AGRONOmy

Graduate Program Head  Erin L. Connolly
Program Code        AGRO
Campus(es)           University Park (Ph.D., M.S.)
Degrees Conferred   Doctor of Philosophy (Ph.D.)
                     Master of Science (M.S.)
                     Dual-Title Ph.D. and M.S. in Agronomy and International Agriculture and Development
The Graduate Faculty View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=AGRO)

The Agronomy program is administered in the Department of Plant Science, College of Agricultural Sciences. Each student will be associated with an adviser who may provide financial support, research facilities, and/or office space. Applicants are encouraged to explore, study, and research opportunities by contacting faculty who may be prospective advisers.

This program provides opportunities for students interested in Agronomy to become professional leaders and independent scholars. Faculty in this program are competent to prepare students in the subfields of Agronomy including:

• plant ecology
• plant genomics
• plant breeding
• plant physiology
• field and forage crop management
• turfgrass management

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 Admissions (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination, are required for admission. At the discretion of the graduate standards committee, a student may be admitted for graduate study in the program without these scores.

Prerequisites for major work in Agronomy vary with the area of specialization and the degree sought, but courses in chemistry, mathematics, physics, geology, basic and applied biological sciences, and English communication skills are required. A baccalaureate degree in basic or applied natural sciences is preferred for M.S. degree applicants.

A minimum junior/senior grade-point average 3.00 (on a 4.00 scale) is required in all courses in the biological and physical sciences regardless of when taken. Exceptions to these requirements may be made for students with special backgrounds, abilities, and interests.

Degree Requirements

Master of science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 31 credits at the 400, 500, 600, or 800 level is required, with at least 18 credits at the 500 and 600 level, combined, including:

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<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>AGRO 501</td>
<td>Graduate Student Dialogue</td>
<td>1</td>
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<tr>
<td>AGRO 555</td>
<td>Effective Scientific Communications</td>
<td>2</td>
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<tr>
<td>AGRO 590</td>
<td>Colloquium 1</td>
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Culminating Experience

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<tr>
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<tbody>
<tr>
<td>AGRO 600</td>
<td>Thesis Research</td>
<td>6</td>
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<tr>
<td>or AGRO 610</td>
<td>Thesis Research Off Campus</td>
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Total Credits 31

1 Students are required to participate in AGRO 590 each semester they are registered, but can only count a maximum of 1 credit of AGRO 590 towards the degree.

In addition, M.S. students are required to complete 1 credit of AGRO 602; however, this 1 credit cannot be counted towards the degree requirements. The remaining elective credits may be chosen from a list of approved electives maintained by the program office.

The thesis must be accepted by the advisory committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Doctor of philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

While a minimum number of courses for the degree is not specified, the Ph.D. committee has the responsibility of specifying courses and credits essential for the education and development of the candidate. Students are expected to be educated in depth in a specific subfield of agronomy and to have a perspective of the general field. Normally, 55 to 60 credits in formal course work beyond the B.S. degree are required including:

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1 Students are required to participate in AGRO 590 each semester they are registered, but can only count a maximum of 1 credit of AGRO 590 towards the degree.
To qualify for the dual-title degree, students must satisfy the degree requirements for the Dual-Title M.S. in INTAD, listed on the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Up to 6 credits of INTAD approved courses can be applied to fulfilling AGRO program requirements. Final course selection must be approved by the student’s advisory committee.

### Degree Requirements for the Dual-Title Ph.D.

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title Ph.D. in INTAD, listed on the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Some courses may satisfy both AGRO program requirements and those of the INTAD program. Up to 6 credits of INTAD approved courses can be applied to fulfilling AGRO program requirements. Final course selection must be approved by the student’s committee.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from AGRO and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs’ Graduate Faculty may service in a combined role. There will be a single qualifying examination, containing elements of both AGRO and INTAD. Dual-title graduate students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed on semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for Ph.D. committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/gcac-608-dual-title-graduate-degree-programs), the dual-title Ph.D. degree will be composed of Graduate Faculty from AGRO and must include at least one Graduate Faculty member from the INTAD program. Dual-title Ph.D. students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed on semester beyond the normal period allowable.

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 AGRO and INTAD. Upon completion of the doctoral 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 graduate program, and the Graduate School.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/gsad-900/gsad-901-graduate-assistants) set by The Graduate School.

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate

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1. Doctoral candidates are required to participate regularly in a departmental seminar and to register for at least 2 credits of the seminar during the Ph.D. program. However, only 1 credit of AGRO 590 can be counted towards the degree.

In addition, Ph.D. students are required to complete 2 credits of AGRO 602; however, these 2 credits cannot be counted towards the degree requirements.

The communication requirement for the Ph.D. degree may be met by completing at least 6 credits of course work in an area of English communications approved by the student’s Ph.D. committee.

Every student has a close professional relationship with his or her faculty adviser. While research that is done for the dissertation will be on subjects that fall within the ongoing research program of the adviser, students are encouraged to propose research projects that are of interest to them. The department encourages professional development of students through participation in meetings of relevant professional societies and organizations.

### Dual-Titles

#### Dual-Title M.S. and Ph.D. in Agronomy and International Agriculture and Development

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 Agronomy and International Agriculture and Development. The goal of the dual-title degree in AGRO and INTAD is to enable graduate students from AGRO to acquire the knowledge and skills of their primary area of specialization in AGRO, while at the same time gaining the perspective and methods needed for work in the 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 broader 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 AGRO 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). Doctoral students must be admitted into the dual-title degree program in INTAD prior to taking the qualifying examination in their primary 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, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title M.S. in INTAD, listed on the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Up to 6 credits of INTAD approved courses can be applied to fulfilling AGRO program requirements. Final course selection must be approved by the student’s advisory committee.

#### Degree Requirements for the Dual-Title Ph.D.

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title Ph.D. in INTAD, listed on the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Some courses may satisfy both AGRO program requirements and those of the INTAD program. Up to 6 credits of INTAD approved courses can be applied to fulfilling AGRO program requirements. Final course selection must be approved by the student’s committee.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from AGRO and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs’ Graduate Faculty may service in a combined role. There will be a single qualifying examination, containing elements of both AGRO and INTAD. Dual-title graduate students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed on semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for Ph.D. committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the Ph.D. committee of an AGRO and INTAD dual-title Ph.D. student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may service in a combined role. 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 AGRO and INTAD. Upon completion of the doctoral 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 graduate program, and the Graduate School.

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#### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate
student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Agronomy (AGRO) Course List (https://bulletins.psu.edu/university-course-descriptions/graduate/agro)

Learning Outcomes

Master of science (M.S.)

1. Know: Graduates of the Agronomy or Horticulture M.S. degree programs will demonstrate mastery of the principles and common research methods within the field of agronomy or horticulture. The demonstration will cover mastery of biotechnology, sustainability, profitability, weed mgt. and herbicide resistance, nutrient mgt., food safety, and/or turfgrass science.

2. Create/Apply: Graduates of the Agronomy or Horticulture M.S. degree programs will be able to assimilate essential concepts and literature in agronomy and horticulture, create hypotheses, develop tests of hypotheses, and develop solutions to agronomic and horticultural problems. M.S. graduates will also be able to carry out applied research projects that address problems in the field of agronomy or horticulture.

3. Communicate: Graduates of the Agronomy or Horticulture M.S. degree programs will be able to effectively communicate technical knowledge, research findings, and current topics in agronomy or horticulture verbally and in writing to scientists and lay people.

4. Critical thinking: Graduates of the Agronomy or Horticulture M.S. degree programs will be able to critically analyze research performed by others and evaluate agronomic or horticultural problems and formulate solutions to problems.

5. Professional practice: M.S. graduates of the Agronomy or Horticulture Graduate Programs will demonstrate ability to collaborate in a collegial manner and demonstrate high ethical standards, values, and best practices.

Doctor of Philosophy (Ph.D.)

1. Know: Graduates of the Agronomy/Horticulture Ph.D. Programs will demonstrate in-depth knowledge of essential theories and research methods within the fields of agronomy or horticulture. The demonstration areas will cover the application of biotechnology, sustainability, profitability, weed mgt. and herbicide resistance, nutrient mgt., food safety, and/or turfgrass science.

2. Create/Apply: Graduates of the Agronomy/Horticulture Ph.D. Programs will be able to assimilate essential theory and literature in agronomy to generate new ideas and develop creative solutions to agronomic and horticultural problems. Graduates of the program will also be able to conduct original research in an independent manner that addresses problems in the fields of agronomy or horticulture.

3. Communicate: Graduates of the Agronomy/Horticulture Ph.D. Programs will be able to convey ideas, arguments, and current topics in agronomy or horticulture verbally and in writing to scientists and lay people.

4. Critical thinking: Graduates of the Agronomy/Horticulture Ph.D. Programs will be able to critically analyze research performed by others in the fields of agronomy or horticulture.

5. Professional practice: Graduates of the Agronomy/Horticulture Ph.D. Programs will demonstrate the ability to work with others in a collegial manner and demonstrate the highest ethical standards, values, and best practices in their field.

Contact

Campus University Park
Graduate Program Head Erin L Connolly
Director of Graduate Studies (DGS) Peter Landschoot or Professor-in-Charge (PIC)
Program Contact Kaylee Harter
Dept. Plant Science, 101 Tyson Building
University Park PA 16802
kah281@psu.edu
(814) 863-7724

Program Website View (http://plantscience.psu.edu/graduateprograms)