Crop and Soil Sciences
Graduate Student Handbook

Academic Year 2015-16

Department of Crop and Soil Sciences
Washington State University
Pullman, WA 99164-6420
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WELCOME

Welcome to the Department of Crop and Soil Sciences (CSS) at Washington State University! We are proud to offer world-class MS and PhD degrees in both Crop Science and Soil Science, with the ability to conduct graduate research in a variety of specialized areas within each discipline.

The Department of Crop and Soil Sciences offers programs in the broad area of crop science, including plant breeding and genetics, crop and seed production, turf management, weed science, plant physiology, cereal chemistry, and plant biotechnology; and soil science, including soil fertility and plant nutrition, soil physics, soil chemistry, soil microbiology, soil genesis morphology and classification, organic and sustainable agriculture, and remote sensing technology including GIS, GPS, and soil mapping. Programs are designed to discover and develop principles of crop and soil sciences and to apply these principles to the development of new crop varieties and new crop, soil and water management practices in agricultural, urban, and natural environments.

Our goal is to train tomorrow's leaders, scientists and educators to make valuable and lasting contributions in their chosen field or endeavor. To achieve this goal, CSS provides students the opportunity to develop in-depth knowledge in their field, to develop critical thinking skills and to conduct original, creative, cutting-edge research. CSS students have opportunities to teach in the classroom and in outreach programs. Students also have the opportunity to develop a breadth of knowledge across the varied CSS disciplines and beyond by interacting with colleagues and faculty working in research areas outside of their own.

We have a long-standing commitment to financially supporting our CSS graduate students with a combination of funds from Washington State and from various private and governmental external grants. Since the availability of these funds fluctuates from year to year, we cannot guarantee support for all students throughout their entire programs. Nevertheless, we have an outstanding and consistent track-record of fully supporting our productive and progressive students from the day they start to the day they complete their degree. Graduate students on formal appointment and receiving a stipend are considered full-time graduate assistants in the department. These appointments represent an agreement between the student and the department with each party having defined responsibilities. Academic responsibilities are defined in this handbook. Your advisor and committee define your research responsibilities. Being a graduate student is more than a full time endeavor and requires your full attention and effort to succeed. Employment in addition to an assistantship is not permitted. Students generally devote half of their time to class studies and half to their research under the guidance of a major professor. Students are expected to complete their research project and thesis prior to graduation. Publication of the research is an expected outcome of graduate research.

Most agree that the time they spent in graduate school was some of the most challenging and rewarding in their life. Immerse yourself in the experience and take full advantage of the many social and professional opportunities coming your way. You will make many new and lasting friends from around the U.S. and world. Your time here will be filled with personal and professional growth, change, and accomplishment. At times you may want to give up. Don't. The CSS faculty and staff are dedicated to enriching your graduate experience and ensuring that it is World Class. We wish you every success in your program and your subsequent endeavors in crop and soil science-related professions.

Jim Harsh, Chair
Department of Crop and Soil Sciences

INTRODUCTION

Policies and procedures regarding graduate education are set at three levels--- the university, college, and department. The WSU Graduate Catalog and the Graduate School's Policies and Procedures contain most of the general policies on admissions and programs. Please refer to these websites for current information. This handbook addresses departmental policies and procedures in addition to the aforementioned. Failure to follow these policies and observe the degree requirements inevitably results in complications and could delay or jeopardize completion of your degree. Please read this handbook carefully and keep refer it throughout your program of study here.

The graduation requirements of the Graduate School, which must be met for completion of a graduate degree program, are those published in the Policies and Procedures of the Graduate School in effect at the time of the student's initial admission as a regular or provisional student. Departmental requirements are those in effect at the time the student files a program of study

STATEMENT OF ETHICS

The CSS faculty and staff are committed to the basic values of:

Accountability
Integrity
Positive Attitude
Respect
Honesty
Passion
Quality
Work Ethic

By upholding these values we strive for our students to develop scientific and professional values of their own. We highly encourage our students to reflect on and consider the following guiding principles:

1. Uphold the highest standards of scientific investigation and professional comportment, and an uncompromising commitment to the advancement of knowledge.
2. Honor the rights and accomplishments of others and properly credit the work and ideas of others.
3. Strive to avoid conflicts of interest.
4. Demonstrate social responsibility in scientific and professional practice, by considering whom their scientific and professional activities benefit, and whom they neglect.
5. Provide honest and impartial advice on subjects about which they are informed and qualified.
6. As mentors of the next generation of scientific and professional leaders, strive to instill these ethical standards in students at all educational levels.

Adopted by ASA, CSSA, and SSSA

STANDARDS OF CONDUCT

Plagiarism and misconduct in research will NOT be tolerated. Students failing to follow standards of conduct dictated by the Office of Student Conduct may face dismissal from Washington State University. If you are not sure what constitutes plagiarism, consult the WSU Plagiarism Information site. If you are unsure what constitutes academic integrity, please review the information presented on the WSU Academic Integrity site. Related, all graduate students are required to complete the web-based Responsible Conduct of Research Training.

MISSION, OBJECTIVES, AND LEARNING OUTCOMES

Mission Statement

The mission of the Graduate Program in CSS is to provide fundamental training in basic and applied plant and soil sciences. Upon completion of their graduate program, students in CSS will be able to formulate, design, and implement research, evaluate and interpret data objectively, and communicate results of their work effectively in oral and written forms.

Objectives

1. Develop effective programs for students that allow them to become well educated and highly skilled individuals with the potential to be national and international leaders;
2. Conduct scientific research on globally relevant problems in crop and soil sciences and contribute this knowledge to their discipline;
3. Enhance the visibility and impact of graduate programs in crop and soil sciences;
4. Place students in lead academic, research, and industry positions.

Learning Outcomes

1. Knowledge of field. Understands the breadth and depth of knowledge associated with their discipline;
2. Scientific reasoning. Designs, conducts, analyzes, and interprets research effectively on important problems in their discipline;
3. Communication. Communicates effectively to a diverse group of people using appropriate traditional and emerging technological media;
4. Original contribution. Makes an original contribution to their discipline.

GRADUATE PROGRAM ADMINISTRATION

Graduate Program Bylaws

The Department of Crop and Soil Sciences Graduate Programs are governed by official bylaws, approved by the Graduate Faculty in Crop and Soil Sciences, The Graduate School, and the WSU Faculty Senate. The Department of Crop and Soil Sciences Graduate Program Bylaws define the qualifications for membership for the Crop and Soil Sciences Graduate Faculty, administration of the Crop and Soil Sciences Graduate Programs, composition of graduate student faculty advisory committees, and participation of Crop and Soil Science graduate students in the administration of the Crop and Soil Sciences Graduate Programs.

The Crop and Soil Sciences Graduate Programs are administered by the Graduate Program Director who is also the department Chair. Duties of the department Chair related to the Graduate Programs in CSS are to provide overall leadership, development and implement policies, represent the interests of the Graduate Program to the campus and University administrators, be responsible for coordinating all Graduate Program administrative matters within the Graduate School, manage the departmental resources for graduate student support in CSS, coordinate CSS graduate course teaching assignments, and appoint a CSS Graduate Committee. The Graduate Committee coordinates and advises the

department Chair on the Crop and Soil Sciences Graduate Programs. Currently the committee is composed of the Crop Science and Soil Science Graduate Coordinators.

Areas in which the CSS Graduate Committee assists and advises the Chair include:

- Review, develop and update long-range goals for the CSS graduate programs and plans for their attainment. These ideas shall be presented at least once annually to a meeting of all faculty.
- Serve as a sounding board for new ideas, changes, etc., in academic or administrative issues.
- Provide guidance on administration of the CSS Graduate Programs.
- Lead the assessment process for the CSS graduate programs.
- Coordinate all activities related to recruitment of CSS graduate students.
- Develop and maintain recruiting materials, including web materials, as required.
- Review all student applications and, in conjunction with the department Chair after consultation with appropriate CSS Graduate Faculty, determine the appropriate disposition of applications (acceptance or rejection) in a timely manner.
- Make recommendations regarding the use of departmental resources for providing financial support to graduate students, including assistantships, scholarships and awards.
- Regularly (at least annually) review the CSS graduate curriculum.
- Make recommendations to CSS Graduate Faculty regarding curricular revision. Such recommendations are forwarded to the department Chair to be presented to the Graduate Faculty for approval by majority vote.
- Prepare drafts of course or curricular change forms for revision and submission by the CSS department Chair.
- With approval by the CSS department Chair, other ad hoc committees may be appointed as needed. Changes to the existing Graduate Committee responsibilities must be approved by amendment of bylaws.

Department Chair

Dr. Jim Harsh, harsh@wsu.edu

Graduate Coordinators

Crop Science

Dr. Kim Campbell, 379 Johnson Hall, 335-0582, kgcamp@wsu.edu
Dr. Ian Burke, 171 Johnson Hall, 3352858, icburke@wsu.edu

Soil Science

Dr. Markus Flury, R&E Center Puyallup, 253-445-4522, flury@wsu.edu

Academic Coordinator / Johnson Hall Graduate Center (JHGC)

Deb Marsh, 335-2615, marshdj@wsu.edu
Lisa Lujan, 335-9542, llujan@wsu.edu

The academic coordinators are responsible for coordinating graduate admissions, student appointments, initial student orientation, graduate student records, forms processing, preliminary and final exam scheduling, as well as curriculum issues such as the catalog and time schedule. The JHGC is your first point of contact upon arrival, and should be your first point of contact thereafter regarding academic policies and procedures.

Graduate Student Representatives

In addition to the major advisor and the Graduate Coordinator, CSS students are represented by at least one, but no more than two, graduate students. The graduate student representative acts as a liaison with the faculty and attends all faculty meetings except those involving personal matters. He/she will communicate student's suggestions to the faculty and will serve as their advocate. These representatives are elected by the graduate students and are the representatives for one academic year.

CSS Statewide Resources

Department of Crop and Soil Sciences, WSU-Pullman http://css.wsu.edu
WSU Puyallup Research and Extension Center http://www.puyallup.wsu.edu/
WSU Prosser Research and Extension Center http://www.prosser.wsu.edu
WSU Mt. Vernon Research and Extension Center http://mtvernon.wsu.edu/
WSU Wenatchee Tree Fruit Research and Extension Center http://www.tfrec.wsu.edu/

GENERAL INFORMATION

Address Change

You can update your address by going to http://myWSU.edu. Paychecks will not be forwarded. International students: Know the SEVIS rules. Failure to update your new address within 10 days of moving can get you deported.

Child Care Center

Full- and part-time child care for 6 weeks to 12-year-old children; call 335-8847. Child Care Resource & Referral Services offers information to all center and family day care homes in Whitman County, call 335-7625, or visit The Children's Center, Room 108.

Compton Union Building (CUB)

Please visit their website for a list of amenities including wireless internet access, increased student meeting space, an upgraded & relocated home for the Student Book Corporation (Bookie), and a multitude of new vendors. Should you need further assistance, please call 335-9444.

Counseling Services

The WSU Counseling Services office offers free and confidential assistance to students with personal, social, and vocational problems. Stop by Lighty Student Services Building, Room 280, call 5-4511, or visit their website.

If you have a crisis situation after regular office hours, call: (509) 335-2159.

Email and List Serves

Students must obtain a WSU network ID and email address. All correspondence regarding academic and business-related activities will be sent to your WSU e-mail address. This address will also be included in the CSS graduate student list serve. Additional list serves are described on our website.

Greenhouses and Growth Chambers

The Agricultural Research Center operates the Plant Growth Facility, a modern greenhouse for research on wheat and legumes, and other greenhouses along Grimes Way. Growth chambers are located in both sets of the greenhouses. To schedule greenhouse and growth chamber space, contact the greenhouse supervisor Dan Dreesmann dreesmann@wsu.edu, (509)-335-5824. Greenhouse policies and regulations can be found there, along with the space request form. Greenhouse and growth chamber space is subject to charge and must be coordinated with the thesis or dissertation advisor. All people who use the greenhouses must take a Worker Protection Training course (about 1 hour) that is offered periodically by the greenhouse crew.

International Programs/SEVIS Information

The International Programs Office of International Students Services is located in Bryan Hall, room 108, phone (509) 335-4508, or email them at: ip.globalservices@wsu.edu. **Students are responsible for maintaining their legal status within the country**. If there are any changes to a student's I-20, that student is responsible for reporting the change to the JHGC and JHBC.

All SEVIS information, including required entry and departure documents, is available through the International Programs office.

Keys and Card Access

To obtain keys for Johnson Hall, Vogel, your office, labs, greenhouses, etc., see the CSS office in Johnson Hall 115. There is no initial charge for the keys, however, in the event that they are lost or the student leaves the University without returning them, the student will be billed a $3.00 replacement fee per key. If the keys are not returned transcripts may be held by the Registrar's Office. Security is the responsibility of everyone, so please assume responsibility for locking your office and lab doors after regular hours. Access to Vogel and the Plant Growth Facility is made with your WSU Cougar Card. Coordinate this access with your thesis or dissertation advisor through the CSS office staff.

Mail

Graduate students share mailboxes in Johnson Hall 115, marked A-Z. Please check this box regularly. Mail sent and received at the university should be official correspondence only. Personal mail should be sent to and from your private residence. Business correspondence can be left in the CSS office for mailing. Letters and packages should not be stamped, and must have the correct departmental return address:

Department of Crop and Soil Sciences
Washington State University
PO Box 646420
Pullman, WA 99164-6420

Offices and Desks

The Department of Crop and Soil Sciences will provide office space and desks for students on regular appointments. Office space is limited and you may have to wait for an opening. Contact the CSS office for a desk and space assignment.

Parking Regulations

Parking regulations are enforced every day, 24 hours a day, all year. If you have a car and intend to park on campus, you need to purchase a parking permit. You should also pick up and read the Parking Rules pamphlet. Permits and pamphlets are available at WSU Parking Services located on the corner of Colorado and D Street. Phone: (509) 335-PARK.

Photocopying

The copy machine in the CSS office is to be used only for copying materials that are clearly related to a faculty research project, or to copy course materials for the course in which the student is a TA. Graduate students may not use the copy machine to copy any personal material such as classroom notes, term papers, books, theses, etc. When in doubt, consult your advisor. Copy machines available for personal use on campus are located at Cougar Copies in the CUB, WSU libraries, and the GPSA office.

Photo Identification Cards - Cougar Card

NOTE: This card is required to obtain access to the Vogel PBS building.

New students may obtain their Cougar Card in the Cougar Card Center located in the Compton Union Building (CUB), room 60. Returning students will continue to use their previously issued card. The Cougar Card Center is open from 8:00 a.m. to 5:00 p.m., Monday through Friday. A $15.00 replacement fee is charged for replacement cards. For any information or to report lost or found ID cards, call 335-CARD or visit their website.

Purchasing

Prior authorization is required for all purchases; contact the faculty member whose budget you will be using before buying anything. It is not appropriate to make a purchase and then request a purchase order or reimbursement. Some type of purchase order is required before you make any kind of purchase. All order requests must be initiated using the CBS online ordering system. POs are generally completed within 48 hours. The Johnson Hall Business Center staff places and receives all orders from vendors outside of the Pullman area. Most research supervisors maintain "blanket" purchase orders at WSU facilities (Central Stores, Chemical Stores, Surplus Stores, etc.) and service centers (Physical Plant, Technical Services, etc.).

Safety

Safety at WSU is regulated by the Washington State Department of Labor and Industries and the US Occupational Safety and Health Administration (OSHA), through WSU Environmemtal Health and Safety (EHS). A safe and healthy working environment at WSU is to be maintained at all times.

It is the responsibility of each graduate student to become familiar with safety policies and to follow safe procedures. Departmental policies and procedures regarding safety are detailed in the WSU Safety Policies and Procedures Manual (SPPM) available at the Office of Procedures, Records and Forms, while policies and procedures specific to individual labs are detailed in the Laboratory Safety Manual located in each lab. Information regarding physical and health hazards, entry routes, permissible exposure limits and precautions or controls for safe use, including emergency first aid procedures, and the name, address and telephone number of the chemical manufacturer or supplier for all chemicals is available on Material Safety Data Sheets (MSDS) located in the individual labs in which the chemicals are used. EHS is also responsible for laboratory and workplace safety, public health and environmental issues, hazardous materials and wastes (except radioactive materials), and training. All disposals of hazardous chemical wastes must be made through EHS.

The CSS Department Safety Committee is a resource for all Pullman departmental safety-related issues, except for radioisotope use, which is handled by the WSU Radiation Safety Office students using radioactive materials, must complete online Radiation Safety Training prior to their use. Greenhouse users on the Pullman campus must attend Worker Protection Standard Training. This training is offered each semester by the CAHNRS Plant Growth Facility Manager, Dan Dreesmann, dreesmann@wsu.edu, 509-335-5824. Students located at branch campuses or Research and Extension Centers should consult the safety committee and specific safety requirements at those locations. Many departmental employees have First Aid training. American Red Cross First Aid and CPR/AED classes are available to all graduate students through WSU University Recreation. Report all accidents and injuries, however minor, to the CSS administrative office (Johnson Hall 115 in Pullman) and complete an electronic accident/illness Incident Report Form.

Staff Assistance

The CSS office staff will not type personal letters, class reports or similar materials for students. Typing of your thesis or dissertation is considered personal work.

Telephone

WSU telephones are available for local calls. Most graduate student offices have telephones or one can be found nearby. Students should consult their advisor or main office regarding authorization codes for long distance calls. In most cases, phones are restricted and an authorization code is required.

Thesis Library

The CSS office maintains a thesis/dissertation library of their graduates; please contact them for assistance.

Travel

Students are strongly urged to attend professional meetings, however the department often does not have funds to pay travel expenses of students on appointment. Advisors may use grant or project monies to pay partial travel expenses for graduate students attending meetings. It is advisable to apply for a travel grant from GPSA if you are presenting a quality paper at a professional meeting. The Crop and Soil Sciences department also has the O.A. Vogel Washington State Crop Improvement Association Travel and Education Grant, as well as the Harry E. Goldsworthy Fund, that can be used for travel; check with the CSS office about the availability of these departmental awards. In addition, space may be available in University vehicles or some faculty members may share travel expenses. The department also owns several vehicles available for official business intended to provide low-cost transportation to local sites and businesses; these vehicles are checked out in the CSS office.

WSU Motor Pool vehicles is another resource for approved business travel. Requests are made through the JHBC and should be placed early to ensure availability. A valid driver's license is required along with your supervisor's permission and budget code numbers for the use charges. Questions can be directed to the JHBC. The use of personal vehicles is an exception to policy and must be justified and approved in advance.

In all cases, travel arrangements should be made using the most economical accommodations available. Please follow the procedures as outlined below.

Travel Authority

A travel authority is required for any travel (outside of Pullman) and must be completed prior to travel. Contact the Johnson Hall Business Center (JHGC) for forms. For authorized travel, a travel advance may be requested in order to help with anticipated expenses; an advance should be requested at least 2 weeks before travel begins. Conference registrations may also be paid directly by the university if received at least 2 weeks before the registration due date. If registration payment requests are not received in time for the university to pay directly, the traveler will have to make the payment and will be reimbursed for the expense. Once your travel authority is approved, you can make airline reservations using local travel agents. Ask the agent to call Bev Brantner in the JHBC (335-3943) for approval to purchase the tickets. The university pays the airfare directly for you. *Tickets for approved travel may not be purchased through online sites*.

The JHBC can generate 'Blanket TAs' for routine/repeat travel, such as collecting data at research sites. Usually done for an entire fiscal year, you should list all the places where the routine travel occurs. For instance, you may have a blanket TA for doing field research at a particular site. This can save a lot of paperwork so use this method when you are able.

International Travel Requirement

The required International Travel Registry is an online registration system that provides WSU with a secure means of documenting international travel plans for undergraduate and graduate students participating in not-for-credit travel for WSU-related activities—including graduate research while enrolled in research credits.

Travel Expense Voucher (TEV)

Authorized travel expenses may be reimbursed up to a set amount for the travel destination. This is called the per diem rate. Check with the JHBC for these rates prior to travel so you can plan your expenses. You will need original, itemized receipts for all lodging and any expenses over $50. If you share a room with WSU personnel, you will be reimbursed one-half of the room rate. A travel expense voucher (TEV) should be submitted by the fifth of the month following travel. If a travel advance is received, the TEV must be completed immediately upon return from travel. Reimbursements are generally received within three weeks of completing the TEV.

Please see the JHBC (or local R&E business office) for answers to all your travel questions.

ACADEMIC INFORMATION

Academic Calendar

The Academic Calendar provides relevant deadlines for registration, fees, applications, enrollment, and exams.

Catalog of WSU Courses

The WSU Catalog is found only online. It is used by both prospective and enrolled students to inform them of the courses offered at WSU and the requirements for each degree. It also highlights the faculty research interests.

Continuing for Another Degree

To continue for another degree you should contact the Academic Coordinator. A form must be filed for any of the following situations:

- Completed MS and continuing for a PhD in the same department.
- Not completing a PhD and continuing for a MS in the same department.
- Not completing a graduate degree and continuing as an undergraduate.
- New Application: Continuing a graduate degree program in a different department.

Cooperative Courses at the University of Idaho

Students register for UI cooperative courses directly via a special non-degree cooperative course application to the University of Idaho. Students will enroll at the U of I, and a placeholder of '900' with associated credit will be applied in ZZUsis for the term. After grades are issued, the WSU registrar will arrange the credit be transferred to WSU.

The WSU and UI Registrar's websites have links to the cooperative listings of both institutions for each term, as well as applications forms and cooperative course policy and procedures. The academic (and grading) policies of the teaching institution apply.

Tuition for UI cooperative courses will be covered by the student's WSU tuition if enrolled full-time. Students enrolling in UI courses that are not officially cooperative, will be responsible for any associated tuition and fees.

Grades

700/800-Level Research Grades

700-level credit is for students working on their master's research, thesis and/or examination. The 800-level credit is for doctoral research, dissertation and/or examination. Credits are variable and grading is satisfactory/unsatisfactory (S/U). Credit is awarded for a grade of 'S'; no credit is awarded for a grade of 'U'. The S/U grade does not carry any quality points and is not calculated in the grade point average (GPA). **In the event of exam failure, a 'U' grade should be recorded for that semester's 700 or 800 credits. Two 'U' grades for 700 or 800 credits will lead to dismissal from the program.** Faculty should set requirements for each semester that a student is enrolled in research credits, and provide an S/U grade at the end of the semester based on the student's performance in meeting those requirements. In extenuating circumstances, faculty may use the 'X' grade to indicate continuing progress toward completion of those requirements. The 'X' grade should be changed when the faculty member determines that the student has successfully met the requirements for that semester; the 'X' grades should be changed by the faculty no later than the semester of the final defense. Generally, students enroll in a minimum of 2 credits of the appropriate 700/800 level in the semester in which they take their final oral examination.

Incomplete Grades

Students will have up to one year (unless a shorter time is specified by the instructor) to complete work for which they received an 'I' grade; after one year the 'I' grade will become an "F" if not completed.

Graduate and Professional Student Association

All graduate students in the university who are currently enrolled in 10 or more hours are members of the Graduate and Professional Student Association (GPSA). GPSA represents the concerns of graduate students within the university and nationally. The Crops graduate program and the Soils graduate

program each have one representative to the GPSA Senate (the governing body for GPSA) who are elected each spring for the next year. Many of the important advisory committees within the university itself have voting positions for graduate students.

Graduate School Policies and Procedures (GSPP)

Referenced frequently, the Graduate School's Policies and Procedures manual serves as a guide to students, faculty and staff to insure that proper advising occurs leading to the completion of a graduate degree.

Schedule of Classes

In addition to myWSU, the web version of the Schedule of Classes (SOC or Time Schedule) lists times and places for all courses offered each semester. Students may find this version easier to review.

Writing Center

In January 2008, the University's new Graduate and Professional Writing Center (GPWC) opened for business. GPWC features one-on-one in-person consultations, peer groups, and an onsite resource library. For further information, please visit their website.

PROGRAM REQUIREMENTS

Degree Options (General)

Master of Science (MS) Thesis Option

Because research is an integral part of science, most students complete the thesis degree program. The thesis describes a research project conducted by the student. The thesis typically has three sections: a background or literature review that sets the stage for the research; a section with one or more chapters describing the actual research and containing data and analysis; and a general conclusion. The thesis should be formatted in a style that is consistent throughout. The final exam is in two parts. The first is a seminar presenting the results of research project. This is a public presentation. The second part is an oral exam that focuses on defense of the research project.

Master of Science (MS) Non-Thesis Option

In a few instances, students may wish to obtain advanced knowledge but do not want to write a traditional research thesis. Such students may elect the non-thesis option. This option must be chosen within the first semester following enrollment. Students in this option are required to take considerably more coursework than is required of students in the thesis option. Students in the non-thesis option must complete a paper or project in lieu of the thesis. The final oral exam will focus more on broad knowledge and less on project defense than would an exam for the thesis option. More details are provided in the 'Final Exam' section of this handbook.

Doctor of Philosophy (PhD)

The PhD degree is awarded in recognition of excellence in scholarship and for an original contribution to the advancement of science. The degree is awarded for originality and creative scholarship rather than for an accumulation of academic credits.

The PhD program is separated into the "initial" period preceding the preliminary examination and the "candidate" period following the preliminary examination. During the initial period, the student acquires

knowledge and skills needed for his/her research program and most of the academic program is completed. The preliminary exam should be completed no later than the fifth semester into the PhD degree program. After passing the preliminary examination, the candidate concentrates on research and preparation of the dissertation. During the latter period the candidate demonstrates his/her ability to do original research. The final oral examination should reflect that students have developed into mature scientists, which includes the ability to conceive research projects, to critically evaluate the literature, to gain knowledge of acceptable scientific behavior, and to think and discern outside the area of the dissertation. More details are provided in the 'Major Examination' section of this handbook.

Annual Review and Evaluations

The Graduate School requires an annual review of each graduate student. In CSS, this review includes academic performance, research accomplishments and presentations, TA performance when applicable and expectations for future performance. These reviews have to be completed and discussed by the student and the major advisor. It is recommended that the review is circulated to the student's faculty advisory committee. Teaching Assistants are also evaluated at the end of the semester by their students. If the student's progress is unsatisfactory, the faculty advisory committee will be consulted to determine if graduate student status should be continued. The department Chair will notify the student in writing of the faculty advisory committee's recommendation and forward a copy of the report to the Graduate School.

Grievances

Differences of opinion between graduate students and their major advisors and/or committee members may arise in the course of a graduate degree. Students and their faculty mentors are encouraged to communicate regularly and directly to resolve such differences. In the event that such communication does not resolve a concern, graduate students can pursue a formal grievance process.

Should a concern not be resolved through informal communication, a student should submit a written grievance detailing their grievance to the following individuals in the order given:

1. The Major Advisor;
2. The department Chair;
3. The Associate Dean of the Graduate School.

At each stage of the grievance process, the individual addressed will be given two weeks in which to respond to the grievance in writing (not counting annual leave.) Should the response be unsatisfactory, the student can then take the grievance and response(s) to the next individual on the list.

The Graduate School has provided a document to provide further guidance on Grievance Procedures.

Continuous Enrollment Policy

All full-time graduate students must register for a minimum of 10 credit hours each Fall and Spring semester, with at least one (1) research credit (CROP SCI or SOIL SCI 700, 702, or 800) to track the contributions of your Major Advisor. Full-time students on assistantship should maintain 10-12 credits to maximize their tuition waivers by enrolling in additional research credit. Part-time graduate students must register for a minimum of 2 credit hours and a maximum of 9 credit hours each Fall and Spring semesters. International graduate students with F-1 or J-1 visa status should consult with the Office of International Students and Scholars for enrollment requirements, which in general requires the same enrollment level as full-time graduate students.

Apart from exceptions for graduate leave for personal reasons or internship leave, all MS and PhD students (prior to preliminary examination) are required by the Graduate School to be continuously enrolled in a minimum of 2 graduate credits each semester, excluding summer, until they have completed all of the degree requirements on their Program of Study. Doctoral Students who have taken their preliminary exams, have met all of their program requirements except completion of their dissertation, and do not have the funding to register for graduate credits may be placed into Continuous Doctoral Status for a limited number of semesters. Doctoral students in Continuous Doctoral Status will be charged a small administrative fee and will have limited access to University resources. Graduate students who are not enrolled for a semester (except doctoral candidates in Continuous Doctoral Status) and have not received approval from the Graduate School for graduate leave or internship leave are subject to the Graduate School's re-enrollment policy and will owe additional fees.

See Chapter 5 of the *Graduate School Policies and Procedures Manual* for details on enrollment and leave policies.

Exit Requirements

Before departure from CSS, students must leave a forwarding address with the Academic Coordinator, schedule an exit interview with the department Chair, return all keys to the main office, and consult with the advisor about cleaning up samples, chemicals, etc., from the student's research and office space.

Milestones to Meet for Successful Completion of the Graduate Degree

Milestone	MS Degree	PhD Degree
Committee identified and agrees to serve	End of first or second semester	End of first or second semester
Research Topic identified	End of first semester	End of first semester
Initial Committee Meeting, Program of Study approved by committee and submitted to Academic coordinator	Early in second semester (thesis) End of first semester (non-thesis)	Early in second semester
Enroll in Crop Sci/Soil Sci 511 Science Writing Workshop		By the end of the 3rd semester (Spring only)
Proposal prepared (in the Crops degree this is part of the preliminary examination for PhD students, see below)		By the end of the 3rd semester.
Course-work completed	End of 4th Semester	End of 4th Semester
Comprehensive Exam (Soils only)		By the end of the 2nd year of study.
Oral Preliminary Exam completed (PhD students). Scheduling Form required; fully signed copy due 12 working days in advance of the exam to the Graduate School, via the Academic Coordinator	N/A	End of 4th or beginning of 5th Semester.
Crops 510/Soils 501 seminars completed	Once, usually as the final thesis seminar given during the semester in which the student plans to graduate.	Twice, the first is the proposal seminar given after proposal is written, during second year of study. The second seminar is the final dissertation seminar, given during the semester in which the student plans to graduate.
Statewide tour Special Topic completed	During first year	During first or second year
Thesis/Dissertation Research completed	One semester prior to expected graduation	One semester prior to expected graduation
First draft of Thesis/Dissertation submitted to advisor	At end of semester prior to expected graduation.	At end of semester prior to expected graduation.
Notice of Intent to Graduate submitted to advisor, committee, and academic coordinator	During first week of semester in which student expects to graduate.	During first week of semester in which student expects to graduate.
Application for Degree filed with the Graduate School	During first month of semester in which student expects to graduate.	During first month of semester in which student expects to graduate.
First draft of Thesis/Dissertation submitted to committee	During second month of last semester.	During second month of last semester.
Committee and Advisor revisions incorporated into Thesis/Dissertation	During third month of last semester.	During third month of last semester.
Final draft of Thesis/Dissertation submitted to Committee (final draft required for scheduling form signatures)	Minimum 20 work-days prior to exam.	Minimum 20 work-days prior to exam.
Final Examination scheduling form with committee signatures submitted to Academic Coordinator for Chair signature, simultaneous with e-copy of thesis/dissertation to the Graduate School (or UMI for PhD) and Academic Coordinator (display copy)	Scheduling Form must be submitted 12 work-days prior to exam.	Scheduling Form must be submitted 12 work-days prior to exam.
Final Examination	See Graduate School Deadlines	See Graduate School Deadlines
Revisions to Thesis/Dissertation completed and submitted to Graduate School	Five working days after examination.	Five working days after examination.
Graduation	If on RA/TA, four to five semesters after beginning study.	If on RA/TA, 8 -10 semesters after beginning study (depending on whether student begins with BS or MS).

GRADUATE COURSEWORK

Required Courses

Seminar

All graduate students and faculty are expected to attend and participate in the departmental seminars regardless of enrollment, including those scheduled outside of the regular seminar series, whenever they have no class conflicts. Seminars are routinely made available via videoconferencing to the Research and Extension Centers at Puyallup, Prosser, and Mt Vernon. Students residing at off-campus locations are expected to participate via videoconferencing whenever possible. Arrangements for other locations can also be made. Contact the Academic Coordinator with questions.

All Crop Science and Soil Science MS thesis and non-thesis students are required to take one credit of Crop Sci 510 or Soil Sci 501, respective to their degree program, during the semester they plan to graduate to give an **exit seminar on their research.**

All Crop Science and Soil Science PhD students are required to take two credits of Crop Sci 510 or Soil Sci 501, respective to their degree program. The **first seminar is the proposal seminar** given after proposal is written, during second year of study. The **second seminar is the final dissertation seminar**, given during the semester in which the student plans to graduate.

Faculty members will evaluate student seminars, research proposals, and like presentations using the 'Rubric for Assessing Graduate Student Work in Crop and Soil Sciences' provided in the Appendix.

It is highly recommended that students in other degree programs (such as Molecular Plant Sciences), who are advised by CSS faculty, take one credit of Crops 510 or Soils 501.

Special Topics, Washington State Tour

To provide graduate students with an overview of the breadth of our departmental resources and the diverse agricultural industries in the state and to acquaint students with our statewide WSU faculty, staff, and graduate students, all incoming Crop Science and Soil Science graduate students are required attend the statewide tour at their earliest opportunity. The tour occurs sometime during the summer break, usually in May. Participating students must enroll for one credit of Crop Sci 512 or Soil Sci 502 *Special Topics: Statewide Tour* in the Fall semester that immediately follows the tour, to coincide with the required paper and group presentation. The instructor of the course rotates between Crops, Soils and Horticulture faculty. The tour is optional for students completing a second graduate degree in Crop Science or Soil Science at WSU.

Science Writing Workshop

Required for Crop Science and Soil Science PhD students only, Crop Sci/Soil Sci 511 (2 credits, Spring semester, graded S/U) was developed to help students 1) Learn how to research and identify grant funding and journal resources for submission of grants or manuscripts, 2) Learn about grant and manuscript structure and effective writing methods that help to "tell a story" to best convey research ideas and results, 3) Engage in peer mentored writing groups to outline, draft and review grant proposals/concept proposals, or manuscripts and 4) Produce a polished draft of either a concept proposal, graduate research proposal or manuscript for submission. Enrollment is open to students from other programs as well.

Graduate Program of Study

Graduate students are ultimately responsible for their own progress in the program and completion of the degree. Faculty shall provide mentoring, financial support (when available), facilities, and equipment.

Additionally, faculty are responsible for regular communication with their graduate students and for evaluating students both annually and through required examinations. But it is critical that both MS and PhD graduate students are self-motivated and responsible in making sure that their research progresses and program requirements are met in a timely manner. Expectations for graduate students and advisors are listed in the Good Practices document made available by the Graduate School.

Major Advisor

The major advisor is the thesis or dissertation advisor and is the graduate student's primary contact for all matters related to the program of study and thesis/dissertation research. The major advisor assists in selecting the student's faculty advisory committee, developing a program of study, and writing the thesis or dissertation research proposal. The major advisor monitors the student's academic and professional growth, reviews program changes, and is responsible for writing the annual student review of progress. While the major advisor generally supports their advisees financially in the program, such funding is provided at the discretion of the major advisor. In the event that the major advisor is unable to provide continued funding, the student shall be responsible for seeking funding from other sources. The major advisor serves as the committee chair. The major advisor must be a member of the faculty for that program.

If the major advisor is located at a Research Station, a *campus advisor* must be identified who will support the academic development of the student if/when that student resides on the Pullman campus. If the student is conducting their project at least partly on campus, then in an ideal situation the campus advisor will be a co-investigator on the student's research with the major advisor. Although the major advisor is responsible for advising the student on experimental design and manipulation and interpretation of data, and for reviewing initial drafts of theses/dissertations and papers, the student will be integrated into the campus advisor's research program. For those students whose research program focus is off-campus, the campus advisor will serve on the student's faculty advisory committee, answer day-to-day questions while the student is in Pullman and will invite the student to research group meetings, journal clubs, and similar activities.

Faculty Advisory Committee

All students have a thesis or dissertation faculty advisory committee. The roles of the Faculty Advisory Committee are listed below:

1. Meet at least once per academic year with the graduate student to assess performance and progress toward degree, and propose goals for the upcoming year. (Students are encouraged to meet with their advisory committee members more regularly either individually or in small groups.)
2. Provide guidance and approval for the program of study.
3. Provide general research guidance for the thesis or dissertation.
4. Administer the PhD preliminary exam.
5. Administer the final exam for MS and PhD students.
6. Review and approve the final thesis or dissertation.

The initial selection, or subsequent changes of a graduate student's faculty advisory committee shall be determined jointly by the student and the student's major advisor and approved by the department Chair.

CSS allows non-tenure track professionals internal to WSU (i.e. research, clinical, adjunct, or affiliate such as USDA –ARS researchers) and appointed as adjunct faculty to act as chairs, co-chair (recommended by USDA), or serve as member of the faculty advisory committee.

All committee members must hold a degree of comparable level to the degree sought by the candidate.

At minimum, the MS committee must have one tenured/tenure track faculty who is graduate faculty in CSS. The second member must be graduate faculty in CSS, but is not required to be permanent tenure track faculty. The third member may be from inside or outside of CSS, does not need to hold graduate faculty status, and does not need to be permanent tenure track faculty.

At minimum, the PhD committee must have two tenured/tenure-track faculty who are members of the graduate faculty in CSS. The third member must be graduate faculty in a WSU graduate program, but is not required to be permanent tenure track faculty.

If a minor is declared, one member of the faculty advisory committee must be from the Graduate Faculty of the minor program.

Experts outside of WSU and faculty from other institutions may serve on committees as a fourth member. In all of the above cases, for any non-WSU member, or for any non-tenured/non-tenure track faculty outside of CSS, the committee chair for that student should forward the name and curriculum vitae of the desired member along with the program of study for approval by the department Chair, and final approval by the Dean of the Graduate School.

Any exception to the composition noted above, or to program bylaws, requires a memo requesting an exception to policy.

The faculty advisory committee chair ensures that the student is making satisfactory progress towards a degree. The faculty advisory committee aids in developing the course program and provides guidance and expertise for the student's research. To ensure guidance in all aspects of their research, many students, especially PhD students, elect to have four or five faculty on their faculty advisory committee. In addition to advising the student, each committee member must read the thesis or dissertation, attend, and vote at the preliminary and final exam. Faculty advisory committee members often participate in the annual student evaluation. The department Chair must approve each faculty advisory committee.

Preparing the Program of Study

Policies and procedures, deadlines, guidelines for faculty advisory committee membership and program of study forms are found on the Graduate School website.

Your faculty advisory committee chair and other members should aid you in developing your proposed MS or PhD Program of Study (POS). This is an official list of classes you have taken and/or will take, and research you have conducted or will conduct. All students should become familiar with the Graduate School program of study requirements as outlined on the Graduate School website.

The POS should be submitted early in your second semester. It is your responsibility to have appropriate forms typed, proofread, and presented to your committee.

After the POS is developed and each member has signed, submit the POS to the CSS Academic Coordinator for full faculty review. The general Crop or Science faculty, respectively, must approve your program and may require additional coursework. Once approved, the Academic Coordinator will forward the POS to the Graduate School. The Graduate School then reviews the POS and contacts the student and Academic Coordinator both regarding any problems. Once any problems are resolved, the Dean of the Graduate school will approve the POS and send electronic notification to both the student and Academic Coordinator.

Once the program has been approved by the Graduate School, the program becomes official and students are required to take all courses listed on the POS. **Any course included in the advanced**

degree program in which a grade of 'C-' or less has been earned must be repeated for credit. Students may choose to take courses not on the POS as well.

Program/Committee Changes

Revisions to the POS are possible should the need arise. These changes are made on a 'Change of Program' or 'Change of Committee' form available on the Graduate School website. Do not refile a new POS. Your committee, the respective Graduate Coordinator, and the department Chair must approve all revisions for presentation to the Graduate School for final approval. Major revisions require a respective all-faculty review as well.

Crop Science Degree Requirements

Recommended Areas of Competency

The advisor, thesis committee, and Graduate Coordinator will discuss course expectations of incoming students on an individual basis. Entering students should have a solid B.S. level background in mathematics, chemistry, and the biological sciences. If it is determined that an incoming student is deficient, they may be asked to make up those deficiencies by taking or auditing courses or by doing extra reading.

Catalog Prefix Number	Title	Cr	Sem	Offered
SOIL SCI 201	Soil Science: A Living System	3	F, S	every year
CROP SCI 202	Crop Growth and Development	4	S	every year
STAT 212	Introduction to Statistical Methods	4	F, S, SS	every year
CHEM 102	Chemistry Related to Life Sciences	4	S, SS	every year
CHEM 345	Organic Chemistry I	4	F, S, SS	every year
CHEM 346	Organic Chemistry II	3		
BIOL 420	Introduction to Plant Physiology	3	F	every year
CROP SCI 411	Crop Environmental Interactions	3	F	every year
PI P 429	General Plant Pathology	3	F	every year
SOIL SCI 441	Soil Fertility	3	S	every year
CROP SCI 445 Or MBIOS 301	Plant Breeding General Genetics	4 3	S F, S, SS	every year

Crop Science MS Course Requirements

Thesis Master's Degree

- 30 hours minimum total credit
- 21 hours minimum of graded course work, which consists of:
  - 15 hours minimum of graded course work at the 500-level including:
    - Crop Sci 510 Seminar, 1 credit
    - Crop Sci 512 Special Topics: Statewide Tour, 1 credit
  - 4 hours minimum of 700-level credit in major
  - 6 hours maximum of non-graduate graded course work (300-400 level only)

Non-Thesis Master's Degree

- 30 hours minimum total credit
- 26 hours minimum of graded course work, which consists of:
  - 17 hours minimum of graded course work at the 500-level including:
    - Crop Sci 510 Seminar, 1 credit
    - Crop Sci 512 Special Topics: Statewide Tour, 1 credit
  - 4 hours minimum of 702 credit in major
  - 9 hours maximum of non-graduate graded course work credit (300-400 level only)

Suggested Coursework for MS Students	Title	Cr	Sem	Offered
MBIOS 303	Introductory Biochemistry	4	F, S, SS	every year
STAT 412	Biometry	3	F, S, SS	every year
CROP SCI 445	Plant Breeding	4	S	every year
CROP SCI 503	Advanced Cropping Systems	3	F	every year
STAT 512	Analysis of Variance of Designed Exp.	3	F, S, SS	every year
STAT 519	Applied Multivariate Analysis	3	F, S	every year

Crop Science PhD Course Requirements

- 72 hours minimum total credits
- 15 hours minimum of graded graduate-level (500-level) coursework beyond the bachelors degree **not including:**
  - Crop Sci 510 Seminar, 1 credit
  - Crop Sci 512 Special Topics: Statewide Tour, 1 credit
  - Crop Sci 511 Science Writing Workshop, 2 credit (S/F)
- 20 hours minimum 800-level research credits
- 9 hours maximum of non-graduate courses
- Courses graded S/F may not be used in the core program even if required by a specific program

Crop Science PhD Teaching Experience Requirement

An educational delivery experience equal or equivalent to a semester teaching assistantship is required. Equivalent experience can include lecturing in a course multiple times, extension program delivery, and assistance with education courses.

Crop Science Recommended Coursework

Breeding/Genetics	Title	Cr	Sem	Offered
BIOL 519	Introduction to Population Genetics	3	F	even years
BIOL 521	Quantitative Genetics	2	S	even years
CROP SCI 505	Adv. Classical and Mol. Breeding	3	F	odd years
CROP SCI 512	Special Topics, History of Genetics	1-2	S	odd years
	Mathematical Genetics (UI)	2	S	even years
MBIOS 513	General Biochemistry	3	F	every year
MPS 525	Plant Molecular Genetics	3	F	every year
PL P 525	Field Plant Pathology and Mycology	3	S	odd–alt yrs, summer
PL P 535	Mol. Genetics of Plant & Pathogen Inter.	3	S	even years
STAT 530	Applied Linear Models	3	S	even years

Physiology	Title	Cr	Sem	Offered
BIOL 513	Plant Metabolism	3		
BIOL 517	Stress Physiology of Plants	3		

Production/Management	Title	Cr	Sem	Offered
CROP SCI 503	Advanced Cropping Systems	3	F	every year
CROP SCI 512 special topic	Herb. Fate Mode of Action	2		
CROP SCI 512 special topic	Herbicides, Tox. and Mode of Action	1		
CROP SCI 513	Biology of Weeds	3	F	even years
SOIL SCI 413	Introduction to Soil Physics	3	F	every year

Turf Management	Title	Cr	Sem	Offered
BIOL 462	Community Ecology	3		
BIOL 517	Stress Physiology of Plants	3	S	even years
BIOL 548	Evolutionary Ecology of Populations	3		
CROP SCI 512 special topic	Herb. Fate Mode of Action	2		
CROP SCI 512 special topic	Herbicides, Tox. and Mode of Action	1		
ENT 558	Pesticide Topics	1		
IPM 452	Pesticides and the Environment	2		
PL P 521	General Mycology	4	F	every year
SOIL SCIS 547	Advance Soil Fertility Management	3	F	even years
STAT 412	Biometry	3	F, S	every year
STAT 512	Analysis of Var. of Designed Exp.	3	F, S	every year
STAT 519	Applied Multivariate Analysis	3		

Soil Science Degree Requirements

Recommended Areas of Competency

*T*o the extent possible, Soils graduate students should be knowledgeable in all five sub-disciplinary areas of Soils (chemistry, fertility, morphology, biology, and physics). However, because many students entering graduate school have received their BS degrees from an area outside of Soils, it is sometimes impractical and often very time consuming to take a graded course in each of these areas for the MS degree. For this reason, the Soils Faculty require that a graded Soils course be taken in a minimum of three of the five sub-disciplinary areas in Soils. Additional Soils and other courses to make up deficiencies can be taken as S/F as determined by the MS thesis committee and Soil Faculty. (It is generally expected that all deficiencies will be taken for a letter grade, but recognize that in special cases, it may make sense to take one as S/F, if agreed to by the thesis committee and Soils Faculty.)

It is recommended that students enter the program with established competence in soil science and supporting subjects. Minimum degree of competence include introductory soil science (Soils 201), organic chemistry (Chem 345), statistics (Stat 412), soil analysis (Soils 442 or 503) and at least two courses in upper level soil science [Soils 414/415(WSU), 413(UI), 422(UI), 441(WSU), 451(UI)]. Deficiencies should be made up in the first one or two semesters following admission and should be done at the student's expense.

Special Soils Course Descriptions

Soils 502 – Advanced Topics

All graduate students in Soils are encouraged to enroll and to participate in this course. Sections of this course are designed to acquaint you with the literature in Soils. The course is organized on an informal basis by subject matter areas, with each area being the responsibility of a faculty member who specializes in that area. You may register and repeat this course for up to six credit hours, but not more than three credits per semester.

Soils 503 – Advanced Soil Analysis

Courses ranging from one to three credits are offered on specialized topics relating to instrumentation and to soil analysis. Topics include site selection and characterization, flame emission and absorption, organic matter analysis, electronics, fluorescent antibody techniques, elemental analysis, microcomputer software, tracer techniques, N-15 mass spectrometry, and others. Students may develop an independent study course in consultation with their advisors and the graduate coordinator. The course should involve mastering the use of instruments or techniques or developing new methodologies applied to research in soil science.

Soils 505 – Teaching Practicum

All Soils PhD degree candidates are required by department policy to enroll in Teaching Practicum (Soils 505) prior to graduating. This course offers credit for experience in Teaching Assistant (TA) duties obtained in a soils course. Foreign TAs must pass an English Proficiency Exam, which tests communication skills in English prior to engaging in Practicum. The type of experience obtained depends upon several factors, including the nature of the course, the capabilities of the student, and the needs of the instructor. Experience could include lecturing in a discussion or laboratory section, preparing and grading exams or homework, or helping set-up laboratory or discussion sessions.

Soil Science Master's Degree

The MS in Soils is awarded to graduate students for substantial scholarly achievement beyond the baccalaureate. To earn this degree a student is expected to demonstrate in-depth knowledge of a basic subject matter area in Soil Science and research competence in the form of a thesis or competence in the application of soil science in the form of a special project. The MS degree in Soils at WSU includes both the thesis and non-thesis options. The students' advisory committee will develop an appropriate program of study that must be approved by the Soils Faculty. In addition to competence in selected areas of soil science, students may be required to obtain competencies in core technical areas including, but not limited to, mathematics, statistics, natural sciences, and computer sciences.

Soil Science MS Course Requirements

Thesis Master's Degree

- 30 hours minimum total credit
- 21 hours minimum of graded course work, which consists of:
  - 15 hours minimum of graded course work at the 500-level including:
    - Soil Sci 501 Seminar, 1 credit
    - Soil Sci 502 Special Topics: Statewide Tour, 1 credit
  - 4 hours minimum of 700-level credit in major
  - 6 hours maximum of non-graduate graded course work (300-400 level only)

MS Soil Science Suggested Course Options	Credits	Sem	Offered	
CROP SCI 503	Advanced Cropping Systems	1	F	every year
STAT 512	Analysis of Variance of Designed Exp.	3	F, S	every year
SOIL SCIS 368	Intro to GIS	3	F	every year
SOIL SCIS 502	Advanced Topics in Soils	1-3	F, S	every year
SOIL SCIS 503	Advanced Soil Analysis	1-3	S	every year
SOIL SCIS 504	Research Presentation Techniques	1		
SOIL SCIS 505	Teaching Practicum	1	F, S	every year
SOIL SCIS 513	Environmental Soil Physics	3	F	odd year
SOIL SCIS 533	Vadose Zone Processes	2	F	even year
SOIL SCIS 514	Environmental Biophysics	2	S	every year
SOIL SCIS 515	Environmental Biophysics Laboratory	1	S	every year
UI SOIL SCIS 526	Soil Mineralogy	2	S	every year
SOIL SCIS 531	Soil Microbiology	3	S	even year
UI SOIL SCIS 537	Soil Biochemistry	3	F	every year
SOIL SCIS 541	Soil-Plant-Microbial Interactions	3	F	odd year
SOIL SCIS 547	Soil Fertility Management	3	F	even year
SOIL SCIS 557	Advanced Soil Genesis and Classification	3		
SOIL SCIS 568	ArcGIS and Spatial Analysis	4	S	every year

Soil Science Non-thesis Master's Degree

Within the Graduate School's minimum requirements, the non-thesis student's graded course work will include 6 credits in plant and soil biology (agronomy, horticulture, forestry, crop protection, plant ecology, biology, microbiology, plant physiology), 15 credits in soil science (soil chemistry, soil physics, soil

biology, soil fertility, pedology, environmental biophysics), and 5 credits in other professional core courses (e.g., statistics, sustainable agriculture, colloid science, hydrology). The student must demonstrate skill in critical thinking, scholarship, and written and oral communication through course work, the seminar course, and the final report and examination. The non-thesis option requires the student to form a committee and develop the program of study during the first semester of enrollment. Students in this option will have lowest priority for state-funded assistantships and will generally be expected to be self-funding.

Non-Thesis Master's Degree

- 30 hours minimum total credit
- 26 hours minimum of graded course work, which consists of:
  - 17 hours minimum of graded course work at the 500-level including:
    - Soil Sci 501 Seminar, 1 credit
    - Soil Sci 502 Special Topics: Statewide Tour, 1 credit
  - 4 hours minimum of 702 credit in major
  - 9 hours maximum of non-graduate graded course work credit (300-400 level only)

Soil Science Doctoral Degree

All students pursuing a PhD are required to have taken an undergraduate course (400 level) in each of the major areas: soil chemistry, soil physics, soil fertility-management, soil genesis, morphology-classification, and soil microbiology-biochemistry. In addition, a graduate (500 level) course must be taken in two of the five Soils areas.

An Interdisciplinary Soils PhD is defined as: expertise in Soils enhanced by another academic discipline (for example, plant physiology, agricultural economics, civil engineering or colloid chemistry). A representative from outside the discipline must serve on the Doctoral Committee. In the program of study the student may substitute one 400/500 level course in another academic discipline for a required 400/500 level course in Soils. The interdisciplinary program must be approved at the same time the program of study is approved. Also refer to Preliminary Doctoral Examination for guidelines specific to the Interdisciplinary Soils PhD.

Soil Science PhD Course Requirements

- 72 hours minimum total credits
- 15 hours minimum of graded graduate-level (500-level) coursework beyond the bachelors degree **not including:**
  - Soil Sci 501 Seminar, 1 credit
  - Soil Sci 502 Special Topics: Statewide Tour, 1 credit
  - Soil Sci 511 Science Writing Workshop, 2 credit (S/F)
  - Soil Sci 505 Teaching Practicum, 1 credit (S/F)
- 20 hours minimum 800-level research credits
- 9 hours maximum of non-graduate courses
- Courses graded S/F may not be used in the core program even if required by a specific program

Soil Science Recommended Coursework

Soil Classification & Genesis	Title	Cr	Sem	Offered
SOIL SCIS 368	Intro to GIS	3	F	every year
SOIL SCIS 513	Environmental Soil Physics	3	F	odd year
SOIL SCIS 514	Environmental Biophysics	2	S	every year
SOIL SCIS 515	Environmental Biophysics Laboratory	1	S	every year
SOIL SCIS 526	Soil Mineralogy (UI SOIL SCIS 526)	2		
SOIL SCIS 531	Soil Microbiology	3	F	even year
Or				
SOIL SCIS 541	Soil-Plant-Microbial Interactions	3	F	odd year
SOIL SCIS 557	Advanced Soil Genesis & Classif. (UI SOIL SCIS 557)	3		
SOIL SCIS 568	ArcGIS and Spatial Analysis	4	S	every year

Soil Chemistry	Title	Cr	Sem	Offered
BSYSE 558	Groundwater Flow and Contaminant Transport	4		
CH E 585	Interfacial Phenomena	3	S	odd year
CHEM 501	Advanced Inorganic Chemistry	3	F	even year
E MIC 586	Special Projects in Electron Microscopy	3	F, S	every year
GEOL 579	Groundwater Geochemistry	3	S	odd year
SOIL SCIS 502	Advanced Topics	V	F, S	every year
SOIL SCIS 503	Advanced Soil Analysis	V	F, S	every year
SOIL SCIS 513	Environmental Soil Physics	3	F	odd year
SOIL SCIS 521	Environmental Soil Chemistry	3	S	even year
SOIL SCIS 526	Soil Mineralogy (UI SoilS 526)	2		
SOIL SCIS 531	Soil Microbiology	3	F	even year
SOIL SCIS 533	Vadose Zone Processes	2	F	even year
SOIL SCIS 541	Soil-Plant-Microbial Interactions	3	F	odd year

Soil Fertility	Title	Cr	Sem	Offered
BIOL 513	Plant Metabolism	3		
BIOL 517	Stress Physiology of Plants	3	S	even years
BSYSE 558	Groundwater Flow and Contaminant Transport	4		
CROP SCI 503	Advanced Cropping Systems	3	F	every year
SOIL SCIS 468	ArcGIS and Geospatial Analysis	4	F	every year
SOIL SCIS 513	Environmental Soil Physics	3	F	odd year
SOIL SCIS 514	Environmental Biophysics	2	S	every year
SOIL SCIS 515	Environmental Biophysics Laboratory	1	S	every year
SOIL SCIS 531	Soil Microbiology	3	F	even year
SOIL SCIS 541	Soil-Plant-Microbial Interactions	3	F	odd year
SOIL SCIS 547	Advance Soil Fertility Management	3	F	even year
STAT 512	Analysis of Variance of Designed Exp.	3	F, S	every year

Soil Physics	Title	Cr	Sem	Offered
BSYSE 558	Groundwater Flow and Contaminant Transport	4		
C E 550	Advanced Hydrology	3		
CE 315	Fluid Mechanics	3	F, S	every year
CH E 585	Interfacial Phenomena	3	S	odd year
E MIC 586	Special Projects in Electron Microscopy	3	F, S	every year
MATH 548	Numerical Analysis	3	F, S	every year
SOIL SCIS 442	Soil Analytical Methods	3	F	every year
SOIL SCIS 513	Environmental Soil Physics	3	Fall	odd year
SOIL SCIS 514	Environmental Biophysics	2	S	every year
SOIL SCIS 515	Environmental Biophysics Laboratory	1	S	every year
SOIL SCIS 521	Environmental Soil Chemistry	3	S	even year
SOIL SCIS 531	Soil Microbiology	3	F	even year
SOIL SCIS 533	Vadose Zone Processes	3	Fall	even year

Soil Microbiology & Biochemistry	Title	Cr	Sem	Offered
BIOL (Bot) 563	Field Ecology	2	S	every year
BIOL 548	Evolutionary Ecology of Populations	3	S	every year
BIOL 564	Molecular Ecology and Phylogeography	3		
CHEM 332	Physical Chemistry	3	S	every year
CHEM 340	Organic Chemistry I	3	S	every year
E MIC 587	Special Problems Electronic Microscopy	1	S	every year
MBIOS 301	General Genetics	4	S	every year
MBIOS 303	Introductory Biochemistry	4	S	every year
MBIOS 426	Microbial Genetics	3	F	every year
MBIOS 442	General Virology	3	S	every year
MBIOS 506	Cell Biology of Disease	3	S	every year
MBIOS 513	General Biochemistry	3	F	every year
MBIOS 514	General Biochemistry	3	S	every year
MBIOS 550	Basic & Applied Microbial Physiology	3	S	every year
MBIOS 578	Molecular Biology Computer Techniques	1-4		
SOIL SCIS 513	Environmental Soil Physics	3	F	odd year
SOIL SCIS 514	Environmental Biophysics	2	S	every year
SOIL SCIS 515	Environmental Biophysics Laboratory	1	S	every year
SOIL SCIS 521	Environmental Soil Chemistry	3	S	even year
SOIL SCIS 531	Soil Microbiology	3	F	even year
SOIL SCIS 541	Soil-Plant-Microbial Interactions	3	F	odd year
STAT 512	Analysis of Variance of Designed Exp.	3	F, S	every year

MAJOR MILESTONES

Crop Science Preliminary Doctoral Examination

The preliminary exam is an exam to determine if a student is qualified to be admitted into candidacy for the PhD degree. The exam assesses knowledge of crop science, ability to think critically and independently, and ability to conduct independent research (form hypotheses, design experiments, collect and analyze data, put the research in context of the current state of knowledge, draw conclusions).

PhD preliminary examinations in Crops consist of three parts as described below: 1. a written proposal on the dissertation research; 2. defense of that proposal to the faculty advisory committee and 3. an oral preliminary exam.

1. The PhD student must write a proposal on his or her research project. The proposal should evidence the student's understanding and critical evaluation of the research topic. The proposal must be an original document written by the student, but with input from the advisory committee, and cannot be taken from a previously written proposal. The research proposal should be initiated no later than the 2nd semester into the PhD program and presented to the student's faculty advisory committee no later than the end of the 3rd semester. The proposal should follow the Dissertation proposal guidelines (see appendix), using a format similar to that of a major funding agency such as USDA-AFRI or NSF. Crops/Soils 511, offered in spring semester, is a support course for proposal development and other scientific writing. Specific details of the format should be discussed with the major advisor and the faculty advisory committee.

2. Before the end of the third non-summer semester of enrollment, the student will participate in a 2-hour (approx.) oral defense of the proposal with faculty advisory committee members. This proposal defense includes a 20-minute presentation of the proposal. This presentation is separate from the longer proposal presentation that the student prepares for their first Crops 510 seminar. This defense does not have to be scheduled through the graduate school. Documentation of completion of this requirement will be through the Crops/Soils graduate program assessment Rubric and should be turned into the academic coordinator by the major advisor. When a student satisfactorily passes the proposal defense he/she will be qualified to take the oral preliminary examination.

3. The oral preliminary examination must be scheduled with the Graduate School Preliminary Exam Scheduling Form. The oral examination should be scheduled in the fourth or fifth non-summer semester of enrollment. The purpose of the oral preliminary exam is to allow faculty to have the opportunity to probe the depth of a student's knowledge of the whole field of Crop Science and the ability of the student to think critically and independently. The doctoral major advisor and faculty advisory committee will administer the preliminary doctoral exam.

All members of the student's faculty advisory committee must be participate in in all three parts of the Crop Science Preliminary Doctoral exam, complete the assessment rubrics and vote (for the oral proposal defense and exam). Any other members of the CSS graduate faculty may be present and may vote. Any faculty who votes has to remain present for the entire duration of the exam. The examiners may pause the exam at any time to give a member time to leave the room and return. To pass the oral defense and the oral exam, the student has to receive a minimum of three-fourth passing votes from the voting faculty.

A student who fails the any component of the preliminary exam will be given the opportunity to retake that part within three months. See the graduate school website for policies. A student who fails any component of the prelim exam the second time is terminated from the graduate program.

Soil Science Comprehensive Doctoral Written Qualifying Exam

The comprehensive written qualifying exam evaluates the student's basic knowledge in soil science. Students are expected to be familiar with disciplinary soil science knowledge at least at the 400-course level. The students will be tested in four of the five sub-discipline areas in Soil Science (chemistry, fertility, morphology, biology, and physics). Students should prepare themselves with appropriate course work and study in the selected sub-disciplines. The exam will be offered twice annually by the soil science faculty: (1) in the middle of spring semester and (2) in the middle of the fall semester. Exceptions to this timeline should be discussed with the department Chair and Graduate Coordinator. Students should take the qualifying exam immediately following completion of core courses in the four sub-disciplines selected for examination, no later than in the fourth non-summer semesters at WSU. The exam consists of questions to a specific problem or issue in soil science. Students will be asked to answer and respond to the exam, which integrates the different soil science disciplines selected by the student. The exam is open book and the student has 5 days to complete the exam, the exam is a take-home exam.

The Graduate Coordinator will coordinate the exam. The major advisor should inform the Graduate Coordinator and Academic Coordinator in the first week of the semester the exam is taken if they have a student taking the exam. A passing grade for the exam must be a "B" or higher. If the student does not pass the exam, the exam must be retaken within 4 weeks. If the student also fails the second exam, the student will be dismissed from the soils doctorate graduate program, but there may the possibility of switching to an MS program. If the advisory committee is supportive, the committee chair should seek approval from the chair of the program, who may submit a request to the Dean of the Graduate School for a change of degree/program to the MS program. A switch to an MS program requires approval of the advisory committee, the program chair, and the Graduate School.

Note that the comprehensive written qualifying exam is not scheduled via the Graduate School.

Soil Science Written Research Proposal

The PhD student must write a proposal on his or her research project. The proposal should evidence the student's understanding and critical evaluation of the research topic. The proposal must be an original document written by the student, but with input from the advisory committee, and cannot be taken from a previously written proposal. The research proposal should be initiated no later than the 2nd semester into the PhD program and presented to the student's faculty advisory committee no later than the end of the 3rd semester. The proposal should follow the Dissertation proposal guidelines (see appendix), using a format similar to that of a major funding agency such as USDA-AFRI or NSF. Crops/Soils 511 is a

support course for proposal development and other scientific writing. Specific details of the format should be discussed with the major advisor and the faculty advisory committee. The proposal will not be graded. The PhD student has to present the proposal in the form of a seminar in Soils 501 no later than in the fourth non-summer semester of enrollment.

Soil Science Preliminary Doctoral Oral Examination

The preliminary examination is designed to evaluate the suitability of the student to become a candidate for the PhD in Soil Science. The exam evaluates the candidate's disciplinary knowledge as well as his/her ability to think creatively, analyze, synthesize, evaluate knowledge and information, and apply that information to establishing new hypotheses for creative research and problem solving. The doctoral major advisor and faculty advisory committee will administer the preliminary doctoral exam.

The student shall schedule and pass their preliminary exam by the end of their 5th non-summer semester in the PhD program at WSU. Students are required to pass the qualifying exam prior to scheduling the Preliminary Doctoral Oral Exam, and need to have completed the Soils 501 proposal seminar prior to the oral exam.

The oral preliminary examination must be scheduled with the Graduate School Preliminary Exam Scheduling Form. The preliminary oral exam is intended to evaluate the student's ability to make an original research contribution to the field. The preliminary oral exam will focus on (a) the thoroughness with which the student understands their dissertation research proposal; (b) the ability of the student to discuss and critically engage literature from their major, minor and related scientific disciplines, and (c) mastery of the sub-disciplines of soil science as defended in the qualifying exam.

The major advisor will organize and preside over the exam. While there is no strict time limit for the questioning, in most cases the exam will not exceed two hours in length.

All members of the student's faculty advisory committee must be present during the oral exam and all must vote. Any other members of the CSS graduate faculty may be present and may vote. Any faculty who votes has to remain present for the entire duration of the exam. The examiners may pause the exam at any time to give a member time to leave the room and return. To pass the oral exam, the student has to receive a minimum of three-fourth passing votes from the voting faculty. A failed oral exam can usually be repeated. The second and final attempt of the oral exam cannot be scheduled earlier than 3 months after the failed first oral exam. A representative from the graduate school will be present at the second exam. If the second oral exam also fails, the student will be terminated from the graduate program.

Crop Science and Soil Science Final Oral Exam

After preliminary approval of the thesis/dissertation by the faculty advisory committee and department chair, and approval of the schedule by the faculty advisory committee, the final exam can be scheduled through the Graduate School (see the Preparing to Graduate section of this handbook).

The final exam has two parts: a seminar and a defense.

The seminar is presented before the defense and is a public presentation highlighting the research results and major accomplishments, as previously described in the 'Seminar' section of this handbook. Non-thesis MS students do not present a final seminar as part of their final exam.

The thesis/dissertation defense is an oral exam at which the student defends the approach, methods, conclusions, background, etc., of the research. The non-thesis defense will focus more on broad knowledge and less on project defense than would an exam for the thesis option. Faculty are encouraged to attend the exam and ask questions, but only members of the thesis or dissertation

committee and the graduate faculty may vote. Questions asked during the final exam do not have to relate to the thesis or dissertation research.

THESIS/DISSERTATION GUIDELINES

Thesis/Dissertation Proposal

All students should develop a thesis or dissertation proposal after consultation with their major advisor and faculty advisory committee. See appendix for proposal format guidelines. This proposal forms the basis for the thesis/dissertation research. All students are expected to develop and carry out original, creative research projects. While the advisor and committee members serve as mentors, the student is expected to develop and demonstrate the ability to work independently; to design, conduct, and analyze experiments; and to prepare the work for publication in scientific journals.

Thesis or dissertation preparation involves synthesizing concepts by interpreting experimental and analytical data that are gathered for that purpose. It constitutes a major part of the creative scholarship in a master's or doctoral program. Experience in preparing and writing a research publication, as well as the peer-review process, are important goals of graduate programs.

General Thesis/Dissertation Format

The general thesis or dissertation format required by the department is one with three sections: a literature review, several chapters describing methodology, research results, and a chapter with the overall conclusion. The chapters describing research results should be written as papers for publication. For the thesis or dissertation, the papers should be modified to clearly reflect the work of the student. This is especially necessary when Thesis/Dissertation chapters will be submitted for publication with multiple authors. If student is not first author, the paper cannot be used or must be revised. They must also be paginated and formatted to give uniformity to the thesis or dissertation. Thesis or dissertation formatting requirements are posted on the Graduate School's website.

Students are expected to publish thesis or dissertation research in an appropriate scientific journal. If the student has not submitted thesis or dissertation results for publication within a reasonable amount of time after passing the final exam, the thesis/dissertation advisor will have the option of publishing the student's thesis or dissertation results.

How to Proceed

Formal guidelines for preparation of the thesis or dissertation are available from the Graduate School. However, the following steps and schedule are recommended:

1. Select a problem and review background literature – prepare and defend research proposal, preferably by the end of the second semester after beginning work for a graduate degree.
2. Complete and summarize literature review in written form and develop theories, conduct experimental work, and collect data -- begin this phase as quickly as practical, and complete at least one semester ahead of the completion date for the degree.
3. Summarize and tabulate data, analyze data, apply theories, and develop a written presentation - begin as early as possible on a tentative basis and follow up by preparing a complete, typed draft for submission to the thesis/dissertation advisor at end of semester prior to graduation. Select a style from a scientific journal you wish to follow. Research papers prepared by professionals may be rewritten as many as a dozen times before submission to a journal for editorial review. Graduate students should plan to rewrite several drafts before the manuscript is given to the thesis/dissertation advisor.

4. Comments from the thesis/dissertation advisor should be carefully considered and addressed while preparing the revised draft that is submitted to the graduate committee. This step in preparation of a thesis corresponds to the process involved in preparing a paper for a journal. The graduate committee should be allowed several weeks for the review process. See above for a suggested timeline. If problems surface involving interpretation or meaning of data, the committee may have to meet to resolve issues. Therefore it is important to allow enough time for a thoughtful and thorough study of dissertation material. The revised draft of this document becomes the "final draft" as outlined in the following section on activity and comments.

Students on research appointments may continue to collect and analyze data, write, etc., during the final semester or summer session. Research results generated after submission of the thesis or dissertation to the committee will not automatically be accepted as essential material. If the advisor(s) consider it appropriate, the data collected during the final semester or summer session may be used in the final draft.

The Faculty recommends that the student be in residence (i.e., on-campus or at an off-campus station) during the semester that the thesis or dissertation is prepared so that the full benefit of consultation with the thesis committee can be realized.

The following schedule thesis draft schedule allows a reasonable amount of time for completion of each step and for details of post-thesis approval and for the preparation of a manuscript for publication. Since faculty members are usually involved with other reviews, as well as regular duties, the following guidelines are suggested. You will notice that a minimum of 14 to 20 weeks is required from the time you submit your initial draft of your thesis or dissertation to your advisor to the time of your final oral exam.

7-12 weeks	Submit multiple drafts to major thesis/dissertation advisor, and campus advisor if appropriate, and allow time for incorporation of the appropriate number of corrections and revisions. Allow 7 to 10 days for each revision by advisor(s) and allow sufficient time for discussion with them.
2 weeks	Submit a revised draft for review by members of your graduate advisory committee. Because of the greater number of reviewers, allow *at least* two weeks for return of this draft.
2 to 4 weeks	Revise and correct draft.
2 weeks	Submit a "final" draft to each committee member and electronically to the department Chair (c/o marshdj@wsu.edu) *at least two weeks* (10 working days) **prior to scheduling your final exam.**

PREPARING TO GRADUATE

Students should consult the Graduate School's website early in the semester they expect to graduate to obtain information regarding policies and procedures, and deadlines for thesis defense and graduation. Failure to meet the deadlines could require enrollment for an additional semester.

Additionally, CSS requires students to submit an email 'Notice of Intent to Graduate' to their advisor and committee, and cc the Academic Coordinator (marshdj@wsu.edu). **The notice is due the first week of the semester in which the student plans to graduate.** The notice shall include a timeline consistent with the aforementioned schedule to illustrate how chapter, draft submissions, and final scheduling will be carried out in a timely and fair manner. This process does not override in any way the responsibility of the faculty advisory committee. Rather, it is meant to offer one more step of preparation by and for the student. Any faculty advisory committee member may deem that the thesis is not ready to be defended at any of the normal steps in the process.

The final draft of the thesis or dissertation should be presented to the faculty advisory committee members for review no less than 10 working days in advance of requesting their signature on the final exam scheduling form.

Members of the faculty advisory committee are responsible for checking the thesis or dissertation for style and format. They certify their approval when they sign the "final oral scheduling form". Faculty advisory committee members cannot sign off on a final exam schedule form if they have not had ample time to review the final draft of the thesis/dissertation.

The student is responsible to prepare the form, schedule the room, and submit to the Academic Coordinator for Chair signature no less than 12 working days in advance of the exam date (the final exam scheduling form is due to the Graduate School no later than 10 working days in advance of the exam date). In addition, a 'display' copy of the final draft of the thesis or dissertation must be provided by email to the Academic Coordinator (marshdj@wsu.edu) simultaneous with providing the scheduling to be posted on a secure Sharepoint site for faculty review (aka display copy).

Check List for Graduation

- Review in advance the Graduate School's deadlines and procedures for graduation (MS) (PhD).
- Submit Notice of Intent to Graduate the first week of the final term to your advisor and committee members, and cc the Academic Coordinator (marshdj@wsu.edu).
- Enroll in Soils 501 or Crops 510 to give exit seminar.
- Set tentative defense date with faculty committee members and contact office for room scheduling.
- Ensure all deadlines on timeline are met throughout final semester:
- Submit Application for Degree to the Graduate School by the deadline (very early in the final term)
- Finish thesis or dissertation final draft; email to committee members.
- Obtain committee approval of thesis or dissertation final draft, approval of defense date and time and committee signatures on final exam scheduling form.
- Route scheduling form through Academic Coordinator for Chair signature, and who will confirm rooms for the defense and assist with AMS arrangements.
- A 'display' copy of the thesis/dissertation must also be submitted electronically to the Academic Coordinator (marshdj@wsu.edu) to load on the faculty Sharepoint site.
- Conduct final exam, and turn in final copy of thesis/dissertation to Graduate School within 5 working days of defense, and also two hard copies to the Academic Coordinator.

Note: It is the sole responsibility of the student to ensure that all deadlines set forth by the Graduate School are met. Failure to follow the CSS Policies and Procedures or to meet the deadlines set forth by the Graduate School will result in a delayed graduation date.

GRADUATE ASSISTANTSHIPS

Preparation for Employment Upon Arrival

Upon arrival in Pullman, students appointed to assistantships (TA or RA) should contact the Academic Coordinator on or before the first date of employment to complete required forms such as an I-9 for employment eligibility and W-4 for withholding taxes. **Section 1 of the I-9 must be completed on or before the date of employment.** Section 2 must be completed by WSU staff within the first 72 hours of employment. We prefer to take care of both sections prior to employment. WSU subscribes to the electronic submission process; paper copies are not accepted. Contact the Johnson Hall Business Center staff for assistance.

A variety of documents can be presented to show employment eligibility and are described in the I-9 link above, but most often presented are driver licenses and social security cards or state-issued birth certificates for domestic students, and passports and visa documents for international students.

Assistantships are considered to be taxable income in the state of Washington and Federal tax will be deducted from your paycheck. There is no Washington State income tax.

Withholding guidelines for the W-4 are available on the Payroll website, for both domestic and international hires. The W-4 requires a Social Security card. If you do not have a social security card, you need to obtain one as soon as possible

For ease, international students can apply for a social security card during the required International Student Orientation (Fall semester only). A letter is required from the department in order to apply. This receipt given to the student needs to be presented to our department personnel staff as soon as possible to complete the appointment and assure a timely paycheck.

Alternatively, students can obtain a social security card at a local office (Lewiston). Information and forms are available here.

Payroll

Fall assistantships begin August 16, and end December 31st. Spring assistantships begin January 1st and end May 15th. Payroll checks for the last half of the month are issued 10 days later (your first check will be September 10 or January 25). Payroll checks for the first half of the month are issued 10 days later, generally on the 25th of the month. Direct deposit arrangements with the Payroll office are encouraged.

Residency Requirement and Tuition Waiver

The assistantship appointment will exempt the student from paying in-state tuition **if living in Washington State** during enrollment at WSU. WSU will provide out-of-state tuition waivers for the first year of studies if you are not a resident of Washington State; however, out-of-state tuition waiver cannot be guaranteed beyond one year. If you are not a resident of Washington State, you should begin the process immediately upon entrance to establish residency. Most required documents need to be in place for one year. Please review the requirements upon arrival to ensure a successful application. Students who have not established Washington State residency by the one-year limit will be required to pay out-of-state tuition, even if they have an assistantship.

Residency waivers are not up to departmental discretion, and the Graduate School will only grant out of state tuition waivers to domestic students for two semesters.

International students are not eligible to become residents. For international students, the assistantship appointment will exempt them from paying the out-of-state and in-state tuition if living in Washington State during enrollment at WSU.

No Tuition Allowed

There are some instances where tuition is not allowed on grants; the student is instead appointed as a Project Assistant at an inflated salary which covers the resident tuition normally charged to the grant and the student is advised to register for payroll deduction of the tuition.

Payroll Deductions

Graduate students on assistantships may authorize Payroll Services to deduct the total amount of their tuition and fees owed over eight (8) pay cycles beginning the second pay date of the semester. Deductions may be authorized for 1) full operating fee or residual operating fee, 2) service/activity/building fees, and 3) spouse and/or dependent medical insurance (fees vary). Payroll deduction is an optional service provided at a fee of $8.00. Online forms must be completed *each*

semester and must be submitted before the last date to pay tuition before late fees accrue (to avoid paying late fees). The payroll deduction service is not offered for summer appointments.

Residual and Mandatory Fees

All students on an assistantship are required to pay residual and mandatory fees (i.e., fees not covered by the tuition waiver) each semester of approximately $1,000. The residual fee pays for CUB, Health and Wellness Services, Pullman Transit, the Student Recreation Center, and a small portion of tuition not covered by the assistantship. Waiver of the mandatory fees will be requested by the Academic Coordinator for those students not residing in Pullman and unable to take advantage of the respective service.

Responsible Conduct of Research Training

The Graduate School requires all graduate students on an assistantship to complete the web-based Responsible Conduct of Research Training. The paperwork for your assistantship cannot be processed until the training has been completed, so please notify our office of the date you completed it.

Insurance

Graduate students on a paid assistantship are automatically enrolled in the Graduate Student Health Insurance Medical Plan (including dental). Effective dates for this plan are 8/16-12/31 for Fall appointments, and 1/1-8/15 for Spring appointments. No premiums are deducted during the summer months if the policy was in effect during spring semester. International students not eligible for the aforementioned plan, will automatically be enrolled in the iSHP health insurance plan and are responsible for the premium. Likewise domestic graduate students not eligible are invited to review the HWS website for other available options and will be responsible for the related premiums. Health cards, plan information and effective dates can be found at the Health & Wellness Services website.

Dependents such as spouse and/or children may be added to the insurance policy but the student is responsible for the additional premiums. If premiums are being paid for a dependent, spring semester rates will be higher than fall semester rates because of the summer coverage.

For student health needs covered by Health and Wellness, an appointment can be made by calling 335-3575. Health and Wellness facilities are located in the Washington Building on the WSU campus (intersection of Stadium Way and Nevada & Washington Streets). Unfortunately, at the beginning of the term, it sometimes takes a week or two for services to align in WSU systems, depending on a number of situations. If you need medical attention and your health card is not yet available, please contact Sally Makamson (509-335-5293) at Health and Wellness services. Explain your situation, graduate assistantship appointment etc. and she can arrange a visit for you.

The PASS Program enables spouses or partners of eligible graduate/professional students (Pullman campus only) to access health care services available at Health and Wellness Services (HWS). The PASS Program is not a substitute for health insurance.

Reappointments

Students must maintain a 3.0 Grade point average to be eligible for assistantships and be making satisfactory progress. Reappointment is also contingent upon the availability of funds.

English Proficiency Exam for International TA's

The University requires that TA's (whose native language is not English) pass an International Teaching Assistant prior to beginning their TA duties. International Students must attend New International Student Orientation through the Office of International Students and Scholars.

Terms and Expectations

Graduate students on appointments enter into an agreement with the University that both parties are expected to honor. Graduate assistants must maintain a cumulative 3.0 GPA in all coursework subsequent to admission, and maintain full-time enrollment (10-18 credit hours) for an entire semester.

A half-time appointment requires graduate appointees to work 20 hours per week in addition to their coursework and to be at work each workday, including periods when the University is not in session (e.g., Spring and Thanksgiving Break), with the exception of legal holidays. Graduate students do not earn sick leave or annual leave. Therefore, all leave and absences during normal work hours must also be arranged with a student's major advisor and, if applicable, campus advisor. Graduate assistants and supervising faculty must certify the student's effort on the annual review form and on the post-graduate information form.

Research Assistant responsibilities may include research assigned by the student's advisor as well as thesis or dissertation research. Most Teaching Assistants should expect to spend up to 20 hours per week on TA duties. Work schedules must be arranged with the thesis or dissertation advisor and/or TA supervisors.

It is important to note that any change to the duration of the appointment that causes it to be for a period less than a full semester or any change in the percent of appointment may cause an immediate termination of the Qualified Tuition Reduction (QTR), Operating Fee Waiver (OFW) and/or non-resident waiver (NR). If a student decides to terminate employment mid-semester, or if the FTE percentage is changed, **the waivers may be removed and the student may be responsible for paying the full tuition charges.**

For most students, the length of the appointment to a graduate assistantship is determined at the time of their initial appointment in the letter of offer of admission. Students with graduate assistantships are expected to perform their assistantship duties in a professional manner, while at the same time maintaining satisfactory academic and research progress toward their graduate degree. MS students are generally supported 2 to 2.5 years; students working towards a PhD are normally supported for 2 to 3 years beyond the MS, or 4 years beyond the BS. All graduate assistantships are also subject to the availability of funding.

Students who want to withdraw from the appointment should always submit a letter of resignation to the department Chair. For details on resignation, contact the Academic Coordinator, Johnson Hall Room 205.

Hourly Appointments (Timeslip)

Summer hourly appointments are for one to three months normally provide a stipend comparable to the the student's academic year monthly stipend. Summer timeslip appointments are arranged by the major advisor, with the Johnson Hall Business Center.

APPENDICES

Annual Review Form

Each of you should retain a fully signed copy of the annual review prior to submitting the signed originals and CV to Deb Marsh by the May 13, 2016 deadline.

Graduate Student Annual Review for 2015-2016

Crop and Soil Sciences, Horticulture, Plant Pathology

The evaluation period for the annual review is May (or starting date) to May. Each student is responsible for completing Sections A and B, and then forwarding it **electronically** with a curriculum vita (CV) to their advisor in advance of the review meeting. **The student is responsible for arranging the annual review meeting.** The student's advisor will complete Sections C and D and review them with the student at the annual review meeting. Both parties will complete Section E (if applicable). Annual reviews must be completed and submitted (including CV) to Debra Marsh, Academic Coordinator, by **Friday, May 13, 2016**.

This form must be typed

Section A

Name:	
WSU ID#:	
Year Entered:	
Degree Objective (MS or PhD):	
Degree Program:	
Advisor:	
Co-Advisor:	
Campus Advisor (if applicable):	
Other Committee Members:	
Number of committee meetings since last review:	
Date of most recent committee meeting:	
Program of Study approval date:	
Or program of study anticipated filing date:	
Cumulative GPA:	
Seminar Date(s):	
Thesis/Dissertation subject title:	
Thesis/Dissertation proposal approval date:	
Or program of study anticipated date:	
PhD Preliminary exam completion date:	
Or program of study prelim date:	
Anticipated term for completion of degree requirements:	

Section B. Self-Evaluation

Summarize your academic and research progress and plans. Please address the following items:

1. What academic/research goals did you propose to accomplish in your last review *(not applicable for first year students)*?
2. What have you accomplished since your last review?
    a. Discuss your academic and research progress
    b. Describe your publications to date. Please list published manuscripts and book chapters, manuscripts in preparation (and expected date of submission), abstracts (professional papers and posters presented).
    c. List professional activities such as awards/scholarships, meetings attended, abstracts/papers published, presentations given, and teaching experience.
    d. Discuss your departmental and professional stewardship.
3. What are your greatest challenges and how will you overcome them?

Discuss your future directions and goals as follows:

1. Overall.
2. For the next review period.

Section C. *Advisor Assessment*

Note to Advisor—be sure to also review the CV your student is required to prepare and provide with this review.

Performance, Skill Ratings	Excellent	Good	Average	Fair	Poor	NA
Academic Performance						
Research Performance						
Work Habits						
Technical Skills						
Rate of Progress						
Communication Skills						
Teaching Performance						
Overall Rating						

Please provide an assessment of your student's research progress and accomplishments for the current review period (or research potential for a first year student). Comment on the student's strengths and weaknesses and provide specific recommendations or requirements on areas that need improvement. Consider the student's understanding of the scientific literature, recent proposal defense (PhD), seminar performance, and other research benchmarks.

Outline specific conditions or expectations that must be fulfilled prior to the next review and discuss the student's probable success in completing their degree requirements in a timely manner. If the probability is not good, please indicate why.

Section D. Recommendations

Overall assessment is ____ satisfactory or ____ unsatisfactory*

If the evaluation is **unsatisfactory, enrollment should be ___ continued or___ discontinued*
*Conditions or recommendations for continued enrollment if evaluation is **unsatisfactory**:*

Signature of Advisor: _____ Date: _____

Signature of Student: _____ Date: _____
My handwritten signature above acknowledges this evaluation has been discussed with me.

Comments on review by student may be attached

Certification of Assistantship Duties

Student: **The graduate assistantship position that you have held during this past year and the related tuition waivers were contingent upon factors as outlined in your offer letter. By signing below you certify you have met the following contingent factors for the preceding semester(s) during which you held an assistantship**

(✓) check the terms you held assistantship:

___Summer 2015 / ___Fall 2015 / ___Spring 2016

- I remained enrolled full time (at least 10 *[3 cr in summer]* credits as defined in Graduate School policy manual, chapter 9) during the period of the appointment.
- I maintained a 3.0 cumulative GPA during the period of the appointment (or approved exception to policy)
- I met the service requirement of an average of 20 hours per week for 0.5 FTE as scheduled by my department/supervisor (or based on hours required for partial FTE appointment).

Student Signature Date RA Advisor **or** TA Supervisor Signature Date

WASHINGTON STATE UNIVERSITY
Department of Crop and Soil Sciences

Guidelines for Authorship on Manuscripts
Summarized February, 2010

From the Harvard Medical School Guidelines (referenced by the VP for Research/Graduate School; http://www.hms.harvard.edu/integrity/authorship.html):

- Everyone who is listed as an author should have made a substantial, direct, intellectual contribution to the work. For example (in the case of a research report) they should have contributed to the conception, design, analysis and/or interpretation of data. Honorary or guest authorship is not acceptable. Acquisition of funding and provision of technical services, patients, or materials, while they may be essential to the work, are not in themselves sufficient contributions to justify authorship.
- Everyone who has made substantial intellectual contributions to the work should be an author. Everyone who has made other substantial contributions should be acknowledged.
- When research is done by teams whose members are highly specialized, individual's contributions and responsibility may be limited to specific aspects of the work.
- All authors should participate in writing the manuscript by reviewing drafts and approving the final version.
- One author should take primary responsibility for the work as a whole even if he or she does not have an in-depth understanding of every part of the work.
- The main/first author should define authorship based on the above criteria.

From Michigan State University (http://rio.msu.edu/authorshipguidelines.htm):

Authorship - A person claiming authorship of a scholarly publication must have met the following criteria:

- Substantial participation in conception and design of the study, or in analysis and interpretation of data;
- Substantial participation in the drafting of the manuscript or in the substantive editing of the manuscript;
- Final approval of the version of the manuscript to be published;
- Ability to explain and defend the study in public or scholarly settings.

(Note: these criteria follow closely those recommended by several professional associations. See especially the International Committee of Medical Journal Editors, *Annals of Internal Medicine* 1988; 108: 258-65.)

Acknowledgment - Contributions that do not justify authorship should be acknowledged separately in the notes to the manuscript. These may include general supervision of a research group, assistance in obtaining funding, or technical support.

PO Box 646420, Pullman, WA 99164-6420
509-335-3475 • Fax: 509-335-8674 • http://css.wsu.edu

"Honorary Authorship" - A claim of authorship by, or assignment of authorship to, persons who may have been associated in some way with a study but do not meet the four criteria in item 1 may constitute an unethical research practice.

Graduate Student Authorship - "Faculty should be especially aware of their responsibility to safeguard the rights of graduate students to publish the results of their research." (*MSU Research Handbook*, 1985, p. 16, section 4.3.1.)

Senior Author and Order of Authorship - The senior author is generally defined as the person who leads a study and makes a major contribution to the work. All the authors at the outset of a project should establish senior authorship, preferably in a written memorandum of understanding. This memorandum of understanding should reference the authors' agreement to abide by their departments' policy on authorship or this University default policy on authorship. At the outset of the study the Senior Author should discuss the outline of work and a tentative Order of Authorship with the study participants. As projects proceed, agreements regarding authorship may need to be changed. It is the responsibility of the senior author to assure that the contributions of study participants are properly recognized.

Disputes Over Authorship - Disagreements over authorship, e.g. who has a right to be an author or the order of authorship, should be resolved by the Senior Author in collegial consultation with the other authors. When this process cannot reach resolution, the Senior Author should arrange with his or her chairperson for arbitration by a knowledgeable and disinterested third party acceptable to all the authors. If the authors cannot agree on a mutually acceptable arbitrator, then the Vice President for Research and Graduate Studies shall appoint an arbitrator. During the arbitration process all the authors are expected to refrain from unilateral actions that may damage the authorship interests and rights of the other authors.

Accountability - Every author listed on a publication is presumed to have approved the final version of the manuscript. Each author is responsible for the integrity of the research being reported.

Plagiarism -The word *plagiarism* is derived from the Latin *plagiarius*, an abductor, and *plagiare*, to steal. The expropriation of another author's text, and the presentation of it as one's own, constitutes plagiarism. Plagiarism, in turn, constitutes misconduct in scholarship under University policies and procedures. Plagiarism in scholarly projects should be reported to one's chairperson, dean, or the University Intellectual Integrity Officer. (American Historical Association, *Statements on Standards*, 1993, p. 13)

Distribution -This policy should be widely distributed, especially to each new faculty, graduate student and research staff member in academic units.

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Rubric for Assessing Graduate Work in Crop and Soil Sciences

Rubric for Assessing Graduate Student Work in Crop and Soil Sciences

PROGRAM-LEVEL COMPETENCY TARGETS = 4.0 FOR M.S. STUDENTS AND 5.0 FOR PH.D. STUDENTS

1. KNOWLEDGE OF FIELD. Understands the breadth and depth of knowledge associated with their discipline.

6 - Mastering	5 - Effective	4 - Competent	3 - Developing	2 - Emerging	1 - Minimal	N/A
Clearly understands most or all of the concepts associated with the discipline as well as the challenges and embedded issues. Demonstrates accurate and nuanced use of disciplinary language, definitions, and terms appropriate to the audience the work is intended for. Demonstrates appropriate breadth AND depth of knowledge associated with the discipline.		Understands some of the key concepts associated with the discipline. May or may not describe embedded issues. Use of technical language, definitions and terms is generally accurate and appropriate for the audience the work is intended for. Demonstrates appropriate breadth of knowledge associated with the discipline but lacks depth (or visa versa).		Does not understand the key concepts, challenges, or embedded issues associated with the discipline; or does so minimally. Often misuses technical terms and concepts, and/or relies on overly general layperson's language. Demonstrates limited breadth and depth of knowledge associated with the discipline.		Unable to rate based on this work
Comments:						

2. SCIENTIFIC REASONING. Designs, conducts, analyzes and interprets research important to their discipline.

2a. Literature: Search, Selection, & Review.

6 - Mastering	5 - Effective	4 - Competent	3 - Developing	2 - Emerging	1 - Minimal	N/A
Uses appropriate, relevant, and high quality info sources to create a presentation that is current, well balanced and richly supported by the cited sources. Evaluates most or all sources for quality, perspectives, relevance, and currency. Identifies gaps in the literature and/or relevant gaps in their own knowledge or skills. Good knowledge of previous and current research in their discipline.		Uses a moderate number of respectable sources that, for the most part, cover the needed info. Some sources may be irrelevant or out of date, and/or key area(s) of the issue may not be addressed. Only minimally evaluates sources for quality, relevance and currency Shows some signs of evaluating info gaps in the literature or in their own knowledge or skills. Gaps in knowledge of previous and current research in their discipline.		Minimal or no evidence of search, selection, or source evaluation skills. No evaluation of info sources is present. Does not identify the info gaps or what they still need to know. Limited knowledge of previous or current research in their discipline.		Unable to rate based on this work
Comments:						

2b. Defining the Problem.

6 - Mastering	5 - Effective	4 - Competent	3 - Developing	2 - Emerging	1 - Minimal	N/A
Identifies a focused, unique, original problem that is challenging and well defined. Potential for significant contribution of the research to their discipline		Identifies a somewhat focused problem that is interesting but not particularly challenging or is simplistic. OR the problem is unsatisfactorily defined and characterized, with important omissions of key considerations. Limited potential for contribution of the research to their discipline or with more focus could prove to contribute significantly.		The problem, if identified, is confused or simplistic. Contribution of the research to their discipline is not clear.		Unable to rate based on this work
Comments:						

College of Agricultural, Human, and Natural Resource Sciences, Office of Assessment and Innovation, and the Sustainable Food & Agricultural Systems Education Project

2c. Methodology & Data Presentation.

6 - Mastering	5 - Effective	4 - Competent	3 - Developing	2 - Emerging	1 - Minimal	N/A
Approach and methodology are complete, appropriate and correct for the problem. Has knowledge of emerging methodologies in their discipline.		Approach and methodology are related to the problem but do not fully address the problems due to flaws or inappropriate approach. Has limited knowledge of emerging methodologies in their discipline.		Poor/inappropriate methodology approaches demonstrated, or approach and methodology are unrelated to the problem. Has no knowledge of emerging methodologies in their discipline.		Unable to rate based on this work
Data collected and presented demonstrates a clear understanding of the info and its relationship with the problem.		Data collected and presented adequately. Relationship of the data to the problem are not entirely clear.		Limited data collected or data/approach demonstrates little attention to or understanding of the problem		
Data presented appropriately - graphs and/or tables are complete, accurate, relevant, and contain appropriate headings, descriptors, significant figures, etc. Use of statistics is appropriate and presented clearly and completely. Interpretations drawn from statistical presentations are accurate.		Data presented are generally appropriately - graphs and/or tables contain relevant headings, but some details may be missing or unclear, such as units, significant figures, etc. Statistical information is generally understood and interpreted correctly.		Data presentation are incomplete, poorly labeled, confusing, or missing all together.		
Comments:						

2d. Data Analysis and Interpretation.

6 - Mastering	5 - Effective	4 - Competent	3 - Developing	2 - Emerging	1 - Minimal	N/A
Use and interpretation of info are accurate and thorough, including interpretation of data given in graphs and tables, as well as the overall results and conclusions given by each source.		Accurately uses and correctly interprets most of the info obtained from sources, including data given in graphs and tables, as well as the overall results and conclusions given by each source. One or more minor points may be overlooked or misinterpreted.		Little or no interpretation of data, instead is simply a restatement of facts and ideas found elsewhere. Misunderstands or misrepresents info given in their sources.		Unable to rate based on this work
Logical and highly insightful inferences from the info presented. Excellent job in integrating literature and data in appropriate and creative ways. Analysis demonstrates firm understanding of data. Alternate interpretations of, or inferences from, data are discussed appropriately and in detail.		Generally makes logical inferences from the info presented, with only few or minor mistakes. Demonstrates a basic understanding of the data and some ability to connect literature and data to analyze evidence, but analysis is confusing in some spots or contains inaccuracies. Analysis generally reflects evidence reviewed, collected and presented. May provide brief, appropriate mention of alternative interpretations.		Limited or no logical inferences from the info presented. Does not appear to understand the info.		
Comments:						

2e. Conclusions and Recommendations.

6 - Mastering	5 - Effective	4 - Competent	3 - Developing	2 - Emerging	1 - Minimal	N/A
Conclusions are accurate, appropriate, and clearly linked to problem and data presented.		Conclusions are reasonable but may not take into account all critical factors.		Conclusions are inaccurate and/or unreasonable, do not reflect the research and data presented, or are merely a simplistic summary not tied to the original problem.		Unable to rate based on this work
Conclusions and recommendations are balanced and qualified to account for uncertainties in the data or unpredictability of the system, and student's own biases.		In a limited way, students consider uncertainties or other limitations of the conclusions or evidence.		Conclusions and recommendations are biased and do not reflect the research and data, suggesting views were established before or in spite of the evidence.		
Comments:						

3. COMMUNICATION. Communicates effectively to a diverse group of people using appropriate traditional and emerging technological media.

6 - Mastering	5 - Effective	4 - Competent	3 - Developing	2 - Emerging	1 - Minimal	N/A
Captures and communicates the intended idea(s) accurately and clearly.		Captures and communicates the intended idea(s) accurately but parts are not clear.		Inadequately/inaccurately captures and communicates the intended idea(s) due to gaps and digressions. Little attention is paid to accuracy.		Unable to rate based on this work
Main points connect with the audience and are smoothly tied together.		Generally easy to identify main points and transitions are usually smooth.		Difficult to identify main points. Transitions may be rough.		
Compellingly conveys why the issue matters.		Background and context sufficient to indicate the issue is important.		Limited background info and context so not at all clear why issue matters.		
Visuals (graphs, tables, diagrams, etc) are clear, concise, and relevant.		Visuals (graphs, tables, diagrams, etc) generally support the written component, but some may be overly complex, simplistic, or redundant.		Not clear how the visuals (graphs, tables, diagrams, etc) add credibility to the topic.		
Polished, error-free, and engaging. Professional.		Contains errors, but errors do not distract from or misrepresent content and ideas.		Multiple errors in grammar, syntax, punctuation, etc., that obscure and/or misrepresents the content.		
Comments:						

4. ORIGINAL CONTRIBUTION. Demonstrates potential for original contribution to their discipline.

6 - Mastering	5 - Effective	4 - Competent	3 - Developing	2 - Emerging	1 - Minimal	N/A
Research demonstrates excellent potential for original contribution to their discipline. Research is unique, well organized, complete, and statistically sound.		Research demonstrates some potential for original contribution to their discipline. Research is unique but contains flaws in interpretation, organization, completeness and/or statistics.		Research contains serious flaws that would make it unpublishable. Not unique.		Unable to rate based on this work
Research prepares student for further productive research beyond graduate school.		Research prepares student for limited research beyond graduate school		Limited or no potential for student to do further research in this area.		
Comments:						

Rubric for Assessing Graduate Work in the Department of Crop and Soil Sciences

August 2011

Student's name: _____; Date: _____; MS or PhD: _____

Title: _____

Check one: Proposal seminar _____; Prelim exam: _____; Final Seminar_____; Defense _____

Check one: Faculty_____; Graduate student:_____; Staff:_____; Professional in the field:_____

For each of the learning outcomes below, please choose the score which best corresponds to the overall level demonstrated in the student work using the attached rubric for guidance. (*6/5 = Mastering; 4/3 = Developing; 2/1 = Minimal; N/A = Unable to rate)*. Please use whole numbers or increments of 0.5.

Learning Outcome	Score
1. Knowledge of Field. Demonstrates adequate breadth and depth of knowledge of the field in their area of research.	
2. Scientific Reasoning. Appropriately designs, conducts, analyzes, and interprets research effectively on important problems in their discipline.	
a. Literature: Search, Selection, and Review. Reviews the literature in a manner that demonstrates comprehensive knowledge of previous and current research in the field of study.	
b. Defining the Problem. Identifies a viable question within the field of study and effectively documents the contribution of the research to the area of study.	
c. Methodology and Data Collection. Designs and implements appropriate research experiments to test the hypothesis or the solve problem.	
d. Data Analysis and Interpretation. Analyzes and interprets research data appropriately. Demonstrates sufficient knowledge of appropriate concepts, theories, and emerging methodologies in their area of research.	
e. Conclusions and Recommendations. Presents conclusions and recommendations that are accurate, clearly linked to data presented, and take into account all critical factors.	
3. Communication. Communicates effectively to a diverse group of people using appropriate traditional and emerging technological media.	
4. Original Contribution. Demonstrates potential for original contribution to their discipline.	

Comments:

Research Proposal Guidelines

REQUEST FOR PROPOSALS FOR GRADUATE PROGRAM STUDENT DISSERTATION PROPOSALS

These guidelines were compiled at the request of and as an aid for Ph.D. graduate students to develop their dissertation proposal, as a component of their preliminary exam.

PURPOSE

The full dissertation proposal should present:

- The long term goals, objectives and scientific, significance of the proposed work; The suitability of the methods to be employed;
- The rationale for the research and benefits to society.
- The merits of the proposed project must be clearly stated.

PROPOSAL PAGE FORMATTING

- Number of pages: 8 - 15 not including references cited, timeline, and facilities (items E, F and G below). Individual Graduate Programs have different page requirements but most have a maximum of 15 pages. Students should check with Graduate Coordinators in their program area for specifics.
- Visual materials, including charts, graphs, maps, photographs and other pictorial presentations are encouraged and should be included in the 15-page limitation.
- Font: Cambria, Courier New,, Times New Roman or similar fonts: 11 points or larger.
- 10 point fonts are acceptable for figure captions, mathematical formulas and equations, table and diagram captions.
- Tables and figures can be embedded in text or listed at the end of the proposal at the discretion of the student's advisor
- No more than six lines of text within a vertical space of one inch.
- Margins in all directions must be at least an inch.
- Single column format.
- The proposal major sections and sub-sections should be delineated with headings and sub-headings.

PROPOSAL ELEMENTS AND ORGANIZATION

A. Cover Sheet

1) Student name
2) Committee members
3) Type of proposal (Dissertation, Second Non-Thesis)

B. Project Summary (Maximum 300 words, written in the third person, understandable by technically literate non-scientists)

1) Overview - need for research
2) Description of methods and expected results including experimental resources, design, and data analysis
3) Statement of intellectual merit, - potential of proposed research to advance knowledge 4. Statement of broader impacts of proposed acitivity- potential of the proposed research to benefit society.

C. Project Description

1) Introduction. The research problem and major objectives of the proposed project should be stated. The need for research should be supported with a description of the present state of knowledge in the field, work in progress in the laboratory in which the student is working, and work in progress elsewhere.
2) Specific Objectives. Include a bullet list or outline of major and specific objectives.

3) Preliminary work by objective:
    a. Ongoing or recently completed activities and pilot studies significant to the project. Concentrate on reporting results in this section.
    b. If the same experiments are to be repeated in the proposed work, it is ok to describe those details in the experimental plan section and refer the reader to those descriptions.
4) Experimental plan by objective. For each objective, the experimental plan should include:
    a. Re-statement of the objective,
    b. A hypothesis for the proposed experiments within that objective. The hypothesis must be testable, falsifiable, parsimonious, precise, useful, and relevant
    c. A rationale for this hypothesis.
    d. Experimental methods to be used. The project activities may be based on previously established and/or innovative methods and approaches, and must be well justified. For each objective:
        i. Address what will be done
        ii. Why this method was chosen
        iii. How the experiment will be conducted
        iv. Feasibility of achieving results with this method/experiment
        v. How the data will be collected and stored
        vi. How the data will be analyzed and interpreted including statistical methods
    e. Expected results by objective
    f. Potential limitations and problems. Include alternative methods to complete the objective.

D. The broader impacts of the proposed research. What are the benefits that will accrue if the project is successful?

E. Timeline for achieving research goals. Include in this timeline the milestones for completing course requirements and preliminary exams.

F. References cited. Each reference must include the names of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication. If the document is available electronically, the website address also should be identified and verified. The use of bibliographic software is encouraged. Please double check to make sure that this software has accurately formatted references in the same style for all references cited.

G. Facilities, equipment and other resources. This section of the proposal is used to assess the adequacy of the resources available to perform the effort proposed. List applicable equipment, laboratory space, greenhouse and field space, available to compete the work proposed.

FINAL COMMENTS AND ADDITIONAL RESOURCES

The dissertation proposal should be initiated during the second semester of the Ph.D. program. In addition to the graduate advisor, committee members and other students, grant writing support is available through

- The WSU Graduate and Professional Writing Center (Smith CUE 414, gpwc@wsu.edu, http://universitycollege.wsu.edu/units/writingprogram/units/writingcenter/grad&prof/),
- Crops/Soils 511: Science Writing Workshop. (2 credits, graded S/F, offered spring semester).