

Plant and Environmental Sciences (MS, PhD)

Graduate Student Handbook
2021-2022

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College of
**AGRICULTURE, FORESTRY
AND LIFE SCIENCES**

Clemson Graduate School Information

These guidelines supplement the current version of the [Clemson University Graduate School Policy Handbook](https://www.clemson.edu/graduate/students/policies-procedures/index.html) (<https://www.clemson.edu/graduate/students/policies-procedures/index.html>)

The policies and procedures of the Graduate School have been established to ensure that a consistent set of standards are followed from the admissions process all the way through to the awarding of degrees for every Graduate School program.

[Graduate School Forms](https://www.clemson.edu/graduate/students/forms.html)

(<https://www.clemson.edu/graduate/students/forms.html>)

[Graduate School Deadlines](https://www.clemson.edu/graduate/students/deadlines.html)

(<https://www.clemson.edu/graduate/students/deadlines.html>)

Overview of Program

The Plant and Environmental Sciences (PES) Program offers areas of study leading to two graduate degrees: Master of Science (MS) and Doctor of Philosophy (PhD).

Students with baccalaureate degrees in agronomy, biology, chemistry, horticulture, physics, plant sciences, soil sciences, or related disciplines may pursue graduate studies in PES.

The PhD and MS (thesis) are research degrees that require a dissertation and thesis, respectively.

The MS (non-thesis) is a terminal degree that may be suited for students who will pursue a career in business, education, or other areas that do not require substantial research experience.

Areas of specialization within PES are aligned with those of the major advisor (advisory committee chair). The most common areas of specialization include research topics in:

- Agronomy
- Crop Improvement/Plant Breeding
- Horticulture
- Crop Physiology/Plant Physiology
- Integrated Pest Management/Crop Protection
- Soil Science/ Soil Health
- Plant Pathology
- Sustainable Agriculture
- Microbial Ecology
- Turfgrass Science
- Weed Science
- Plant Nutrient Management

Goal

The goal of the PES program is to educate students in plant systems and the various factors that affect plant performance and crop productivity. Students graduate with a basic understanding of fundamental and applied

concepts in plant and environmental sciences, including plant biology and plant interactions with other organisms at the molecular, cellular, whole plant or ecosystem level.

What PES Graduates do

The PES Program forms graduates who can help producers and consumers face critical challenges in areas such as food security, stewardship of natural resources, climate change, and sustainable agriculture. Our graduates are employed by:

- Colleges and Universities (Research/Teaching/ Extension)
- Diagnostic Laboratories
- Agricultural Consulting Companies
- Biotechnology Companies
- Agrichemical Companies
- Public Policy Organizations
- Seed and Plant Production Companies
- Nurseries and Garden Centers
- International Agricultural Research Centers
- Biological Control Industries
- Botanical Gardens and Arboreta
- State Departments of Agriculture
- Landscape Design and Maintenance Firms
- USDA-Agricultural Research Service
- USDA-Animal and Plant Health Inspection Service
- Commercial Farms
- EPA- Environmental Protection Agency
- Family-owned Farms

Professional Licensure

No professional licensure applies to the PES Graduate Program

Approved Locations and Modalities of Delivery

The only approved modality of delivery is traditional (face-to-face). Students will be required to complete their coursework on the main campus.

In some cases, select courses may be offered online or off-campus, but these are not typically offered on a regular basis.

Research credits can be completed on the main campus, at Research and Education Centers, or at other locations approved by the advisory committee.

Cohort information

No cohort information applies to the PES Graduate Program.

Basic Program Metrics

Typical time to degree:

MS (thesis).....	2.0 - 2.5 years
MS (non-thesis).....	1.5 - 2.0 years
PhD.....	3.5 - 4.0 years
PhD (MS en route)	5.0 – 5.5 years

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Advisory Board

There is no Advisory Board for the PES Graduate Program.

Financial Information

The [PES department faculty members](#) provide research assistantships (RA) within our degree programs if funding is available.

<https://www.clemson.edu/cafls/departments/plant-environmental-sciences/faculty-staff/index.html>

Many faculty members post opportunities for RAs on the PES [Graduate Research Assistantship Openings](#) web page.

<https://www.clemson.edu/cafls/departments/plant-environmental-sciences/student-resources/graduate-research-assistantship-openings1.html>

There are a small number of College and University fellowships available to incoming students, that would provide a stipend. Some of those can be browsed at the [Graduate School's Fellowship and Awards web page](#).

<https://www.clemson.edu/graduate/finance-tuition/fellowships.html>

Admission Requirements

Requirements (in addition to Graduate School requirements)

A Bachelor of Science in a PES-related discipline is desirable, but not required.

GRE (Graduate Record Examination) scores are required for application. Prospective major advisors may petition to waive this requirement. A duly justified request to waive the GRE requirement should be addressed to the Graduate Program Coordinator. Waiver requests from the applicant will not be considered.

We rarely accept students straight from BS to PhD, and when we do, we accept them as MS en route to PhD. When a student goes straight to PhD, we (PES) require that the MS requirements for the first 30 credit hours are met.

Dates and deadlines

The PES Program has rolling admissions, and accepts students for the Spring, Summer and Fall semesters. Applications are considered year-round for all semesters.

Support Mechanisms

The most common mechanism of support is a Graduate Research Assistantship (GRA). Interested students are encouraged to contact prospective advisors regarding GRA availability and eligibility. These assistantships are awarded on a competitive basis directly by the Principal Investigator of each research project.

Graduate Teaching Assistantships (GTA) are sometimes available, but are much less common than GRAs. Some students may have the opportunity to combine GRA and GTA support.

Applications from students who have not been in communication with their prospective advisor before applying to the PES Graduate Program are rarely successful.

A few recruitment fellowships and other merit-based scholarships are also available to be awarded on a competitive basis. Prospective advisors should inform interested students of these opportunities as appropriate.

Fees

No Program-specific fees apply to the PES Graduate Program.

Transfer Credits

The PES Program follows Graduate School guidelines for transfer credits.

Requirements for Degree

Minimum Degree Requirements

The PES Graduate Program follows Graduate School minimum degree requirements for credit hours (including research credits), time limits, and theses/dissertations.

WITH REGARD TO MS DEGREE CREDIT REQUIREMENTS, the Graduate School requires a minimum of thirty hours beyond the bachelor's degree for any master's degree. At least one-half of the total graduate credit hours required by the advisory committee, exclusive of thesis research, must be selected from courses numbered 8000 or above.

WITH REGARD TO PHD DEGREE CREDIT REQUIREMENTS, the Graduate School requires that a doctoral degree comprise a minimum of 30 credits beyond the master's degree, and at least 60 credits beyond the bachelor's degree. A minimum of 12 credit hours of non-research coursework and a minimum of 18 hours of dissertation research are required for any doctoral degree.

See a *Suggested Timetable of Student Progress* on page 7.

PLAN OF STUDY. The Plan of Study is tailored to each student's needs and interests. There are no core courses, but students are expected to be proficient in experimental design, statistical analysis, and the areas in plant sciences that are relevant to their research topics. Students may be required to correct deficiencies in their academic background by auditing or by enrolling in the supplemental courses.

PROPOSAL SEMINAR. Students are encouraged to attend PES seminar every semester and are required to present a proposal seminar while enrolled in PES 8250 or PLPA 8070. This seminar should be pre-approved by the major advisor and advisory committee. We do allow non-enrolled students to present their seminar if they have taken either class in the past. Each student may get a maximum of two 8000-level credits for seminar during each degree program (MS and PhD).

RECORD-KEEPING. Students must keep accurate records of experiments, data, and analyses. These records should be duplicated regularly and be available for inspection by the advisor or the advisory committee. Photographic records should be included as needed. The student must leave these records, including electronic files, with the advisor upon graduation or departure from the program.

NON-THESIS REPORT. Non-thesis MS students are required to present an exit seminar and final report in accordance to the guidelines set by the advisory committee during the first committee meeting.

Advisory Committees

PES follows Graduate School guidelines for forming or modifying Advisory Committees.

Preliminary Exams

Preliminary Exams are not conducted in the PES Graduate Program.

Comprehensive Exam

The advisory committee meets with the student and sets the details and rules for the examination. Written examinations should be evaluated and returned to the student with appropriate comments before the oral examination. The oral examination will include questions covering areas where weakness was demonstrated on the written examinations. Oral exams typically last 2 to 3 hours.

Expectations for Thesis/Dissertation

The preferred format is that of individual chapters presented as independent publishable units, but there is flexibility to allow for other formats as suggested by the advisory committee. Submission of a printed copy of thesis or dissertation is not required.

Additional Requirements

No additional Requirements apply (i.e. no foreign language requirement, no internship requirement, etc.)

Suggested Timetable of Student Progress

Time	Action
Before Registration	<p>Obtain information about program requirements and guidelines.</p> <p>Meet with your major advisor and the Graduate Program Coordinator.</p>
First Month	<p>Introduce yourself to faculty members and staff of the department.</p> <p>Become acquainted with policies for laboratory, greenhouse and vehicle use.</p> <p>In consultation with major advisor:</p> <ul style="list-style-type: none"> • Begin project literature review. • Select Advisory Committee members (form GS2).
First Semester	<p>Prepare Research Outline.</p> <p>Conduct first Advisory Committee Meeting.</p> <p>Complete Plan of Study (form GS2).</p> <p>Consider applying for fellowships. As always, consult with your advisor.</p>
Second or Third Semester	<p>Complete literature review.</p> <p>Present Research Proposal in Seminar (PES 8250 or PLPA 8070).</p> <p>Schedule second Advisory Committee Meeting.</p>
All semesters	<p>Keep major advisor and advisory committee informed of your progress.</p> <p>Schedule meeting with advisory committee at least once a year.</p> <p>An approved summary of each meeting should be kept on file.</p> <p>Every year, provide the Graduate Program Coordinator the citations for your scientific presentations and publications completed during that year.</p>
Comprehensive Exam for PhD only	<p>Comprehensive Exams (Form GS5) are typically completed 12-18 months before graduation, but no later than 6 months before graduation.</p>
Final Semester	<p>Provide advisory committee final draft of thesis/dissertation at least two weeks before the defense. This draft must be pre-approved by the major advisor.</p> <p>Set the date for exit seminar and defense at least one month in advance.</p> <p>MS Students: GS7M Form PhD Students: GS7D Form</p> <p>Submit thesis/dissertation to the Graduate.</p>
After defending successfully	<p>Provide Evaluation of Graduate Experience:</p> <ul style="list-style-type: none"> • Share with the Graduate Program Coordinator, Department Chair, or your advisor any suggestions for improvement of our program. • Complete the PES Program Exit Questionnaire.

Standards of Performance

Annual Review of Progress

Graduate students are required to meet at least once a year with their advisory committee. During these meetings, students should present progress reports on research, coursework, and professional development activities. The advisory committee should make recommendations for improvement of the work and activities and approve timelines for completion of the degree.

The student must submit a written summary of each meeting to the major advisor within one week after the committee meeting. Once approved by the advisory committee, the summary should be kept by the student in their files and made available for use by the Graduate Program Coordinator or Department Chair upon request.

Academic Performance

The PES Graduate Program follows Graduate School policy and expectations for academic performance.

Professional Requirements and Expectations

PUBLICATIONS. Graduate students are expected to prepare their research results for publication in a timely manner prior to graduation. Publications are important to the student, the department and the faculty. Peer-reviewed publications are documentation of research accomplishments and serve as a criterion for continued commitment of funds by those who have supported the research. The student is required to submit a list of publications, presentations and other scholarly achievements to the Program Coordinator in August of every year.

SERVICE TO THE PES DEPARTMENT. Participation in departmental functions, meetings, seminars, and search committees is highly recommended.

TEACHING. Teaching is strongly encouraged, but not required. Graduate students should show initiative in helping new graduate students or undergraduate students in their research. The teaching experience can be conducted under the supervision of the advisor, if a formal GTA is not available.

PROFESSIONAL MEETINGS. Participation in professional meetings at state and national levels is strongly encouraged. Efforts should be made by the major advisor to assist with funding for at least one major meeting presentation during the student's tenure. The advisor should also lead the student to seek travel funds from external sources.

PROFESSIONAL ORGANIZATIONS. Students should affiliate with appropriate professional societies, e.g. American Association of Plant Biologists, American Phytopathological Society, American Society of Agronomy, American Society for Horticultural Science, Crop Science Society of America, Soil Science Society of America, or the International Turfgrass Society, among others.

GRADUATE STUDENT ASSOCIATION. Students are encouraged to participate in the Graduate Student Association. An organizational meeting is held each year to elect a program representative to the Steering Committee of the Graduate Student Association. Other meetings are held throughout the year. Interaction with fellow students is a necessary component of graduate student training.

HONORS AND AWARDS. Election to honor societies signifies research excellence and scholarship. Superior scholars are frequently awarded fellowships. These recognitions aid in documenting the student's success in his chosen field of study.

Performance Expectations for Graduate Assistants

The PES Program follows Graduate School guidelines on performance expectations for Graduate Assistants.

Attendance Policies

The PES Program follows Graduate School attendance policies.