

# INTEGRATED PLANT AND SOIL SCIENCES

(IPSS)

## GRADUATE PROGRAM GUIDE

DEPARTMENT OF PLANT AND SOIL SCIENCES

DEPARTMENT OF HORTICULTURE

DEPARTMENT OF FORESTRY

UNIVERSITY OF KENTUCKY

Covering M.S. and Ph.D. Degrees in IPSS

Revised, January 2014

## CONTENTS

I. Introduction . . . . .	5
II. Description of the Graduate Programs in IPSS . . . . .	7
A. Executive Summary . . . . .	7
B. Rationale . . . . .	7
C. Core Courses . . . . .	10
D. Other Course Requirements . . . . .	10
E. Learning Outcomes . . . . .	11
F. Awarding of Degrees . . . . .	11
G. Administration . . . . .	11
Director of Graduate Studies . . . . .	12
Graduate Program Steering Committee . . . . .	12
Membership in Program Areas . . . . .	13
Creation of New Ph.D. Program Areas in IPSS . . . . .	13
H. Admission . . . . .	14
Application . . . . .	14
Requirements for Admission . . . . .	14
I. Funding . . . . .	15
J. Program Requirements . . . . .	15
K. Orientation . . . . .	15
L. Registration . . . . .	15
M. Advising . . . . .	15
N. Preparatory Background . . . . .	16
O. Curriculum . . . . .	16
P. Teaching Requirement . . . . .	17
Q. Publication Requirement . . . . .	17
R. Plan of Studies and Annual Review of Progress . . . . .	17
S. Program Areas . . . . .	18
T. Part-time Graduate Students . . . . .	20
III. The Graduate Faculty and Advising . . . . .	21
A. Advisor or Major Professor . . . . .	21
B. Advisory Committees . . . . .	21
C. The Graduate Faculty . . . . .	23
IV. Facilities . . . . .	24

## CONTENTS (con.)

V. Application and Admission . . . . .	26
A. Application Procedure . . . . .	26
B. Requirements for Admission . . . . .	26
VI. Assistantships and Fellowships . . . . .	27
A. Assistantship Options . . . . .	28
B. Application for Financial Support . . . . .	28
C. Criteria for Assistantship Awards . . . . .	28
D. Responsibilities of Graduate Assistants . . . . .	28
E. Enrollment Requirements . . . . .	29
F. Duration of Assistantships . . . . .	29
G. Review of Progress and Termination of Assistantships . . . . .	30
H. Annual Review of Student Progress . . . . .	30
I. Stipend, Benefits, and Fees . . . . .	31
VII. Requirements for Advanced Degrees . . . . .	32
A. Master of Science, Integrated Plant and Soil Sciences (Thesis Option). . . . .	32
B. Master of Science, Integrated Plant and Soil Sciences (Non thesis Option) . . . . .	33
C. Course Work Requirements for the M.S. in IPSS . . . . .	34
D. Ph.D. Degree . . . . .	34
General Requirements . . . . .	34
Language . . . . .	34
Program Area . . . . .	34
Course Requirements . . . . .	35
Seminar . . . . .	35
Residency . . . . .	35
Qualifying Exam . . . . .	36
Dissertation Proposal . . . . .	37
Partial Publication of Dissertation . . . . .	37
Presenting the Dissertation and Final Examination . . . . .	37
E. Guidelines for Ph.D. Course Work . . . . .	39
Crop Science Program Area. . . . .	39
Plant Physiology Program Area. . . . .	40
Soil Science Program Area . . . . .	42

## CONTENTS (con.)

VIII. Academic Performance, Evaluation, Probation, and Termination . . . . .	44
A. Repeat Option . . . . .	45
B. Evaluation of Student Progress . . . . .	45
IX. Placement . . . . .	46
X. Check Sheets . . . . .	47
A. Master of Science Degree . . . . .	47
M.S. Student Forms . . . . .	49
B. Ph.D. Degree . . . . .	50
Doctoral Student Forms . . . . .	53
Appendix A. Course Distribution Based on Learning Objectives . . . . .	54
Appendix B. Sample Academic Programs . . . . .	56
Appendix C. Composite Curriculum Maps for Graduate Courses in IPSS . . . . .	60

## I. INTRODUCTION

This handbook for the Graduate Programs in Integrated Plant and Soil Sciences (IPSS) is provided as a guide for faculty, current graduate students (enrolled prior to Spring 2012 semester) and new students enrolled in IPSS after Spring 2012. The handbook summarizes the major rules and procedures of the Graduate School, and describes policies specific to the IPSS graduate programs.

The policies and procedures described here are intended to be consistent with those contained in the Graduate School Bulletin ([www.research.uky.edu/gs](http://www.research.uky.edu/gs)), but Graduate School rules take precedence in all cases. Students are advised to review the Graduate School Bulletin and become familiar with its contents

The Graduate Faculty of the Department of Forestry, Department of Horticulture, and Department of Plant and Soil Sciences place the highest priority on excellence in graduate student education. We make every effort to provide an environment conducive to learning, productive graduate research, and professional development. Graduate students should feel free to contact the program Director of Graduate Studies (DGS), area DGS, any of our faculty, or their department chair, for advice or information at any time.

In general, the advisor or DGS is the best source of advice on procedures, program requirements, application, and admission requirements. The DGS administers the rules of the Graduate School and handles admissions. The Department Chairs administer assistantships and provide general guidance for graduate activities in Forestry, Horticulture, and Plant and Soil Sciences.

### **Contact Information:**

Forestry Department Chair:

Terrell Baker (859-257-7596; [terrellbaker@uky.edu](mailto:terrellbaker@uky.edu))

Horticulture Department Chair:

Robert Houtz (859-257-1982; [rhoutz@uky.edu](mailto:rhoutz@uky.edu))

Plant and Soil Sciences Department Chair:

Todd Pfeiffer (859-218-0709; [tpfeiffe@uky.edu](mailto:tpfeiffe@uky.edu))

Directors of Graduate Studies:

Program DGS – Mark Coyne (859-257-4202; [mcoyn00@email.uky.edu](mailto:mcoyn00@email.uky.edu))

Area DGS

Crop Science – Tim Phillips (859-257-5020x80769; [tphillip@uky.edu](mailto:tphillip@uky.edu))

Horticultural Science – Doug Archbold (859-257-3352; [darchbol@uky.edu](mailto:darchbol@uky.edu))

Forest Science – David Wagner (859-257-3773; [dwagner@uky.edu](mailto:dwagner@uky.edu))

Plant Biology – Arthur Hunt (859-218-0776; [aghunt00@uky.edu](mailto:aghunt00@uky.edu))

Soil Science - Mark Coyne (859-257-4202; [mcoyn00@email.uky.edu](mailto:mcoyn00@email.uky.edu))

Forestry Department Web Site: <http://www.ca.uky.edu/forestry/>

Horticulture Department Web Site: <http://www.uky.edu/hort/>

Plant and Soil Sciences Department Web Site: <http://pss.ca.uky.edu>

College of Agriculture Web Site: <http://www.ca.uky.edu>

## II. DESCRIPTION OF THE GRADUATE PROGRAMS IN IPSS

### A. Executive Summary

In 2010 Graduate Faculty in the departments of Forestry, Horticulture, and Plant and Soil Sciences, proposed an umbrella degree program to provide an integrative and creative approach to graduate education in the plant and soil sciences. The M.S. and Ph.D. Programs in IPSS were approved by the University of Kentucky Board of trustees in Spring 2011, and the Programs began in Spring 2012.

The objectives of IPSS are to build strength in the current graduate M.S. and Ph.D. programs in Crop Science, Plant Biology, Molecular Biology and Biochemistry, Horticulture, and Soil Science by combining these programs into an overall Integrated Graduate Program in Plant and Soil Sciences. The integrated program offers advantages in student recruitment, training, assessment, program student numbers, and administrative efficiency. The program provides a unique opportunity to cultivate and exploit the benefits that can be derived from an interdisciplinary approach to graduate education and research.

The IPSS program provides: (a) a dynamic environment that can evolve interdisciplinary credentials and programs tailored to suit the needs of current and future graduate students in the plant and soil science disciplines, and develop options responsive to developing scientific trends in agricultural science; (b) interdisciplinary coursework required of all students in the program without creating intrusive changes to prior graduate curricula; (c) the opportunity for increased visibility and identity for research programs currently without separate graduate identity; (d) a more inclusive approach to graduate education for existing graduate programs and faculty.

The IPSS program represents a positive step toward accomplishing the top 20 goal for the University of Kentucky by increasing the number of M.S. and Ph.D. degrees awarded through improved recruitment and training, leading to increased retention of all students interested in advanced education in the plant and soil sciences.

### B. Rationale

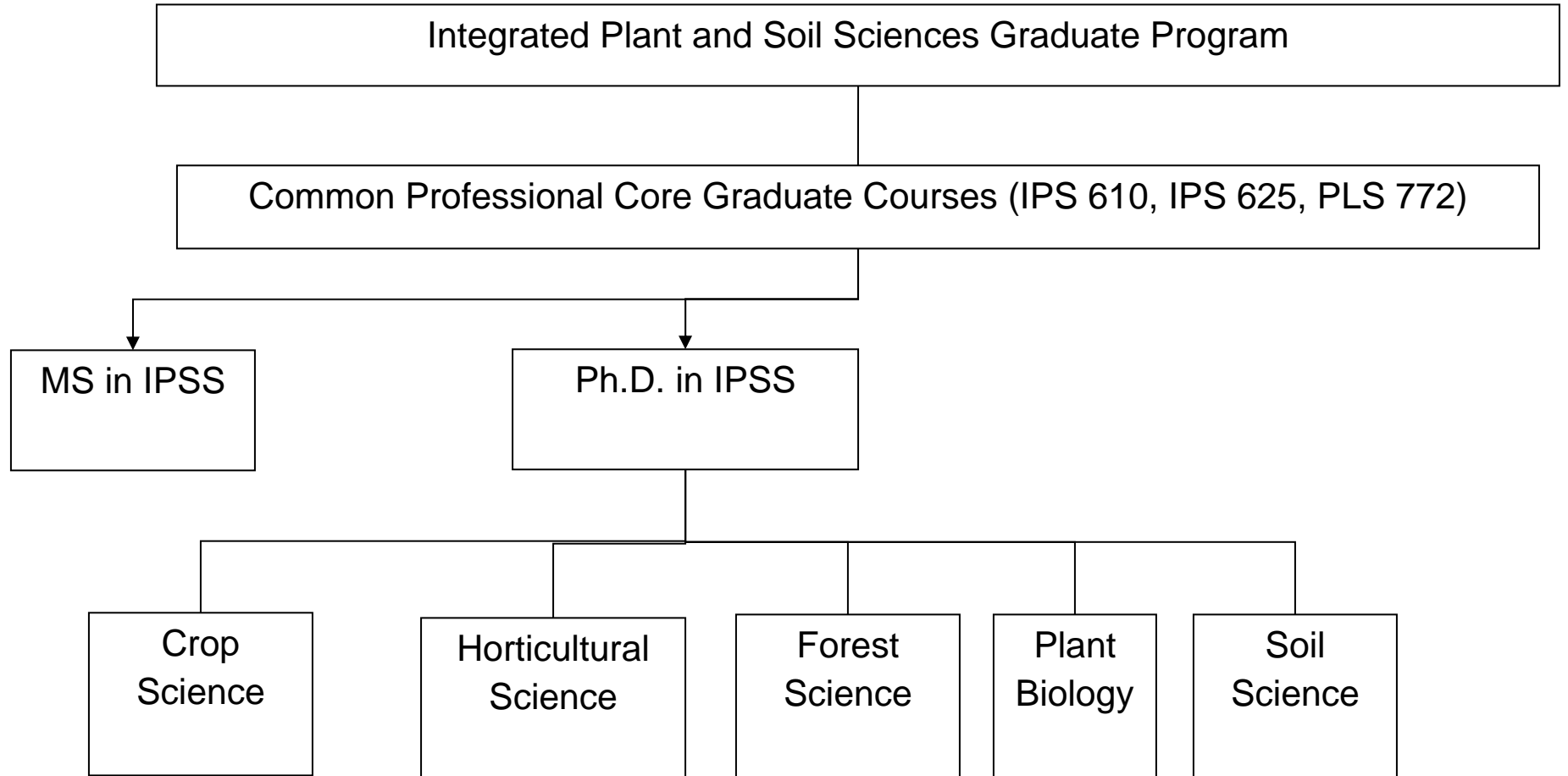
Creation of the IPSS program provides for a novel and competitive way to recruit students into an environment that allows for considerable cross-disciplinary expertise in graduate training. Under the IPSS umbrella, graduate students will be able to work closely with a community of scholars to assemble a curriculum and develop a research program with considerable disciplinary flexibility, tailored to their individual career goals and interests. This programmatic flexibility is also an invitation to faculty to consider how they might facilitate such

interdisciplinary training through their own programs or develop programs that would become future graduate degree options in the IPSS program.

The IPSS program provides graduate identity to those existing programs that have always trained and graduated students with expertise in disciplines proven to be valuable assets in agriculture. These programs are already interdisciplinary by nature, and would by inclusion as potential graduate degree programs further their own visibility, and moreover increase the attractiveness and recruitment capabilities of the IPSS program as a whole. A model of the potential degree programs offered under IPSS is attached. **Forestry has a professional MS program that remains independent of the IPSS program.**



# IPSS Structural Model



## C. Core Courses

The IPSS Program allows Ph.D. area programs in the plant and soil sciences to maintain their respective individual admission criteria and degree requirements with the exception of IPS 610 and IPS 625 (see below). Each area program, will adhere to the goals of general education reform in which graduates demonstrate, through their course selection, competence in four specific areas: understanding and ability to employ processes of intellectual inquiry; competence in employing methods of quantitative reasoning; competent written, oral, and visual communication skills; understanding of the complexities of global citizenship and making informed choices in a multicultural world. The latter two education goals are specifically addressed in the objectives of the core curriculum: IPS 610, IPS 625, and PLS 772.

The IPSS program requires all M.S. and Ph.D. graduate students to enroll in IPS 610 (1 credit, Trans-Disciplinary Communications in IPSS) and IPS 625 (2 credits, Trans-Disciplinary Research in IPSS) at least once. IPS 610 and 625 are interdisciplinary, topic driven courses, interfaced with current seminar programs in the plant and soil science disciplines. It is anticipated that a minimum of two IPSS graduate faculty members will coordinate and host these courses. Each student will also be required to enroll at least once in PLS 772 (1 credit, Seminar in Plant and Soil Sciences) to demonstrate their competence in public presentation skills.

The environment established by IPS 610/625 and the associated students and faculty reflects a concerted effort to address an emerging concern regarding the lack of intellectual community development in today's graduate programs. IPS 610/625 provides an outlet for intellectual discussion and dialogue among students, faculty, and guest speakers on a philosophical as well as scientific basis. The strong emphasis in IPS 610/625 on graduate student participation, hosting outside speakers, and critical evaluation of scientific presentations, all with the assistance of several faculty members will allow the IPSS program to develop the intellectual community necessary for the IPSS program and students to succeed.

## D. Other Course Requirements

Each program area within IPSS will meet the minimum requirements of the Graduate School for the awarding of M.S. (24 graduate credit hours) and Ph.D. (36 graduate credit hours, of which at least 18 hours are taken in residence) degrees. The subsequent amount and composition of coursework will be **individually developed** by the graduate faculty in each area, specific to the needs, training, and career goals of each student in that area. See the relevant sections on coursework identified later in the handbook.

## E. Learning Outcomes

At the completion of their program, graduates of the M.S. and Ph.D. program in IPSS will:

1. Have acquired extensive knowledge of the science and technology that supports research, education, and technological innovation in plant sciences, soil sciences, environmental science, and agriculture.
2. Be conversant with the literature, current concepts, and experimental methods that support research, teaching, outreach, and technological innovation in plant sciences and soil sciences and their application to agriculture and environmental sciences.
3. Have acquired skills in critical and analytical thinking and in communication that may be applied to research, education, outreach, industry, and government.
4. Have acquired those elements of professionalism necessary for rewarding and developing careers in plant science and soil science devoted to research, education, outreach, agriculture and agribusiness, and the environment.

## F. Awarding of Degrees

Degrees are awarded in IPSS, with additional identification of the area reflecting a student's programmatic emphasis. The initial areas are: crop science, forest science, horticultural science, plant biology (including plant physiology, biochemistry, and molecular biology), and soil science. New options can be developed to address changing interdisciplinary needs.

## G. Administration

The IPSS Program began in Fall 2011. The M.S. program in Plant and Soil Sciences became the M.S. program in IPSS. After Fall 2011 admission to previous doctoral programs in Crop Science, Plant Physiology, and Soil Science was suspended, and students were only admitted to the IPSS program. Students already enrolled in Crop Science, Plant Physiology, and Soil Science have the option to continue their existing program or to transfer into the new IPSS program. The doctoral programs in Crop Science, Plant Physiology, and Soil Science will be suspended once the last enrolled student has graduated. Because several part-time students are enrolled in these programs, the final date of suspension is indeterminate. Likewise, beginning in Fall 2011 all students currently in the M.S. in Plant and Soil Science will have the option to transfer into the new M.S. in IPSS program, or continue with their existing program. New students will automatically be enrolled in the M.S. in IPSS and be subject to its requirements. All faculty that are currently members of the Graduate Faculties in Crop Science, Plant and Soil Sciences, Plant Physiology, and Soil Science – including adjunct members – will be automatically receive a

secondary appointment to the Graduate Faculty in IPSS at either the associate or full rank, depending on their highest current standing in any graduate faculty.

#### **a. Director of Graduate Studies**

There is an overall Director of Graduate Studies (DGS) for the IPSS program who serves as the official contact for the Graduate School. Duties and responsibilities of the IPSS DGS are as outlined in the Graduate School Bulletin. The IPSS DGS coordinates all correspondence and interactions with the Graduate School and all individual degree requirements for students who elect to receive an IPSS degree using a collection of the existing course and degree requirements from the areas associated with the IPSS program. The DGS of IPSS also coordinates annual assessment requirements in the program. The DGS for the IPSS program is appointed by the Dean of the Graduate School, with recommendations from college administration, graduate faculty, and respective departmental chairs. Support for this administrative position will be negotiated by the participating departments. Because of the size of the graduate program, and the time demands on the DGS, this position carries a significant administrative distribution of effort assignment.

The current DGS of each existing Ph.D. and M.S. program (or their successor) will continue in that role, maintaining the same responsibilities for coordinating graduate student progress to degree, until all students have graduated. All responsibilities for recruitment and management of new students in IPSS, however, will be coordinated by members of the new Graduate Program Steering Committee appointed to that role.

#### **b. Graduate Program Steering Committee**

The IPSS DGS will be assisted by a committee of representatives from each area represented by the umbrella program. A Graduate Program Committee comprised of the DGS, department chairs, and additional faculty members from each of the departments participating in the program (appointed by the respective department chairs) will be responsible for overall direction of the degree. The DGS from each existing graduate program (e.g. Crop Science, Forestry, Horticultural Science, Plant Physiology, Soil Science) with current student enrollment will also be a member of the Graduate Program Steering Committee until such a time as the last student has graduated from that program. These faculty members will help identify candidates for recruitment, locate opportunities for student support, provide interested students with program- and faculty-specific information, and assist with program assessment. In addition, the committee will be responsible for reviewing applications for admissions and will make recommendations on which applicants should be admitted with departmental support. Final decisions on admission will include consideration of availability of support. The committee members will be chosen by the DGS and the chairs of the participating departments, in

consultation with the program faculty, and be appointed to a five-year term. The DGS and the chairs will annually solicit input from the program faculty as to the performance of the committee members.

For new program areas created as part of IPSS, a faculty member from that program area will automatically become a member of the Graduate Program Steering Committee. The DGS of an existing graduate program will no longer be a member of the Graduate Program Steering Committee once the last student in their program has graduated. They may remain on the committee, however, as a representative of a program area.

### **c. Membership in Program Areas**

All graduate faculty currently members of graduate programs affiliated with IPSS (Forestry, Horticulture, Plant and Soil Sciences) will automatically receive a primary appointment to the IPSS M.S. program at their current Graduate Faculty rank. All graduate faculty members of graduate programs currently affiliated with IPSS will elect a program area in IPSS (Crop Science, Horticultural Science, Forest Science, Plant Physiology, Soil Science) as their primary appointment, and may elect one other area as their secondary appointment.

### **d. Creation of New Ph.D. Program Areas in IPSS**

Graduate faculty are encouraged to cross disciplinary lines and create new program areas in the IPSS program to respond to changing research opportunities. Creation of new program areas in IPSS must be approved by the Graduate School, Graduate Council, and University Senate as it is a major program change. To create a new program area requires a minimum of four faculty, three of whom must be full members of the Graduate Faculty. These faculty must provide a rationale explaining the need for the new program area, identify the background knowledge and preparation, core science, and disciplinary coursework required for Ph.D. students in their area. These requirements can be no less than the minimum required by the Graduate School as specified in the Graduate School Bulletin and can be more rigorous at the discretion of the proposed program area. The faculty members must identify the basis for written and oral qualifying examinations and the format that will be followed for written exams. The IPSS DGS will work with the graduate faculty to submit this information to the Graduate School for approval.

At least four active faculty must be identified as members of a program areas at all times or enrollment in the program area will be suspended. At least one student must be enrolled in the program area during a three-year rolling period or enrollment in the program area will be suspended.

## H. Admission

### a. Application

Application forms for Admission and Assistantships/Fellowships can be obtained and completed on-line from the Graduate School:

<http://www.research.uky.edu/gs>

In addition, applicants will supply a cover letter (specifying, if known, areas of interest or faculty they are interested in working with), unofficial copies of transcripts, and at least three letters of recommendation and send them to:

Director of Graduate Studies  
Integrated Plant and Soil Sciences Graduate Program  
University of Kentucky  
Lexington, KY 40546-0312

### b. Requirements for Admission

Evaluation for admission is based on the student's academic record, GRE scores, and letters of recommendation. The Graduate School has minimum requirements for admission as outlined by the Graduate School Bulletin ( i.e., B.S. degree from an accredited institution, a grade point average of 2.75 on a 4.0 scale, and Graduate Record Examination [GRE] scores; Graduate GPA of 3.0 on a 4.0 scale). Individual graduate programs may require a higher grade- point average and the Integrated Plant and Soil Sciences Graduate Program will reserve the right to enforce more stringent admissions requirements.

The University of Kentucky requires minimum TOEFL scores of 550 (paper-based), 213 (computer-based), or 79 (internet-based) or an IELTS score of 6.5 for all international students whose first language is not English. International students who receive college degrees from US universities and universities in other designated English-speaking countries may be exempted from taking the TOEFL test, but this is determined on a case-by-case basis by the Graduate School. The Integrated Plant and Soil Sciences Graduate Program will also reserve the right to enforce more stringent English language requirements as part of its admission process.

Individual options in IPSS may require specific academic background that must be met before admission to the program is allowed or that must be satisfied early in the student's academic career.

## I. Funding

Each student enrolled in the IPSS program through either departmental or grant-funded research assistantships will receive a uniform base stipend depending on the degree program (M.S. or Ph.D.), tuition scholarship, and health insurance. Other university fees will be the responsibility of the student. The base stipend for grant-funded assistantships may be supplemented for exceptional candidates and performance at the discretion of the department chairs.

## J. Program Requirements

Program areas will maintain their respective individual admission prerequisites, degree requirements, and professional expectations. Information about these items can be obtained from the Area DGS. All M.S. and Ph.D. graduate students will enroll in IPS 610 (Trans-disciplinary Communications in IPSS – 1 cr) and IPS 625 (Trans-disciplinary Research in IPSS – 2 cr). All students will create a discipline-specific committee (consistent with Graduate School Requirements - 3 members for the M.S. program and 4 members for the Ph.D. Program) and individualized program of study within one year, and satisfy basic Graduate School requirements for residency, examination, and good standing.

## K. Orientation

Each fall at the beginning of the semester, the IPSS program will conduct an orientation for new and returning students. The orientation will include an introduction to rules and procedures, such as travel and purchasing, an overview of faculty programs in IPSS (with the potential for poster displays), a discussion of the importance of attendance and participation in seminars, and opportunities for scholarships, fellowships, and other financial support.

## L. Registration

New graduate students will be coded as students in the Integrated Plant and Soil Sciences (IPSS) Curriculum for purposes of identifying these students.

## M. Advising

Students are assigned advisors in three ways. Those students entering the program electing to work with an individual faculty member from the outset will work with that faculty member as their advisor. Ph.D. students who enter the program undecided on a major advisor will work with a faculty member from their area to prepare a program of studies for the first year and a set of program rotations if applicable. M.S. or Ph.D. students who enter the program uncertain of either an area or major advisor will be advised by the DGS. No student will be allowed to

continue in the program without having identified a major advisor and program of study by the end of their second semester of study.

## N. Preparatory Background

So that all entering graduate students are at an academic level to successfully complete their graduate program, entering students should have minimum preparation in scientific courses. The following courses or their equivalent are the minimum levels of preparation expected of students entering the IPSS program:

MA 113	the first semester course in calculus
PHY 201	the first semester course in physics
CHE 230	the first semester course in organic chemistry

All program areas have also found that additional training in such areas as basic biology, biochemistry, chemistry, crop science, plant biology, microbiology, and soil science, (as some examples) promote student success. It is the prerogative of the student's advisory committee to address and correct any deficiencies in a student's academic background by requiring additional coursework.

## O. Curriculum

The curriculum in IPSS consists of 24 (thesis) or 30 (non thesis) credit hours of coursework as specified in the revised M.S. program in IPSS and the new doctoral program in IPSS.

The M.S. in IPSS requires a common core of IPS 610, IPS 625, and PLS 772, and one graduate level statistics course in addition to a minimum of 16-17 hours of disciplinary courses.

The Ph.D. in IPSS requires coursework to demonstrate competence in four areas: Communication and Professionalism (4 cr)(met by taking a common core of IPS 610, IPS 625, and PLS 772, Basic Scientific Knowledge (9 cr), Computational and Analytical Assessment and Skills (3-4 hours), and Disciplinary Knowledge and Skills (19-20 hours) (Appendix A). Appendix B illustrates sample curricula and a menu of courses sufficient to demonstrate those competencies, and how a student might design a personal curriculum to that effect. Per Graduate School rules, 9 credit hours of graduate level coursework beyond the bachelor's or master's degree may be accepted in partial fulfillment of these requirements.

The prequalifying residency requirement (18 credit hours minimum) may be met by any model currently used by the Graduate School for that purpose (e.g. receipt of an M.S. degree at UK plus two consecutive semesters of full time enrollment). Based on the curriculum requirements,



an incoming student would typically be able to sit for qualifying exams no sooner than the end of their third semester of residence.

## P. Teaching Requirement

There is no formal teaching requirement for IPSS graduate students, but students interested in pursuing a career in teaching will be encouraged to explore obtaining the Graduate Certificate in College Teaching and Learning offered through the graduate school. Information on the certificate can be found at:

<http://www.research.uky.edu/gsbulletin/current/GraduateCertificates>

In addition, the students should consult the program graduate handbook for a listing of opportunities to gain teaching experience.

## Q. Publication Requirement

The IPSS program believes that publication of research in refereed journals is the key to successful academic careers and represents the final objective of any research project. It is also an essential means of evaluating the success of the student and the academic program. Therefore, it is imperative that students gain this skill during their academic training. To this end, the IPSS program requires each M.S. or Ph.D. student to have submitted a manuscript based on their dissertation or thesis work to an appropriate refereed journal, selected in consultation with their advisory committee, prior to the dissertation or thesis defense. However, because circumstance can arise to prevent this, the manuscript requirement can be waived by the DGS upon the recommendation of the student's advisory committee.

## R. Plan of Studies and Annual Review of Progress

Each student will establish, in consultation with their advisory committee, a proposed set of courses to be taken and the arrangement for fulfilling any service requirement. This will be forwarded, with the advisory committee's approval, to the DGS.

Each student should meet, at a minimum, with their advisory committee once each year. At this meeting, the progress of the student towards fulfilling the requirements for the degree will be reviewed and discussed. The results of this determination will be communicated to the student in writing with a copy sent to the DGS. Further information about program evaluation can be found in the proposed assessment plan for IPSS. Grounds for termination of a student from the IPSS Program include (but are not limited to): academic probation, failure to demonstrate satisfactory progress in research.

## S. Program Areas

The IPSS program is interdepartmental, being operated primarily by faculty in the Department of Horticulture and Department of Plant and Soil Sciences, but including faculty from other departments throughout the University of Kentucky. Students apply to, and enroll in, IPSS, not the Department of Horticulture or Department of Plant and Soil Sciences. Interaction among students and faculty in all of the programs is extensive. Assistantship support, some research projects, many student related activities, and some graduate courses are organized along departmental lines.

Within IPSS areas of specialization include:

### **IPSS (M.S.)**

Crop Science	Horticultural Science
Plant Physiology	Soil Science

### **IPSS (Ph.D.)**

#### **Crop Science**

Cellular and Molecular Genetics	Turf Science
Crop Physiology and Management	Seed Science and Technology
Forage Use and Management	Weed Science
Plant Breeding and Genetics	

#### **Forest Science**

#### **Horticultural Science**

#### **Plant Physiology**

Carbohydrate Partitioning	Molecular Biology
Developmental Biology	Natural Products
Disease Resistance Mechanisms	Photosynthesis
Herbicide Metabolism	Plant Nutrition
Membrane Biology	

## **Soil Science**

Forest Soils

Rhizosphere Biology

Soil and Water Environmental Quality

Soil Biology and Biochemistry

Soil Chemistry

Soil Fertility and Plant Nutrition

Soil Genesis and Classification

Soil Management and Conservation

Soil Mineralogy

Soil Physics

## T. Part-time Graduate Students

The M.S. and Ph.D. programs in IPSS may accommodate limited numbers of part-time graduate students. Part-time students are ineligible for graduate research assistantships and pay tuition per credit hour. Part-time students are often individuals wishing to continue their graduate education, perhaps as a requirement of their employment. Employees of UK and other public universities may be eligible for tuition waivers for up to 18 hours of graduate credit each year under the Kentucky Employee Education Program (KEEP). Up to 9 hours of graduate credit may be transferable to UK graduate programs from other public universities. Contact your DGS for more information on part-time programs and KEEP.

### III. THE GRADUATE FACULTY AND ADVISING

Establishing good working relationships with faculty is critical to a graduate student's success. Selection of an Advisor or Major Professor should be made with great care and very soon after admission, if not prior to that time. The Graduate Faculty identified below are those faculty approved to advise graduate students and teach graduate level courses.

#### A. Advisor or Major Professor

An **Advisor** is appointed for each M.S. student. He/She advises the student on course work and serves as the **Thesis Director**.

A **Major Professor** for each Ph.D. student is appointed by the Graduate Dean on recommendation by the DGS. Only Full Members of the Graduate Faculty may act as sole advisor to a Ph.D. student. He/She assumes primary advisory functions for the student, chairs the **Advisory Committee**, and serves as **Dissertation Director**. The DGS or his/her designee serves as advisor until a Major Professor is appointed. This formally occurs when the Advisory Committee is formed and approved by the Graduate School.

#### B. Advisory Committees

The Graduate School requires only that an M.S. examining committee be designated prior to the Final Examination. The examining committee consists of at least three qualified faculty members recommended by the Director of Graduate Studies and appointed by the Dean of the Graduate School. At least two committee members (including the chair or co-chair) must be members of the Graduate Faculty, and at least one of the two must be a Full member of the Graduate Faculty. The IPSS program requires that M.S. Students form an advisory committee during their first term of study and meet on a yearly basis.

Each doctoral student's program is directed by a Major Professor and an Advisory Committee. In cases where the Major Professor is not yet a full member of the Graduate Faculty, a Co-Director who is a full member of the Graduate Faculty must be a member of the committee. In some cases, given the nature of a student's dissertation research, it is appropriate that two Co-Directors of the Advisory Committee are named, one of whom must be a full member of the Graduate Faculty. The Major Professor and Advisory Committee are appointed by the Graduate School Dean after receipt of a 'Formation of an Advisory Committee' form submitted electronically by the student, and approved by the DGS. *This should be done during the first*

*semester*, and no later than the point at which 18 credit hours of graduate work have been accumulated, and at least one year prior to the Qualifying Examination.

The Ph.D. Advisory Committee has a core of four members. This core consists of the Major Professor as chair, two other members from the program area, and at least one committee member from any minor area(s). At least one committee member must be from outside the program area (or department). All members of the core must be members of the Graduate Faculty of the University of Kentucky and three (including the Major Professor or Co-Director) must possess full Graduate Faculty status. Additional faculty members may serve as members of the advisory committee. The core of the Advisory Committee must be kept at its full complement throughout the graduate career of the individual student. The Advisory Committee provides advice to the student and specifically sets requirements that the student must meet in pursuit of the doctorate (within Program, Graduate School, and University regulations). The Advisory Committee administers the Qualifying Examination, supervises the preparation of the dissertation, and administers the Dissertation Defense and Final Examination.

Normally, Thesis and Advisory Committees will meet once each year. A student is required to designate a committee within his/her first year of study and expected to consult frequently with committee members, and any other appropriate faculty, during the planning and execution of their research project.

When faculty members retire or leave the University, they may continue their service on previously established committees, but may not be appointed to new committees. The departing faculty member cannot be the sole chair of the committee; a UK faculty member must serve as co-chair.

Continued service requires the approval of the Dean of the Graduate School. In the case of a faculty retirement or departure, the DGS should inform the Dean of the Graduate School, in writing, if continued service on Advisory Committees is requested for the faculty member. The DGS should specify all student committees for which continued service is requested.

On recommendation of the Director of Graduate Studies and with the approval of the Dean of the Graduate School, persons who normally do not hold academic appointment in the University, but who have demonstrated an interest in collaborative participation in its graduate programs, may be appointed as **Auxiliary Graduate Faculty Members**. They should hold the terminal academic degree in the field and possess a record of research or creative experience that would warrant their inclusion on advisory committees to assist graduate students in conducting research. Auxiliary Graduate Faculty may serve only as nonvoting members of the

advisory committee.

**Adjunct Members** of individual graduate programs may be appointed for the specific purpose of serving on advisory committees in those programs. They are voting members of advisory committees. Adjunct Members should hold the terminal academic degree in the field and possess a record of research or creative experience that would warrant their inclusion on advisory committees to assist graduate students in conducting research. Departmental procedures exist for appointing Adjunct Members to graduate faculties for this purpose. Contact the DGS of the appropriate program for additional information.

C. The Graduate Faculty [Disclaimer – The Graduate Faculty List is Constantly in Revision. Consult the Graduate School ([www.research.uky.edu/gs](http://www.research.uky.edu/gs)) to Identify the Names and Status of Individual Faculty]

Graduate Faculty are members of one-or-more Graduate Faculties depending on their research and program involvement.

Crop Science (M.S. and Ph.D.)

Plant and Soil Sciences (M.S.)

Plant Physiology (Ph.D.)

Soil Science (Ph.D.)

Current members of the graduate faculty in existing graduate programs under the IPSS umbrella will also have appointments in IPSS for both the M.S. and Ph.D. programs. New appointments to the Graduate Faculty will only have appointments to IPSS.

## IV. FACILITIES

Excellent facilities and equipment are available for graduate research. Faculty, staff, and laboratories associated with the graduate program are distributed among four buildings: Agricultural Science Building, Kentucky Tobacco Research and Development Building, Thomas Poe Cooper Building (Forestry), and Plant Science Building. There are additional outlying buildings on central campus and research farms. The departments have research at multiple research stations: South Farm (Lexington), Spindletop and Maine Chance Farms (Lexington), Oran C. Little Animal Research Farm (Woodford Co.), Quicksand Experiment Station (eastern Kentucky), and Princeton Agricultural Research Center (western Kentucky).

Access to laboratories, greenhouse, and field facilities is arranged and determined by a graduate student's advisor. In general, laboratories and equipment are under the control of individual faculty; however, most equipment is shared and available to all graduate students to the maximum extent possible. Shared use facilities require emphasis on consideration for others and knowledge of proper operation.

All students must receive preliminary safety training before using any research facilities. This can be arranged through the appropriate department office.

The Plant and Soil Sciences computer labs (Agricultural Science Building, Plant Science Building) are designed primarily for use by graduate students and staff. A programmer/systems analyst is available for initial instruction and consulting.

The Plant and Soil Sciences Soil and Plant Analysis Laboratory provides excellent facilities for many routine procedures; expert technical advice and support is also available. Graduate students should ask their advisor to arrange initial use of this facility.

Desk space will be provided when available and is distributed by area coordinators in the Agricultural Sciences Building and Plant Science Building. The Major Advisor and/or DGS are responsible for informing the area coordinator of an arriving student requiring desk space. When desk space is not available, students will be assigned desk space on a seniority basis, with students receiving assistantships or fellowships having priority. Keys to appropriate office and laboratory facilities can be obtained by filling out an appropriate 'key card' available in the main office in 105 Plant Science Building (for rooms in the Department of Plant and Soil Sciences) or 401D Plant Science Building (for rooms in the Department of Horticulture).



A mailbox is provided for each student. Students should check their mailboxes daily for announcements of importance. Upon registration, all students are provided with an '@uky.edu' email address, which is the official venue by which University and departmental announcements are transmitted electronically.

## V. APPLICATION AND ADMISSION

### A. Application Procedure

Application for admission to graduate programs at the University of Kentucky is a completely on-line process. Visit the Graduate School web site ([www.research.uky.edu/gs](http://www.research.uky.edu/gs)) to establish an on-line account.

All official documents associated with the application (GRE scores, TOEFL or IELTS scores, academic transcripts, etc.) should be sent or forwarded directly to the Graduate School. In some cases applicants can arrange for copies of transcripts and at least three letters of recommendation to be sent to the Director of Graduate Studies for the IPSS program. Have these addressed to:

Director of Graduate Studies, IPSS  
Department of Plant and Soil Sciences  
University of Kentucky  
Lexington KY 40546-0312

Individual area programs may have additional requirements. Contact the associate DGS for that program for specific details.

### B. Requirements for Admission

The Graduate School has set requirements for admission as outlined by the Graduate School Bulletin, i.e., B.S. degree from an accredited institution, a grade point average of 2.75 on a 4.0 scale, and Graduate Record Examination (GRE) scores; Graduate GPA of 3.0 on a 4.0 scale. However, a graduate program may require a higher grade point average or test scores. The graduate program in IPSS requires a grade point average of at least 3.0 on a 4.0 scale and a combined GRE score (Verbal + Quantitative) of at least 300 (1,000 in the scale used prior to 2013). These minimum requirements may be waived in exceptional cases if sufficient evidence of the student's ability to do graduate work is presented. Evaluation for admission, once the student has been approved for admission by the Graduate School, is based on the student's academic record, GRE scores, and letters of recommendation.

## VI. ASSISTANTSHIPS AND FELLOWSHIPS

### A. Assistantship Options

There are multiple types of financial assistance available to students wishing to pursue a graduate degree.

#### Research Assistantships

Research assistantships are awarded on a competitive basis by individual departments, not by graduate programs. They may be funded from College research funds or from grants. Stipend amounts depend on research experience, academic record, and the availability of funds in particular program areas. Students will be notified of stipend amounts during the application and admission process. The current base stipend for an M.S. student is \$15,000/year and for a Ph.D. student \$18,000/year.

#### Teaching Assistantships

Teaching assistantships are awarded on a competitive basis by individual departments, not by graduate programs. Recipients are expected to assist in teaching, usually as laboratory instructors. Students recruited for teaching assistantships may subsequently be awarded a research assistantship, but are usually expected to serve as a teaching assistant for several semesters. The departments award very few teaching assistantships.

#### Graduate School Fellowships

Several different fellowships are awarded by the Graduate School. They are highly competitive and are usually awarded to superior students. Examples of Fellowships are: Open Competition Academic Year Fellowships, Minority Fellowships, Jeffrey Fellowships for Tobacco Research, Presidential Fellowships, Academic Excellence Scholarships, Singletary and Matthews Fellowships, and Dissertation Year Fellowships. If the fellowship stipend is not equal to or greater than a research assistantship stipend, the fellowship normally will be supplemented by the department within the limits established by the Graduate School. Graduate Fellowship applications are usually submitted in February or March. Contact the DGS for further information on procedures. Many fellowships and scholarships are self-nominated by the student. Information can be obtained from the Graduate School web site:

[www.research.uky.edu/gs](http://www.research.uky.edu/gs).

## B. Application for Financial Support

Application for Assistantships/Fellowships should be made at the time of application for admission. Evaluation for assistantships and fellowships is based on academic record, GRE Scores, TOEFL or IELTS scores (for international applicants), letters of recommendation, and any other available information relevant to evaluating the academic potential of the student.

## C. Criteria for Assistantship Awards

Assistantships are awarded on a competitive basis. Because the number of available assistantships is usually fewer than the number of qualified applicants, the requirements for assistantships may exceed the requirements for admission. Students having the best academic record and potential for successfully completing graduate study are given the highest priority for assistantship support. However, exceptions can be made for the following reasons:

- a. Extraordinary number of students in an area of specialization or with an individual faculty member.
- b. Need for additional students in an area of specialization.
- c. Availability of funds, particularly for assistantships supported by research grants.

## D. Responsibilities of Graduate Assistants

Graduate Research Assistantships are awarded to support a student financially while he/she conducts research for the Master's thesis or Doctoral dissertation. The thesis or dissertation is the student's own work. However, the research is almost always consistent with the long-range objective of the Major Professor's research program. The Major Professor may request assistance in research not related to the student's thesis or dissertation, or may request the student to participate in other activities for their educational benefit.

Research assistantships are generally referred to as half-time assistantships, implying that the recipient should devote approximately 20 hours per week to his/her research, with the remaining 20 hours at the discretion of the Major Professor. The departmental philosophy is that commitment and dedication are essential characteristics of a good graduate student; that an assistantship should provide the student the opportunity to devote full attention to study and graduate research; and that successful graduate study demands very frequent evening and weekend work. Graduate study is an avocation, not just a job. An effort is made to evaluate

ambition, motivation, and commitment in awarding assistantships. Students are given flexibility in arranging their study and work schedules with the expectation that supervision of working hours will be unnecessary.

Graduate students involved in research are held to the same high standards of ethical and professional conducts as all scientists. Misrepresentation of research or course work may result in termination of financial support and academic sanctions. The publication 'Student Rights and Responsibilities' (available on-line at <http://www.uky.edu/StudentAffairs/Code/>) provides detailed information about the Code of Student Conduct, academic offenses, and related questions. Further information is available from the Academic Ombud, 109 Bradley Hall.

## E. Enrollment Requirements

Masters students receiving assistantships or fellowships must be enrolled for a minimum of nine credits each semester to receive full health and tuition benefits. Enrollment is not required during summer terms. Masters students should register for PLS 748 (zero credit hours) if they are not taking other formal courses that are required for the completion of their degree.

In addition to satisfying the University residence requirement (two consecutive full time terms with nine credit hours or three consecutive part time terms with six credit hours), doctoral students receiving assistantships or fellowships must register for a minimum of nine credit hours each semester before the qualifying exam to receive full health and tuition benefits. After the qualifying exam, students register for two credit hours of PLS 767 each term until the completion of their degree. Two credit hours of PLS 767 are considered by the University to represent full time status.

## F. Duration of Assistantships

Fellowships are usually awarded for the academic year, the duration being established by the Graduate School. Graduate Research Assistantships are awarded on a 12-month basis. Providing the student is making satisfactory progress, assistantships are automatically renewed annually with the following limits:

- a. Master of Science – Assistantships will terminate at the end of two years.
- b. Ph.D. Degree
  1. From the B.S. degree without a Master's degree - Assistantships will terminate at the end of the fifth year.
  2. From the Master's degree – Assistantships will terminate at the end of the third year.

Extension of assistantships beyond the normal termination date can be granted on a semester-by-semester basis. The extension must be requested by the student, recommended by the M.S. Advisor or the Ph.D. Advisory Committee, and approved by the Departmental Graduate Steering Committee or its designee. The request must be accompanied by a report of progress and justification for extension. Contact the DGS of the appropriate program area for more information.

## G. Review of Progress and Termination of Assistantships

Academic progress and research progress will be monitored by the Advisor in the case of M.S. students or by the Advisory Committee in the case of Ph.D. students and candidates. Students who are placed on academic probation because of failure to meet the required 3.0 grade point standing will automatically be placed on probation with respect to the assistantship. The assistantship will be terminated if the student is not removed from academic probation after one semester of full-time enrollment or two semesters of part-time enrollment, unless extenuating circumstances can be satisfactorily demonstrated to the Departmental Graduate Steering Committee or other designated body. Graduate research assistants on academic probation forfeit their out-of-state tuition scholarship while they are on probation.

Other reasons for terminating an assistantship prior to completion of degree requirements or prior to the normal termination date identified under 'F. Duration of Assistantships' include, but are not limited to:

1. Failure to make satisfactory research progress as determined by the Advisor and/or Advisory Committee.
2. Failure of the Ph.D. Qualifying Examination. If deemed appropriate by the committee, the exam may be retaken no earlier than four months after failure.
3. Failure of the Final Examination for the Master's degree or the Ph.D. degree.

Normally, termination of an assistantship is recommended by the Advisor and/or the Advisory Committee, reviewed by the appropriate graduate program steering committee, and finally approved by the appropriate Department Chair.

## H. Annual Review of Student Progress

As part of its formation the Graduate Programs in IPSS adopted formal protocols for the annual evaluation of student progress. These protocols, and their rationale, are available from the DGS

of IPSS. The Plant Physiology Ph.D. program area maintains its own, separate, annual evaluation of student progress. See the associate DGS of the Plant Physiology program area for further details. Annual reviews of progress are required of all graduate students, regardless of whether they are full time or part time, and regardless of whether they are receiving institutional support or not. In addition, the Graduate School requires an annual report of graduate student productivity from each program. The data to fulfill this request is obtained from the annual review of progress, which is usually completed by June 1 of each calendar year.

## I. Stipends, Benefits, and Fees

Current annual stipends for teaching or research assistantships are \$18,000 for Ph.D. students and \$15,000 for M.S. students. Stipends may be increased for an individual student demonstrating outstanding abilities and paid from extramural grant funds. Benefits include all scheduled and announced University holidays, and annual health insurance. Graduate students are responsible for the Johnson Center Fee (campus recreation), the Student Health Fee (access to Student Health Services facilities), any lab or departmental fees, and any distance learning fees.

## VII. REQUIREMENTS FOR ADVANCED DEGREES

Requirements for an advanced degree shall be no less than the minimum established by the Graduate School.

### A. Master of Science, Integrated Plant and Soil Sciences (Thesis Option)

In addition to meeting all general requirements for a Master's degree as identified in the Graduate School Bulletin, the candidate must complete 24 semester credit hours of graduate course work with a standing of 3.0 or higher, and write a thesis.

The general requirements of the Thesis option are as follows:

1. 24 credit hours of approved graduate courses that includes IPS 610, IPS 625, and PLS 772.
2. 12 of the 24 hours must be at the 600- or 700-level.
3. 12 of the 24 hours must be in plant and soil sciences (or closely related areas).
4. 16 of the 24 hours must be organized courses (not seminars, special topics, or independent research projects).
5. Presentation of an exit seminar.

Provided that these requirements are satisfied, students may apply up to 9 hours of approved post baccalaureate graduate course work (i.e. completed after the undergraduate program and before graduate school enrollment) from the University of Kentucky or other accredited institutions to the 24 credit hour requirement. The plan of course work in both the major area and in background courses in basic sciences (if required) must meet the approval of the Advisor.

Before the final examination the Thesis Director (Advisor) and the DGS must indicate to the Graduate School that the thesis satisfies all requirements of the Graduate School and is complete in content and format with the exception of pagination, and that the student is ready for examination. The final printed quality of the completed thesis must be acceptable to the Graduate School.

Students are expected to attend all graduate seminars and all graduate enrichment seminars in their discipline. They should also attend other departmental seminars related to their subject matter interest. Seminar presentation requirements will vary among the different discipline areas. All M.S. students in IPSS will present one seminar each academic year. One of those



seminars may be the exit seminar. They must enroll for credit in PLS 772 at least once during their course of study. They may repeat enrollment in PLS 772 for a maximum of two credits.

## B. Master of Science, Integrated Plant and Soil Sciences (Non-thesis option)

A Non-thesis option is offered by the IPSS graduate program. The Non-thesis option is generally intended for students who already hold professional positions and have no intention of graduate study beyond the M.S. This option provides strong technical training, but does not require an extended period of full-time, on-campus study (often, only one semester). An overall GPA of 3.0 is required to graduate.

The general requirements of the Non-thesis option are as follows:

1. 30 credit hours of approved graduate courses that includes IPS 610, IPS 625, and PLS 772.
2. 15 of the 30 hours must be at the 600- or 700-level.
3. 20 of the 30 hours must be organized courses (not research, special problems, or seminars).
4. At least 4, but not more than 8, of the 30 hours must be PLS 799 Research in Horticulture/Plant and Soil Sciences. This course is intended for on-campus (Lexington, Princeton, or Robinson Substation/Forest) independent research. It will consist of a research project involving design, execution, analysis, and a written report by the student.
5. One semester of full time residence (registration for 9 credit hours)
6. Presentation of an exit seminar.

Provided that these requirements are satisfied, Non-thesis students may apply up to 9 hours of approved post baccalaureate graduate course work (i.e. completed after the undergraduate program and before graduate school enrollment) from the University of Kentucky or other schools to the 30-hour requirement. Students may also take up to 8 hours of PLS/HOR 599 Special Problems. This course differs from PLS/HOR 799 in that PLS/HOR 599 may involve off campus projects conducted under the supervision of any faculty member. This will still require a written report by the student. The plan of course work in both the major area and in background courses in basic sciences (if required) must meet the approval of the Advisor.

Assistantship support is not available to Non-thesis students. To be admitted as a Non-thesis student, the individual should submit a list of courses to be taken and a brief plan for research credits. This must be approved by the DGS and the appropriate graduate program steering committee.

## C. Course Work Requirements for the M.S. in IPSS

All students (Thesis and Non-thesis option) will submit a course plan by the end of their first full semester of enrollment. This is to be developed in cooperation with the Major Professor (Advisor) and approved by an Advisory Committee consisting of at least three members of the Graduate Faculty in IPSS. A list of potential courses is included in Appendix C. The requirements for the course plan include:

1. A minimum of 24 hours of graduate level courses (400G+) (30 hours, Non-thesis option) at least 12 of which are at the 600-level or above (15 hours, Non-thesis option), and two thirds of which (16 hours Thesis option; 20 hours, Non-thesis option) are in organized courses.
2. A minimum of 4 hours in core requirements (IPS 610, IPS 625, PLS 772 and one course (at least 3 credit hours) of graduate level statistics.
3. A minimum of 16-17 hours (22-23 hours, Non-thesis option) of disciplinary coursework related to plant and soil sciences.

## E. Ph.D. Degree

### General Requirements

The degree of Doctor of Philosophy is conferred after completing, usually, at least three years of graduate work devoted to study of a special field of knowledge, passing a comprehensive examination on the dissertation subject and chosen field, presenting a satisfactory dissertation, and demonstrating evidence of scholarly achievement.

Some specific requirements for the Ph.D. degrees granted through the Departments of Horticulture and Plant and Soil Sciences are identified below.

### Language

Formal language requirements have been eliminated for all graduate programs in the plant and soil sciences. In the Plant Physiology program area, the Advisory Committee may elect to require course work or other evidence of proficiency in foreign language.

### Program Area

Each student must declare at least one program area of emphasis.

### Course Requirements

The course requirements consist of 4 common hours, 9 basic science hours, 3 computational hours (graduate level statistics), and 20 disciplinary hours. There is no minor requirement. To be credited to the program the course must be 400G+-level and at least 50% of the courses must be 500+-level. The common hours IPS 610 and IPS 625 are required of all Ph.D. students. At least one seminar, PLS 772 must also be evaluated for credit; this should not be the exit seminar.

### Seminar

Students are expected to attend all graduate seminars and all graduate enrichment seminars in their discipline. They should also attend other departmental seminars related to their subject matter interest.

### Residency

See the Graduate School Bulletin for specific residency requirements

1. For students without an M.S. degree, four semesters of full time residence (36 semester hours) at the University of Kentucky are required prior to the qualifying examination . Students with completed M.S. degrees should request that the DGS petition the Graduate School to accept M.S. studies in lieu of two semesters of residency. Alternately, students may be approved for the qualifying exam following three consecutive semesters of part-time enrollment (at least 6 graduate credit hours per semester). During any additional semesters before the qualifying exam, students on assistantship must register for at least 9 credit hours per semester (graduate or undergraduate courses) to receive full benefits. Students not on assistantship are required only to register for at least one credit hour per semester.
2. Each student must register for 2 credit hours of PLS 767 (Post Qualifying Exam Residency Credit) every semester following the qualifying exam to the termination of their degree. The University of Kentucky considers students in PLS 767 to have full-time status. A student may enroll for IPS/PLS 767 in the same term that they take their qualifying exams, but if they fail those exams, they are required to retroactively add and satisfactorily complete 9 credit hours of course work for the semester in question. **Therefore, it is the policy of the IPSS program that a student on assistantship may only sit for qualifying examinations in a Fall or Spring Term when they are enrolled as full**

**time students, or they may take the qualifying examinations during the first or second summer terms, or winter intersession, when classes are in session.**

### Qualifying Examination

The qualifying examination must be both written and oral and is normally taken during or after the student's fourth semester of full time graduate study or the equivalent. Once a doctoral student has based the qualifying exams he/she is considered a 'doctoral candidate.'

1. *The Written Exam.* The form of the written qualifying exam is at the discretion of the program area. Crop Science program area students will have an examination consisting of no fewer than 15 and no more than 20 questions. Questions will be generated by the Advisory Committee. The Advisory Committee has the option of soliciting questions from any other member of the Crop Science program area graduate faculty. Once all the questions have been collected, the Advisory Committee will meet to compose the exam. All questions will be graded with a dual system, both pass or fail and a percentage grade. To pass the exam the student must not fail more than two questions and must achieve an average score over all questions of 70% or greater.

In the Plant Physiology and Soil Science area programs, each member of the Advisory Committee administers a written exam and grades the exam. In the Plant Physiology area program, additional questions may be solicited from non-program faculty.

2. *The Oral Exam.* An oral exam will be administered after successful completion of the written exam according to graduate school rules. A student may repeat a qualifying exam after a minimum of four months has expired. A student may have no more than two chances to pass a qualifying exam. Oral exams are open to the participation of every member of the Graduate Faculty in IPSS and must be scheduled at a place and time to permit full participation of the Graduate Faculty.

Students must have the equivalent of 2 years of residency (36 hours or 18 hours plus written approval to use the M.S. degree to partially satisfy residency requirements). In addition, academic transcripts must show that there are no missing grades, 'I' grades, and a GPA of 3.00 or higher. Graduate School policy will not allow a student to sit for the exam if they have unresolved academic issues.

The oral exam must be scheduled with the graduate school a minimum of two weeks before the proposed examination date. It requires that the student have an approved advisory committee in place. The scheduling process is on-line. The **Qualifying Examination Request** can be made at:

### Dissertation Proposal

In the Crop Science program area a dissertation proposal and proposed course work should be submitted to the Advisory Committee during the first year of the program. The dissertation proposal should include hypothesis, objectives, literature review, and methods for the proposed research. Requirements for a dissertation proposal are at the discretion of the individual Advisory Committees in the Plant Physiology and Soil Science area programs.

### Partial Publication of Dissertation

A student, in cooperation with the Dissertation Advisor, may submit manuscripts, derived from the dissertation, for publication prior to completing the dissertation defense and is strongly encouraged to do so as evidence of scholarly achievement. Before such manuscripts are submitted, it is recommended that they be reviewed by the Dissertation Advisor and faculty members who are on the student's Advisory Committee. It is the current policy of the doctoral programs mentioned in this guide that students will not be allowed to schedule a dissertation defense unless a manuscript has been submitted. This requirement may be waived by the DGS if extenuating circumstances are presented by the student's Advisory Committee.

### Dissertation

A dissertation that is the result of original research must be presented in conformity with instructions provided by the Graduate School.

### Presenting the Dissertation and Final Examination

Procedures for presenting the dissertation to the Advisory Committee and the Graduate School are as follows:

1. At the beginning of a term in which a final examination is scheduled, and no later than four weeks before the desired exam time (which must be held when regular classes are in session) notify the Graduate School via a '**Notification of Intent to Schedule a Final Examination**' form, which provides an approximate time during which the defense will occur, and allows the Graduate School ample time to identify an Outside Examiner. This is an on-line form available at the Graduate School web site ([www.research.uky.edu/gs](http://www.research.uky.edu/gs)). Distribute the dissertation to members of the Advisory Committee and the Outside Examiner at least four weeks prior to the final examination.

2. After distributing the dissertation to the Advisory Committee, and a minimum of two weeks before the final examination, the student should file a '**Request for Final Examination**' form on-line. Prior to this, the student should have arranged with the Advisory Committee and Outside Examiner a mutually agreeable time and place to hold the exam. An examination cannot take place unless all participants are present. The DGS will be notified of this request and asked to approve the request.
3. Specific Time and Scheduling of the Final Examination and Dissertation Defense
  - a. Time and scheduling of the final examination are designated by the Graduate School at least two weeks prior to the examination.
  - b. To schedule, the student completes a '**Request for Final Examination Form**' on-line and a Dissertation Approval form for transmittal to the Graduate School. All members of the Advisory Committee, except the Outside Examiner, will have had the opportunity to suggest revisions prior to the exam. The '**Request for Final Examination**' form must have been transmitted to and approved by the DGS before an examination card is released.
  - c. The draft dissertation must be complete in its content. The pre-exam copy of the dissertation must include title page, abstract, table of contents with page numbers, complete text, footnotes, list of tables, list of figure, appendices, references, and it must be typed in final format form except that page numbers may be penciled in. It should include any revisions that Advisory Committee members have suggested during their initial review. This copy should be presented to the Outside Examiner a minimum of two weeks before the scheduled exam date. A dissertation approval form is not required as part of the dissertation defense.
  - d. The Final Examination includes a defense of the dissertation and may be as comprehensive as the Advisory Committee chooses to make it. It is conducted by the Advisory Committee plus an Outside Examiner appointed by the Graduate School and is chaired by the DGS or someone designated by the DGS. The examination is a public event. Any member of the University may attend.
  - e. The final copy of the dissertation is prepared after the Final Examination is passed. Contact the Graduate School for detailed regulations on organization and printing of the dissertation. As of 2013 all theses and dissertations were required to be

submitted electronically. The final copies, with signatures of the Major Professor and DGS must be received in the Graduate School within 60 days of the Final Exam. See the Graduate School Bulletin for details.

## F. Guidelines for Ph.D. Course Work

Students are allowed to apply up to 9 credit hours of graduate level coursework beyond those required for the B.S. or M.S. degree to meet the coursework requirements in the Ph.D. program such that all other coursework requirements are satisfied.

**Note that because this is new and evolving program, specific program requirements may change, and the suggested coursework should be used as a guide only.**

### Crop Science Program Area

The Advisory Committee is responsible for determining specific course requirements for Ph.D. students in the Crop Science program area. The following are intended as minimum course requirements for Ph.D. students and advisors and may also be used as a guide for M.S. students in IPSS interested in focusing on Crop Science.

#### *Academic Preparation*

So that all entering Ph.D. students are at an academic level to successfully complete course requirements, entering students need to have minimum preparation in scientific courses. The following courses or their equivalent are the minimum levels of preparation expected of students entering the Crop Science Ph.D. program area:

1. Chemistry – a first semester course in organic chemistry (equivalent to CHE 230)
2. Calculus – a first semester course (equivalent to MA 113)
3. Physics – a first semester course (equivalent to PHY 201)

Students are expected to make up any deficiencies within one year of enrollment in the Crop Science Ph.D. program area; the qualifying examinations will not be administered until the entry level course deficiencies are eliminated.

### *Doctoral Course Requirements*

The following courses, or their equivalent at other institutions, are required for the Ph.D. degree in the Crop Science program area:

BCH 401G	General Biochemistry	3
BCH 609	Plant Biochemistry	3
BIO 430G	Plant Physiology	3
or		
PLS/BIO 622	Physiology of Plants I	3
or		
An advanced genetics course		
STA 570	Basic Statistical Analysis	4
STA 671	Regression and Correlation	2
STA 672	Design and Analysis of Experiments	2

These courses are to be completed before the qualifying examination is administered. Exceptions may be approved by the DGS upon recommendation of the student's Advisory Committee.

### Plant Physiology Program Area

The advisory committee is responsible for setting course requirements. The following provide guidelines for doctoral studies in the Plant Physiology program area.

### *Academic Preparation*

So that all entering Ph.D. students are at an academic level to successfully complete course requirements, entering student need to have minimum preparation in specific scientific courses. The following courses, or their equivalent, are the minimum levels of preparation expected of students entering the Plant Physiology Ph.D. program area:

1. Chemistry – a first semester course in organic chemistry (equivalent to CHE 230)
2. Calculus – a first semester course (equivalent to MA 113)
3. Physics – a first semester course (equivalent to PHY 201)

Students are expected to make up any deficiencies within one year of enrollment in the Plant Physiology Ph.D. program area; the qualifying examinations will not be administered until the entry level course deficiencies are eliminated.



### *Doctoral Course Work*

The following courses, or their equivalents, are required of all students in the Plant Physiology Ph.D. program area:

BCH 401G	General Biochemistry	3
BCH 609	Plant Biochemistry	3
PLS 620	Plant Molecular Biology	3
PLS/622	Physiology of Plants I	3
PLS/623	Physiology of Plants II	3

Four additional courses (nominally 12 credits) at the 500-700 level must be completed.

Suggested courses are:

BCH 610	Biochemistry of Lipids and Membranes	3
BCH 611	Biochemistry/Cell Biology of Nucleic Acids	3
BCH 612	Structure/Function of Proteins and Enzymes	3
BIO 615	Molecular Biology	3
CHE 442G	Thermodynamics and Kinetics	3
STA 570	Basic Statistical Analysis	4
STA 671	Regression and Correlation	2
STA 672	Design and Analysis of Experiments	2

### *Minor in Plant Physiology*

A declared minor is required by some Ph.D. programs, and for those students declaring a minor in Plant Physiology, the Plant Physiology program area has the following course requirements:

An undergraduate Plant Physiology course with lab		
PLS/BIO 622	Physiology of Plants I	3
PLS/BIO 623	Physiology of Plants II	3

Plus two of the following:

BCH 401G	General Biochemistry	3
BCH 609	Plant Biochemistry	3

## Soil Science Program Area

The Advisory Committee is responsible for determining specific course requirements for Ph.D. graduate students in the Soil Science program area. The following requirements are intended as minimum guidelines for students and advisors in planning course work. Significant deviations from these guidelines must be approved by the Advisory Committee.

### *Academic Preparation*

So that all entering Ph.D. students are at an academic level sufficient to complete course requirements successfully, entering students need to have taken specific scientific courses. The following courses, or their equivalents, are the minimum levels of preparation expected of students entering the Soil Science Ph.D. program area.

1. Chemistry - analytical Chemistry (equivalent to CHE 226) and organic Chemistry (equivalent to CHE 230 or 236)
2. Calculus – a first semester course (equivalent to MA 123 or MA 113)
3. Physics – a first semester course (equivalent to PHY 201)
4. Introductory Soil Science with a lab (equivalent to PLS 366) and at least two additional soils courses
5. Biology, two courses in basic biology (equivalent to BIO 151/152) and two additional courses in crop science, plant biology, or microbiology
6. Statistics, including regression and experiment design (equivalent to STA 570, 671, and 672)

In certain areas of specialization, additional preparatory course work may be recommended by the Advisory Committee. Students are expected to make up any deficiencies within one year of enrollment in the Soil Science Ph.D. program area; the qualifying examination will not be administered until the entry level course deficiencies are made up.

### *Doctoral Course Requirements*

Doctoral students should have flexibility in designing course work to suit individual goals and backgrounds. However, this course work is expected to include some rigorous work in the basic science as indicated by the following guidelines:

During the Ph.D. program, students must pass at least three graduate level courses in basic sciences outside of Soil Science. Certain areas of specialization may require more courses:

- Graduate level biochemistry
- Graduate level chemistry
- Graduate level geology
- Graduate level mathematics
- Graduate level physiology
- Graduate level physics

Recommended courses include:

BCH 401G, 604, 607, 608, 610, 611, 612, 615

BIO 430G, 510, 520

CHE 440G, 442G, 510, 522, 532, 524

GLY 450G, 585

MA 415G, 416G, 417G, 432G, 433G, 537

PLS 620, 622, 623 (these are basic plant biology courses, other upper level PLS courses are not recommended for satisfying this requirement)

All of the basic science courses are to be completed before the qualifying examination is administered. Exceptions may be approved by the director of Graduate Studies upon recommendation of the student's Advisory Committee.

Soil Science is by nature and application an interdisciplinary field. Prior to sitting for the qualifying exam, Ph.D. students are expected to have demonstrated competence in disciplinary areas of soil science by having passed graduate level courses (at the University of Kentucky or elsewhere) in the following areas:

Soil Biology

Soil Chemistry

Soil Conservation and Management

Soil Fertility

Soil Morphology and Genesis

Soil Physics

## VIII. ACADEMIC PERFORMANCE, PROBATION, AND TERMINATION

A student's grade-point average (GPA) must meet or exceed the 3.0 average established by the Graduate School. A letter grade of 'D' is not allowable for graduate students, and 'D' grades for any graduate student will automatically be converted to 'E' grades (no quality points earned). If, after having earned at least 12 credits of graduate work, a student's GPA drops below 3.0, he/she is placed on probation. One semester is allowed for a student on probation to attain a 3.0 GPA.

The enrollment of a student in Forestry, Horticulture, or Plant and Soil Science graduate programs may be terminated for the following reasons (these are not the same rules for assistantship termination).

1. Academic probation for three enrolled semesters regardless of whether that enrollment is full-time (9 credit hours) or part-time (<9 credit hours), i.e. being placed on academic probation three different semesters (exclusive of summer sessions).
2. Having failed the final examination for the Master's Degree or the Ph.D. qualifying examination two times. (See the Graduate School Bulletin for rules on the final Ph.D. examination.)
3. Unsatisfactory progress prior to the qualifying examination. Prior to the qualifying examination the Ph.D. student will meet annually with the Advisory Committee and/or the graduate faculty in the area of specialization for review of his/her progress, course work, dissertation research, and other areas of professional development. The student will be informed of specific weaknesses requiring improvement. Those weaknesses considered sufficient for possible termination will be reported to the Graduate School, and a period established for correction, and for another evaluation of the student. It is the responsibility of the Advisory Committee to determine if weaknesses have been corrected. If a majority of the Advisory Committee feels the weaknesses have not been corrected by the established time, a recommendation will be made to the Graduate School to terminate the student's enrollment. In cases when the Advisory Committee lacks consensus with respect to termination, the Advisory Committee may consult the faculty of the particular graduate program to establish such consensus.
4. Unsatisfactory progress after the qualifying examination. After passing the qualifying examination the candidate will meet annually – more often if deemed necessary – with his/her Advisory Committee. In cases where the Advisory Committee recommends

termination after the qualifying Examination has been passed, the Graduate Faculty in the area of specialization will meet to vote on the recommendation. If a majority of the Graduate faculty concurs with the original decision, a recommendation will be made to the Graduate School for termination of the student.

5. Plagiarism, cheating, or misrepresentation of research. Further information about academic offenses and sanctions is provided in the publication 'Student Rights and Responsibilities,' which is available on-line at [www.uky.edu](http://www.uky.edu).

#### A. Repeat Option

A graduate student may elect to repeat a course and count only the second grade as part of his/her GPA. The option can only be used once in a degree program. The student must obtain a **Repeat Option Form** from the office of the Associate Dean. If the student retakes the course without prior approval, both grades will count in calculating the GPA.

#### B. Evaluation of Student Progress

The IPSS program has formal protocols in each area to evaluate student progress. In addition, the Graduate School requires an annual report of graduate student productivity from each program. The data to fulfill this request is obtained from the annual review of progress, which is usually completed by June 1 of each calendar year.

## **IX. PLACEMENT**

Part of the faculty's responsibility in accepting a graduate student advisee is assistance in placing the student in a position at the completion of the degree program. This is not a guarantee that awarding the graduate degree will result in a position. The assistance is given primarily in the form of recommendations. A student can expect a faculty reference to give an honest appraisal of the student's academic performance, attitude, work habits, grasp of subject matter, capability to conduct independent research, and potential future performance.

Students are encouraged to actively seek from faculty, their Director of Graduate Studies, and their Department Chair, advice on application procedures, interview techniques, and development of a positive professional image.

## X. CHECK SHEETS

### A. Master of Science Degree

**GRE Completed** – Students accepted conditionally without a GRE must take the GRE by the end of the first semester.

\_\_\_\_\_ (Date Scores submitted to Graduate School)

**Official Academic Transcripts Received** – Students accepted conditionally on the basis of partial academic transcripts must provide an official academic transcript notifying that the undergraduate degree has been awarded within 8 weeks of the start of the term.

\_\_\_\_\_ (Date Transcripts sent to Graduate School)

#### **Transfer of Credit Form:**

Written request to transfer up to 9 hours of post baccalaureate graduate credit (12 hours, Non-thesis plan). This form is downloaded from the Graduate School web site, filled out by the student, and delivered to the appropriate DGS for approval.

\_\_\_\_\_ (Date Submitted)

Identify Program of Course Work (end of First Semester)

\_\_\_\_\_ (Date Approved by Major Advisor)

Annual seminars (if required)

\_\_\_\_\_ (Dates Presented)

#### Degree Audit

Conduct a review of the transcript to insure there are no missing grades, 'I' grades, and the GPA is 3.00 or higher. Graduate School policy will not allow a student to sit for the exam if there are unresolved academic issues.

Minimum number of hours/requirements for program \_\_\_\_\_

50% of minimum requirements of credit hours at 600/700 level \_\_\_\_\_

2/3 of minimum requirements of credit hours in regular courses \_\_\_\_\_

**Exit seminar**

\_\_\_\_\_ (Date Presented)

Submit the following form during the intended semester of graduation:

**Application for degree:**

<http://myuk.uky.edu/> Click on: Student Services / myRecords / Graduate Degree Application Due 30 days after the beginning of the semester (15 days for 2nd summer session). Please see <http://www.uky.edu/Registrar/AcademicCalendar.htm> for specific deadlines.

\_\_\_\_\_ (Date Submitted)

Submit the following form at least 2 weeks prior to examination:

**Request for Final Master’s Examination:**

[http://www.research.uky.edu/cfdocs/gs/MastersCommittee/Student/Selection\\_Screen.cfm](http://www.research.uky.edu/cfdocs/gs/MastersCommittee/Student/Selection_Screen.cfm)

**(The Thesis Approval form is incorporated into the above online form).** Examining Committee consists of at least three qualified members recommended by the DGS and appointed by the Graduate Dean. The final examination must take place no later than eight days prior to the last day of classes of the semester in which the student expects to graduate. Final examinations may not be scheduled during the period between semesters or between the end of the eight-week summer session and the beginning of the fall semester. Consult the Academic Calendar (<http://www.uky.edu/Registrar/AcademicCalendar.htm>) for deadlines for the scheduling of final examinations.

\_\_\_\_\_ (Date Submitted)

**Thesis (Thesis Students Only):**

A student has 60 days following the date of his/her defense to submit the final, accepted document to the Graduate School. Students will not have the entire 60 days if they defend late in the semester and need to graduate that semester (check <http://www.uky.edu/Registrar/AcademicCalendar.htm> for submission deadlines). Prior to final submission, the thesis must be reviewed by the Graduate School for a first format check. This process takes about 48 hours.

Presentation of the final copy of the thesis in approved form to the Graduate School.

\_\_\_\_\_ (Date Submitted)



## M.S. Student Forms

All forms are available on-line at: [www.research.uky.edu/gs/Forms/](http://www.research.uky.edu/gs/Forms/)

### **Students in Master's/Specialist Programs**

[Check sheet for Master's Non-Thesis Students](#)

(pdf - for personal use)

[Check sheet for Master's Thesis Students](#)

(pdf - for personal use)

[Concurrent Master's Degrees](#) (pdf)

[Request for Final Master's Degree Examination](#) (pdf)

[Request for Specialist Examination](#) (pdf)

[Graduate School Application for Degree](#)

Click on Student Services / myRecords / Graduate Degree Application

[Transfer of Credit: Master's or Specialist](#) (pdf)

[Information on Degree Certification](#) and [Request for Degree Certification form](#) (pdf)

## B. Ph.D. Degree

**GRE Completed** – Students accepted conditionally without a GRE must take the GRE by the end of the first semester.

\_\_\_\_\_ (Date Scores submitted to Graduate School)

**Official Academic Transcripts Received** – Students accepted conditionally on the basis of partial academic transcripts must provide an official academic transcript notifying that the undergraduate or M.S./M.A. degree has been awarded within 8 weeks of the start of the term.

\_\_\_\_\_ (Date Transcripts sent to Graduate School)

### **Transfer of Credit Form:**

Written request to transfer up to 9 hours of post baccalaureate graduate credit. This form is downloaded from the Graduate School web site, filled out by the student, and delivered to the appropriate DGS for approval. Note restrictions on the type of credit hours that can be transferred.

\_\_\_\_\_ (Date Submitted)

### **Formation of Advisory Committee:**

\_\_\_\_\_ (Date Submitted)

[http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection\\_Screen.cfm](http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection_Screen.cfm)

The advisory committee has a core of four members. This core consists of the major professor as chair, two other members from the major area. At least one representative must be from outside the student's home department or program area. All members of the core must be members of the Graduate Faculty of the University of Kentucky and three (including the major professor) must possess full Graduate Faculty status. It is strongly suggested that this committee be formed by the end of the student's first semester and no later than the end of the student's second semester.

### **Annual Advisory Committee Meetings**

\_\_\_\_\_ (Date Held)

\_\_\_\_\_ (Date Held)

\_\_\_\_\_ (Date Held)

**Qualifying Examination Request (minimum of two weeks before the requested date):**

\_\_\_\_\_ (Date Submitted)

[http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection\\_Screen.cfm](http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection_Screen.cfm)

Students must have the equivalent of 2 years of residency (36 hours or 18 hours plus written approval to use the M.S. degree to partially satisfy residency requirements) Conduct a review of your transcript to insure you don't have any missing grades, ' I 'grades, and your GPA is 3.00 or higher. Graduate School policy will not allow you to sit for the exam if you have unresolved academic issues.

Language Requirement (only if required by committee) – Before qualifying Exam

After passing the qualifying exam, students must maintain continuous enrollment in PLS 767 for 2 credit hours each term until the dissertation is successfully defended.

Submit the following form the semester you intend to graduate:

<http://myuk.uky.edu/> Click on Student Services / myRecords / Graduate Degree Application

**Application for degree:**

\_\_\_\_\_ (Date Submitted)

Due 30 days after the beginning of the semester (15 days for 2nd summer session). Please see <http://www.uky.edu/Registrar/AcademicCalendar.htm> for specific deadlines. Students must resubmit the application for degree the following semester if they do not graduate.

Submit the following form at least 8 weeks prior to the expected final exam date:

[http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection\\_Screen.cfm](http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection_Screen.cfm)

**Notification of Intent:**

\_\_\_\_\_ (Date Submitted)

Once submitted, the graduate school will appoint an outside examiner. There must be a two week window given to find an appropriate outside examiner. Assigning the outside examiner typically takes 4-5 weeks and you will receive an email when an outside examiner has been found.

At least 4 weeks prior to final examination:

Provide a nearly complete (except for pagination) copy of the dissertation to Advisory Committee. **A Dissertation Approval form is no longer required by the Graduate School** but it is expected that the student provide the Advisory Committee with a document sufficiently organized and complete that it provides strong evidence the dissertation is ready to defend.

\_\_\_\_\_ (Date Submitted)

Submit the following form at least 2 weeks prior to final examination:

[http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection\\_Screen.cfm](http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection_Screen.cfm)

**Request for Final Doctoral Examination:**

\_\_\_\_\_ (Date Submitted)

The candidate must provide the outside examiner with an approved (by the Advisory Committee) dissertation giving evidence of sufficient completeness that it is ready to defend.

**Dissertation:**

A student has 60 days following the date of his/her defense to submit the final, accepted document to the Graduate School. Students will not have the entire 60 days if they defend late in the semester and need to graduate that semester (check <http://www.uky.edu/Registrar/AcademicCalendar.htm> for submission deadlines). Prior to final submission the dissertation must be reviewed by the Graduate School for a first format check. This process takes about 48 hours but may take longer during peak periods, especially during the end of the semester. Plan accordingly.

**Presentation of exit seminar.**

\_\_\_\_\_ (Date Presented)

## Ph.D. Student Forms

All forms are available on-line at: [www.research.uky.edu/gs/Forms/](http://www.research.uky.edu/gs/Forms/)

### **Students in Doctoral Programs**

[Check sheet for Doctoral Students](#)

(pdf - for personal use)

[Transfer of Credit: Doctoral](#) (pdf)

[Concurrent Masters and Doctoral Programs](#)

[Formation of an Advisory Committee](#) (login required)

[The Qualifying Exam](#) (login required)

[Graduate School Application for Degree](#)

Click on Student Services / myRecords / Graduate Degree Application

[Notification of Intent to Schedule a Final Doctoral Examination](#)

(login required)

[Request for Final Doctoral Examination](#) (login required)

[Information on Degree Certification](#) and [Request for Degree Certification form](#) (pdf)

## Appendix A

### IPSS Program Distribution of Courses Based on Learning Objectives

#### **Common Courses – Communication and Professionalism (4 hours)**

IPS 610

IPS 625

PLS 772

#### **Basic Knowledge (Core Science) (9 hours)**

*Core Science varies by discipline and student interest but can be overlapping*

BCH 401G, 517, 604, 607, 608, 610, 611, 612, 615

BIO 430G, 431G

CHE 440G, 442G, 450G

GLY 450G, 530, 585

PLS 620, 622, 623

#### **Computational and Analytical Assessment and Skills (3-4 hours)**

STA 570, 671, 672, 676

Biostatistics STA 680, 681

Spatial Statistics PLS 655

MA 411G, 432G, 433G

BIO 520

## Disciplinary Knowledge and Skills (19-20 hours)

(If not already taken to satisfy the Basic Knowledge requirement)

<u>Crop Science</u>	<u>Horticultural Science</u>	<u>Forestry</u>	<u>Plant Biology</u>	<u>Soil Science<sup>a</sup></u>
PLS 502	ENT 530	BAE 532	BCH 604	PLS 450G
PLS 510	ENT 667	BIO 551	BCH 610	PLS 455G
PLS 514	NRC 420G	BIO 575	BCH 611	PLS 456G
PLS 515	NRC 470G	CHE 565	BCH 612	PLS 468G
PLS 531	PLS 515	FOR 599	BIO 510	PLS 470G
PLS 602	PLS 520	FOR 601	BIO 520	
PLS 664	PLS 525	FOR 602	BIO 615	PLS 566
PLS 676	PPA 400G	FOR 609	BIO 632	PLS 567
	PPA 640	FOR 612	BIO 633	PLS 573
		PLS 650	IBS 607	PLS 575
		PLS 660	PGY 607	PLS 576
			PLS 601	PLS 650
			PLS 609	PLS 655
			PLS 620	PLS 660
			PLS 622	PLS 671
			PLS 623	PLS 712
			PPA 670	PLS 741
			PPA 671	
			PPA 672	
			PPA 673	

<sup>a</sup> Soil Science represents at least five traditional disciplinary areas: Biology, Chemistry, Fertility, Pedology, and Physics.

It is recognized that there is considerable cross-disciplinary academic preparation in any specific option. Students are expected to draw from a variety of courses in each discipline while constructing their degree programs.

## Appendix B - Sample Academic Programs

*Disciplinary Area Soil Science (Emphasis in Microbiology and Ecology) – Total Credit Hours = 39*

### **Common Courses – Communication and Professionalism (4 hours)**

IPS 610

IPS 625

PLS 772

### **Basic Knowledge (10 hours)**

BCH 401G, 517, 604 or 607

### **Computational and Analytical Assessment and Skills (4 hours)**

STA 570

### **Disciplinary Courses (21 hours)**

PLS 468G Environmental Soil Fertility

PLS 566 Soil Microbiology

PLS 573 Soil Classification and Morphology

PLS 575 Soil Physics

PLS 660 Adv. Soil Microbiology

PLS 671 Soil Chemistry

PPA 400G Plant Pathology



Disciplinary Area Soil Science (*Emphasis in Soil Fertility*) – Total Credit Hours = 36

**Common Courses – Communication and Professionalism (4 hours)**

IPS 610

IPS 625

PLS 772

**Basic Knowledge (9 hours)**

CHE 440G, 442G, 450G

**Computational and Analytical Assessment and Skills (4 hours)**

STA 671, 672

**Disciplinary Courses (19 hours)**

PLS 468G Environmental Soil Fertility

PLS 573 Soil Classification and Morphology

PLS 575 Soil Physics

PLS 650 Soil Plant Relations

PLS 671 Soil Chemistry

PLS 712 Adv. Soil Fertility

*Disciplinary Area Plant Biology (Emphasis in Seed Biology) – Total Credit Hours = 37*

**Common Courses – Communication and Professionalism (4 hours)**

IPS 610

IPS 625

PLS 772

**Basic Knowledge (9 hours)**

BCH 401G, 604, 620

**Computational and Analytical Assessment and Skills (4 hours)**

STA 570

**Disciplinary Courses (21 hours)**

PLS 556 Seed Production and Technology

PLS 602 Principles of Yield Physiology

PLS 622 Physiology of Plants I

PLS 623 Plant Physiology II

PLS 657 Seed Biology

PLS 664 Plant Breeding

Disciplinary Area Crop Science – Total Credit Hours = 36

**Common Courses – Communication and Professionalism (4 hours)**

IPS 610

IPS 625

PLS 772

**Basic Knowledge (9 hours)**

PLS 609, 622, 623

**Computational and Analytical Assessment and Skills (3 hours)**

STA 661

**Disciplinary Courses (20 hours)**

PLS 556 Seed Production and Technology

PLS 597 Plant Genomics

PLS 602 Principles of Yield Physiology

PLS 620 Plant Molecular Biology

PLS 676 Quantitative Genetics

PPA 400G Plant Pathology

PPA 640 Identification of Plant Diseases

APPENDIX C - COMPOSITE CURRICULUM MAPS FOR GRADUATE CLASSES OFFERED IN INTEGRATED PLANT & SOIL SCIENCES

I = Outcome is Introduced; E = Outcome is Emphasized; R = Outcome is Reinforced; A = Outcome is Applied.

		Outcome 1	Outcome 2	Outcome 3	Outcome 4
CLASS	Subject matter	“Knowledge”	“Skills”	“Communications”	“Professionalism ”
IPS 610	Transdisciplinary Communication in IPSS	E	I	I	R
IPS 625	Transdisciplinary Research in IPSS	E	I	R	R
NRC 450G	Biogeochemistry	R	R	E	I
NRC 455G	Wetland Delineation	A	A	E	R
NRC 456G	Constructed Wetlands	E	E	E	R
NRC 470G	Soil Nutrient Management	R	A	E	R
PLS 468G	Soil Use and Management	R	A	A	R
PLS 502	Ecology of Economic Plants	A	S	R	E
PLS 510	Forage Management and Utilization	A	A	R	E
PLS 512	Turf Management				
PLS 514	Grass Taxonomy and Identification				
PLS 515	Turf Management				
PLS 520	Fruit and Vegetable Production	R	E	E	I
PLS 525	Greenhouse Floral Crop Management				
PLS 531	Field Schools in Crop Pest Management				
PLS 547	Seed Biology				
PLS 556	Seed Production and Technology	R	R	A	A
PLS 557	Seed Vigor				
PLS 566	Soil Microbiology	E	R	R	E
PLS 567	Methods in Soil Microbiology	A	I	R	E
PLS 573	Soil Morphology and Classification	E	R	R	R
PLS 575	Soil Physics	E	E	R	E
PLS 576	Laboratory in Soil Physics	A	I	E	E
PLS 581	Chemical Analysis of Soils and Plants	A	I	E	
PLS 597	Special Topics	A	I	E	R
PLS 599	Special Problems	A	I	E	A
PLS 601	Molecular and Cellular Genetics	R			
PLS 602	Principles of Yield Physiology	A	A	R	E
PLS 605	Physiological Mechanisms in Horticultural Plants				
PLS 609	Plant Biochemistry	I	E/I	A/R	R
PLS 619	Cytogenetics				
PLS 620	Plant Molecular Biology	I	I	R	R

		<b>Outcome 1</b>	<b>Outcome 2</b>	<b>Outcome 3</b>	<b>Outcome 4</b>
<b>CLASS</b>	<b>Subject matter</b>	<b>“Knowledge”</b>	<b>“Skills”</b>	<b>“Communications”</b>	<b>“Professionalism ”</b>
PLS 622	Physiology of Plants I	I	I		
PLS 623	Physiology of Plants II	I/R	I/R		
PLS 640	Identification of Plant Diseases				
PLS 642	Biosynthesis of Natural Products				
PLS 650	Soil-Plant Relationships	R	A		
PLS 655	Spatial and Temporal Statistics	I	A	R	E
PLS 657	Seed Biology				
PLS 660	Advanced Soil Biology	R	A	R	R
PLS 664	Plant Breeding I				
PLS 671	Soil Chemistry	R	I	E	
PLS 676	Quantitative Inheritance in Plant Populations				
PLS 697	Special Topics in Plant and Soil Science	A	I	E	
PLS 712	Advanced Soil Fertility	R	I	E	R
PLS 721	Pedogenic Processes				
PLS 741	Clay Mineralogy	R	R	E	R
PLS 748	Master’s Thesis Research	A	A	A	R
PLS 767	Dissertation Residency Credit				
PLS 768	Residence Credit for Master’s Degree				
PLS 772	Seminar in Integrated Plant and Soil Sciences	R	R	A/E	R
PLS 799	Research in Plant and Soil Sciences	A	A	A	R