

# PLANT AND SOIL SCIENCES GRADUATE PROGRAM

Stockbridge School of Agriculture

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# Table of Contents

PLANT AND SOIL SCIENCES GRADUATE PROGRAM.....	- 1 -
WELCOME TO THE PLANT AND SOIL SCIENCE GRADUATE PROGRAM .....	- 1 -
1.1 Getting Started.....	- 1 -
1.2 Administration of the Program .....	- 3 -
1.2.1 Major Advisor/Professor .....	- 3 -
1.2.2 Graduate Program Director (GPD) .....	- 3 -
PRACTICAL CONCERNS.....	- 4 -
2.1 Student ID Card: you need this to do just about anything!.....	- 4 -
2.2 Contacts you need to know .....	- 5 -
2.3 Office (desk) space .....	- 5 -
2.4 Keys .....	- 5 -
2.5 Phones and mail.....	- 6 -
2.6 Information Technologies .....	- 6 -
Information technology services on campus, including computer and telephone services, are provided by the UMass Amherst Information Technology (IT).....	- 6 -
<i>What if I did not receive a NetID and password?</i> .....	- 6 -
<i>What services are provided by IT?</i> .....	- 6 -
2.7 Library information.....	- 7 -
2.8 Graduate Employee Organization (GEO).....	- 7 -
What does GEO do? .....	- 8 -
What benefits and assistance does GEO provide? .....	- 8 -
How do you become a member? .....	- 8 -
How many hours a week do I need to work to receive a tuition waiver?.....	- 8 -
How many hours a week do I need to work to receive health insurance?.....	- 9 -
How do I sign up for the Dental and Vision Plans?.....	- 9 -

If I elect to pay the Continuation Fee (formerly known as the Program Fee) for a semester in which I am not enrolled in classes, am I still eligible for benefits?.....	9 -
Do I have access to any discounts as a GEO member?.....	9 -
What if I have a problem in my workplace or with my insurance provider?.....	9 -
How can I get involved in GEO?.....	10 -
2.9 Graduate student fees.....	10 -
Important considerations:.....	11 -
Fee Minimization Strategies:.....	11 -
2.10 Seminar Series offered in Stockbridge School of Agriculture, and College of Natural Sciences.....	12 -
2.11 Graduate Program Meetings.....	12 -
2.12 Animal and Human Use Protocol / Research Permits.....	13 -
When should I pursue this?.....	14 -
2.13 Travel Grants.....	14 -
THE PROGRAM.....	15 -
3.1 General Policies and Administrative Requirements.....	15 -
3.1.1 Academic Honesty.....	15 -
3.1.3 Publishing.....	16 -
3.1.4 Statute of Limitations.....	17 -
3.1.5 Stipends and Tuition Waiver.....	18 -
3.1.6 Full-time Status.....	19 -
3.1.7 Continuation (Program) Fees.....	19 -
3.2 Examination/Advisory Committee.....	19 -
3.2.1 MS Degree (thesis and professional degree concentrations).....	19 -
3.2.2 Ph.D. Degree.....	20 -
3.2.3 Changing advisors and committee members.....	21 -
3.3 SSA Program Requirements.....	21 -
3.3.1 Course Credit Requirement.....	22 -

3.3.2 MS Degree (thesis option) Course Requirement .....	- 23 -
3.3.3 MS Degree (non-thesis On-campus option) Course Requirement.....	- 23 -
3.4 Thesis/Dissertation Proposal .....	- 30 -
3.5 Thesis/Dissertation Defense/General Exam .....	- 31 -
3.5.1 Before the Defense.....	- 31 -
3.5.2 Content of the Defense.....	- 33 -
3.5.3 After the Defense .....	- 34 -
3.5.4 MS Professional General Exam .....	- 35 -
3.5.5. Accelerated (Fifth year) MS in the Plant and Soil Sciences.....	<b>Error! Bookmark not defined.</b>

# WELCOME TO THE PLANT AND SOIL SCIENCE GRADUATE PROGRAM

Welcome to the Plant and Soil Science (PSS) Graduate Program in the Stockbridge School of Agriculture within the College of Natural Sciences at the University of Massachusetts Amherst. The director of Stockbridge School of Agriculture, the Graduate Program Director, and the members of the Graduate Policy Committee are confident that the experience you will gain through course works, research, and interactions with your professors and fellow students will serve you well throughout your professional career. The present document provides a detailed description of all policies, procedures, and requirements specific to a graduate degree in PSS, inclusive of the Master of Science (MS) *Thesis Degree*, the MS *Professional Degree*, and the Doctor of Philosophy (Ph.D.). You are personally responsible for adhering to all policies and requirements of the program as detailed in this document. We strongly recommend that you **do not rely on your major advisor** or others to prompt you to meet these requirements.

This document is organized into several sections. It begins with an overview of the PSS graduate program and its administration. The second section details a variety of practical needs that will help you in navigating the program. The third section describes the academic program in detail, including general policies, procedures, and administrative requirements and the specific requirements for each degree concentration. For specific information regarding official Graduate School policies and regulations, you should obtain copies of the [Graduate Student Handbook](#), and the most current [Graduate School Bulletin](#). Together, these documents contain nearly all of the technical information you will need to know to successfully complete the program.

## 1.1 Getting Started

- See the main office Paige Lab room 208 for how to get a key to your building (Paige, Bowditch, and Fernald) and the lab you will primarily be using.
- International students: Contact the [International Programs Office \(IPO\)](#) as soon as you have arrived on campus, and make an appointment to meet with an IPO advisor.

- Get a "UCard" campus ID from Whitmore Room 168. Start at the [UCard website](#).
- You will receive a "NetID" and password from OIT (Office of Information Technologies), Log into [SPIRE](#), our student information system, where you can change your password and update your personal information, including preferred first name and pronouns. Class rosters and other important documents use your SPIRE information, so it is a good idea to make corrections to your personal information before joining our campus
- Share your email address with [Sara Kelley](#), the Graduate Program Director Assistant in Paige Room 201, and with your faculty advisor. You will want to check your UMass email address daily as all official University correspondence will be sent there.
- If you are receiving a stipend, see [Sara Kelley](#) in Paige 201 to sign paperwork so you can start getting paid.
- IMPORTANT: Payment of your stipend may be contingent upon the University receiving a complete record of vaccination, including for TB. Contact University Health Services: <https://www.umass.edu/uhs/> and provide your proof of vaccination or make an appointment to receive vaccination as soon as you arrive on campus.
- Sign up for and attend a lab safety training session with [Environmental Health and Safety](#). For more information please contact [Samantha Glaze-Corcoran](#).
- Discuss planned courses and timing for your degree with [your advisor](#).
- **More places on campus you may want to check out:**
  - Campus Center for [UMass Store](#) and [Blue Wall Café](#)
  - [UMass Dining](#) for breakfast, lunch, and dinner commons
  - [Peoples Market](#) for snacks and coffee
  - [Recreation Center](#) for gym membership
  - [Mullins Center](#) for hockey, basketball games and shows
  - [University Health Services](#) for doctor appointments.
- **Useful University links:**
  - [Campus Map](#)
  - [Accessibility Campus Map](#)
  - [Parking Services](#)
  - [Graduate Student Handbook](#)
  - [Tuition and Fee Payment Information](#)

## 1.2 Administration of the Program

### 1.2.1 Major Advisor/Professor

You should know upon entry into your degree program who your major advisor will be since students are not admitted into the graduate program without a faculty member having first agreed to serve as their advisor (also called major professor). This person will play a major role in the many academic decisions you will face while enrolled. Your major professor will chair your examination/advisory committee (see "Examination/Advisory Committee") and be responsible for supervising your graduate work. Schedule regular (weekly or monthly) meetings with your major professor to discuss your research and your courses, and other professional interests and concerns.

Each major professor will have a slightly different way of keeping track of project or other expenses, so it is necessary to check with her/him, even for small amounts, before purchasing or ordering items. Be sure you are aware of the specific requirements from our bookkeepers regarding purchases, too.

Also, it is better to ask early about expectations regarding work hours, methods of data collection and handling, etc., before a problem arises. Note: there is no assumed vacation time for graduate students, except as negotiated by the Graduate Employee Organization (GEO), which amounts to 4 hrs. per month for a 20 hour/week appointment. If you are receiving a 52-week stipend, you are expected to be working full-time on the project that is paying you. Again, each major professor will have his/her concept of what constitutes reasonable "flex" time. It is prudent to ask questions before rather than after a problem arises, so clear any proposed time-off with your advisor well ahead of time.

At times, emergencies arise, and it may be essential to contact you quickly. Please make it easy for your major professor, the Graduate Program Director, and Graduate Program Assistant to find you by filing your cell and home phone numbers with each of them. If you move, be sure to update the listing. Also, check your mailbox and email daily if possible.

### 1.2.2 Graduate Program Director (GPD)

In the eyes of the University, the Program is a single graduate program with a single Graduate Program Director (GPD); thus, all official correspondence

between the Program and the graduate school must be via the GPD. Most of the paperwork for the Graduate School will require the GPD signature.

The GPD can serve as a sounding board if you have a problem you are reluctant to raise with your major professor, and the GPD can help you resolve any serious conflicts you are having with your major professor or any aspect of the graduate program. Remember, the GPD is the graduate student advocate and is there to help you succeed in the program. Problems regarding money ultimately should be resolved through discussions with the Department Head, the GPD, your major professor, and you.

## PRACTICAL CONCERNS

### 2.1 Student ID Card: you need this to do just about anything!

Getting a UMass UCard is a requirement for all students. Start at the web page for the [UMass Amherst UCard Office](#), located in Whitmore, Room 168.

Your UCard has many uses on and around campus. Your UCard is:

- Your library card for the [5-College Library System](#) (library barcode is located on the front)
- Your PVRTA bus pass; see [Transportation Services](#) for complete information on bus routes and schedules; (routes to the Five Colleges, including Amherst, Hampshire, Smith and Mt Holyoke Colleges are free with your pass).
- Your pass to access the [Recreation Center](#) (membership fees apply)
- Your access to certain locked rooms and buildings, such as labs, and greenhouses. Email GPD Assistant [Sara Kelley](#), in Paige 201, to request activation of your UCard for the entrance to Paige. To gain access rights to the CNS Research and Education Greenhouse, email Greenhouse Superintendent [Chris Joyner](#) with a request to activate your UCard for this purpose.
- You have the option to set up a debit UCard account that can be used to make purchases on campus (copy machines, food, etc.) Contact the [UCard Office](#) to set this up.



- Your access to student discounts at the [Bromery Fine Arts Center](#) on campus, and [some local businesses near campus](#).

## 2.2 Contacts you need to know

*Who:* **Sara Kelley (GPD Assistant):** [skelley@umass.edu](mailto:skelley@umass.edu)

*Where:* Paige Lab, Room 201

*What:* Sara is the person to contact if you need:

- A guest parking permit. Guest passes for visiting lecturers as part of a class or department meeting (e.g., committee meetings). Please give at least one day's notice for a pass. Parking passes for all other guests may be requested but will cost \$6.50 per day.
- To reserve the conference room in Paige Lab building
- To report a maintenance problem or something that needs to be fixed
- Student forms

*Who:* **Masoud Hashemi (GPD):** [masoud@umass.edu](mailto:masoud@umass.edu)

*Where:* Bowditch Hall, room 207

*What:* To get advice on just about everything related to the graduate program including program requirements and timeline and graduate courses available to the students. The University of Massachusetts Amherst aspires to be a university environment that is free of discrimination, harassment, and sexual violence. Report any discrimination, sexual harassment, sexual violence, dating violence, domestic violence, stalking, and other sexual misconduct to the GPD or GPD assistant immediately.

## 2.3 Office (desk) space

Regardless of whether you are supported on a research project or not, a teaching assistantship, or on your own, your advisor is responsible for providing a desk space for you on campus in consultation with the Main Office.

## 2.4 Keys

After you have been assigned a desk by your advisor, contact the main office for instructions on how to get the keys you need. Keys often take several days to obtain, so don't be dismayed if you don't have immediate access to places you need to go. Note: access to some buildings, labs and greenhouse requires activation of your ID card (See 2.1 above).

## 2.5 Phones and mail

Campus calls can be made on office telephones by dialing just the last five digits of the number. For example the GPD campus phone number is 5-1843. To make local and domestic long distance calls as part of your project simply dial 9, then 1, and then your 10 digit number including area code.

Upon the first arrival on campus, you and your major advisor need to contact [Sara Kelley](#) in Paige 201, who will assign you a mailbox with your name on it. Both professional and personal mail can be delivered there. For outgoing mail, regularly stamped mail will be picked up from designated box. If postage is to be charged to a research account, get the account number from your major professor, stamp the envelope with that number, and place it in metered mailbox. Packages that won't fit in these pickup boxes can be left on the floor directly below the boxes.

## 2.6 Information Technologies

Information technology services on campus, including computer and telephone services, are provided by the [UMass Amherst Information Technology \(IT\)](#)

- You should receive a NetID and password when you are officially accepted into the Graduate school. Your NetID and password are used to access all of the services provided by IT, including wireless web access on the EDUROAM network
- Use the NetID to activate your IT account in [SPIRE](#), the university records system. You can change your password after the initial setup.
- When you establish your IT account you will receive a UMass e-mail account (will look something like [xxxxxx@umass.edu](#))
- 

### *What if I did not receive a NetID and password?*

- Contact the [IT office](#) in LGRC A113, (413) 545-9400. You may need to go to the office in person to set up an account.

### *What services are provided by IT?*

- See the [full list of current services](#)

- [MOODLE](#) is a web-based learning management system used by many faculty to post course-specific information such as the syllabus, lecture material, quizzes and grades
- IT offers both free and discounted [student software licenses for both Mac and PC](#). You can download OS system software, email programs, web browsers, Adobe products, and anti-virus software directly from the above site
- IT offers information on [free and discounted statistical software](#)
- IT offers several [beginner and intermediate level workshops](#) on a variety of topics
- IT offers 24/7 help information at their [Online Support Center](#)

## 2.7 Library information

The library tower on campus is the W.E.B. Du Bois Library. But your ability to search libraries goes far beyond the tower.

[See the New Student Guide to UMass Amherst Libraries](#)

[Start Your Library Search](#) to access any of the 5-College Libraries, Course Reserves, and Interlibrary Loan

[See the Weekly Hours](#) for different elements of our library

The [Science & Engineering Library](#) is located in Lederle Graduate Research Center, on the second floor, Room A273

The [Five College Libraries](#) include the nearby Amherst, Hampshire, Smith, and Mt. Holyoke Colleges, accessible by [free PVRTA bus](#). You can also request items be sent to UMass from these colleges without using the Interlibrary Loan process

## 2.8 Graduate Employee Organization (GEO)

If you are a Teaching Assistant (TA), Teaching Associate (TO), Research Assistant (RA), Project Assistant (PA), Assistant Resident Director (ARD), Intern, Trainee, or Working Fellow then you can become a member of the [Graduate Employee Organization \(GEO\)](#), a union ensuring competitive and equitable pay with benefits. GEO is a unit of the [United Auto Workers \(UAW\) Local 2322](#), which is based in Holyoke, MA. We are not the only graduate students affiliated with the UAW – UMass Boston, UMass Lowell, the

University of Washington, and the entire University of California system are too. UMass Amherst graduate students have been unionized since 1990.

## What does GEO do?

The main task of GEO is to negotiate a contract with the University Administration that determines wages and benefits for graduate student employees. This contract is usually a major undertaking and requires many meetings, negotiations, and usually several rallies.

## What benefits and assistance does GEO provide?

- Tuition and curriculum fee waivers
- Dental and vision plans
- Discounted Health Insurance
- Help to resolve workplace conflicts

## How do you become a member?

To be a voting member of GEO, you must check off the box for membership on your Payroll Deduction Form. This form is sometimes attached to your assistantship contract, or you can sign it at the new employee orientation hosted by the Graduate School. Updated membership dues are listed in the Dues Deduction form accessible on the [GEO website](#). Graduate employees who choose not to join the union must still pay an "Agency Fee," as established under state law. This amount is recalculated each year. The protections and benefits offered by GEO are significant, and the union recommends full membership for all graduate student employees.

## How many hours a week do I need to work to receive a tuition waiver?

In general, you will receive one semester's tuition waiver for one semester if you work a 10-hour per week appointment for either the Fall or Spring semesters. If you work one 10-hour appointment in the fall and one 10-hour in the spring, you receive a full year's tuition waiver. If you work 20 hours per week in either semester you will receive a full year's tuition waiver.

## How many hours a week do I need to work to receive health insurance?

Health insurance is provided by the University. Anyone eligible for a tuition waiver also gets basic health care coverage. In general, working one 20-hour appointment per year will give you Basic and SHIP coverage at a reduced rate for the entire calendar year. Working one 10-hour appointment per year will give you 95% waivers for Basic and SHIP fees for one 6-month coverage period. Working one 10-hour appointment in the fall and one 10-hour in the spring will earn you waivers for Basic and SHIP fees for the whole year. Check the [GEO website](#) for information about Family and Domestic Partner Coverage.

## How do I sign up for the Dental and Vision Plans?

The GEO Union administers these plans. You must sign up for these plans every year. Check out the [UAW/UMass Health & Welfare Trust Fund website](#) for details.

## If I elect to pay the Continuation Fee (formerly known as the Program Fee) for a semester in which I am not enrolled in classes, am I still eligible for benefits?

You are still eligible for benefits, but you must go to University Health Services to sign up for health insurance in person before the add/drop period of each semester. [See more information from UMass Health Services.](#)

## Do I have access to any discounts as a GEO member?

GEO membership provides a for a significant discount on parking fees. To access your GEO discount, print out a copy of your graduate assistantship form (GFAF) through Spire, and bring it to Parking Services to demonstrate your eligibility for the parking discount. Check the parking services website for the [current GEO fees](#).

## What should I do if I have a problem in my workplace or with my insurance provider?

If you feel that any portion of the contract is being violated, you can contact the GPD or the GEO office and speak with a staff member about your options.

## How can I get involved in GEO?

- Read over the current contract available online <https://www.geouaw.org/geo-contract>, so you know your entitled benefits.
- Check out the entire GEO website <http://www.geouaw.org/>
- Know your GEO Steward at <https://www.geouaw.org/stewards/>
- You will get GEO emails. Read them to stay on top of what's going on.
- Attend the membership meetings and social gatherings. They are a great way to meet people from other departments.
- Support the hard work that the GEO officers do by going to a rally, even if you don't feel particularly educated about the issue. People will fill you in once you get there.

## 2.9 Graduate student fees

- You can pay your bill using a variety of methods described on the [Office of the Bursar Payments page](#)
- GEO-eligible members working a 10 hour-per-week semester may be eligible for fee waivers.
- Paying spring fees (or having them waived) also covers summer enrollment in health coverage.
- Different options for GEO eligible students, and the associated fees, are subject to change with each academic year. See the latest fee schedule for [Graduate Tuition Rates](#).
- The [Continuation Fee](#) (formerly known as Program Fee) is charged to maintain your university enrollment during a semester in which you take no classes. This is common when you have completed your classes but are working on your thesis or dissertation. You can register to pay the Continuation Fee through [Spire](#) by enrolling in GRADSCH 999 every semester until the degree is awarded.

## Important considerations:

- If you register for Continuation fee or are taking less than nine credits and wish to be considered a full-time student you must ask your major advisor to email this request to GPD Director Assistant [Sara Kelley](#) to upgrade your status to 'full-time' in SPIRE. There is no longer a need for a memo from the GPD; an email from your major advisor is all that is necessary. Note, you will need full-time status to be eligible to receive most student loans, scholarships, and fellowships.
- **IMPORTANT:** You must register full-time (9 credits) for two consecutive semesters (residency requirements) to be eligible for graduation. When considering registering for the Continuation fee as opposed to credits, make sure you meet this requirement.
- GEO eligible students pay 5% of the health plan costs. If you are taking less than five credits or on program fees, you must re-enroll in person at the health center at the beginning of each semester. If you are taking more than five credits, you should be automatically enrolled in the health plan, but you might still want to check with the health center. You must go and pay your health fee and sign a form at the beginning of the semester to get your insurance for that semester if you are on continuation fee.
- In addition to the above fees, there is an entering student fee that you must pay during your first semester.

## Fee Minimization Strategies:

- After you've decided what classes you're taking, it costs you nothing more to add thesis/dissertation credits up until just below the next fee threshold (make your total credits for the semester 4 or 8). Just make sure to get a memo saying you're a full-time student and don't forget to enroll in the health plan.
- Similarly, if you have over nine credits in classes, you don't pay anything more for adding additional thesis/dissertation credits. There's a maximum of 16 per semester (or 18 with GPD approval).
- If you're not taking any classes in a semester, realize that the cost of enrolling in 4 thesis/dissertation credits is pretty much the same as the continuation fee. Similarly, the cost of taking a single class (3 or 4 credits) is pretty much the same as the cost of taking no classes.

- PSS Program requires MS-with-thesis students to take 6 to 10 thesis credits, and a total of 30 graduate credits. Ph.D. students need 10-18 dissertation credits.

## 2.10 Seminar Series offered in Stockbridge School of Agriculture, and College of Natural Sciences

The Stockbridge School of Agriculture offers a weekly seminar series. See the latest scheduled events on the [Stockbridge Events page](#). PSS no longer requires graduate students enroll in seminar however, it is highly recommended that students attend department seminars. Some events are in person, while others are on Zoom. When in person, we recommend that you also attend the guest speaker lunch in Paige Lab Conference room, usually at 12 noon on the same day as the seminar.

The College of Natural Sciences, of which Stockbridge is a part, provides a dynamic list of seminars hosted by other science departments at UMass. See the latest scheduled events on the [CNS Events page](#).

## 2.11 Graduate Program Meetings

The Program holds meetings for all PSS graduate students at least once each semester. The GPD makes every effort to schedule these meetings after department seminar from 5:00-6:30 in Paige Lab Conference Room. The purpose of these meetings include 1) to build and promote a sense of community among students in the Program 2) to provide an opportunity for students to learn about the research and professional projects of other students, and 3) to provide a regular opportunity for socializing. Students are encouraged to share their topics of interest to GPD to be discussed in these meetings. The subject can be federal jobs, knowing new faculty, international opportunities, publishing, career paths of selected faculty, etc. These themes will be identified through student input at the start of the academic year. Food and drinks will be provided during these meetings.

While it is not required to attend these meetings, you are strongly encouraged to do so. These meetings, after all, are for your benefit and provide you an excellent opportunity to get fully engaged in the Program and make the very best of your UMass experience.



## 2.12 Animal and Human Use Protocol / Research Permits

If you are conducting research on vertebrate animals, you must have an approved Animal Use Protocol on file in the [Research Administration and Compliance Office](#). [Animal Care Services Office](#) on Campus.

Your major professor may already have prepared a protocol and had it approved, but you need to make sure you have a copy.

- If one has not been prepared, you will need to collaborate with your major professor to prepare one and have it approved before any affiliated research
- The IACUC requires that all personnel listed in an animal use protocol who have contact with living vertebrate animals receive appropriate training for animal users, including graduate and undergraduate students
- Potential field technicians must go through the training as before starting work on a project
- The Compliance Coordinator conducts monthly one-hour classroom training sessions for new animal users that meet federal requirements. All animal users must take the animal users' update training each year on or before the anniversary of their first training
- All State or Federal permits must be approved and in hand before official IACUC approval

If you are conducting research on human subjects, you must have an approved Human Subjects Research Protocol on file with the [Human Subjects / Institutional Review Board \(IRB\)](#) in the Human Research Protection Office

- Your major professor may already have prepared a protocol and had it approved, but you need to make sure you have a copy.
- If one has not been prepared, you will need to collaborate with your major professor to prepare one and have it approved before any related research.

## When should I pursue this?

The best time to submit your IACUC and IRB forms would be as soon as you have completed your research proposal. The reason for this recommendation is because the IACUC and IRB committee only meets on specific times a semester, and if you miss a review date, you will be delayed until the next date of review.

- If your proposal gets rejected for some reason, you may have to wait longer.
- Forms are available on the web and are very specific. Any further questions should be brought to your advisor and the IACUC or IRB offices.

## 2.13 Travel Grants

The department gets a limited travel budget from the College of Natural Sciences and Graduate School every year to support graduate student's travel to professional conferences. The call for travel grant applications is usually made by graduate school in September after the budget is finalized. If you travel to a conference and present either a poster or oral paper, you are eligible to apply for this Travel Grant. Grant funds may be applied to the registration, transportation, and lodging expenses documented by receipts for up to \$200 for regional, \$300 for domestic, and \$400 for international travel. Meals, copying, and other incidentals are not reimbursable. The number of awards can vary with budget, number, and value of individual awards. The applications will be received and awarded on a continuous, rolling basis until the allocated funds are exhausted. Applications for travel to Fall/Spring conferences should coincide with that specific Fall/Spring semester. Applications will be selected based on the type of conference, type of presentation, and justification for funds.

If you are awarded a travel grant, please submit all travel receipts to the Graduate Program Director Assistant, [Sara Kelley](#), within **three weeks** of your travel.

# THE PROGRAM

The overall objective of Plant and Soil Science Graduate Program is to develop a successful, high-quality graduate program that provides proper training of graduate students, giving the tools necessary for them to be successful leaders in research, education, and industry.

## 3.1 General Policies and Administrative Requirements

### 3.1.1 Academic Honesty

Read and understand sections VIII Academic Honesty Policy and IX Graduate Student Honor Code found in the Graduate Student Handbook. Also, all graduate students should try and obtain a copy of Sigma Xi. 1986. Honor in Science. The Scientific Research Society, Research Triangle Park, NC, 41pp. Academic Honesty Policy for the University of Massachusetts is outlined at <http://www.umass.edu/honesty>

### 3.1.2 Title IX

Title IX is a U.S. law that prohibits discrimination in education on the basis of gender. A focus of Title IX is the prevention of sexual misconduct on college campuses. "Sexual Misconduct" includes sexual assault, sexual harassment, domestic or dating violence, and stalking.

To create a caring and compassionate university culture, it is important for all of us to understand the resources that are available and our Title IX reporting responsibilities. Sexual misconduct harms its victims and the entire campus community; it is in the interest of all of us to prevent such offenses.

As a student, you or a peer may be a potential target of Title IX-related violations. If you are also a graduate student employee, you have Title IX reporting obligations as well. Under federal law, graduate student employees who are made aware of a possible incident of sexual harassment, sexual assault, or any other kind of sexual misconduct are required to report it.

If you or someone you know needs to report a possible Title IX offense, please follow these procedures:

- If the accused is a student, the report should be made to Patricia Cardoso, Deputy Title IX Coordinator, Dean of Students Office (DOSO): 227 Whitmore Administration Building, telephone (413) 545-2684 or email at [pcardoso@stuaf.umass.edu](mailto:pcardoso@stuaf.umass.edu)
- If the accused is an employee, the report should be made to Kelly Burgess, Deputy Title IX Coordinator, Office of Equal Opportunity and Diversity (EOD): 243 Lederle GRC Lowrise, telephone (413) 545-3464 or email at [kellyb@admin.umass.edu](mailto:kellyb@admin.umass.edu)

Graduate student employees are not confidential reporters and cannot guarantee confidentiality to anyone reporting a Title IX issue. If a student or employee asks to discuss such a matter in confidence, graduate student employees must state that they may not be able to maintain confidentiality. If you are approached regarding a possible Title IX violation, you might respond in this manner: "While I'm not a confidential source, I respect your privacy rights and will work with the campus Title IX coordinator and other resource areas to provide support."

If the individual reporting the incident to you chooses not to continue the conversation, you should encourage them to contact the Dean of Students Office, the Office of Equal Opportunity and Diversity, the UMass Police Department (UMPD), the Center for Women and Community (CWC), or the Center for Counseling and Psychological Health (CCPH). UMPD, CWC, and CCPH are permitted to maintain confidentiality.

Failing to report a possible Title IX offense deprives the campus community of valuable information and will not help victims/survivors to get the resources they need.

You can find extensive additional information about Title IX and the University's resources and policies by navigating to the UMass Title IX webpage, <https://www.umass.edu/titleix>

### 3.1.3 Publishing

It is expected that your research or special project work will lead to publication in refereed journals. Even though Master's Theses and Doctoral Dissertations may be copyrighted, you and your major professor have a

responsibility to make sure your work is indeed published and made accessible to the broader scientific community.

Typically, you should write the articles stemming from your work. It is expected that your major professor will be included in the author list even if you have done most of the writing. If a year passes after your final defense and the appropriate rough draft(s) is still not written, your major professor is entitled to write the article and assume the first authorship even though you have the copyright to the dissertation or thesis. Determining who should be included and in what order in the author list is sometimes a problem. R. H. Schmidt (Bull. Ecol. Soc. 68:8-10, 1987) gives a worksheet approach to help determine the relative contributions to the five areas of "conception, design, data collection, data analysis, and manuscript preparation." R. A. Day (see reading list) asks "And what do these colleagues do when everything suddenly falls into place as a result of a searching question by the traditional 'guy in the next lab' who had nothing whatever to do with the research?" J. G. Dickson et al. (Wildl. Soc. Bull. 6:260-261, 1978) suggest "if the professor conceives and designs a project and is instrumental in other areas, he should be the first author."

In short, authorship is a tricky business, one that should be discussed at length with your major professor. The best time to discuss authorship is before the start of a project to avoid any misunderstanding and conflicts down the road. Also, Weltzin et al. (Front Ecol. Environ 4(8): 435-441, 2006) recommend communication between coauthors throughout the research process. It is highly recommended to follow the guidelines on publication and research ethics listed by the Ecological Society of America (ESA): <https://www.esa.org/about/code-of-ethics>.

All oral and poster presentations and publications should acknowledge sources of funding and other support for the research.

For thesis/dissertation degree students, the department expects a digital copy of your thesis/dissertation in pdf format. Your paperwork may be held up by the GPD or Department Head if you don't provide one. Also, you should provide your major advisor a copy of your thesis/dissertation and all research data on a computer disk before graduation.

### 3.1.4 Statute of Limitations

The Graduate School expects you to finish your program promptly which means within **four years** for the MS and within **seven years** for a Ph.D. (assuming the candidate already has the MS). **Please note funding**

**restrictions will apply: admitted students ranked in merit by the GPC are guaranteed funding support for their entire PhD (5 years maximum) and MS (2 years maximum).**

The first extension is granted automatically, but your major advisor must inform the GPD of this request so that we can approve the extension. A second extension requires a special petition to the Graduate School. To do this, you must write a memo to your major professor that summarizes your progress and the difficulties causing the need for an extension. Your major professor will send a cover memo to the GPD supporting the request, and the GPD will normally forward a copy of this memo as an attachment to his/her notification or request for the SOL extension.

### 3.1.5 Stipends and Tuition Waiver

Most research students in the program will receive monetary support in the form of a teaching assistantship (TA) or research assistantship (RA). The amount of stipend varies somewhat among students but is usually sufficient (i.e., 10 hr/week TA) to merit a tuition and partial fee waiver. Note, you must be appointed on a TA or RA amounting to at least 10 hr/week to qualify for a tuition waiver. It is your major professor's responsibility to expedite your appointment as an RA or TA with the office. If you and your major professor do not arrange for an assistantship, you will be responsible for paying tuition, with one exception. If you are receiving a stipend from another source equivalent to a 10-hr TA/RA for work directly related to your academic program, you can apply for a tuition waiver. UMass refers to this as an "externship" see:

<https://www.umass.edu/graduate/funding/externship-policies-procedures>

For this option, you must complete a special form (obtained from the front office in Graduate School in Goodel Building) documenting your employment and verifying that the work and stipend are directly related to your academic progress. Your employer must sign the form, which is accompanied by a letter from your sponsor on letterhead describing the work to be completed, the amount you will be paid and the period (start and end date) over which the work will be completed. Also, this form and accompanying letter from the sponsor must be submitted each semester separately.

If you don't receive a payroll or expense check when you expect it, don't delay in asking your major professor to help you. Please do not contact the

Main Office about your stipend unless your major professor has specifically instructed you to do so.

### 3.1.6 Full-time Status

Any semester that you are not enrolled full-time (at least 9 credits) for coursework, including thesis or dissertation credits (e.g., during semesters you are in the field conducting research), you may need to request full-time status to be eligible to receive fellowships, scholarships, and student loans.

**Your major advisor must recommend a full-time status to the GPD,** who will upgrade your status to full on SPIRE. A memo is no longer needed to request an enrollment status change. **Note, this must be done before the last day of add/drop for the semester** and does not have to be done during the summer months.

### 3.1.7 Continuation (Program) Fees

If you are not enrolled for any credits, including thesis or dissertation credits (e.g., during semesters you are in the field/lab conducting research), you must still register for the Continuation (Program) Fee only; otherwise, the Graduate School will automatically drop you from the program. Specifically, to register for Continuation Fee only, you must enroll (via SPIRE) in the following: GRADSCH 999 (note, the specific schedule # changes each semester, therefore check on SPIRE), and you will need to enroll before the last day of add/drop.

**IMPORTANT:** If you are paying continuation fee only (i.e., not enrolled for course credits, including thesis or dissertation credits) OR you are signed up for less than 5 credits (including thesis or dissertation credits), then you must physically go to the Health Center and sign up for Health Insurance at the beginning of each semester, otherwise it will be dropped automatically. Health Insurance is only automatically carried forward if you are signed up for 5 or more credits.

## 3.2 Examination/Advisory Committee

### 3.2.1 MS Degree (thesis and professional degree concentrations)

You need at least two (but more is OK) SSA Graduate Faculty (as approved so by the Graduate School) on your committee. The Chair (almost always your major professor) must be a member or adjunct member of the SSA

Graduate Faculty. A second member must also be a member or adjunct member of the SSA Graduate Faculty, who could bring diverse viewpoints to the committee. Additional members can be from outside SSA (e.g., faculty from other departments and universities, agencies, and private industry who are approved by the Graduate School to serve one-time as a Graduate Faculty). At least one member of the committee must be a regular University employee (i.e., not an adjunct faculty member).

UMass Research Associates (holding an MS degree at a minimum) are eligible to serve as members of MS committees, but not on Ph.D. committees. People not listed as UMass Five College Graduate Faculty (e.g., faculty from other institutions or individuals from agencies or industry that hold PhD's) can be included as "Consulting members" (i.e., non-voting) or "Members" (i.e. voting), but cannot replace either of the two SSA faculty members (i.e., they can be the third or fourth member). If such people are included as "Consultants" or full "Members," the GPD has to forward a memo to the Graduate School (along with the curriculum vitae, and date of birth) to convince them to allow it. The Graduate School prefers such people to be named as Consultant.

With your assistance, your major professor must forward a committee request memo to the GPD (for professional degrees) and the Graduate School by the GPD (for thesis degrees). Your graduate committee is not officially formed until this memo has been sent to the GPD and Graduate School. You must have an approved committee before you can submit your thesis proposal.

### 3.2.2 Ph.D. Degree

The Ph.D. committee needs to have at least three committee members with Ph.D. and Graduate Faculty Status. Additional members could be appointed depending on the research needs. At least one member must be an "outside of department member," defined by the graduate school as a UMass Five College Graduate Faculty member, not in your department. Members outside the Five College System could be appointed after approval by the Graduate School as Graduate Faculty. With your assistance, your major professor must forward a committee request memo to the GPD for submission to the Graduate School. Your graduate committee is not officially formed until this memo has been sent to the Graduate School and a letter from the Graduate Dean is received by the student. You must have an approved committee before you can submit your dissertation proposal.



### 3.2.3 Changing advisors and committee members

There might be situations when you feel a need to change major advisor or committee members. This could stem from many reasons, including a change in topic, major disagreements, work environment, etc. Changing a committee member can be done by discussing with your major advisor and informing the GPD of any changes to the committee member through a memo to graduate school. In cases that involve changing your major advisor, you are encouraged to discuss it with the GPD or school director on such changes. Discussing such issues with other faculty is encouraged. GPD will try to mediate any issues that can be resolved without changing your major advisor. When mediation does not work, you upon being discussed, the GPD can suggest another advisor in the department to work with. If this option does not work, the GPD will take the administrative role in the advising process by consulting with your original advisor or another faculty for expertise and content approval. When a decision is made by you and a new advisor is identified, GPD will make a recommendation for such changes through a memo to the graduate school. Changes to the graduate committee need to be recommended by the GPD to the graduate school in a new memo.

### 3.3 SSA Program Requirements

- Upon joining the PSS program, each graduate student, advisor, and the GPD will sign an agreement regarding these requirements. The student, advisor, and GPD all will maintain a copy of this agreement.
- All students are required to submit an annual progress report in consultation with their advisors to the GPD who will forward it to the evaluation committee. The Graduate Policy Committee (GPC) will act as the evaluation committee.
- For the first year, the GPC will act as advising committee in consultation with student's advisor. GPC will meet each student and the advisor at the beginning of the fall and spring semester to ensure students are taking appropriate courses. This should be a brief 10-15-minute meeting with each student.
- The Program requires **all** Ph.D. students to have **comprehensive knowledge** in core areas of the program. This requirement is assessed through "Preliminary Exam" or just "Prelims," for Ph.D. degrees.
- The qualifying exam should be completed prior to start of 5<sup>th</sup> semester or earlier of a Ph.D. candidate's program. At that point, students must

present a clear understanding of their research topic and demonstrate fundamental knowledge in plant and soil science.

- Student's advisor should officially send the names of qualifying exam committee members to the GPD. The qualification exam committee will decide how to proceed with the written and oral exam.
- There is no qualifying exam requirement for the MS student but will have a MS thesis defense that consists of a public presentation of their thesis research and a closed final exam with the committee.
- Each student's graduate dissertation committee should be appointed by the end of the 2<sup>nd</sup> semester. For Ph.D. candidates who have not yet passed the qualifying exams, this committee is not the "official" dissertation committee but will serve as a guidance committee.
- Ph.D. students should present their dissertation proposal/prospectus to the Graduate dissertation committee and graduate faculty during the 4<sup>th</sup> semester or earlier.
- MS students should get their thesis outline approved by thesis examination committee and submit to the graduate school before the beginning of 3<sup>rd</sup> semester of initiation of MS degree program.
- It is mandatory for all PSS students to meet yearly with their graduate committee to evaluate and discuss the progress report. The committee will sign off on the annual report and sent it to the GPD and GPC. The GPC just checks whether everything is okay, and if not, it intervenes. This will help avoid any problem a student might face and will keep the students on track to graduate on time.
- It is mandatory for all PSS graduate students to present their research (poster) at SSA's Annual Research Symposium (most likely in spring semester). Senior level undergraduate students engaged in research are also encouraged to participate and present posters.
- All Ph.D. students must have at least two 1<sup>st</sup> author submitted/accepted, peer-reviewed publication before scheduling their final dissertation defense. MS students are highly encouraged to have at least a draft of the manuscript before graduation.
- All doctoral candidates must spend the equivalent of at least one continuous academic year (two consecutive semesters) of full-time graduate work (nine credits per semester) in residence at the University to satisfy their residency requirement. The residency year must be either in a Fall/Spring or Spring/Fall sequence.

### 3.3.1 Course Credit Requirement

The minimum course credit requirements for different graduate program are listed below. Please note that your advisor and committee should be satisfied with your course credits. Graduate students must consult with their

advisor to determine if they need additional courses based on the research project.

### 3.3.2 MS Degree (thesis option) Course Requirement

- A minimum of 30 course credits is required.
- At least 6 credits in letter-graded 600-800 series courses are required.
- Required courses include Global Challenges in Agriculture and the Environment (STOCKSCH 650) (3 credits). It is highly recommended for MS degree students with thesis option to take a statistical/biometry course, such as Public Health 640, Statistics 501, or a similar course.
- Master's thesis is 6-10 credit.
- Up to 6 credit can be taken as independent study.
- Up to 6 credits with  $\geq$  B grade and advisor's approval can be transferred from other universities. Requests to transfer credits must be filed and approved by your advisor, and by the GPD, and then be sent to the Graduate School.
- The remainder course credits should be graduate-level courses in a major field defined as Plant & Soil Science or Environmental Science, determined primarily by advisor and thesis committee. No Pass/Fail grading in major field is allowed. See the list of available graduate-level courses in the appendix.

### 3.3.3 MS Degree (non-thesis On-campus option) Course Requirement

- A minimum of 30 course credits is required.
- Twenty-one (21) of these must be in major field defined as Plant & Soil Science or Environmental Science courses or closely related courses.
- At least 12 credits in letter-graded 600-800 series courses are

required. See the list of available graduate-level courses in the appendix.

- Required courses include Global challenges in Agriculture and the Environment (STOCKSCH 650) (3 credits).
- No more than 6 credits of Independent Study can be taken to meet degree requirements.
- An independent written report or literature review is required. Up to 3 Independent Study credits can be used for this purpose.
- No more than 6 degree credits of grade "B" or better can be transferred from another institution.
- A final General Examination is also required.
- **No financial support is committed by the department for the non-thesis MS degree students.**

### 3.3.4 Accelerated M.S. Degree

#### **Accelerated Master's Degree in the Plant and Soil Sciences**

##### ***Brief Description of the Program***

The Stockbridge School of Agriculture (SSA) offers Accelerated Masters of Science degree (AcMS) in the Plant and Soil Science Graduate Program. B.S. students in Stockbridge or interdepartmental majors who wish to continue current undergraduate research projects and complete a M.S. degree efficiently are eligible to enroll in this option.

##### ***Course sequence for AcMS and the timeline to completion for students.***

Students who already are conducting research or an independent internship/project in SSA or related departments will be eligible for the AcMS option. Also, undergraduate students who are not conducting undergraduate research but would like to continue their education in a *non-thesis* option are eligible. **A minimum of 6 and a maximum of 9 credits at the 500 level courses are required to be completed by the end of the senior year for the AcMS.** These credits will be transferable to the MS degree if they are within the student's indicated area of interest, however, the total number of credits, taken across both bachelors and masters programs, must be at least 150.

Students may apply to the program in the first semester of their junior year, or during their senior year if adequate course and lab work are in progress or completed. **Application materials should include two letters of recommendation, of which one letter should be from the student's research advisor or mentor explicitly assuring that they approve the student's proposed work.** There is no GRE requirement. Applications will be reviewed, and acceptance based on a vote of the PSS Graduate Policy Committee.

Students must complete their degree requirements within 15 months of the completion of their baccalaureate degree.

**No financial support is committed by the department for the AcMS degree students.** Students are liable to pay the tuition and other mandatory fees required by the program and the Graduate School.

#### **Accelerated M.S Requirements**

A minimum of 30 credits (500-level and above) are required. Of these, a minimum of 6 must be completed by the end of the student's senior year; a maximum of 9 of these credits may be counted towards both student's BS and AcMS degrees, however the total number of credits, taken across both bachelors and masters programs, must be at least 150. Transfer credits must have a grade of B or above. Students can select either a thesis or non-thesis option.

***Thesis Option –minimum 30 credits***

- Six to 10 thesis credits can be applied towards the degree.
- A maximum of 6 credits can come from Independent Study (696, 796) courses.
- No Pass/Fail grading in required courses is allowed, except for 700-level seminars and thesis credits.
- The grade-point average of courses submitted for the degree must be 3.0 or above.
- Taking a statistics or biometry course offered by other departments is highly recommended.
- See the list of available graduate-level courses in the appendix.

**Table 1: List of required credits for M.S. in Plant & Soil Sciences, Thesis Option**

<b>Number</b>	<b>Course Name</b>	<b>Credits</b>
STOCKSCH 650	Global Challenges in Agriculture & the Environment	3
STOCKSCH 699	Master's Thesis	6-10
STOCKSCH 696	Independent Study	Up to 6
Elective	Graduate-level courses (500-800 level)	9 - 15
<p>This table is intended to be used as a convenient check-off sheet; the information in it does not take precedence over Graduate School requirements.</p> <p>Seminar courses (STOCKSCH 792A) and Independent study (STOCKSCH 696 and STOCKSCH 796) cannot be used to substitute the requirement for 600-level without the permission from the Graduate Program Director.</p>		

***Non-thesis Option – minimum 30 credits***

- All elective credits must be at the 500-level or above.
- A maximum of 6 Practicum/Internship credits are accepted; and a minimum of 3 are required. All Practicum/Internship projects must be approved by the SSA Graduate Program Director. These credits must be taken as a matriculated graduate student.
- No Pass/Fail grading in required courses is allowed, except for 700-level seminars and Practicum/Internship credits.
- The grade-point average of courses submitted for the degree must be 3.0 or above.

**Table 2: List of required credits for M.S. Plant & Soil Sciences, Non-Thesis Option**

<b>Number</b>	<b>Course Name</b>	<b>Credits</b>
STOCKSCH 650	Global Challenges in Agriculture & the Environment	3
STOCKSCH 698	Practicum/Internship <sup>v</sup>	3
STOCKSCH 696	Independent Study (Individual Project) <sup>y</sup>	3- 6
Elective	Graduate-level courses (500-800 level) <sup>u</sup>	9 -18
<ul style="list-style-type: none"> <li>• This table is intended to be used as a convenient check-off sheet; the information in it does not take precedence over Graduate School requirements.</li> <li>• Seminar courses (STOCKSCH 792A) and Independent study (STOCKSCH 696 and 796) cannot be used in the requirement for 600-level and above courses without the permission from the Graduate Program Director.</li> </ul> <p>An independent project written report is required. This may be an in-depth literature review, or a report of a research project. The student will present their project to the committee and the graduate faculty in a seminar, followed by final exam.</p> <p><sup>u</sup> Elective courses need to be approved by the SSA Graduate Committee.</p>		

### 3.3.5 M.S. Degree (non-thesis, Off-campus Soils Option)

- A minimum of 30 course credits is required.
- Twenty-three (23) of these must be in major field (defined as Soil courses) or closely related courses such as Geology.

- The following courses are required:
  - STOCKSCH 566 (Soil formation) (3 credits)
  - STOCKSCH 575 (Environmental soil chemistry) (3 credits)
- No Pass/Fail grading in major field is allowed.
- At least 12 credits in letter-graded 600-800 series courses are required. See the list of available graduate-level courses in the appendix.
- An independent written report or literature review is required. This may be an in depth literature review, or a report of a research project. The student will present their project to the committee and the graduate faculty in a seminar, followed by the final examination. Six credits of Independent Study are required however, these 6 credits may be taken over the course of study.
- No more than 6 degree credits of grade "B" or better can be transferred from another institution.

M.S. Degree (non-thesis, Off-campus Soils Course  
Requirements)

Required Courses	Completed
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Number	Course Name	Credits	Fall	Spring	Year	Credits	Grade
STOCKSCH 696	Independent Study (Individual Project)*	6					
STOCKSCH 602	Research Literature	3					
STOCKSCH 793A	Seminar Presentation	1					
	Graduate-level courses (see list below)	18					

At least 15 credits in addition to those required must be complete prior to graduation. These credits must be acquired through completion of a combination of the following courses:

- STOCKSCH 515      Microbiology of the Soil (3 credits)
- STOCKSCH 564      Environmental Soil Science (4 credits)
- STOCKSCH 566      Soil Formation (3 credits)
- STOCKSCH 575      Environmental Soil Chemistry (4 credits)
- STOCKSCH 576      Hydric Soils (1 credit)
- STOCKSCH 577      Advanced Hydric Soils (1 credit)
- STOCKSCH580      Soil Fertility (3 credits)
- STOCKSCH585      Inorganic Contaminants in Soil, Water and Sediment (3 credits)
- STOCKSCH 597M    Morphology and Mapping (3 credits)

### 3.3.6 Ph.D. Degree

While the Graduate School requires no minimum number of credits for a doctoral program, all doctoral students need to take a minimum of 18 course credits to prepare for the comprehensive exams and to achieve mastery of the subject. On average, doctoral students may take a minimum of two years of coursework to build their knowledge before taking the comprehensive exam.

Doctoral comprehensive exam include both written and oral examination. Your advisor will forward a memo to the GPD recommending members of the Examination/Advisory Committee. This committee may or may not be the same as dissertation committee. Each member of examination committee will give the student a pass/fail grade.

A minimum of 18 course credits is required before the comprehensive exam. However, your advisor and committee may recommend taking more course credits, based on your research project.

- Required courses Global challenges in Agriculture and the Environment (STOCKSCH 650) (3 credits). While biometry is not a required course, it is strongly recommended that Ph.D. candidates take at least one biometry/statistic course such as Public Health 640 or Statistics 501 or other similar course.
- The remainder 15 course credits should be graduate-level courses (500-800 level) in major field defined as Plant & Soil Science and Environmental Science, determined primarily by advisor and thesis committee.
- No Pass/Fail grading in major field is allowed.
- Dissertation is 10 - 18 credits.
- See the list of available graduate-level courses in the appendix.
- Up to 6 credits with  $\geq$  B grade and advisor's approval can be transferred from other universities.

### 3.4 Thesis/Dissertation Proposal

You must submit a thesis/dissertation proposal (also called a prospectus) describing fully the research work to be done. For Ph.D. candidates, the proposal defense should be done after the candidate successfully passed the comprehensive exam. The thesis/dissertation proposal must be approved and signed by all members of the Committee, the GPD, and the Department Head and forwarded to the Graduate Dean at least **four months before the thesis defense** or **seven months before the dissertation defense**. A

specific format is given for the title page (see Graduate Student Handbook online), but there is no specific format for the text.

The format of the proposal is to be determined by you and your examination/advisory committee. Ideally it should be written in an appropriate publication format but with the "Results and Discussion" sections replaced with "Anticipated Results." Include your experimental design (layout), plans for data statistical analysis, measurements and methodology, a timeline, and your publication plans. The Research Concepts course will provide you with the background for developing a proposal.

For doctoral students, the date the prospectus was defended along with a copy of the proposal, signed by all advisory committee members must be submitted by GPD to the Graduate School.

For MS students, a copy of signed proposal should be given to graduate school by the student.

## 3.5 Thesis/Dissertation Defense/General Exam

The final defense is much more than just a rehash of your thesis/dissertation. The defense is intended to determine if you see the larger picture within which your work fits and determine whether you can adequately defend your work under scrutiny. Note, the entirety of the defense is fully open to any interested persons, including other students, faculty and the general public. Use the following link for detailed information:

[https://www.umass.edu/graduate/sites/default/files/files/thesis\\_and\\_dissertation\\_guidelines.pdf](https://www.umass.edu/graduate/sites/default/files/files/thesis_and_dissertation_guidelines.pdf)

### 3.5.1 Before the Defense

- You must have prepared and submitted a thesis/dissertation proposal (see "section 3.4 for detail) describing fully the work to be done.
- You must obtain tentative approval of the thesis/dissertation as to subject matter and syntax by all members of the Committee before the defense can be scheduled. Specifically, at least one week before the thesis defense is scheduled or four weeks before the dissertation defense is scheduled, all committee members must email the Committee Chair

confirming that they have read the thesis and approve your readiness to proceed to defense. After hearing from all committee members, it is up to the Chair to determine that you are ready to defend and with you coordinate the scheduling of a defense date. Note, the thesis/dissertation need not be in its final version for tentative approval; the Committee may require amendments following the defense.

- A memo requesting that the Final Doctoral Oral Examination be announced must be signed by the GPD or the Department Head/Chair and submitted to the Graduate Student Service Center one month prior to the examination date. Staff at the Graduate Student Service Center will review the requirements below and, if complete, will send an announcement to the Inside UMass "[Weekly Bulletin](#)" section of the UMass website:
- ✓ Course work completed
- ✓ Residency requirement satisfied and verified by Department (Residency requirement is two consecutive semesters enrolled as a full time student taking at least 9 credits each semester)
- ✓ Registered for the appropriate number of dissertation (899) credits
- ✓ Preliminary Comprehensive Examination passed
- ✓ Dissertation Committee appointed by the Graduate Dean
- ✓ Dissertation Prospectus/Outline approved and filed with the Graduate School
- ✓ There has been 7 months between submission of Prospectus/Outline and Final Doctoral Oral Examination/Dissertation Defense date
- Your major professor must distribute an announcement of the defense to all faculty and graduate students in the program at least one week before the defense. The announcement will include your name, thesis/dissertation title, the place and time of the defense, names of the examining committee members (and the Moderator, if there is one), and a list of your graduate courses. Defenses should be scheduled only when the University is open and not on holidays or religious holy days.
- The entirety of the defense, including the seminar presentation, Q&A involving non-committee members, and examination by the Committee, is by default open to any interested persons, including other students, faculty, and the general public. However, you and your major professor may petition the GPD to have the committee examination portion of the defense closed to students and the public. Faculty cannot be excluded

from any portion of the defense. This petition must be received by the GPD, as appropriate, at least one week before the defense. If approved, the Committee Chair will announce the closed exam during their review of the ground rules of the defense at the time of the defense (below).

### 3.5.2 Content of the Defense

- The emphasis of the defense will be on your thesis/dissertation and closely related subjects that require you to demonstrate an understanding of how your work fits into the broader context of environmental conservation.
- The Chair will review the ground rules of the defense and introduce you and the committee members.
- You will summarize your research in a seminar presentation. You will be expected to do this in 30-45 minutes.
- The Chair will invite questions from the audience; the presentation and Q&A session are not expected to exceed 60 minutes in total. After questions, there will be a break, and the candidate and committee members will reconvene to begin the formal examination. All other interested persons (faculty, students, public) are free to attend the examination but may not participate (i.e., they may not ask questions).
- You will be asked questions by each member of the committee (including Consultants) with each questioner given 20-40 minutes depending on the number of committee members and the time available. An examiner may yield the floor, with permission of the Chair, if another examiner wants to pursue a line of questioning toward a logical conclusion or to resolve any ambiguities. Note, non-committee members may be present during the examination, but they are not allowed to ask you questions. They may participate in the ensuing discussion if and only if the Chair deems it appropriate and solicits their participation.
- After the examiners are through, you and all other students and non-invited guests will be asked to leave.
- Nonvoting faculty and guests may address comments to the Committee. Nonvoting faculty and guests, excepting the moderator and Consultants, will then be asked to leave before the voting.
- Voting: All voting will be by secret, written ballot for PASS or FAIL. Only officially-appointed examiners vote. After a brief discussion, a first ballot

will be taken. If the votes are unanimously PASS, no further discussion is necessary, and you will have passed the defense. If there are FAIL votes, there will be further discussion regarding the extent and seriousness of your weakness. There will then be a final vote. *The vote must be unanimously PASS for you to pass the defense.*

- You will be informed verbally of the result as soon as it is reached. Note, you may pass the defense, but still be required to make changes in the thesis/dissertation before it is signed in its final form.

### 3.5.3 After the Defense

- The Committee will inform you of any changes required in the thesis/dissertation. *All committee members and the Department Head* must sign your thesis/dissertation/professional paper in its final form.
- The Chair will notify the Graduate Dean of the date and results of the defense by a memorandum to be co-signed by the GPD.
- If you pass the defense, you must complete and sign the Degree Eligibility Form, obtain the required signatures, and deliver it to the Graduate School (Office of Degree Requirements) along with the required fees. For MS Thesis and Ph.D. Degrees, you must also submit your thesis/dissertation and the accompanying signature page to the Graduate School and see that *digital* copies are provided for the Department (delivered to the Main Office) and your major professor. Make sure and check on the deadlines set by the Graduate School for delivering theses/dissertations and other materials. Note, thesis/dissertation can now be submitted electronically, so check with the Graduate School for the procedures on submitting electronically.
- *Consequences of failure.* —If you fail the defense, you may petition (in writing) the Executive Committee of the Department within two weeks of the Examination. If the Executive Committee finds that your Committee has committed one or more procedural errors, it may ask your Committee to reconsider. If there are serious personality conflicts involved, the Executive Committee may ask the GPD to petition the Graduate School for a new committee to be appointed which may conduct a new defense. Also, you may seek help from the Graduate School directly either by contacting the Assistant Dean or by contacting the Graduate Council. Be aware that they may refuse to hear your petition. Be aware also, that if

things get to this point, it is most difficult to resolve the situation to everyone's mutual satisfaction. For example, it may prove impossible to find faculty willing to serve on a new committee. Also, you may find help and advice through the university's Ombuds Office. Finally, your Committee may decide to table a FAIL vote and conduct a second (last) defense after allowing you time to make changes in your thesis/dissertation paper and presentation.

### 3.5.4 MS Professional General Exam

For professional MS students, a general exam will be administered by the advisory committee. On passing, your major advisor will complete the relevant memo on the outcome of the general exam and send it to GPD for signature and submission to the graduate school. The graduate school requires this memo for graduation.

#### ***Accelerated M.S Requirements***

A minimum of 30 credits (500-level and above) are required. Of these, a minimum of 6 must be completed by the end of the student's senior year; a maximum of 9 of these credits may be counted towards both student's BS and AcMS degrees, however, the total number of credits, taken across both bachelors and masters programs, must be at least 150. Transfer credits must have a grade of B or above. Students can select either a thesis or non-thesis option.

#### ***Thesis Option –minimum 30 credits (see Table 1)***

- Six to 10 thesis credits can be applied towards the degree.
- A maximum of 6 credits can come from Independent Study (696, 796) courses.
- No more than 6 credits with grades "B" or better can be transferred from other institutions.
- No Pass/Fail grading in required courses is allowed, except for 700-level seminars and thesis credits.
- The grade-point average of courses submitted for the degree must be 3.0 or above.
- All elective credits must be at the 500-level or above.

**Table 1: List of required and elective credits for Fifth year M.S. in Plant & Soil Sciences; Thesis Option**

<b>Number</b>	<b>Course Name</b>	<b>Credits</b>
STOCKSCH 650	Global Challenges in Agriculture & the Environment	3
STOCKSCH 699	Master's Thesis	6-10
STOCKSCH 696	Independent Study	3- 6
Elective Courses	Graduate-level courses (500-800 level)	11-18
<p>This table is intended to be used as a convenient check-off sheet; the information in it does not take precedence over Graduate School requirements.</p> <p>Seminar courses (STOCKSCH 792A) and Independent study (STOCKSCH 696 and STOCKSCH 796) cannot be used to substitute the requirement for 600-level and above courses without the permission from the Graduate Program Director.</p>		



### **Non-thesis Option – minimum 30 credits (see Table 2)**

- A maximum of 6 Practicum/Internship credits are accepted; All Practicum/Internship projects must be approved by the SSA Graduate Committee. These credits must be taken as a matriculated graduate student.
- A maximum of 6 credits can come from Independent Study (696, 796) courses.
- No more than 6 credits with grades “B” or better can be transferred from other institutions.
- No Pass/Fail grading in required courses is allowed, except for 700-level seminars and Practicum/Internship credits.
- The grade-point average of courses submitted for the degree must be 3.0 or above.
- All elective credits must be at the 500-level or above.

**Table 2: List of required and elective credits for fifth year M.S. Plant & Soil Sciences, Non-Thesis Option.**

<b>Number</b>	<b>Course Name</b>	<b>Credits</b>
STOCKSCH 650	Global Challenges in Agriculture & the Environment	3
STOCKSCH 698	Independent study	3-6
STOCKSCH 696	Practicum/Internship (Individual Project) <sup>x</sup>	3-6
Elective	Graduate-level courses (500-800 level) <sup>y</sup>	15 -21

This table is intended to be used as a convenient check-off sheet; the information in it does not take precedence over Graduate School requirements.

Seminar courses (STOCKSCH 792A) and Independent Study (STOCKSCH 696 and 796) cannot be used in the requirement for 600-level and above courses without permission from the Graduate Program Director.

<sup>x</sup> **An Independent Project written report is required. This** may be an in-depth literature review or a report of a research project. The students will present their project to the committee and the graduate faculty in a seminar, followed by a final exam.

<sup>y</sup> Elective courses need to be approved by the Graduate Program Director in consultation with the potential practicum advisor.

### 3.5.5 Checkoff Lists

### ***M.S. Degree (NON-Thesis, On-campus Option)***

<b>CHECKOFF -- REQUIREMENTS FOR M.S. (NON-THESIS, ON- CAMPUS OPTION)</b>		
Requirement	Recommended time	Date completed
Memo sent by <b><i>student's advisor</i></b> to the Graduate Program Director, with a copy to the student, stating the desired composition of the student's Guidance/Examination committee. <b><i>Graduate Program Director</i></b> appoints the Committee	Within 2 semesters of initiation of program	
<b><i>School Director</i></b> and <b><i>Graduate Program Director</i></b> meet with the <b><i>student's advisor</i></b> to review progress.	In the 3 <sup>rd</sup> semester	
<b><i>Student</i></b> presents seminar.	Prior to final exam	
Memo sent by <b><i>student's advisor</i></b> to graduate faculty, with a copy sent to the Graduate Program Director and the student, inviting them to student's final exam.	At least 7 days before date of exam	
Memo sent by <b><i>student's advisor</i></b> to the Graduate Program Director, with a copy to the student, stating that the student has passed final exam. <b><i>Graduate Program Director</i></b> will inform the Graduate School if the student passed.	Within 3 years of initiation of program	
<u>If appropriate</u> , School Check-Out Form taken by <b><i>student</i></b> to advisor for signature and taken by <b><i>student</i></b> to the Graduate Program Director.	Before signing of Degree Eligibility Form	

Copy of Degree Eligibility Form taken by <b>student</b> to the Graduate Program Director and the School Director for signatures. <b>Student</b> then takes it to the Graduate School.	As soon as Committee approves final report	
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### ***M.S. Degree (NON-Thesis, Off-campus Soils Option)***

<b>CHECKOFF -- REQUIREMENTS FOR M.S. (NON-THESIS, OFF- CAMPUS SOILS OPTION )</b>		
Requirement	Recommended time	Date completed
Memo sent by <b>student's advisor</b> to the Graduate Program Director, with a copy to the student, stating the desired composition of the student's Guidance/Examination committee. <b>Graduate Program Director</b> appoints the Committee	Within 2 semesters of initiation of program	
<b>Student</b> presents seminar.	Prior to final exam	
Memo sent by <b>student's advisor</b> to graduate faculty, with a copy sent to the Graduate Program Director and the student, inviting them to student's final exam.	At least 7 days before date of exam	

<p>Memo sent by <b>student's advisor</b> to the Graduate Program Director, with a copy to the student, stating that the student has passed final exam. <b>Graduate Program Director</b> will inform the Graduate School if the student passed.</p>	<p>Within 3 years of initiation of program</p>	
<p>If appropriate, School Check-Out Form taken by <b>student</b> to advisor for signature and taken by <b>student</b> to the Graduate Program Director.</p>	<p>Before signing of Degree Eligibility Form</p>	
<p>Copy of Degree Eligibility Form taken by <b>student</b> to the Graduate Program Director and the School Director for signatures. <b>Student</b> then takes it to the Graduate School.</p>	<p>As soon as Committee approves final report</p>	

## M.S. Degree (Thesis Option)

CHECKOFF -- REQUIREMENTS FOR M.S. (THESIS OPTION)		
Requirement	Recommended time	Date completed
Memo sent by <b>student's advisor</b> to the Graduate Program Director, with a copy to student, stating the desired composition of the student's Thesis Committee. <b>Graduate Program Director</b> will request appointment of a committee by the Graduate School. The final composition may vary from the advisor's recommendation.	Within 2 semesters of initiation of program	
<b>School Director, Graduate Program Director,</b> and <b>student's advisor</b> review progress. The <b>School Director</b> determines if continued School funding is appropriate.	In the 3 <sup>rd</sup> semester of a <u>School- funded candidate</u>	
Signed thesis proposal taken by <b>student</b> to the Graduate School. Copy of signed title page given by <b>student</b> to the Graduate Program Director. <b>Graduate Program Director</b> will date and place it in the student's file. Another copy is given by <b>student</b> to the student's advisor.	Before the start of the 4 <sup>th</sup> semester	
Memo sent by <b>student's advisor</b> to graduate faculty, with a copy to the Graduate Program Director and student, inviting them to the student's thesis defense.	At least 7 days before date of exam	

<p>Memo sent by <b>student's advisor</b> to the Graduate Program Director, with a copy to the student, stating the outcome of the thesis defense. <b>Graduate Program Director</b> will inform the Graduate School if the student passed.</p>	<p>Within 3 years of initiation of program</p>	
<p>Thesis submitted by <b>student</b> to the Graduate School. Copy of signed thesis title page taken by <b>student</b> to the Graduate Program Director, with a copy to the student's advisor.</p>	<p>As soon as Committee approves thesis</p>	
<p>School Check-Out Form taken by <b>student</b> to advisor for signature and taken by <b>student</b> to Graduate Program Director.</p>	<p>Before signing of Degree Eligibility Form</p>	
<p>Completed Copy of Degree Eligibility Form taken by <b>student</b> to the Graduate Program Director and School Director for signatures and then taken to the Graduate School.</p>	<p>As soon as Committee approves thesis</p>	

## Ph.D.

CHECKOFF -- REQUIREMENTS FOR PH.D.		
Requirement	Recommended time	Date completed
Student's annual progress report (in consultation with student's advisor) submitted to the Graduate Program Director who will forward it to the evaluation committee. Graduate Policy Committee (GPC) will act as the Evaluation Committee.	Annually by the end of each academic year	
Memo sent by <b>student's advisor</b> to Graduate Program Director, with a copy to student, requesting the appointment of a Comprehensive Examination Committee and listing the subjects of the comprehensive examination.	Prior to completion of 2 <sup>nd</sup> semester	
Memo sent by <b>student's advisor</b> to graduate faculty (not later than 7 days before the exam), with a copy to the Graduate Program Director and the student, inviting them to attend the student's <b>written</b> comprehensive examination	Prior to the start of 5 <sup>th</sup> semester or earlier	
Memo sent by <b>student's advisor</b> to the Graduate Program Director, with a copy to student, stating the outcome of the comprehensive examination (include vote tally). <b>Graduate Program Director</b> will inform the Graduate School if the student passed.	Within 3 weeks of the examination	

<p>Memo sent by <b>student's advisor</b> to the Graduate Program Director, with a copy to the student, stating desired composition of the Dissertation Committee. <b>Graduate Program Director</b> will request appointment of a committee by the Graduate School. The composition may vary from the advisor's recommendation.</p>	<p>Soon after passage of the comprehensive examination or <b>prior to the completion of 3<sup>rd</sup> semester</b></p>	
<p>Memo sent by <b>student's advisor</b> to graduate faculty, with a copy to the Graduate Program Director and the student, inviting them to attend the student's prospectus presentation.</p>	<p>No later than 7 days before the presentation</p>	
<p><b>Student</b> presents the prospectus to the dissertation Committee and faculty. <b>Advisor</b> informs the Graduate Program Director of approval.</p>	<p>Prior to the start of 5<sup>th</sup> semester or earlier</p>	
<p>Original copy of approved proposal taken by <b>student</b> to the Graduate School. Copy of signed title page taken by <b>student</b> to the Graduate Program Director, with a copy to student's advisor. <b>Graduate Program Director</b> will date it and place it in the student's file.</p>	<p>Within 3-4 weeks of the presentation</p>	
<p><b>School Director, Graduate Program Director,</b> and <b>student's advisor</b> review progress. <b>School Director</b> determines if continued School funding is appropriate.</p>	<p>In the 5<sup>th</sup> semester of a <u>School- funded candidate</u></p>	
<p><b>Student</b> completes residency requirement.</p>	<p>Before approval of proposal</p>	
<p><b>Student</b> presents seminar.</p>	<p>Usually during final semester</p>	



<p>Memo sent by <b>student's advisor</b> to the Graduate Program Director, with a copy to the student, providing information needed for publishing an announcement of the dissertation defense in the <i>Campus Chronicle</i>. <b>Graduate Program Director</b> will send this to the Graduate School, who will arrange for its publication.</p>	<p>At least 4 weeks before date of defense. <b>Note: Exam cannot be held if the announcement failed to meet the publication deadline.</b></p>	
<p>Memo sent by <b>student's advisor</b> to graduate faculty, with copies to the Graduate Program Director and the student, inviting them to attend the student's dissertation defense.</p>	<p>No later than 7 days before the defense</p>	
<p>Memo sent by <b>student's advisor</b> to the Graduate Program Director, with copy to the student, reporting the outcome of the dissertation defense (include vote tally). If student passed, <b>Graduate Program Director</b> will inform the Graduate School.</p>	<p>As soon as defense is completed, and within 6 years of beginning program, unless extension granted</p>	
<p>Dissertation submitted by <b>student</b> to the Graduate School. Copy of signed dissertation title page taken by <b>student</b> to the Graduate Program Director, with copy to the student's advisor.</p>	<p>As soon as Committee approves dissertation</p>	
<p>School Check-Out Form taken by <b>student</b> to advisor for signature and taken by <b>student</b> to Graduate Program Director.</p> <p>Link to two published manuscripts or official letter from journal (s) indicating that manuscripts have been accepted for publication should be provided to the GPD.</p>	<p>Before signing of Degree Eligibility Form</p>	

Copy of Degree Eligibility Form taken by **student** to the Graduate Program Director and the School Director for signatures and then taken to the Graduate School.

As soon as Committee approves dissertation

## LIST OF CURRENT AVAILABLE GRADUATE COURSES

### **505 General Plant Pathology (1st sem)**

Causes, nature, and control of plant diseases. Diagnosis of plant diseases. Mechanisms, biochemistry, and genetics of plant disease induction, development, and control. Prerequisite: a course in plant biology. *Credit, 4.* Dr. petit

### **510 Management and Ecology of Plant Diseases (2nd sem)**

The ecology of plant, microbe, and human interactions in plant diseases, from wilderness to industrial farms. Epidemics, traditional farming, environmental impacts, and sustainability issues. Ways in which agriculture, particularly plant production and plant disease management, change ecosystems. Independent project. BIOLOGY 100 or equivalent recommended. *Credit, 3.* Dr. Cooley

### **515 Microbiology of the Soil (2nd sem, odd yrs)**

Microbial processes in the soil and sediment environment; ecology of the various microbial communities; the decomposition of organic matter, carbon transformation, nitrogen, sulfur, phosphorus, and other mineral transformations. Chemistry of these reactions and their biogeochemical implications. Biological equilibrium, the rhizosphere, and microbial associations. Prerequisites: basic biology and chemistry courses. Consent of instructors other than juniors and seniors. Also listed as ENVIRSCI 515. *Credit, 3.* Dr. Simkins

### **520 Physiology Crop Yield (1st sem)**

Physiology of crop plants, carbon fixation, partitioning, growth and development, competition in crops, environmental factors, and yield relationships of crops. *Credit, 3.* Dr. Herbert

### **523 Plant Stress Physiology (1st sem)**

Major topics and recent advances in plant stress physiology. Discussion of environmental stresses addresses the methodology used for stress tolerance evaluation as well as assessment of current research areas in plant stress physiology. *Credit, 3.* Dr. DaCosta

### **530 Plant Nutrition (1st sem)**

With lab. The acquisition, transport, translocation, distribution, and function of the essential inorganic elements in plants. Genetic control of plant nutrition and ecological adaptation to nutritional variables. Diagnosis of nutritional disorders. *Credit, 4.* Dr. Barker

### **575 Environmental Soil Chemistry (1st sem)**

With lab. Chemical reactions that occur in soils. Topics include the nature and properties of soil minerals, cations exchange, soil acidity, and chemical relations in soils of plant nutrients and soil amendments. *Credit, 4.* Dr. Xing

### **580 Soil Fertility (2nd sem).**

Crop responses to fertilizers and other soil amendments; soil reaction, nutrient deficiencies, and toxicities; environmental impact of soil fertility management practices; modeling; tillage; livestock and soils. Prerequisites: STOCKSCH 105 and STOCKSCH 108 and either CHEM 110 or CHEM 111 or equivalent courses. *Credits. 3.* Dr. Barker

### **581 Integrated Pest Management (1st sem)**

With the lab. Theory and application of the principles of insect, disease, and weed pest management; emphasis on insects. Focus on pest and natural enemy sampling techniques, properties of available control strategies, underlying ecological and behavioral principles, model pest management systems, and societal concerns. Prerequisite: STOCKSCH 326 or 505. *Credits, Dr. Pinero.*

**585 Inorganic Contaminants in Soil, Water (2nd sem, even yrs)**

Physical, chemical, and biological factors involved in the fate and effects of heavy metals and other inorganic contaminants in soils, sediments, and groundwater. Bioleaching, acid mine drainage, and environmental bioremediation are also covered. *Credit, 3.* Dr. Xing

**587 Phyto/bioremediation (1st sem)**

The use of hyper-accumulator and transgenic plants, and their associated microbes with the purpose of environmental clean-up of contaminated soil, sediments, and water. Various strategies for a wide range of toxic pollutants, both organic and elemental, with emphasis on toxic metals. *Credit, 3.* Dr. Dhankher

**590M Microbe-Mineral-Organic Matter Interactions in Soils (2nd sem)**

This course discusses fundamental interactions between microbes, minerals, and organic matter responsible for carbon cycling, mineral weathering, and nutrient dynamics in soils. Through a combination of lectures and in-class discussions, we will examine the importance of these interactions for soil development, carbon storage, and fertility. *Credit, 3.* TBD

**Plant Biotechnology Journal Club (both sem)**

This course will familiarize students with concepts and current status of plant genetic engineering for crop improvement and health applications, covering with wide range of topics for engineering plants for abiotic and biotic stresses, metabolic engineering for nutrient enhancement, and risk assessment of engineered crops. *Credit, 1.* Dr. Dhankher

**597M Topics in Turf Pathology (2nd sem)**

Review and discussion of concepts and issues related to turfgrass diseases. Weekly readings of scientific papers and trade journals required. Guest speakers from the turfgrass industry present many of the topics and lead subsequent class discussions. *Credit, 2.* Dr. Jung

**597O Organic Contaminants in Soils, Waters, and Sediments (1st sem, even yrs)**

Transport and fate of manmade compounds in natural and managed environments: abiotic and biotic effects including partitioning, interfaces, concentration, biodegradation and biotransformation. Examination of specific examples of compounds and classes of contaminants in affected environments, such as haloorganics and petroleum products in soil and ground water. Dr. Simkins

**597V Special Topics in Integrated Turf Management (2nd sem)**

Integrates material from several turf courses. Concepts of Integrated Pest Management, including stress management and pest management, emphasized. Each student develops an ITM plan for a turf setting. TBD

**597W Artificial Treatment Wetlands (1st sem, even yrs)**

Aquatic plant selection, sizing, and design techniques. Pollution parameters of primary concern include BOD, suspended solids, nutrients, heavy metals, pathogens, organics. Treatment applications include primary and secondary effluents and sludges; storm water and agricultural runoff; solid and hazardous waste leachates, liquid industrial wastes. Field trips, student projects.

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**602 Research Literature**

A critical review of the scientific literature in an area of specialization. (up to 3 credits, Advisor of the Graduate Student)

**650 Global Challenges in Agriculture and Environment. (2nd sem) (required Course)**

This course will address topics related to the challenges imposed by climate change and environmental contamination on plant growth and production, ecosystem integrity, soil health and ecology, and the sustainability of landscapes. Credit 3, Group teaching)

**687 Phyto/bioremediation (1st sem)**

The use of hyper-accumulator and transgenic plants, and their associated microbes with the purpose of environmental clean-up of contaminated soil, sediments, and water. Various strategies for a wide range of toxic pollutants, both organic and elemental, with emphasis on toxic metals. Prerequisite: BIOLOGY 100 or 103, or Instructor's permission. (Credit 3, Dr. Dhankherr)

**690S Soil Ecology (1st sem)**

Biological processes found in the soil are essential to life on Earth. This course will introduce students to soils as their own ecosystem. Throughout the course, we will weave together descriptions of the diversity of life found within soils, plant-soil interactions, and biogeography to paint a mosaic of soil life, its complexity, and global importance. The final portion of the course will address the global challenges facing soil ecosystems and the potential of the soil health movement. There is also a field component. *Credit, 3.* Dr. Keiser

**691A Research Proposal Presentation**

Master's and Ph.D. candidates attend and present their research proposals in a regular seminar meeting open to all Plant and Soil Sciences graduate students. *Credit, 1.*

**691M Special Topic in Plant-Soil-Microbe Journal Club (2nd sem)**

*Credit 1. TBD*

**691S Special Topics in Sustainable Soil Management Journal Club (2nd sem)**

*Credit 1.*

**692A Special Topics in Plant-Pathogen Interactions**

*Credit, 1.*

**696 Independent Study**

selected research problems not related to a candidate's master's thesis. *Credit, 1-6.* (Graduate student choice of instructor)

**699 Master's Thesis**

*Credit, 6-10.*

**830 Advanced Soil Chemistry (2nd sem, every 3-4 years, depending on students' enrollment)**

The course discusses in depth the chemical processes affecting the fate, bioavailability, and redistribution of both organic and inorganic chemicals in soils, and the state-of-the-art knowledge, theories, and research in Soil Chemistry. Research methodology including advanced analytical instruments is also covered. *Credit, 3.* Dr. Xing

**896 Independent Study**

Selected research problems not related to a candidate's doctoral dissertation. *Credit, 1-6.* (PhD student choice of instructor)

**899 Doctoral Dissertation**

*Credit, 10.*



