Horticulture, Ph.D.

The department provides graduate training leading to the doctor of philosophy in horticulture. Each doctoral student will have a major advisor who will supervise their program of study and their thesis research. Specializations are available in several aspects of crop science: organic and sustainable horticulture, diversified crop production for urban and regional food systems, environmental impact of horticultural practices, environmental regulation of plant growth and development, plant breeding, biochemistry and molecular biology of horticultural plants, microculture and biotechnology, weed control and herbicide physiology, and biostatistics. Students have the opportunity to develop their research projects using vegetables, fruits, trees, ornamentals, turf, specialty crops, or model species such as Arabidopsis thaliana.

The Ph.D. student’s dissertation project will involve an in-depth mentored exploration of a research question and the development of a dissertation in conjunction with a graduate committee of at least four faculty members. A public presentation and defense of the dissertation is required.

The department houses research labs, controlled environment chambers, and greenhouse facilities. Field-plot areas with associated storage and laboratory facilities are available at the UW–Madison Arboretum, Horticulture Research Farm at Arlington, and the Agriculture Research Stations managed by the College of Agricultural and Life Sciences at selected locations throughout the state. In conjunction with the farm at Sturgeon Bay, the world’s largest collection of tuber-bearing Solanums is maintained by the Inter-Regional Potato Introduction Project and is available for research use.

Admissions

The department accepts applications for fall, spring, and summer entry. The applicant’s academic preparation should include fundamental courses in the plant sciences such as botany, bacteriology, genetics, and physiology, as well as courses in chemistry (general, organic, quantitative), physics, mathematics, and biochemistry. The academic average should be at least 3.0 (on a 4.0 scale) with evidence of proficiency in subjects related to agriculture and plant sciences.

Application Deadlines

Spring entry: October 30
Summer entry: January 2
Fall entry: January 2

Application Checklist

A complete application should include the following items:

1. Graduate School Application and Application Fee
2. Supplementary Application: The supplementary application will appear as a part of the Graduate School’s electronic application once the applicant selects Horticulture.
3. Statement of Purpose: Your essay should be a concise description of your reasons for choosing to study horticulture at the University of Wisconsin. Please include your research interests and career goals as well as a description of your preparation for graduate study including relevant coursework, related employment, research experience, publications, presentations, awards, and honors.
4. Transcripts: We require all applicants to submit an unofficial transcript in PDF format to their online application. If an applicant is recommended for admission, then they will be required to submit their official transcript to the Graduate School. International academic records must be submitted in the original language and accompanied by an official English translation. Documents must be issued by the institution with an official seal/stamp and an official signature.
5. Three Letters of Recommendation
6. GRE Scores: GRE scores are not required for admission but are highly recommended. GRE scores are required for applicants who are interested in fellowships and other forms of financial support
7. Proof of English Proficiency: Applicants, whose native language is not English, or whose undergraduate instruction was not in English, must follow the Graduate School’s guidelines for proof of English proficiency.

Faculty Advisors

The Horticulture M.S. and Ph.D. programs do not support lab rotations. All students are admitted directly into a faculty member’s lab. Thus, we strongly encourage applicants to contact faculty members who work in their areas of interest before and during the application and admissions process.

Graduate School Admissions

Graduate admissions is a two-step process between academic degree programs and the Graduate School. Applicants must meet requirements of both the program(s) and the Graduate School. Once you have researched the graduate program(s) you are interested in, apply online (https://grad.wisc.edu/admissions).

Funding

Graduate School Resources

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information (https://grad.wisc.edu/funding) is available from the Graduate School. Be sure to check with your program for individual policies and processes related to funding.

Program Resources

All applicants to the graduate program in Horticulture are automatically considered for financial support. There is no need to submit a separate application. Most of our students are supported through research assistantships, but additional sources of internal financial support include teaching assistantships, project assistantships, scholarships, and fellowships.

Requirements

Minimum Graduate School Requirements

Review the Graduate School minimum academic progress and degree requirements (http://guide.wisc.edu/graduate/#policiesandrequirementstext), in addition to the program requirements listed below.
MAJOR REQUIREMENTS

MODE OF INSTRUCTION

<table>
<thead>
<tr>
<th>Mode of Instruction Definitions</th>
<th>Face to Face</th>
<th>Evening/Weekend</th>
<th>Online</th>
<th>Hybrid</th>
<th>Accelerated</th>
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<tbody>
<tr>
<td>Evening/Weekend: These programs are offered in an evening and/or weekend format to accommodate working schedules. Enjoy the advantages of on-campus courses and personal connections, while keeping your day job. For more information about the meeting schedule of a specific program, contact the program.</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<td>Online: These programs are offered primarily online. Many available online programs can be completed almost entirely online with all online programs offering at least 50 percent or more of the program work online. Some online programs have an on-campus component that is often designed to accommodate working schedules. Take advantage of the convenience of online learning while participating in a rich, interactive learning environment. For more information about the online nature of a specific program, contact the program.</td>
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<td>Hybrid: These programs have innovative curricula that combine on-campus and online formats. Most hybrid programs are completed on-campus with a partial or completely online semester. For more information about the hybrid schedule of a specific program, contact the program.</td>
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<td>Accelerated: These on-campus programs are offered in an accelerated format that allows you to complete your program in a condensed time-frame. Enjoy the advantages of on-campus courses with minimal disruption to your career. For more information about the accelerated nature of a specific program, contact the program.</td>
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CURRICULAR REQUIREMENTS

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<tr>
<th>Minimum Credit Requirement</th>
<th>51 credits</th>
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<tr>
<td>Minimum Residence Credit Requirement</td>
<td>32 credits</td>
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<tr>
<td>Minimum Graduate Coursework Requirement</td>
<td>Half of degree coursework (26 credits out of 51 total credits) must be completed graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university’s Course Guide.</td>
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<tr>
<td>Overall Graduate GPA Requirement</td>
<td>3.00 GPA required.</td>
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<tr>
<td>Other Grade Requirements</td>
<td>The Graduate School requires an average grade of B or better in all coursework (300 or above, not including research credits) taken as a graduate student unless conditions for probationary status require higher grades. Grades of Incomplete are considered to be unsatisfactory if they are not removed during the next enrolled semester.</td>
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<tr>
<td>Assessments and Examinations</td>
<td>Doctoral students are required to take a comprehensive preliminary/oral examination after they have cleared their record of all Incomplete and Progress grades (other than research and thesis). Deposit of the doctoral dissertation in the Graduate School is required.</td>
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<tr>
<td>Language Requirements</td>
<td>Contact the program for information on any language requirements.</td>
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REQUIRED COURSES

Departmental Requirements

All Horticulture Ph.D. students must satisfy the following general course requirements. These requirements can be satisfied by coursework completed while the student was an undergraduate or enrolled in another graduate program.

- Physical Sciences—one course in each of the following:
  - Physics, including electricity, heat, and light
  - Calculus
  - Organic Chemistry lecture
  - Organic Chemistry lab or Biochemistry lab
- Biological Sciences—one course in each of the following:
  - Crop Production
  - Plant Breeding or Genetics
  - Plant Structure, Plant Taxonomy, or Plant Physiology
  - Plant Pathology or Entomology
- A Statistics Course
- A Soil Science Course

Specific course requirements

There are no specific course requirements for the Ph.D. in Horticulture. Instead, each student is required to work with the major professor and the Ph.D. committee to design a program of coursework that best meets the individual student's needs and interests. The resulting program of coursework must satisfy the departmental requirements as well as the requirements specified by the Graduate School. The final determination of a student's required coursework is made by the student's Ph.D. committee as part of the certification process.

Seminar requirement

During their graduate careers, students are required to present a seminar during three of their seminars in advanced seminar courses and receive a passing grade in each seminar. Advanced seminar courses offered by the departments other than Horticulture may be used to satisfy this requirement.

Policies

GRADUATE SCHOOL POLICIES

The Graduate School’s Academic Policies and Procedures (https://grad.wisc.edu/acadpolicy) provide essential information regarding general university policies. Program authority to set degree policies beyond the minimum required by the Graduate School lies with the degree program faculty. Policies set by the academic degree program can be found below.

MAJOR-SPECIFIC POLICIES

GRADUATE PROGRAM HANDBOOK

The Graduate Program Handbook (https://horticulture.wisc.edu/academics/graduate-program/phd-degree) is the repository for all of the program's policies and requirements.
PRIOR COURSEWORK

Graduate Work from Other Institutions
Allowed; coursework earned ten or more years prior to admission to a doctoral degree is not allowed to satisfy requirements.

UW–Madison Undergraduate
Students are allowed to count no more than 7 credits numbered 300 or above toward the minimum graduate degree credit requirement, if those courses are numbered 700 or above they may count toward the minimum graduate coursework requirement. Coursework earned ten or more years prior to admission to a doctoral degree is not allowed to satisfy requirements.

UW–Madison University Special
With program approval, students are allowed to count no more than 15 credits of coursework numbered 300 or above taken as a UW–Madison Special student. Coursework earned ten or more years prior to admission to a doctoral degree is not allowed to satisfy requirements.

PROBATION

The Graduate School regularly reviews the record of any student who earned grades of BC, C, D, F, or Incomplete in a graduate course (300 or above), or grade of U in research credits. This review could result in academic probation with a hold on future enrollment or in being suspended from the Graduate School.

ADVISOR / COMMITTEE

Every graduate student must have a faculty advisor (major professor) who is on the Horticulture faculty. The major professor advises the student about course work and supervises the student’s research. The major professor must approve the student’s coursework and research direction. A student may have more than one major professor, in which case at least one of the professors must be a member of the Horticulture faculty.

A Ph.D. committee is composed of at least four members, the major professor, and four more whom must be UW–Madison graduate faculty or former UW–Madison graduate faculty up to one year after resignation or retirement. The Graduate School requires that at least three committee members are designated as readers. Readers are committee members who commit themselves to closely reading and reviewing the entire dissertation. The committee is empowered by the program to advise and evaluate the student with regards to certification, administer the preliminary examination, oversee progress meetings, approve thesis composition, and conduct the final Ph.D. examination.

The student, in consultation with their major professor(s), should select the members of their Ph.D. committee prior to the end of the second semester of graduate study in order to convene a meeting to discuss the student’s coursework and plan for certification. Certification is the process by which the Ph.D. committee certifies that the student has completed the formal coursework requirements of the Ph.D. certification is particularly important in the horticulture department because each student has a custom-designed program of coursework. This coursework plan must be approved by the student’s Ph.D. committee, and for this reason it is important for the student to convene a meeting of their Ph.D. committee prior to the end of their second semester so that additional courses suggested by the committee may be taken during the student’s second year of graduate study. The Graduate School requires at least one member of the Ph.D. committee to be from outside the horticulture department. The horticulture department requires that at least half of the committee members have an appointment in the horticulture department. Students choosing Minor Option A typically include their minor professor as a member of their Ph.D. committee. It is the student’s responsibility to seek and obtain (verbal) approval from the faculty members selected to serve on this committee.

CREDITS PER TERM ALLOWED

15 credits

TIME CONSTRAINTS

Doctoral degree students who have been absent for ten or more consecutive years lose all credits that they have earned before their absence. Individual programs may count the coursework students completed prior to their absence for meeting program requirements; that coursework may not count toward Graduate School credit requirements.

A candidate for a doctoral degree who fails to take the final oral examination and deposit the dissertation within five after passing the preliminary examination may be required to take another preliminary examination and to be admitted to candidacy a second time.

OTHER

n/a

PROFESSIONAL DEVELOPMENT

GRADUATE SCHOOL RESOURCES
Take advantage of the Graduate School’s professional development resources (https://grad.wisc.edu/pd) to build skills, thrive academically, and launch your career.

PROGRAM RESOURCES
The Horticulture Graduate programs encourage students to develop Individual Development Plans (https://grad.wisc.edu/pd/idp) in collaboration with their Major Advisor to facilitate professional development. Besides the extensive opportunities offered across the campus at large, students in the Horticulture programs also benefit from activities and programs provided by the Plant Sciences Graduate Council (http://psgsc.wisc.edu), a student-led organization for graduate students at UW-Madison interested in plant science.

LEARNING OUTCOMES

1. Articulates challenges, frontiers and limits with respect to knowledge within the field of horticulture.

2. Formulates ideas, concepts, designs, and/or techniques beyond the current boundaries of knowledge within the field of horticulture.

3. Creates research that makes a substantive contribution to the field of horticulture.
4. Demonstrates breadth within their learning experiences.

5. Communicates complex or ambiguous ideas in a clear and understandable manner.

6. Fosters ethical conduct and professional guidelines.

**PEOPLE**

**Faculty:** Professors Goldman (chair), Bamberg, Colquhoun, Havey, Jiang, Krysan, Nienhuis, Palta, Patterson, Simon, Spooner, Yandell; Associate Professors Bethke, Jansky, Jull, Weng, Zalapa; Assistant Professors Atucha, Dawson, Endelman, Wang