grants/guide/notice-files/NOT-OD-10-019.html), [NSF](http://edocket.access.gpo.gov/2009/E9-19930.htm), and [NIFA](https://nifa.usda.gov/responsible-and-ethical-conduct-research) have requirements for RCR training for students, postdoctoral researchers, and other trainees.

Penn State’s SARI program has two components:

1. **Online Training:** Completion of at least one online course in [CITI (Collaborative Institutional Training Initiative)](http://citi.psu.edu/): Responsible Conduct of Research (RCR), Human Subjects Research (IRB), or Animal Research (IACUC). The RCR course is recommended for AEPS graduate students. Researchers funded by National Institute of Food and Agriculture (NIFA) must take the RCR course in CITI, as outlined in the terms and conditions of all NIFA grants. Note: The online CITI training is different from the CATS submission trainings, which do not count toward SARI credit.
2. **Discussion-Based Education**: Participation in a minimum of 5 hours of in-person, discussion-based educational activities that address topics related to the RCR is required by all AEPS graduate students before graduation. This is a one-time requirement that does not need to be fulfilled each year. A 2-hour workshop offered each spring by Department of Plant Science faculty, 1 hour is offered in [AEPS 502](https://bulletins.psu.edu/search/?P=AEPS%20502), and 3 hours are offered in AEPS 515. Certain Rock Ethics events can also count for SARI credit. The Office of Research Protections (ORP) offers [workshops for SARI credit](https://www.research.psu.edu/education/sari/sari-events) in the Fall and Spring Semesters**. Only 2 of the 5 hours required can be obtained from workshops outside of the Department.**

AEPS Graduate students must complete **both** the online AND discussion-based SARI components. The ORP highly recommends the RCR course be taken in the first year of enrollment. SARI is tracked in LionPath by the AEPS Graduate Program Coordinator.

**M.S. student advisory committee:** The M.S. student advisory committee must consist of at least three members of the Graduate Faculty, including the student’s faculty advisor and two additional members. At least one member must be outside of the AEPS program. At times it may be desirable to have two faculty serve as co-advisors. If a minor is selected, a faculty member representing the minor field will serve on the advisory committee. Selection of the committee shall be by the advisor and student, in consultation and agreement with faculty members asked to serve.

The M.S. advisory committee should be appointed during the first semester of enrollment. The advisor, in consultation with the committee, is responsible for selection and direction of the student’s plan of study and for selection and supervision of thesis research. A plan of the proposed thesis research is to be submitted to the committee by the student by the end of the second semester. The committee will subsequently meet with the student to provide feedback.

**Proposal meeting:** The proposal meeting should take place by the end of the second semester of the student’s M.S. program. This meeting involves presentation of the student’s thesis research proposal to the advisory committee and approval of a course work plan. A written proposal (including hypothesis, objectives, and methods) should be delivered to each member of the committee at least one week before the proposal meeting. The AEPS Graduate Program Coordinator should be notified ahead of the meeting by completing the proposal meeting form located at the following site:

<https://pennstate.qualtrics.com/jfe/form/SV_9LvKbbSptbX0mMK>.

In the meeting, the student will present the research plan at the meeting for discussion and recommendations by members of the committee. Changes agreed upon by the committee members, adviser, and student will be incorporated in a revised research plan. If a new draft is required, it will be completed within one month of the meeting. Subsequent revisions of the plan may be accomplished by consulting committee members individually. Copies of each revision will be distributed to committee members for their concurrence.

The advisory committee will consider the coursework plan in the context of the student’s prior preparation, performance on the competency evaluation, and professional goals. The committee may approve the plan as presented or require additional courses.

**Colloquium**: Sometime during their final semester, M.S. degree candidates must present a scheduled public seminar of their thesis work. This involves taking 1 credit of [AEPS 590](https://bulletins.psu.edu/search/?P=AEPS%20590) and presenting a seminar to the Department of Plant Science faculty and graduate students. The seminar requirement will have equivalent status to all other requirements for the M.S. degree and certification of graduation requirements will not be granted without evidence that the seminar has been given.

**Minimum grade-point average:** A minimum grade-point average of 3.0 (4.0 basis) for graduate work done at the University is required for graduation.

**Final oral exam (thesis defense)**: Upon completion of the thesis, the student is required to pass an oral examination given by the student’s M.S. advisory committee. The final oral exam will be based on the student’s written thesis which shall be prepared in accordance with the regulations of the Graduate School and the AEPS graduate program:

<https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/>.

As author of the thesis, the M.S. student is responsible for meeting all the Graduate School deadlines, format and signature requirements, as well as the thesis/dissertation fee. Students must first apply to graduate on LionPATH at the beginning of the semester they plan to defend the thesis. To apply, see [registrar.psu.edu/graduation/intent.cfm](http://www.registrar.psu.edu/graduation/intent.cfm) for instructions.

### The completed M.S. thesis must be submitted to the advisory committee at least 10 days prior to the scheduled final oral exam. The thesis should be in a technical and grammatical form that is acceptable to the committee and conform to requirements in the [Thesis and Dissertation Guide](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/thesis-and-dissertation-guide).

### The advisory committee typically requests a presentation during the oral exam. A favorable vote of a two-thirds majority of the committee is required for passing. The student should be able to marshal a satisfactory defense of the methods, findings, and conclusions of the thesis, and be able to relate the findings to pertinent literature and demonstrate acceptable knowledge in the major and minor fields.

### After passing the exam the advisory committee will sign the appropriate forms for completion of the M.S. degree. If a candidate fails the oral exam, the committee will determine whether another exam may be taken at a later date. Only one re-examination shall be offered.

After passing the oral exam the student makes edits suggested by the advisory committee members. Once all edits are completed and accepted by the committee, the student uploads a draft of the thesis for format review (pdf only) to the eTD website [submit-etda.libraries.psu.edu/author](https://submit-etda.libraries.psu.edu/author). All M.S. theses must be submitted electronically. When a thesis is submitted to the eTD website, it must meet the [deadline](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/thesis-dissertation-performance-and-oral-presentation-deadlines-calendar/) requirement and formatting standards set forth in the [Thesis and Dissertation Guide](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/thesis-and-dissertation-guide/). Corrections and detailed instructions will be returned to the student by email. For more information on electronic theses and dissertations (eTDs), visit the [eTD website](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/about-etds/).

# Checklist for Scheduling a Thesis Defense and Submitting a M.S. Thesis

* Become familiar with format requirements in the Graduate School’s Thesis and Dissertation Guide.
* Apply to graduate on LionPATH during the semester you plan to graduate. Go to: [registrar.psu.edu/graduation/intent.cfm](http://www.registrar.psu.edu/graduation/intent.cfm) for instructions. See:  [gradschool.psu.edu/current-tudents/etd/thesisdissertationperformance-calendar/](http://gradschool.psu.edu/current-students/etd/thesisdissertationperformance-calendar/) for deadlines.
* Schedule the oral examination with M.S. advisory committee.
* Following the exam make any changes required by the advisory committee.
* 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 Office of Theses and Dissertations. Convert the file to a PDF for eTD submission. If you cannot do this, contact the Office of Theses and Dissertations for assistance.
* Go to the eTD website ([submit-etda.libraries.psu.edu/author](https://submit-etda.libraries.psu.edu/author)) and upload the final eTD. The $25. thesis fee can be paid at [secure.gradsch.psu.edu/paymentportal](https://secure.gradsch.psu.edu/paymentportal/).
* Await notification of thesis approval by email. If changes are required, you will be notified. Your eTD will be accessible on the eTD website immediately after graduation unless you have chosen restricted access.

For bound copies, contact any Multimedia & Print Center on campus ([multimediaprint.psu.edu](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.

### Links to Thesis Submission Requirements

* [Thesis and Dissertation Guide](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/thesis-and-dissertation-guide)
* [Thesis, Dissertation, Performance, and Oral Presentation Calendar](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/thesis-dissertation-performance-and-oral-presentation-deadlines-calendar/)
* [About eTDs](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/about-etds/)
* [Copying and Binding](http://www.multimediaprint.psu.edu/thesis/)
* [The Most Common Mistakes](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/how-to-avoid-the-most-common-mistakes/)
* [How To Submit a Master's Thesis](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/how-to-submit-a-masters-thesis/)
* [Format Review Instructions](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/format-review/)
* [Acknowledgement of Federal Funding](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/acknowledgement-of-federal-funding/)

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### Checklist of Graduate Coursework for M.S. Degree

**Course Number and Title Credits Grade**

**Required Core Courses and Thesis Research Credits:**

AEPS 502 ‘Current Issues in Agricultural Innovation’ (2 credits) \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_

AEPS 515 ‘Professional Development for the Plant Sciences’ (3 credits) \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_

AEPS 555 ‘Effective Scientific Communications’ (3 credits) \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_

AEPS 602 ‘Supervised Experience in College Teaching’\* (1 credit) \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_

AEPS 590 ‘Colloquium’ (Final Semester) (1 credit) \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_

AEPS 600 or 610 ‘Thesis Research’ (minimum – 6 credits) \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_

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\*Even though 1 credit of AEPS 602 is required it cannot be counted towards fulfilling the 30-credit course requirement for the degree.

**Electives:**

Statistical methods (minimum 3 credits at 400, 500, or 800-level)

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Nine credits of AEPS 500-level core courses and 6 credits of AEPS 600 or 610 Thesis Research credits count towards the required 18 credits of 500/600 courses, combined. For the remainder of 500-level course-credit requirement and to meet the 30-credit total course credit requirement (400-800 level courses), choose from AGRO, AEPS, BIOL, ENT, FOR, HORT, INTAD, PLBIO, PPATH, PPEM, SOILS, STAT, TURF, or related areas with approval of M.S. advisory committee.

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### Checklist for Advisory Committee, Proposal, Final Exam, and Other Requirements for M.S. Degree

 DATE ACTION

1. English Oral Proficiency Test (AEOCPT – International only) \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Appointment of advisory committee \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_

The M.S. student’s advisory committee must consist of at least three members of the Graduate Faculty, including the student’s faculty advisor and two additional members. At least one member must be outside of the AEPS program.

NAME DEPARTMENT

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3. Proposal of thesis presented to advisor. Title: DATE ACTION

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4. Establishment and approval by advisory committee of

Program of study and research \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_

1. Scholarship and Research Integrity (SARI) Program \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_
2. Annual Progress Meetings \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_

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1. Coursework completed \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_
2. Apply for Graduation in LionPATH \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_
3. Delivery of thesis to advisory committee \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_
4. Final examination (defense) \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_
5. Final thesis copy signed by advisory committee and

 Graduate Program Director \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_

1. Thesis uploaded and accepted by the Graduate School \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_

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

The objective of the Ph.D. degree is to accomplish original, valid, and important research. Since the degree is the training ground for a career in academic teaching and scholarly research, the Ph.D. student must demonstrate the ability to perform independent research.

A student who has been admitted to the Graduate School and the AEPS Ph.D. program may begin working toward a Ph.D. degree. However, the student has no official status as a Ph.D. candidate and no assurance of acceptance as a Ph.D. candidate (hereafter referred to as Ph.D. student) until the qualifying examination has been passed. This examination is administered by the Department of Plant Science and AEPS program and is given early in the student's program.

The plan of study followed by a Ph.D. degree student is determined by his or her background and interests. Following successful completion of the qualifying exam, the student’s academic program is developed jointly by the student and the faculty advisor, with the approval of the student's Ph.D. advisory committee. Department. of Plant Science Graduate Faculty members strive to provide students with an academic environment that will foster scholarly and creative activities. Successful completion of a graduate program in AEPS requires demonstration of an ability for independent thinking and creativity. Students will have an opportunity to develop and display their individual abilities and talents through participation in courses, seminars, and research activities.

To earn a Ph.D. degree, the student will (i) satisfy the Graduate School residence requirement, (ii) complete coursework approved by the Ph.D. advisory committee, (iii) accomplish the required research and prepare a dissertation embodying the research findings, and (iv) pass all examinations and complete the requirements prescribed by the AEPS graduate program and Graduate School.

**Residence requirement:** Over a twelve-month period, the Ph.D. student must spend at least two consecutive semesters, exclusive of summer sessions, as a registered full-time student engaged in academic work at the University Park Campus. AEPS 601 and AEPS 611 cannot be used to meet this requirement.

A full-time University employee enrolled in the AEPS Ph.D. program must be registered for 6 credits or more each semester in which residency is declared and must be certified as a full-time employee by the Head of the Dept. of Plant Science. In exceptional cases, the Head of the AEPS program may certify to Graduate Enrollment Services that the student is devoting half time or more to graduate studies in lieu of registered credits. This requirement must be satisfied at the University Park Campus and must be satisfied prior to the semester in which the final oral examination is administered.

**Required courses:** The course requirements listed below are in addition to Graduate Policies listed under [GCAC-600 Research Degree Policies.](http://gradschool.psu.edu/graduate-education-policies/)

[AEPS 502](https://bulletins.psu.edu/search/?P=AEPS%20502) Current Issues in Agricultural Innovation 2 credits

AEPS 515 Professional Development for the Plant Sciences 3 credits

[AEPS 555](https://bulletins.psu.edu/search/?P=AEPS%20555) Effective Scientific Communications 3 credits

[AEPS 602](https://bulletins.psu.edu/search/?P=AEPS%20602) Supervised Experience in College Teaching\* 2 credits

[AEPS 590](https://bulletins.psu.edu/search/?P=AEPS%20590) Colloquium (Final Semester) 1 credit

\*Even though two credits of AEPS 602 are required, they cannot be counted towards fulfilling course credit requirements for the Ph.D. degree.

Students who have completed AEPS 502, 515, and 555 as part of the AEPS M.S. degree program are not required to take these classes again in the Ph.D. program. However, students who have completed 1 credit of AEPS 602 in the AEPS M.S. program and have transitioned to the AEPS Ph.D. program are required to take 2 credits of AEPS 602.

**Electives:** Choose 6 credits of appropriate coursework in statistical methods at the 400-800 level. Choose from 400-800 level courses in AGRO, AEPS, BIOL, ENT, FOR, HORT, INTAD, TURF, PLBIO, PPATH, PPEM, SOILS, STAT or related areas with approval of the Ph.D. advisory committee. Coursework should be completed prior to the comprehensive exam.

Minimum Number of Credits: 30 beyond the baccalaureate degree from an accredited college or university.

Minimum Grade-Point Average: A minimum grade-point average of 3.0 (4.0 basis) for graduate work completed at the University is required for graduation.

**Research credits:** AEPS 600 (on campus) and AEPS 610 (off campus) are available for credit in dissertation research. The bursar assesses charges for these courses at the current rate of tuition, according to the student’s status at the time of registration.

AEPS 601 and AEPS 611, with associated special fees, are only available to Ph.D. degree students who have passed the comprehensive examination and met the two-semester residence requirement. They may be used for dissertation preparation work during the later stages, when the academic activity of the student consists partly (AEPS 611) or solely (AEPS 601) of work on the completion of research and writing of the dissertation.

The student may register for AEPS 601 if engaged full-time in the preparation of a dissertation, or for AEPS 611 if engaged part-time in dissertation preparation. Registration under these numbers will maintain status as a full-time (601) or part-time (611) Ph.D. student during the interval that begins at the time he or she passes the comprehensive examination and meets the two-semester residence requirement and ends at the time the Ph.D. committee accepts the dissertation.

The Graduate Council has established limits on the total number of research credits that can be assigned quality grades (A, B, etc.) in a Ph.D. student’s program: 12 credits. Course numbers 601 and 611 do not carry academic credit; hence, candidates for the Ph.D. degree do not receive grades for noncredit registrations. AEPS 601 and AEPS 611 are entered on the academic transcript only to indicate the registration and the nature of the student’s academic activity. AEPS 601 and AEPS 611 may not always appear in the Schedule of Courses for each semester, but they are available for registration each semester.

**Teaching credits:** A teaching experience is required of all Ph.D. students in the Department of Plant Science. This experience shall consist of two semesters of classroom teaching assistance documented by at least two credits of [AEPS 602](https://bulletins.psu.edu/search/?P=AEPS%20602). Equivalent teaching experience completed outside of the Department may be substituted for this requirement.  An example of equivalent experience could involve development of a Cooperative Extension program that involves clientele-oriented oral presentations and assistance writing publications. Students may waive the formal classroom teaching requirement only by written concurrence of the faculty advisor, Graduate Program Director, and Department Head.

**Summer registration:** In most situations AEPS graduate students do not have to be registered for courses or research credits in summer and receive summer stipends from their faculty advisor. However, Ph.D. students planning to graduate during summer (after the spring semester ends and before the fall semester begins) must be registered for research credits during that summer.

**Off-campus and transfer credits:** In accordance with guidelines set forth by the Graduate School, the following types of off-campus and transfer credits may be applied toward requirements for the Ph.D. degree:

1. A maximum of 10 credits of high-quality graduate work (credits must be equivalent to 400-level or higher at Penn State) transferred from a regionally accredited U.S. institution or a recognized degree-granting international institution may be applied toward the requirements of a graduate degree. However, credits earned to complete a previous degree, whether at Penn State or elsewhere, may not be applied to a graduate degree program at Penn State, except for those students who are approved to double-count credits as part of an approved concurrent or integrated undergraduate-graduate degree, or those students approved by the Graduate School to receive a Master’s Degree Along the Way to a Ph.D. degree. For more information see: [Graduate Admissions (psu.edu)](https://gradschool.psu.edu/graduate-admissions/)
2. A student may register for research performed away from the University Park Campus, provided it is approved by the faculty advisor and the Head of the AEPS graduate program.

**Scholarship and Research Integrity (SARI) training**: SARI is a responsible conduct of research (RCR) education program for graduate students, postdocs, and faculty at Penn State. The SARI program is designed to create an awareness of ethical principles and established professional norms in the performance of all activities related to scholarship and research. The goal of this program is to foster trust among scholars and researchers and to increase the public’s support for research.

All scholars confront ethical issues, and training can be beneficial to prepare graduate students to address ethical challenges that may arise in their work. **Penn State requires RCR training for all graduate students to ensure the ethical conduct of research and scholarship at the University.** In addition, funding agencies including[NIH](http://grants.nih.gov/grants/guide/notice-files/NOT-OD-10-019.html), [NSF](http://edocket.access.gpo.gov/2009/E9-19930.htm), and [NIFA](https://nifa.usda.gov/responsible-and-ethical-conduct-research) have requirements for RCR training for students, postdoctoral researchers, and other trainees.

Penn State’s SARI program has two components:

1. **Online Training:** Completion of at least one online course in [CITI (Collaborative Institutional Training Initiative)](http://citi.psu.edu/): Responsible Conduct of Research (RCR), Human Subjects Research (IRB), or Animal Research (IACUC). The RCR course is recommended for AEPS Ph.D. students. Researchers funded by National Institute of Food and Agriculture (NIFA) must take the RCR course in CITI, as outlined in the terms and conditions of all NIFA grants. Note: The online CITI training is different from the CATS submission trainings, which do not count toward SARI credit.
2. **Discussion-Based Education**: Participation in a minimum of 5 hours of in-person, discussion-based educational activities that address topics related to the Responsible Conduct of Research (RCR) is required by all AEPS graduate students before graduation. This is a one-time requirement that does not need to be fulfilled each year. A 2-hour workshop offered each spring by Department of Plant Science faculty, 1 hour is offered in [AEPS 502](https://bulletins.psu.edu/search/?P=AEPS%20502), and 3 hours are offered in AEPS 515. Certain Rock Ethics events can also count for SARI credit. The Office of Research Protections (ORP) offers [workshops for SARI credit](https://www.research.psu.edu/education/sari/sari-events) in the Fall and Spring Semesters**. Only 2 of the 5 hours required can be obtained from workshops outside of the Department of Plant Science.**

AEPS graduate students must complete **both** the online and discussion-based SARI components. The ORP highly recommends the Responsible Conduct of Research (RCR) course be taken in the first year of enrollment. SARI is tracked in LionPath by the AEPS Graduate Program Coordinator.

Ph.D. students who completed SARI requirements for a M.S. degree do not have to complete additional SARI requirements.  However, CITI training for human subjects or animal research protocols must be renewed every three years.

**Qualifying examination:** The purpose of this exam is to assess whether the student is capable of conducting independent Ph.D. research based on critical thinking, basic intellect, attitude, and previous training. It is also designed to determine if the student can demonstrate a satisfactory level of competence in the use of the English language, including reading, writing, and speaking. This oral exam is conducted by the student’s faculty advisor and prospective Ph.D. advisory committee members. The student cannot be considered a Ph.D. candidate or form a formal Ph.D. advisory committee prior to passing the qualifying exam.

The qualifying examination must be taken within three semesters (not including the summer semester) of enrolling in the AEPS Ph.D. program. Students who have been identified as master’s-along-the-way upon admission into the graduate program may be allowed an extension such that the three-semester time limit will begin upon completion of the M.S. degree. Students pursuing dual-title degrees must take the qualifying examination within four semesters (not counting the summer semester) of entry into the Ph.D. program.

To be eligible to take the qualifying examination the student must:

* + 1. Have earned at least 18 credits in courses counted toward the graduate degree. These may be graduate credits earned previously at other recognized institutions from which transfer credits would be accepted, or the equivalent as determined and documented by the program.
		2. Have a grade-point average of 3.00 or greater for work done at the University while a graduate student.
		3. Have no incomplete or deferred grades.
		4. Be in good academic standing and registered as a full-time or part-time graduate degree student for the semester (excluding summer session) in which the qualifying examination is taken.

Process: The student meets with his or her Ph.D. faculty advisor to ensure that all the requirements for the examination have been met, to discuss potential exam committee members, and to arrange possible dates and locations for the qualifying examination. Typically, the student selects faculty that will likely serve on the Ph.D. advisory committee after passing the qualifying examination. The student and/or advisor then contacts each member of the committee and arranges a mutually agreeable date and time for the qualifying examination.

When all arrangements have been made with the examination committee members, the student will complete the qualifying exam form: <https://pennstate.qualtrics.com/jfe/form/SV_eR12jwno262g3Mq> and contact the AEPS Graduate Program Coordinator with the date, time, and location of the examination.

The Graduate Program Coordinator will then file the necessary paperwork with The Graduate School. The Graduate School will verify that all requirements have been met and will then forward the exam paperwork to the Graduate Program Coordinator. This paperwork will then be given to the examination committee chair for the date of the examination.

Qualifying exam requirements: The student will prepare a written summary of a challenging research journal article related to the student’s area of research interest selected by the student’s advisor (in consultation with the student). The summary will be submitted to the examining committee at least one week before the oral qualifying examination date. The student should also prepare a packet consisting of undergraduate and graduate transcripts, an abstract from the student’s M.S. thesis (and any other relevant publications), and the goal statement from the admissions application. This packet should be distributed to the examination committee members at least one week before the exam date. Additional questions concerning the examination should be directed to the student’s faculty advisor or the Graduate Program Director.

At the beginning of the exam, the student will make a 15-minute oral presentation summarizing the research journal article. Each member of the exam committee will ask questions of the student during or after the presentation and rate the student’s performance. This exam also includes an evaluation of English competency. Committee members will determine whether the student should take additional courses or actions to improve English competency.

After the oral presentation, and with time permitting, each exam committee member will have up to 30 minutes to question the student. At the end of the questioning period, the student will be asked to leave the room and the committee members will evaluate the student’s performance. The student will then be asked to return to the exam room and be informed of the committee’s decision.

#### Evaluation of performance will include one of the following: Pass without reservation; failure, with an opportunity to retake the exam at a later date (no more than one retake, at a date no later than one month following the first examination, will be allowed); or failure without the opportunity to retake the exam. At least two thirds of the exam committee must vote in favor of the student passing the qualifying exam.

#### The exam committee chair (typically the student’s advisor) submits the examination results and forms with signatures to the Graduate Program Coordinator immediately following the examination. The outcome of the examination will be reported to the Graduate School by the Graduate Program Coordinator.

#### Improvement of English Competency: Students with English deficiencies must schedule remedial undergraduate courses as soon as possible after the candidacy examination. Advanced (400- and 500-level) courses may be taken when convenient but must be completed before the comprehensive examination is scheduled. The choice of appropriate remedial and advanced courses will be made by the student’s advisor and Ph.D. advisory committee.

Qualifying Examination for students enrolled in a dual-title degree program: If the Ph.D. student is also enrolled in a dual-title graduate degree program the qualifying examination requirement shall be satisfied by one of the following:

* + - 1. Ideally, a single qualifying examination that incorporates content from both the graduate major program and the dual-title program. The qualifying examination committee must include at least one member of the Graduate Faculty from the dual-title program.
			2. In cases where the timing of the qualifying examination in the major area precludes the inclusion of the dual-title area, the dual-title program may choose to examine proficiency in the dual-title area at a later time, but no later than the end of the fourth semester (not counting summer semesters) of entry into the major Ph.D. program.
			3. Dual-title programs may choose to allow the qualifying examination in the major area alone to satisfy the requirements for the dual-title program.

**Ph.D. committee:** Each Ph.D. student must have an appointed Ph.D. committee to guide their research training. Committee selection is typically based on faculty expertise in the student’s research area, and requests to serve are made by the student. The Ph.D. committee shall be nominated to the Graduate School by the AEPS Graduate Program Head as soon as possible after successful completion of the qualifying examination. Ph.D. committees must be approved by the Dean of the Graduate School.

Ph.D. Committee Member Roles: A student’s Ph.D. committee must consist of at least four members of the Graduate Faculty. At least two of these four members shall be from the AEPS graduate program.

Each committee shall have a Ph.D. committee chair, Outside Field Member, Outside Unit Member, and include the student’s faculty adviser. The Ph.D. committee chair and adviser are typically one and the same. For students pursuing a graduate minor, the Ph.D. committee shall include a Minor Field Program Member representing each graduate minor. For students pursuing a dual-title degree, either the Ph.D. committee chair or a co-chair must be a Graduate Faculty member of the dual-title program.

1. Outside Field Member: Each Ph.D. advisory committee shall have appointed at least one Outside Field Member. The Outside Field Member must have a disciplinary expertise different from the student’s primary field of study and is responsible for broadening the disciplinary perspective available to the student and the committee. The Outside Field Member may be from student’s graduate program but may not also serve as a major program member. In cases where the student is also pursuing a dual-title program, any dual-title Graduate Faculty member of the advisory committee may serve as the Outside Field Member.
2. Outside Unit Member(s): Each advisory committee shall have appointed at least one Outside Unit Member. The Outside Unit Member is responsible for bringing to the attention of the student and the committee non-academic issues (including, for example, conflicts of interest) that may impact a student’s progress. Outside Unit Members must have their primary academic appointment in an administrative unit different than the advisory committee chair(s) and faculty advisor(s).
3. Minor Program Member(s): Advisory committees assigned to students pursuing graduate minors shall include at least one Minor Program Member for each minor. Each graduate minor pursued by a student shall be represented by at least one Minor Program Member who is a member of the Graduate Faculty and a member of that minor graduate program. Minor Program Members are responsible for providing the students and the committee with information, advice, and perspective on student progress in fulfilling the graduate minor requirements in the graduate program they represent.
4. Special Members: Advisory committees may include Special Members who are not members of the Graduate Faculty but are otherwise qualified and have expertise in the student’s research area. Special members do not have to be affiliated with Penn State.

Annual Review of Advisory Committee Membership: It is crucial that all committee members remain actively engaged in the guidance of the student through the completion of their program. The Head of the AEPS graduate program shall review annually each student’s committee to ensure that all members continue to qualify for service in their designated roles. The Graduate Program Head is responsible for promptly making any necessary changes and informing the Graduate School.

When Advisory Committee Members Retire or Become Emeritus.

1. Committee members who retire or become emeritus may continue to serve for the duration of the student’s program if they were appointed to the committee in this role prior to retirement, and they have the continuing approval of the student’s Graduate Program Head and the Graduate School. In the case of students pursuing a dual-title degree, the dual-title Graduate Program Head must also approve.
2. It is the responsibility of the Graduate Program Head to ensure that all committee members continue to qualify for service in their designated roles. The Head of the AEPS graduate program will review the committee membership whenever any committee member retires to ensure that students receive expert faculty guidance through their dissertation project.

When Advisory Committee Members Leave the University: Committee members in any role who leave Penn State for reasons other than retiring or becoming emeritus may maintain their committee appointment for up to one year with the approval of the AEPS Program Head and the Dean of the Graduate School.

Other Changes in Advisory Committee Membership: If the need for committee membership change is required, whether at the time of an annual review or otherwise, the Head of the AEPS program will promptly make the necessary changes and notify the Director of Graduate Enrollment Services.

The Ph.D. committee must meet all Graduate Council requirements; refer to [GCAC-602 Ph.D. Committee Formation, Composition, and Review – Research Doctorate](http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-602-phd-committee-formation/). Ph.D. students must complete the Ph.D. committee appointment form and obtain signatures of committee members: <https://www.eecs.psu.edu/assets/forms/ee/grad-forms/PhD-Committee-Appointment-Signature-Form.pdf>

**Proposal meeting:** Following successful completion of the qualifying exam and selection of a Ph.D. committee, the student will prepare a written research proposal, including hypothesis, objectives, and methods, for presentation to and approval by the Ph.D. advisory committee. A proposal meeting form should be completed in advance of the committee meeting: <https://pennstate.qualtrics.com/jfe/form/SV_9LvKbbSptbX0mMK>

A copy of the proposal should be delivered to each member of the committee at least one week before the scheduled meeting. The committee will suggest modifications to be considered by the student and the faculty adviser. At the conclusion of the proposal presentation and approval meeting, each committee member must rate the student’s dissertation proposal. If a new draft of the research proposal is required, it must be completed within one month of the proposal meeting. Copies of the revision should be distributed to committee members for their concurrence. An assessment of the proposal meeting must be completed and signed by each committee member. Assessment forms are available from the Graduate Program Coordinator.

**Comprehensive exam:** This examination may be taken only after the Ph.D. student has demonstrated English competency, and after the student has completed a substantial amount of his/her required course work. Students are required to have a minimum grade point average of 3.0 (4.0 basis) for graduate courses completed at this University at the time the comprehensive examination is taken.

The examination is officially scheduled and announced by the Dean of the Graduate School upon recommendation of the Ph.D. advisory committee. It will include both written and oral components and will be administered by the student’s committee. A candidacy exam form should be completed in advance of the exam: <https://pennstate.qualtrics.com/jfe/form/SV_ebrQQ8sj99AxfJI>

The written component, which should be completed within one week, will consist of questions prepared by each member of the Ph.D. advisory committee. To prepare for the exam, the student should meet well in advance with each committee member individually to seek broad guidance regarding potential areas of study. Committee members should then submit their specific exam questions to the chair (typically the student’s advisor), who will distribute them to the student on the days of the exam. The student is to be allowed approximately one-half day to answer each committee member’s questions.

The oral component will be an oral examination given by the Ph.D. advisory committee. The student will be expected to demonstrate a high degree of competence in his/her specialty, in related areas, and in the solution of research problems. A favorable vote of at least two-thirds of the members of the committee is required for passing. Based on the student's performance in the examination, the committee may recommend to the Dean of the Graduate School one of the following actions:

1. The student is passed, either with no reservations or subject to fulfillment of certain conditions.
2. The student will be re-examined at a later date.
3. The student is disapproved unconditionally for the degree.

**Continuous registration:** Students must be registered, credit or noncredit (AEPS 601 or 611), continuously each semester (excluding summers) beginning with the semester following the passing of the comprehensive examination and continuing each semester until the final oral examination is passed. Students must be registered the semester of both the comprehensive examination and the final oral dissertation examination ─ even if it is taken during summer session.

**Colloquium**: Sometime during their final semester, Ph.D. students must present a scheduled public seminar of their dissertation work. This involved taking 1 credit of [AEPS 590](https://bulletins.psu.edu/search/?P=AEPS%20590) and presenting a seminar to the Department of Plant Science faculty and graduate students. The seminar requirement will have equivalent status to all other requirements for the Ph.D. degree and certification of graduation requirements will not be granted without evidence that the seminar has been given.

**Final oral exam (dissertation defense)**: Upon completion of the dissertation, the student is required to pass an oral examination given by his or her Ph.D. advisory committee. The final oral exam will be based on the student’s written dissertation which shall be prepared in accordance with the regulations of the Graduate School and the AEPS graduate program.

<https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/>.

As author of the dissertation, the Ph.D. student is responsible for meeting all the Graduate School deadlines, format and signature requirements, as well as the dissertation fee. The student must apply to graduate on LionPATH at the beginning of the semester he/she plans to defend the dissertation. To apply, go to [registrar.psu.edu/graduation/intent.cfm](http://www.registrar.psu.edu/graduation/intent.cfm) for instructions. For a listing of deadlines, see: [gradschool.psu.edu/current-tudents/etd/thesisdissertationperformance-calendar/ .](http://gradschool.psu.edu/current-students/etd/thesisdissertationperformance-calendar/)

The student’s completed dissertation should be submitted to his or her Ph.D. advisory committee at least 10 days prior to the scheduled final oral exam. The thesis should be in a technical and grammatical form that is acceptable to the advisory committee and conforms to Graduate School guidelines. A final dissertation exam form should be completed in advance of the exam:

<https://pennstate.qualtrics.com/jfe/form/SV_bPgFoRK5UaMOe10>

The student should be able to marshal a satisfactory defense of the methods, findings, and conclusions of the thesis, and be able to relate the findings to pertinent literature and demonstrate acceptable knowledge in the major and minor fields. The advisory committee typically requests a presentation during the oral exam. A favorable vote of a two-thirds majority of the committee is required for passing. After passing the exam the advisory committee will sign the appropriate forms (see Graduate Program Coordinator for forms) for completion of the Ph.D. Degree. If the student fails the oral exam, the committee will determine whether another exam may be taken at a later date. Only one re-examination shall be offered. After passing the oral exam the student makes edits suggested by the advisory committee members. Once all edits are completed and accepted by the committee, the student uploads a draft of the thesis for format review (PDF only) to the eTD website:[submit-etda.libraries.psu.edu/author](https://submit-etda.libraries.psu.edu/author). All doctoral dissertations and master's theses must be submitted electronically. When a thesis or dissertation is submitted to the eTD website, it must meet the [deadline](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/thesis-dissertation-performance-and-oral-presentation-deadlines-calendar/) requirement and formatting standards set forth in the [Thesis and Dissertation Guide](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/thesis-and-dissertation-guide/). Corrections and detailed instructions will be returned to the student by email. For more information on electronic theses and dissertations (eTDs), visit the [eTD website](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/about-etds/).

**Time limitation:** A student devoting half-time to study for the Ph.D. degree normally will require 10 semesters beyond the M.S. degree, or 15 semesters if entering the program without an M.S. degree. However, much will depend upon the nature of the dissertation research problem. In most cases a student will not take more than 5 years to complete the program from the date of admission to candidacy. A Ph.D. student is required to complete the program, including acceptance of the Ph.D. dissertation, within 8 years after the date of successful completion of the qualifying examination, not including approved leaves of absence as outlined in [GSAD-906](https://gradschool.psu.edu/graduate-education-policies/gsad/gsad-900/gsad-906-graduate-student-leave-of-absence/)

# Checklist for Scheduling a Dissertation Defense and Submitting a Ph.D. Dissertation

* Become familiar with format requirements in the Graduate School’s Thesis and Dissertation Guide.
* Apply to graduate on LionPATH during the semester you plan to graduate. Go to: [registrar.psu.edu/graduation/intent.cfm](http://www.registrar.psu.edu/graduation/intent.cfm) for instructions. See:  [gradschool.psu.edu/current-tudents/etd/thesisdissertationperformance-calendar/](http://gradschool.psu.edu/current-students/etd/thesisdissertationperformance-calendar/) for deadlines.
* Schedule the oral examination with M.S. advisory committee.
* Following the exam make any changes required by the advisory committee.
* 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 Office of Theses and Dissertations. Convert the file to a PDF for eTD submission. If you cannot do this, contact the Office of Theses and Dissertations for assistance.
* Go to the eTD website ([submit-etda.libraries.psu.edu/author](https://submit-etda.libraries.psu.edu/author)) and upload the final eTD. The $25. thesis fee can be paid at [secure.gradsch.psu.edu/paymentportal](https://secure.gradsch.psu.edu/paymentportal/).
* Await notification of thesis approval by email. If changes are required, you will be notified. Your eTD will be accessible on the eTD website immediately after graduation unless you have chosen restricted access.

For bound copies, contact any Multimedia & Print Center on campus ([multimediaprint.psu.edu](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.

### Links to Dissertation Submission Requirements

* [Thesis and Dissertation Guide](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/thesis-and-dissertation-guide)
* [Thesis, Dissertation, Performance, and Oral Presentation Calendar](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/thesis-dissertation-performance-and-oral-presentation-deadlines-calendar/)
* [About eTDs](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/about-etds/)
* [Copying and Binding](http://www.multimediaprint.psu.edu/thesis/)
* [The Most Common Mistakes](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/how-to-avoid-the-most-common-mistakes/)
* [How To Submit a Doctoral Dissertation](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/how-to-submit-a-doctoral-dissertation/)
* [Format Review Instructions](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/format-review/)
* [Acknowledgement of Federal Funding](https://gradschool.psu.edu/completing-your-degree/thesis-and-dissertation-information/acknowledgement-of-federal-funding/)

### Checklist of Graduate Coursework for Ph.D. Degree

**Course Number and Title Credits Grade**

**Required Core Courses:**

AEPS 502 ‘Current Issues in Agricultural Innovation’ (2 credits) \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_

AEPS 515 ‘Professional Development for the Plant Sciences’ (3 credits) \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_

AEPS 555 ‘Effective Scientific Communications’ (3 credits) \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_

AEPS 602 ‘Supervised Experience in College Teaching’\* (2 credits) \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_

AEPS 590 ‘Colloquium’ (Final Semester) (1 credit) \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_

\*Even though two credits of AEPS 602 is required, it cannot be counted towards fulfilling the course credit requirement for the degree.

**Electives:**

Choose appropriate courses in statistic methods at 400, 500, or 800-level (6 credits)

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Choose from 400-800 level courses in AGRO, AEPS, BIOL, ENT, FOR, HORT, INTAD, PLBIO, PPATH, PPEM, SOILS, STAT, TURF, or related areas with approval of Ph.D. advisory committee. Complete all or most of course work before the comprehensive exam. No specific number of courses are required, other than those recommended by the student’s advisory committee.

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### Checklist for Qualifying Exam, Advisory Committee, Proposal, Final Exam, & Other Requirements for the Ph.D. Degree

 **Date Action**

1. English Oral Proficiency Test (AEOCPT – International only) \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_
2. Scholarship and Research Integrity (SARI) Program \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_
3. Assessment of English Competency and Qualifying Examination \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_
4. Appointment of Advisory Committee \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_

**Members of Advisory Committee Area\* Department**

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\*Area = Agronomy, Soils, Turf, Minor, General Studies, etc.

 **Date Action**

1. Proposal of Thesis Presented to Advisor. Title:

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1. Approval of Proposal by Advisory Committee \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_
2. First Teaching Experience \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_
3. Second Teaching Experience \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_
4. Annual Progress Meetings (List Date of Meeting)

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1. Coursework Completed \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_
2. Comprehensive Exam \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_
3. Final Dissertation Exam Scheduled in LionPath \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_
4. Dissertation Seminar (Colloquium) \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_
5. Dissertation Sent to Advisory Committee \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_
6. Final Exam Completed and Passed \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_
7. Final Dissertation Copy Signed by Advisory Committee & Dept. Head \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_
8. Dissertation uploaded and accepted by Graduate School \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_

***DUAL-TITLE M.S. AND PH.D. IN AGRICULTURAL AND ENVIRONMENTAL PLANT SCIENCE AND INTERNATIONAL AGRICULTURE AND DEVELOPMENT (INTAD)***

Requirements listed here are in addition to requirements listed in [GCAC-208 Dual-Title Graduate Degree Programs](http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/gcac-208-dual-title-graduate-degree-programs/). Graduate students with research and educational interests in international agriculture may apply to the dual-title degree program in AEPS and International Agriculture and Development (INTAD). The goal of the dual-title degree is to enable graduate students from AEPS to acquire the knowledge and skills of their primary area of specialization, while at the same time gaining the perspective and methods needed for work in international agriculture. Graduate study in this program seeks to prepare students to assume leadership roles in science, engineering, outreach, and project management anywhere in the world. Students acquire a broad perspective on how to apply their research findings in the context of the international community. Thus, the dual title will allow students to master their field of specialization from an international perspective so that they can effectively engage in agricultural development activities within various countries and regions.

**Admission requirements:** Students must apply and be admitted to the graduate program in AEPS and the Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the INTAD dual-title program. Refer to the Admission Requirements tab on the [INTAD Bulletin page](http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development/). Ph.D. students must be admitted into the dual-title degree program in INTAD prior to taking the qualifying examination in the AEPS graduate program.

**Degree requirements for the dual-title M.S.:** To qualify for the dual-title degree, students must satisfy the degree requirements for the M.S. degree in AEPS. In addition, students must complete the degree requirements for the dual-title in INTAD, listed on the [INTAD](http://bulletins.psu.edu/graduate/programs/W/GRAD%20WMNST) [Bulletin page.](http://bulletins.psu.edu/graduate/programs/W/GRAD%20WMNST)  Up to 6 credits of INTAD-approved courses can be applied to fulfilling AEPS program requirements. Final course selection must be approved by the student’s advisory committee.

**Degree requirements for the dual-title Ph.D.:** The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from AEPS and must include at least one Graduate Faculty member from the INTAD program. Graduate Faculty members who hold appointments in both programs may serve in a combined role.

Qualifying examination procedures for students enrolled in a dual-title degree program: If the Ph.D. student is also enrolled in a dual-title graduate degree program the qualifying examination requirement shall be satisfied by one of the following:

1. Ideally, a single qualifying examination that incorporates content from both the graduate major program and the dual-title program.
2. In cases where the timing of the qualifying examination in the major area precludes the inclusion of the dual-title area, the dual-title program may choose to examine proficiency in the dual-title area at a later time, but no later than the end of the fourth semester (not counting summer semesters) of entry into the major Ph.D. program.
3. Dual-title programs may choose to allow the qualifying examination in the major area alone to satisfy the requirements for the dual-title program.

Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

If the chair of the Ph.D. committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair. The INTAD representative on the student’s Ph.D. committee will develop questions for and participate in the evaluation of the **comprehensive examination**.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their Ph.D. committee and reflects their original research and education in AEPS and INTAD. Upon completion of the Ph.D. dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the Ph.D. committee, the Head of the AEPS program, and the Graduate School.

### Plant Science Graduate Student Annual Evaluation

Student Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Advisor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Sem & Yr began program \_\_\_\_\_\_\_\_\_\_ Last Committee meeting: \_\_\_\_\_\_\_\_\_ Expected Grad Date \_\_\_\_\_\_\_\_\_\_\_

**[ ] M S or [ ] Ph D** **Progress Toward Degree**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Progress to date** | **Timing** | **Date Completed** | **Result (pass/fail)** | **Comments** |
| Qualifying Exam (PhD only) | 2nd or 3rd semester |  |  |  |
| Committee Appointment | By end of 2nd (MS) or 3rd/4th (PhD) semester |  |  |  |
| Proposal Meeting | By end of 2nd (MS) or 4th (PhD) semester |  |  |  |
| Comprehensive Exam (PhD only) | By end of 5th semester |  |  |  |
| Thesis/Dissertation Defense | By end of 2.5 (MS) or 5 (PhD) years |  |  |  |

Please give the anticipated date for your next accomplishment towards completing your degree:

Advisors are required to evaluate performance of graduate students at least once a year. Evaluations must be signed by both the graduate student and advisor, and returned to *Stephanie Hill, Graduate Programs Coordinator, in Tyson Bldg.*

The evaluation should be based on the performance of the graduate student in relation to their academic and professional qualities. The advisor is to complete the form and share the results with the graduate student. The graduate student may write a comment/statement, if desired, in the last section. Signature of the graduate student is required.

**Evaluation of Student Performance**

Check the box that indicates your judgment of performance for each of the items below:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Needs Improvement | Satisfactory | Superior |
| Overall academic progress |  |  |  |
| Overall research progress |  |  |  |
| Exhibits initiative and commitment to program |  |  |  |
| Accepts and fulfills responsibilities |  |  |  |
| Works effectively with fellow students, staff, faculty,  |  |  |  |
| Demonstrates integrity in data collection and reporting of research findings |  |  |  |
| Accepts suggestions and constructive criticism |  |  |  |
| Produces an adequate amount of work within time allotted |  |  |  |
| Demonstrates ability to produce and report research results |  |  |  |
| Takes advantage of opportunities for professional improvement |  |  |  |

Comments, concerns and/or expectations for coming year.

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\*Advisor Signature Date:

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\*Student Signature Date:

**\*FORM MUST BE SIGNED BY BOTH THE STUDENT AND HIS/HER ADVISOR\***

### AEPS M.S. and Ph.D. Proposal Meeting Evaluation Form

Student Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Committee Member Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Rating Scale:

1 – Not acceptable: 2 – Improvement needed: 3 – Acceptable: 4 – High quality

Description of rating factors:

1. Not acceptable: Serious shortcomings in rigor or logic of proposal; proposal poorly written; poor presentation (lack of preparation, poor command of background literature, and weak justification for proposed research).
2. Improvement needed: Serious, but correctable shortcomings in organization and logic of proposal; proposal poorly written but can be re-written; poor presentation skills.
3. Acceptable: Some flaws in writing, approach to research or presentation; but fundamentals of proposal are good and should lead to an acceptable thesis without major change in direction of research after assistance from advisor and/or committee members.
4. High quality: Addresses significant research issue or problem in the plant sciences. Proposal well written and presentation demonstrates good preparation, command of background literature, and good justification for proposed research.

Overall rating score: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Comments: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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\*\*When completed, please return to Stephanie Hill, Graduate Programs Coordinator, in Tyson Building\*\*

### AEPS Ph.D. Qualifying Exam Evaluation Form

Student’s Name: Date of Exam:

Committee Member’s Name:

Please evaluate the candidate’s performance in the Qualifying Exam using the following 1 to 4 rating scale:

1. Not acceptable: Serious shortcomings in presentation portion of the exam (lack of organization and/or insufficient preparation; lack of rigor in explaining justification for research, methods, or results of the research paper; poor command of background science and/or logic needed to interpret results of paper; and/or unable to critique experimental design/methods/conclusions of authors of research paper). Poor verbal and/or written communication skills involving the exam. Did not demonstrate fundamental scientific knowledge, application of logic in problem solving, or communication skills needed to continue Ph.D. program.

2. Improvement needed: Serious, but correctable shortcomings in presentation portion of the exam (insufficient organization and/or preparation, rigor used in presentation; critique of experimental design/methods/conclusions of authors of research paper). Poor, but correctable, verbal and/or written communication skills. Adequate fundamental scientific knowledge, application of logic in problem solving, and communication skills; but improvement needed to continue Ph.D. program (perhaps extra course work).

3. Acceptable: Some flaws in in presentation portion of the exam, but generally well organized, appropriate level of rigor in explaining justification for research, methods, or results of the research paper; good command of background science and/or logic needed to interpret results of paper; and good critique of experimental design/methods/conclusions of authors of research paper. Good verbal and/or written communication skills. Good fundamental scientific knowledge and application of logic in problem solving.

4. High quality: Excellent presentation of research paper in Qualifying Exam. Well organized, appropriate level of rigor in explaining justification for research, methods, or results of the research paper; very good command of background science and/or logic needed to interpret results of paper; and very good critique of experimental design/methods/conclusions of authors of research paper. Excellent verbal and/or written communication skills. Very good fundamental scientific knowledge and application of logic in problem solving.

Overall rating score:

Comments:

**Recommendation:**

□ Pass without reservation

□ Fail without reservation

□ Fail with opportunity to retake

Conditions for retake: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Signature of Evaluator

\*\*Once completed, please return to Stephanie Hill, Graduate Programs Coordinator, in Tyson Building\*\*