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March 15, 2010

Dr. Jeannine Blackwell, Dean
Graduate School
102 Gillis Building
University of Kentucky
Campus 0033

Dear Dean Blackwell:

We would like to propose a new umbrella graduate degree program (Integrated Graduate Program in Plant and Soil Sciences, IPSS) which will provide an integrative and creative approach to graduate education in the plant and soil sciences. Graduate faculty in the departments of Forestry, Horticulture, and Plant and Soil Sciences support this proposal. The objectives of this proposal are to build strength in the currently existing graduate M.S. and PhD programs in Crop Science, Plant Physiology, Molecular Biology and Biochemistry, Horticulture, and Soil Science by combining these programs into an overall Integrated Graduate Program. The integrated program offers many advantages in student training, recruitment, program student numbers, and efficiency in administration. The program provides unique opportunities to cultivate and exploit the benefits that can be derived from an interdisciplinary approach to graduate education and research, and significantly contributes to the culture and development of graduate students as future scholars. There are two new courses associated with the IPSS program, IPS 610, and IPS 625.

The IPSS program would be a new graduate program with several options that stem from existing plant and soil science graduate programs, but also provides the opportunity for the creation of new graduate programs. The existing graduate programs in plant and soil science will continue to operate until existing students matriculate through those programs. We would anticipate a starting date for the IPSS graduate program in the fall of 2011.

A brief perusal of Plant and Soil Science graduate programs across the country shows that most are associated with Plant and Soil Science departments, but none are based on an interdisciplinary approach with separate departments like the IPSS program.

Please find attached as outlined below the documents necessary for consideration of the IPSS program.

- IPSS Proposal
- Request for new doctoral degree form
- Request for change in MS degree program
- Application for new courses: IPS610
- Application for new courses: IPS 625
- IPS 610 course description
- IPS 625 course description
- Sample syllabus IPS 610
- Sample syllabus IPS 625
- Sample distribution of courses in IPSS based on learning objectives
- Assessment Plan – Graduate Program in Integrated Plant and Soil Sciences

Sincerely,



Robert L. Houtz



Mark S. Coyne



David A. Van Sanford

xc: Dr. M. Scott Smith, Dean
Dr. Nancy Cox, Associate Dean for Research
Dr. Jimmy Henning, Associate Dean for Extension
Dr. Larry Jones, Associate Dean for Academic Programs
Dr. Larry Grabau, Assistant Dean for Academic Programs
Dr. Todd Pfeiffer, Chair, department of Plant and Soil Sciences

Proposal
Integrated Plant and Soil Sciences (IPSS) Graduate Program

Executive Summary

Graduate faculty in the departments of Forestry, Horticulture, and Plant and Soil Sciences, propose an umbrella degree program to provide an integrative and creative approach to graduate education in the plant and soil sciences.

The objectives of this proposal are to build strength in the current graduate M.S. and PhD 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 would provide 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 would provide: (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 the existing 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 masters and doctorate degrees awarded through improved recruitment and training, leading to increased retention of all students interested in advanced education in the plant and soil sciences.

Proposal

1. Programmatic Flexibility and Capacity for Growth

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. As an example, an IPSS degree in the future might be awarded with an option in plant medicinal/natural products or environmental systems.

The IPSS program will provide 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. The support of Forestry faculty for the IPSS program, as well as their desire to have an option in IPSS, is indicated in the attached comments. Forestry has a professional MS program that would remain independent of the IPSS program.

2. Core Courses

The IPSS Program allows existing PhD graduate programs in the plant and soil sciences to maintain their respective individual admission and degree requirements with the exception of IPS 610 and IPS 625 (see below). Each component program, however, 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 or PLS 773.

The IPSS program requires all M.S. and PhD 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 (course descriptions attached). These courses represent a minor 3 credit addition to current credit hour requirements for existing plant and soil science graduate programs, and are interdisciplinary, topic driven courses, interfaced with current seminar programs in the plant and soil science disciplines. It is anticipated that a minimum of three IPSS graduate faculty members will coordinate and host these courses. Each student will also be required to enroll at least once in PLS 772/773 (1 credit, Seminar in Plant and Soil Sciences or Plant Physiology) to reflect 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. Specifically, while much emphasis is placed on the

mechanics of graduate education, such as curriculum development and preparation for qualifying exams, less attention is paid to the culture and development of graduate students as future scholars (see “The Importance of Intellectual Community”, *The Chronicle of Higher Education*, December 14, 2007). Active engagement of graduate students across a wide-array of disciplines fosters the camaraderie and sense of community that ultimately lead to the involvement of graduate students in the day-to-day activities and endeavors that give faculty professional satisfaction. 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.

3. Other Course Requirements

Each option within the IPSS program will meet the minimum requirements of the Graduate school for the awarding of M.S. (24 graduate credit hours) and PhD (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 discipline specific to the needs, training, and career goals of each student in that option.

4. Learning Outcomes

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

- A. 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.
- B. 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.
- C. Have acquired skills in critical and analytical thinking and in communication that may be applied to research, education, outreach, industry, and government.
- D. 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.

5. Awarding of Degrees

Degrees are awarded in IPSS with additional identification of the option reflecting a student’s programmatic emphasis, such as crop science, forest science, horticultural science, plant biology or soil science.

6. Administration

We anticipate that the new IPSS Program will commence in Fall 2011. At this time admission to existing doctoral programs in Crop Science, Plant Biology, and Soil Science will cease and students will only be admitted to the IPSS program.

Students already enrolled in Crop Science, Plant Biology, and Soil Science will have the option to continue their existing program or be grandfathered into the new IPSS program. The doctoral programs in Crop Science, Plant Biology, 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 be grandfathered 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 Biology, and Soil Science – including adjunct members – will be automatically enrolled in 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 will be an overall Director of Graduate Studies (DGS) for the program who will serve 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 will coordinate 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 options associated with the IPSS program. Because of the size of the graduate program, and the time demands on the DGS, it is envisioned that this position will carry a significant administrative distribution of effort assignment.

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. Ultimately, the success of the IPSS graduate program will necessitate more than implementation of new graduate courses, programs, and educational philosophies. For this reason, the position of DGS represents an important component of the program. Like any new endeavor that seeks commonality, cohesiveness, and change where none currently exist, much will depend on perception. The DGS for the IPSS program must be an individual with passion and conviction for the principles described above as well as the ability to forge new programs and challenges for IPSS graduates that make them the highly successful scholars they deserve to be.

The current DGS of each existing PhD 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 the new graduate committee appointed to that role.

b. Graduate Program Steering Committee

The IPSS DGS will be assisted by a committee of representatives from each option 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. These faculty members will help identify candidates for recruitment, opportunities for student support, and provide interested students with program- and faculty-specific information. 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

c. 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 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. However, a graduate program may require a higher grade- point average. The Integrated Plant and Soil Sciences graduate program requires a grade-point average of at least 3.0 and a combined GRE score (Verbal plus Quantitative) of at least 1,000. These minimum requirements may be waived in exceptional cases if sufficient other evidence of the student's ability to perform graduate work is presented.

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.

Individual options in IPSS may require a specific academic background.

d. Requirements

Existing graduate programs in the plant and soil sciences maintain their respective individual admission prerequisites, degree requirements, and professional expectations. All M.S. and PhD 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 PhD Program) and individualized program of study within one year, and satisfy basic Graduate School requirements for residency, examination, and good standing.

e. 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.

f. Registration

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

g. Advising

Students are assigned advisors in three ways. Ph.D. students who enter the program undecided on a major advisor or option will work with a faculty member from their option and/or the DGS to prepare a program of studies for the first year and a set of program rotations if applicable. 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.

h. Preparatory Background

So that all entering graduate students are at an academic level to successfully complete their graduate program, 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 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 of the options 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.

i. 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.

j. 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 form 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, this requirement can be waived by the DGS upon the recommendation of the student's advisory committee.

k. 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 will be required, at a minimum, to meet 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.

I. Curriculum

The curriculum in IPSS consists of 24 or 36 credit hours of coursework as specified in the accompany requests for change in the M.S. in Plant and Soil Sciences and New Doctoral Program in IPSS. The M.S. in IPSS requires a common core of IPS 610, IPS 625, and PLS 772 or PLS 773, 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 or PLS 773), Basic Scientific Knowledge (9 cr), Computational and Analytical Assessment and Skills (3-4 hours), and Disciplinary Knowledge and Skills (19-20 hours). The accompanying distribution of courses and sample curricula illustrate 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 may be accepted in partial fulfillment of these requirements.

The prequalifying residency requirement 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.

i. Curriculum evaluation

The success of the curriculum will be evaluated on a regular basis by the Graduate Program Steering Committee based on results obtained from annual assessment as specified in the program assessment plan.

ii. Creation of New Options

New options within the IPSS program may be created at any time when a core group of faculty (minimum of four) develop an appropriate option-specific disciplinary core and demonstrate they have the interest of at least three graduate students in that option. A majority vote of the IPSS graduate faculty will suffice to approve the new option.

iii. Removal of Options

In the event that a core group of four faculty cannot be maintained within a specific option, that option will no longer be available to incoming students. Currently enrolled students will retain the right to have that option appear on their graduate and records or to switch to another option. Options that are unable to maintain a minimum enrollment of three students on a three-year rolling average will no longer be made available to incoming students. Currently enrolled students will retain the right to have that option appear on their graduate records or to switch to another option.

5. Recruitment

Implementing the IPSS graduate program provides new opportunities for consolidated graduate student recruitment efforts. A web page will be developed in which interested parties are directed to a link for the College of Agriculture web site indicating Graduate programs in Plant and Soil Sciences,

Forestry, and Horticulture. The IPSS Program will also seek to directly recruit students from existing national and international student populations through invited speakers and the encouragement of IPSS participants and faculty to visibly display appropriate materials at societal meetings, and advertising campaigns with notices in national and international journals.

6. Advantages of IPSS

The IPSS Program will provide the motivation and means to accomplish several important goals.

- A. Provide a critical mass of students necessary to maintain graduate program status.
- B. Maintain graduate identity of existing well-recognized programs that have trained and graduated students with expertise in disciplines proven valuable to agriculture and natural resource management.
- C. Provide interdisciplinary coursework required of all students in the program without creating intrusive changes to existing graduate curricula.
- D. Develop a dynamic environment that can evolve interdisciplinary credentials and programs tailored to suit the needs of all graduate students in the plant and soil science disciplines.
- E. Create opportunities for visibility and identity for research programs currently without separate graduate identity.
- F. Facilitate interdisciplinary activities, and by providing an inclusive approach to graduate education, increase the visibility for existing graduate programs and increase the attractiveness and recruitment capabilities of the IPSS program as a whole.

7. Activities to Date

Trial runs of IPS 610/625 under PLS 597 special topics were offered in Fall 2007, 2008, and 2009 with themes solicited from faculty of “What is the World’s Largest Organism?” (2007), “The Global Food Crisis” (2008), and “Biofuels” (2009). Three faculty members from soil science, plant science, and horticulture coordinated the course with approximately 7 graduate students from diverse backgrounds including soil science, tobacco research, turfgrass, plant biology, and crop science enrolled each term. With support from the Associate Dean for Research, two nationally recognized outside speakers (Lynn Margulis, 2007; Pedro Sanchez, 2008) with outstanding publications and contributions in research were recruited to deliver two hour lectures to IPS 625 students followed by an interdisciplinary seminar jointly sponsored by the departments of Horticulture and Plant and Soil Science. IPS 610 students carried the majority of responsibilities for hosting the visiting speakers.

Comments from Forestry faculty:

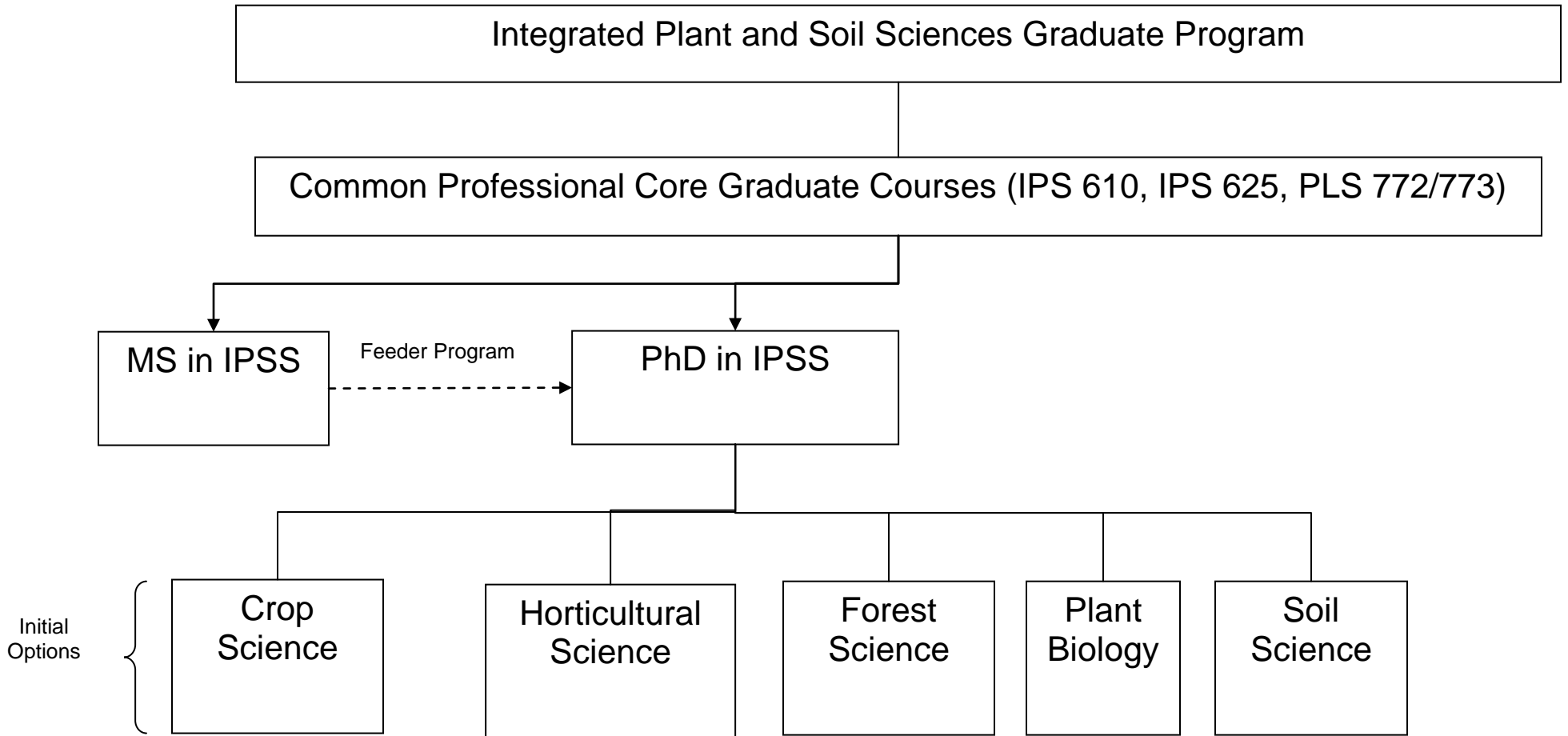
Thanks for your invitation to respond to the proposed IPSS degree program. The proposal has been discussed at length by the Forestry Graduate Program Committee, as well as by our Department faculty as a whole. In general, we think the proposal is a great move in the right direction of establishing umbrella graduate degree programs in the College. We see our participation in the IPSS program as follows:

- The proposed IPSS degree program would be appropriate for some Ph.D. students of the Department of Forestry.
- Ph.D. students of the Department of Forestry would enroll in the IPSS program on a case-by-case basis, as appropriate for individual students.
- Several Department of Forestry faculty members should become members of the IPSS graduate program when it is established.
- Most M.S. students of the Department of Forestry would not enroll in the IPSS degree program, although there may be rare exceptions for individual students.
- If and when the College of Agriculture establishes one or more additional multi-disciplinary umbrella graduate degree programs organized like the IPSS program (*e.g.*, perhaps a Natural Resources program), then it may become feasible for most or all M.S. students of the Department of Forestry to be enrolled in the umbrella degree programs.

I hope our input is useful. We look forward to further discussions as the IPSS proposal and proposals for other umbrella graduate programs move forward.

Cheers,
Dave Wagner

IPSS Structural Model



REQUEST TO CLASSIFY PROPOSED PROGRAM

Section I (REQUIRED)

1.	The proposed new degree program will be (please check one): <input type="checkbox"/> Undergraduate* <input type="checkbox"/> Masters* <input checked="" type="checkbox"/> Doctoral* <input type="checkbox"/> Professional*		
2.	Have you contacted the Associate Provost for Academic Administration (APAA)?		
	YES <input checked="" type="checkbox"/>	Date of contact: 12/15/09	
	NO <input type="checkbox"/>	(Contact the APAA prior to filling out the remainder of this form.)	
3.	Degree Title:	Integrated Plant and Soil Sciences	
4.	Major Title:	NA	
5.	Option:	Crop Science, Horticultural Science, Forest Science, Plant Biology, Soil Science	
6.	Primary College:	Agriculture	
7.	Primary Department:	Plant and Soil Sciences	
8.	CIP Code (supplied by APAA)	01.1199	
9.	Accrediting Agency (if applicable):	NA	
10.	Who should be contacted for further information about the proposed new degree program:		
	Name: Bob Houtz	Email: rhoutz@uky.edu	Phone: 257-1758
11.	Has the APAA determined that the proposed new degree program is outside UK's band?		
	<input type="checkbox"/> YES (Continue with the Section II* on a separate sheet.)		
	<input checked="" type="checkbox"/> NO (This form is complete. Print PAGE ONE & submit with appropriate form for new program.)		

Section II (Attach separate pages.)

I.	Submit a one- to two- page abstract narrative of the program proposal summarizing: how this program will prepare Kentuckians for life and work; any plans for collaboration with other institutions; and any plans for participation in the Kentucky Virtual University.
II.	Provide a comprehensive program description and complete curriculum. For undergraduate programs include: courses/hours; college-required courses; University Studies Program; pre-major courses; major courses; option courses; electives; any other requirement. Include how program will be evaluated and how student success will be measured. Evaluative items may include, but are not limited to retention in the major from semester to semester; success rate of completion for core courses; and academic performance in suggested program electives.
III.	Explain resources (finances, facilities, faculty, etc.) that are needed and available for program implementation and support.

* After filling out this form, you must also submit a form for New Undergraduate Program, New Master's Program, or New Doctoral Program. There is no form for new professional programs.

(Attach completed "Application to Classify Proposed Program"¹)

GENERAL INFORMATION

College:	<u>Agriculture</u>	Department:	<u>Plant and Soil Science, Horticulture, Forestry</u>
Major Name:	<u>Integrated Plant and Soil Sciences</u>	Degree Title:	<u>PhD</u>
Formal Option(s):	<u>Crop Science, Horticultural Science, Forestry, Plant Biology, Soil Science</u>	Specialty Fields w/in Formal Option:	<u>Seed Biology, Environmental Science</u>
Date of Contact with Associate Provost for Academic Administration ¹ :		<u>12/15/09</u>	
Bulletin (yr & pgs):	_____	CIP Code ¹ :	<u>01.119.01</u>
Accrediting agency (if applicable):		_____	
Requested Effective Date:	<input type="checkbox"/> Semester following approval.	OR	<input checked="" type="checkbox"/> Specific Date ² : <u>Fall 2011</u>
Dept Contact Person:	<u>Mark Coyne</u>	Phone:	<u>257-4202</u>
		Email:	<u>mcoyn00@email.uky.edu</u>

1. Number of transfer credits allowed:	<u>9</u>
<small>(Maximum is Graduate School limit of total of 9 hours (or 25% of the credit hours needed to fulfill the pre-qualifying residency requirement.)</small>	
2. Residence requirement:	<u>18</u>
<small>(Minimum of one year before and after Qualifying Exams.)</small>	
3. Language(s) and/or skill(s) required:	<u>None</u>
4. Provisions for monitoring progress and termination criteria:	<u>Annual review of progress; unsatisfactory progress (see attached Assessment Plan)</u>
5. Total credit hours required:	<u>36</u>
6. Required courses :	<u>IPS 610, IPS 625, PLS 772 or PLS 773</u>
7. Required distribution of courses within program:	<u>4 Common Hours, 9 Basic Science Hours, 3 Computational Hours, 20 Disciplinary Hours</u>
8. Minor area or courses outside program required:	<u>None</u>
9. Distribution of courses levels required (400G-500/600-700):	<u>All courses 400G +; 50% of Courses 500+</u>
10. Qualifying examination requirements	<u>Written and Oral</u>

¹ Prior to filling out this form, you MUST contact the Associate Provost for Academic Administration (APAA). If you do not know the CIP code, the APAA can provide you with that during the contact.

² Programs are typically made effective for the semester following approval. No program will be made effective until all approvals are received.

11. Explain whether the proposed new program (as described in numbers 1 through 10) involve courses offered by another department/program. Routing Signature Log must include approval by faculty of additional department(s).

No other courses required outside the participating departments.

12. Other requirements not covered above:

One seminar presented each year; one exit seminar, dissertation; submitted or published work prior to final dissertation exam.

13. What is the rationale for the proposed new program? Include specific references to accreditation requirements if applicable.

The multidisciplinary nature of current research demands that students have the flexibility to pursue multiple paths toward their graduate degrees yet still be prepared with fundamental skills required of the professional scientist. The creation of the IPSS program enables it to be fully integrative among three distinct disciplines (Crop Science, Soil Science, Plant Physiology) while maintaining disciplinary focus on topics of student interest. The core courses (IPS 610, IPS 625, PLS 772/773) prepare the student to interact with diverse colleagues in plant and soil sciences and provides the background to function in a professional manner through written and verbal presentation of research ideas and results. Within the program the student has the ability to create an individual course of study in a specific option that satisfies their interests and disciplinary requirements.

Signature Routing Log

General Information:

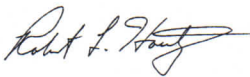



Proposal Name: Integrated Plant and Soil Sciences

Proposal Contact Person Name: Mark Coyne Phone: 257-4202 Email: mcoyn00@email.uky.edu

INSTRUCTIONS:

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
Horticulture Faculty	01/15/10	Robert L. Houtz / 257-1758 / rhoutz@uky.edu	
Plant and Soil Science	01/22/10	Todd Pfeiffer / 257-5020 / tpfeiffe@uky.edu	
Forestry	3/15/10	Michael J. Lacki / 257-3217 / mlacki@uky.edu	
Graduate Curriculum Comm, COA/SHES	3/5/10	Larry J. Grabau/257-1885/lgrabau@email.uky.edu	
		/ /	

External-to-College Approvals:

Council	Date Approved	Signature	Approval of Revision³
Undergraduate Council			
Graduate Council	Received from Graduate Council 7/9/10		
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

³ Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

APPLICATION FOR NEW COURSE

1. Submitted by the
College of AGRICULTURE Date: 01/01/2010

Department/Division proposing
course: PLANT AND SOIL SCIENCES

2. Proposed designation and Bulletin description of this course:

Prefix and
a. Number IPS 610

b. Title* TRANS-DISCIPLINARY COMMUNICATION IN
INTEGRATED PLANT AND SOIL SCIENCES

*If title is longer than 24 characters, offer a sensible title of 24
characters or less: COMMUNICATION IN IPSS

c. Courses must be described by at least one of the categories below. Include number of actual contact hours per week.

() CLINICAL	() COLLOQUIUM	() DISCUSSION	() LABORATORY	() LECTURE
() INDEPEND. STUDY	() PRACTICUM	() RECITATION	() RESEARCH	() RESIDENCY
(<u>X</u>) SEMINAR	() STUDIO	() OTHER – Please explain:	_____	

Please choose a grading
d. system: Letter (A, B, C, etc.) Pass/Fail

e. Number of credit
hours: 1

f. Is this course
repeatable? YES NO If YES, maximum number of credit
hours: 2

g. Course description:

A one-credit companion course to IPS 625 specific for graduate students in the Integrated Plant and Soil Sciences program. This course exposes IPSS students to critical skills in publication, grantsmanship, and public presentation. It requires IPSS students to systematically evaluate research presentations from multiple disciplines, present a synthesis of the research topic addressed in IPSS 625, and interact with other members of the college and the university on topics related to plant and soil science issues. The course may be repeated twice.

h. Prerequisite(s), if any:

GRADUATE STUDENT STATUS

i. Will this course also be offered through Distance Learning? YES NO

If YES, please check one of the methods below that reflects how the majority of the course content will be delivered:

Internet/Web-based Interactive video Extended campus

3. Supplementary teaching component: N/A or Community-Based Experience Service Learning Both

4. To be cross-listed as: _____ / _____
Prefix and Number printed name Cross-listing Department Chair signature

5. Requested effective date (term/year): FALL / 2011

6. Course to be offered (please check all that apply): Fall Spring Summer

7. Will the course be offered every year? YES NO
If NO, please explain: _____

8. Why is this course needed?
Graduate students in plant and soil sciences must recognize the interdisciplinary nature of their fields and appreciate the value of effective presentation of research ideas from multiple perspectives. To best train our graduate students we expect them to develop skills in the areas of writing, grantsmanship, research presentation and assessment. To that end we have three objectives in offering this course: 1. Gain experience in writing for publication and extramural support; 2. Gain experience in preparing oral presentations of knowledge gained through scientific inquiry; 3. Increase knowledge and appreciation of the diversity of plant and soil science issues and modes of presenting scientific research; 4. Increase scientific interactions between students and faculty on topics related to plant and soil science issues.

9. a. By whom will the course be taught? Team Taught - Dr. Mark Coyne (Co-ordinator)

b. Are facilities for teaching the course now available? YES NO
If NO, what plans have been made for providing them?

10. What yearly enrollment may be reasonably anticipated?

7

11. a. Will this course serve students primarily within the department? Yes No
- b. Will it be of interest to a significant number of students outside the department? YES NO
If YES, please explain.

The skills gained in this course are applicable to the professional goals of any beginning graduate student.

12. Will the course serve as a University Studies Program course[†]? YES NO
If YES, under what Area? _____

[†]AS OF SPRING 2007, THERE IS A MORATORIUM ON APPROVAL OF NEW COURSES FOR USP.

13. Check the category most applicable to this course:

- traditional – offered in corresponding departments at universities elsewhere
- relatively new – now being widely established
- not yet to be found in many (or any) other universities

14. Is this course applicable to the requirements for at least one degree or certificate at UK? Yes No

15. Is this course part of a proposed new program? YES NO
If YES, please name: Graduate Program in Integrated Plant and Soil Sciences (IPSS)

16. Will adding this course change the degree requirements for ANY program on campus? YES NO
If YES[‡], list below the programs that will require this course:

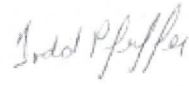
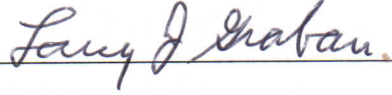
This course in conjunction with IPS 625 will serve as the core course requirements in the IPSS graduate program , which includes the existing MS program in Plant and Soil Sciences.

[‡]In order to change the program(s), a program change form(s) must also be submitted.

17. The major teaching objectives of the proposed course, syllabus and/or reference list to be used are attached.
18. Check box if course is 400G or 500. If the course is 400G- or 500-level, *you must include a syllabus showing differentiation for undergraduate and graduate students by (i) requiring additional assignments by the graduate students; and/or (ii) the establishment of different grading criteria in the course for graduate students. (See SR 3.1.4)*
19. Within the department, who should be contacted for further information about the proposed new course?

Name: Mark Coyne Phone: 257-4202 Email: mscopyn00@email.uky.edu

20. Signatures to report approvals:

01/22/10	Todd Pfeiffer	/ 
DATE of Approval by Department Faculty	printed name	Reported by Department Chair signature
03/05/10	Larry J. Grabau	/ 
DATE of Approval by College Faculty	printed name	Reported by College Dean signature
* DATE of Approval by Undergraduate Council	printed name	/ Reported by Undergraduate Council Chair signature
* DATE of Approval by Graduate Council	printed name	/ Reported by Graduate Council Chair signature
* DATE of Approval by Health Care Colleges Council (HCCC)	printed name	/ Reported by Health Care Colleges Council Chair signature
* DATE of Approval by Senate Council	Reported by Office of the Senate Council	
* DATE of Approval by University Senate	Reported by Office of the Senate Council	

*If applicable, as provided by the *University Senate Rules*. (<http://www.uky.edu/USC/New/RulesandRegulationsMain.htm>)

APPLICATION FOR NEW COURSE

1. Submitted by the
College of AGRICULTURE Date: 01/01/2010

Department/Division proposing
course: PLANT AND SOIL SCIENCES

2. Proposed designation and Bulletin description of this course:

Prefix and
a. Number IPS 625

b. Title* TRANS-DISCIPLINARY RESEARCH IN INTEGRATED
PLANT AND SOIL SCIENCES

*If title is longer than 24 characters, offer a sensible title of 24
characters or less: RESEARCH IN IPSS

c. Courses must be described by at least one of the categories below. Include number of actual contact hours per week.

() CLINICAL	() COLLOQUIUM	(X) DISCUSSION	() LABORATORY	() LECTURE
() INDEPEND. STUDY	() PRACTICUM	() RECITATION	() RESEARCH	() RESIDENCY
() SEMINAR	() STUDIO	() OTHER – Please explain: _____		

d. Please choose a grading
system: Letter (A, B, C, etc.) Pass/Fail

e. Number of credit
hours: 2

f. Is this course repeatable? YES NO If YES, maximum number of credit
hours: 4

g. Course description:

A two-credit course specific to students in the Integrated Plant and Soil Sciences Program. This course is designed to explore the foundations, principles, and philosophies of scientific research in a truly integrative manner with strong emphasis on the value of multidisciplinary approaches to a significant issue in plant and soil sciences. The course may be repeated twice.

h. Prerequisite(s), if any:

GRADUATE STUDENT STANDING

i. Will this course also be offered through Distance Learning? YES NO

If YES, please check one of the methods below that reflects how the majority of the course content will be delivered:

Internet/Web-based Interactive video Extended campus

3. Supplementary teaching component: N/A or Community-Based Experience Service Learning Both

4. To be cross-listed as: _____ / _____
Prefix and Number printed name Cross-listing Department Chair signature

5. Requested effective date (term/year): FALL / 2011

6. Course to be offered (please check all that apply): Fall Spring Summer

7. Will the course be offered every year? YES NO
If NO, please explain: _____

8. Why is this course needed?
Graduate students in plant and soil sciences come from diverse backgrounds with diverse interest. Yet, there is significant commonality in many of the most basic and focused areas of research in the plant and soil sciences that are not communicated in an interdisciplinary or unified manner. The exposure of all students in the IPSS program to the value of interdisciplinary approaches to problem solving as well as the merits of cross-disciplinary education will serve as a cohesive tool for generating mutual respect and admiration among IPSS students, and help them develop more creative approaches to problem solving in their own research programs.

9. a. By whom will the course be taught? Team Taught - Dr. David Van Sanford (Co-ordinator)

b. Are facilities for teaching the course now available? YES NO
If NO, what plans have been made for providing them?

10. What yearly enrollment may be reasonably anticipated?
7

11. a. Will this course serve students primarily within the department? Yes No

b. Will it be of interest to a significant number of students outside the department? YES NO
If YES, please explain.

12. Will the course serve as a University Studies Program course[†]? YES NO
 If YES, under what Area? _____

[†]AS OF SPRING 2007, THERE IS A MORATORIUM ON APPROVAL OF NEW COURSES FOR USP.

13. Check the category most applicable to this course:

- traditional – offered in corresponding departments at universities elsewhere
 relatively new – now being widely established
 not yet to be found in many (or any) other universities

14. Is this course applicable to the requirements for at least one degree or certificate at UK? Yes No

15. Is this course part of a proposed new program? YES NO
 If YES, please name: Integrated Graduate Program in Plant and Soil Sciences (IPSS)

16. Will adding this course change the degree requirements for ANY program on campus? YES NO
 If YES[‡], list below the programs that will require this course:
 This course in conjunction with IPS 625 will serve as the core course requirements in the IPSS graduate program, which includes the existing MS program in Plant and Soil Sciences.

[‡]In order to change the program(s), a program change form(s) must also be submitted.

17. The major teaching objectives of the proposed course, syllabus and/or reference list to be used are attached.

18. Check box If the course is 400G- or 500-level, you must include a syllabus showing differentiation for undergraduate and graduate students by (i) requiring additional assignments by the graduate students; and/or (ii) the establishment of different grading criteria in the course for graduate students. (See SR 3.1.4)

19. Within the department, who should be contacted for further information about the proposed new course?

Name: MARK COYNE Phone: 257-4202 Email: mcoyn00@email.uky.edu

20. Signatures to report approvals:

01/22/10
 DATE of Approval by Department Faculty

Todd Pfeiffer

printed name

Reported by Department Chair

signature

03/05/2010
 DATE of Approval by College Faculty

Larry J. Grabau

printed name

Reported by College Dean

signature

* DATE of Approval by Undergraduate Council	printed name	Reported by Undergraduate Council Chair	signature
		/	
* DATE of Approval by Graduate Council	printed name	Reported by Graduate Council Chair	signature
		/	
* DATE of Approval by Health Care Colleges Council (HCCC)	printed name	Reported by Health Care Colleges Council Chair	signature
* DATE of Approval by Senate Council		Reported by Office of the Senate Council	
* DATE of Approval by University Senate		Reported by Office of the Senate Council	

*If applicable, as provided by the *University Senate Rules*. (<http://www.uky.edu/USC/New/RulesandRegulationsMain.htm>)

IPS 610 Course Description

A one-credit companion course to IPS 625 specific for graduate students in the Integrated Plant and Soil Sciences program. This course exposes IPSS students to critical skills in publication, grantsmanship, and public presentation. It requires IPSS students to systematically evaluate research presentations from multiple disciplines, present a synthesis of the research topic addressed in IPSS 625, and interact with other members of the college and the university on topics related to plant and soil science issues. The course may be repeated twice.

IPS 625 Course Description

A two-credit course specific to students in the Integrated Plant and Soil Sciences Program. This course is designed to explore the foundations, principles, and philosophies of scientific research in a truly integrative manner with strong emphasis on the value of multidisciplinary approaches to a significant issue in plant and soil sciences. The course may be repeated twice.

TRANS-DISCIPLINARY COMMUNICATION IN INTEGRATED PLANT AND SOIL
SCIENCES
(IPS 610)

FALL SEMESTER 2010 (Section 001)

Instructor(s): M.S. Coyne (257-4202; [mscoyn00@email.uky.edu](mailto:m scoyn00@email.uky.edu))
N-122 Ag Sci Building
R.L. Houtz (257-1982; rhoutz@uky.edu)
401-D Plant Science Building
D. Van Sanford (257-5020; dvs@email.uky.edu)
327 Plant Science Building

Classroom: TBA

Meeting Times: TBA

Office Hours: By appointment

PREREQUISITES

Graduate student status.

COURSE DESCRIPTION

A one-credit companion course to IPS 625 specific for graduate students in the Integrated Plant and Soil Sciences program. This course is an opportunity for IPSS students to practice important skills in manuscript preparation, grantsmanship, public presentation, and systematic evaluation of research presentations from multiple disciplines on topics related to plant and soil science issues. The course may be repeated once.

COURSE OBJECTIVES

1. Gain experience in preparing manuscripts for publication.
2. Gain experience in writing grants for extramural support.
3. Gain experience in preparing oral presentations of knowledge gained through scientific inquiry.
4. Increase knowledge and appreciation of the diversity of plant and soil science issues and modes of presenting scientific research.
5. Increase scientific interactions between students and faculty on topics related to plant and soil science issues.

METHODS TO MEET OBJECTIVES

1. Practice writing, evaluating, and editing the essential components of research publications.
2. Practice writing, evaluating, and editing the essential components of an extramural grant and participate in generating a group extramural grant.
3. Prepare presentations using computer software programs (e.g. PowerPoint) and/or overheads, and orally present to colleagues.
4. Increase knowledge in plant and soil science issues by attending and evaluating departmental seminars, and multiple other seminars related to plant and soil science.
5. Promote interaction by asking questions and participating in discussions at seminars.

REQUIREMENTS

1. Present a synthesis review of the IPS 625 topic for that semester.
2. Peer-review at least one research manuscript during the semester.
3. Participate in generating a group extramural grant for IPS 625 or submit an independent extramural grant.
4. Attend all departmental seminars during the semester and 8 or more other seminars outside the student's disciplinary area.
5. Evaluate the quality of speaker presentations during the semester.

EVALUATION CRITERIA

	<u>Points</u>
1. Summary Presentation	25
2. Peer-review of manuscript	25
3. Grant preparation	25
4. Seminar Attendance	5
5. Seminar Evaluation/critique	<u>20</u>
Total	100

There is no final exam for this course.

GRADING POLICY

90-100 %	A	Superior
80-89 %	B	Very Good
70-79 %	C	Average
< 70%	E	Fail

STUDENT RESPONSIBILITIES

Prepare a well-organized synthesis presentation. The total time allocated for each presentation will depend on the number of student participants each term, but should last a minimum of 10 minutes with two minutes allocated for questions. This is equivalent to about 10-15 slides. Major sections of the presentation and points that you will be graded on include: Abstract (5), Eye Contact with Audience (5), Voice Projection/Diction (5), Mannerisms/Appearance (5), Timing/Smoothness (5), Accuracy/Editing of Visual Aids (5), Clarity/Quality of Visual Aids (5), Well-explained/self-explanatory Visual Aids (5), Length of Presentation (5), Introduction (10), Body (15), Summary/Conclusions (10), Knowledge of Subject (10), Handling of Questions (10). It is suggested that you keep these criteria in mind while preparing your talk. Presentation quality will be evaluated based on the average score given by students enrolled in the course and faculty in the audience (50:50 ratio). The summary presentation accounts for 25% of the course grade. It is recommended that speakers set up their presentations on their own laptop computer and become familiar with the projection/microphone/laser pointer in PSB 101 sometime during the week of final presentations. Arrangements to reserve PSB 101 and practice your talk can be made by contacting office staff in PSB 105 at 257-5020 ext. 80709. On the day of the presentation, you should arrive early and quickly evaluate your presentation to make sure the system is working properly.

Peer Review of Manuscript. The student will obtain or be given a manuscript for peer review. The student will be expected to evaluate the manuscript from a technical and scientific perspective and write a summary review. The manuscript peer review accounts for 25% of the course grade.

Grant Preparation. During the term students enrolled in IPS 625 will prepare a cooperative grant as the major course requirement. The student will participate in the preparation of that grant (if concurrently enrolled in IPS 625) or has the option of preparing an independent grant. The grant preparation accounts for 25% of the course grade.

Attend all department seminars. Attendance will be monitored by collecting speaker evaluation forms prepared by students enrolled in the course. Each student should bring a pen/pencil and a copy of the evaluation form (one copy is included in the syllabus, make additional copies as needed to obtain credit for attending seminars). Departmental seminars in Plant and Soil Sciences will take place on Friday at either 2:00 or 3:15 pm; for various reasons a seminar might take place at a different time/place or be cancelled altogether. Seminars in other departments will be at variable times. Attendance at departmental seminars accounts for 5% of the course grade.

Formal written excuses, consistent with University regulations, will be required for each absence. University policies for excused absences are specified on the web page entitled Student Rights and Responsibilities <http://www.uky.edu/StudentAffairs/Code/part2.html>.

Evaluate presentation quality at external seminars. Students enrolled in IPS 610 are expected to evaluate the quality of presentations outside the department (a minimum of eight), with the idea that evaluators will gain better insight into what makes a good talk. Students should bring a copy of the speaker evaluation form to each seminar and turn in the completed form to the course instructor each week to obtain full credit for this part of the course. Evaluation criteria are as before.

**This syllabus is modeled after the syllabus for PLS 772 – Section 2 – Soil Science Seminar developed by Elisa D’Angelo (PhD) Department of Plant and Soil Sciences

**TRANS-DISCIPLINARY RESEARCH IN INTEGRATED PLANT AND SOIL
SCIENCES**

**IPS 625 (Section 001) 2 credits
Fall 2010**

Lecture (2 hr): W 3-4:50 Rm 460 PSB

Instructors: M.S. Coyne/ R. L. Houtz/ D. Van Sanford

Office Hours: By appointment

Telephones: 257-4202;257-1982;257-5020

PREREQUISITES

Graduate student status.

COURSE DESCRIPTION

A two-credit course specific to students in the Integrated Plant and Soil Sciences Program. This course is designed to explore the foundations, principles, and philosophies of scientific research in a truly integrative manner with strong emphasis on the value of multidisciplinary approaches to a significant issue in plant and soil sciences. The course may be repeated once.

COURSE OBJECTIVES

1. Instill in students a firm grasp, appreciation, and value of multidisciplinary approaches to important problems in the Plant and Soil Sciences.
2. Have students develop and utilize a philosophical approach to research THAT emphasizes broad relationships and significant overlap between diverse disciplines.

METHODS TO MEET OBJECTIVES

The topic for this class will focus on one particular area of research that is prominent and significant in terms of societal impact or impact in the broad area of plant and soil sciences. The topic will represent a theme that will cover all aspects of plant and soil science education. Speakers will be solicited and recruited from all appropriate areas of research with the ability to integrate into this theme. Both the topic and speakers will be different each year, making this course unique for each student.

Students will:

1. Gain fundamental knowledge by attending lecture presentations.
2. Increase scientific interaction between students and faculty on topics related to crucial issues in plant and soil sciences.
3. Gain skills in interpersonal interactions by participating in open discussions for each topic.
4. Gain skills in the synthesis and presentation of information via collaborative grant-writing and discussion.

REQUIREMENTS

1. Attend all class sessions.
2. Participate in class discussions.
3. As part of a group effort, prepare an extramural grant related to a significant topic addressed during the semester.

EVALUATION CRITERIA

There will be a summary powerpoint presentation of the proposed extramural grant. Additionally students will be required to introduce weekly speakers and summarize the general context of the issues to be discussed.

GRADING POLICY

Grades will be awarded based on the following scale:

90 % or greater	A	Superior
80% to 89.9%	B	Very Good
70% to 79.9%	C	Good
< 70%	E	Fail

STUDENT RIGHTS AND RESPONSIBILITIES

From the Student's Rights and Responsibilities

5.2.4.2 EXCUSED ABSENCES: (US: 11/11/85; 2/9/87; 4/12/04) The following are defined as excused absences:

A. Significant illness of the student or serious illness of a member of the student's household (permanent or campus) or immediate family. The instructor shall have the right to request appropriate verification.

B. The death of a member of the student's household (permanent or campus) or immediate family. The instructor shall have the right to request appropriate verification.

* Children of students are considered members of the immediate family (RC: 11/9/94)

* For the purpose of this rule, immediately family is defined as:

· Spouse or child or parent (guardian) or sibling (all of the previous include steps, halves and in-laws of the same relationship); and

· Grandchild or grandparent (US: 4/12/04)

C. Trips for members of student organizations sponsored by an academic unit, trips for University classes, and trips for participation in intercollegiate athletic events. When feasible, the student must notify the instructor prior to the occurrence of such absences, but in no case shall such notification occur more than one week after the absence. Instructors may request formal notification from appropriate university personnel to document the student's participation in such trips.

* Intercollegiate athletic events include club sports registered with the university as well as varsity sports. (RC: 10/18/00)

D. Major Religious Holidays. Students are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day for adding a class.

E. Any other circumstances which the instructor finds reasonable cause for nonattendance. (US: 4/23/90)

Students missing work due to an excused absence bear the responsibility of informing the instructor about their excused absence within one week following the period of the excused absence (except where prior notification is required), and of making up the missed work. The instructor shall give the student an opportunity to make up the work and/or the exams missed due to an excused absence, and shall do so, if feasible, during the semester in which the absence occurred. (US: 11/10/85 and RC: 11/20/87)

If attendance is required or serves as a criterion for a grade in a course, and if a student has excused absences in excess of one-fifth of the class contact hours for that course, a student shall have the right to petition for a "W", and the faculty member may require the student to petition for a "W" or take an "I" in the course. (US: 2/9/87; RC: 11/20/87)

* If a student has an excused absence on a day when a quiz is given, the instructor may not deny permission for a makeup exam and simply calculate the student's grade on the basis of the remaining requirements. (RC: 8/20/87)

* The language "The instructor shall give the student an opportunity to make up the work and/or the exam missed during an excused absence..." implies the student shall not be penalized for the excused absence. (RC: 8/25/95)

* This rule applies to all graded work. (RC: 1/29/03)

6.3.0 ACADEMIC OFFENSES AND PROCEDURES: Students shall not plagiarize, cheat, or falsify or misuse academic records. (US: 3/7/88; 3/20/89)

6.3.1 **PLAGIARISM** All academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about a question of plagiarism involving their work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgment of the fact, the students are guilty of plagiarism.

Plagiarism includes reproducing someone else's work, whether it be published article, chapter of a book, a paper from a friend or some file, or whatever. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be. Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone.

When a student's assignment involves research in outside sources or information, the student must carefully acknowledge exactly what, where and how he/she has employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain.

6.3.2 **CHEATING** Cheating is defined by its general usage. It includes, but is not limited to, the wrongfully giving, taking, or presenting any information or material by a student with the intent of aiding himself/herself or another on any academic work which is considered in any way in the determination of the final grade. Any question of definition shall be referred to the University Appeals Board.

Tentative Schedule
IPS 625 – Fall 2010
“The Chemical Basis of Life”

Week	Week of	Speaker	Topic
1	Aug 23		
2	Aug 30		
3	Sept 6		
4	Sept 13		
5	Sept 20		
6	Sept 27		
7	Oct 4		
8	Oct 11		
9	Oct 18		
10	Oct 25		
11	Nov 1		
12	Nov 8		
13	Nov 15		
14	Nov 22	Thanksgiving Break	
15	Nov 29		
16	Dec 6	Group presentation – Course Evaluation	
17	Dec 13	Finals Week	

Sample Schedule from 2009

IPS 625 (Taught under PLS 597): Biofuels – Where Are We Going?

Fall 2009

List of Speakers

Week	Date	Speaker/ Topic or Title
1	August 26	Orientation – Discuss class goals
2	Sept 2	Dr. John Grove – Soils Issues Related to Biofuels
3	Sept 9	Dr. Joe Chappell - Botryococcus: Micro-Algal Biofuel Source
4	Sept 16	Dr. Ray Smith – Biofuel/Forage Dual Purpose Species
5	Sept 23	Dr. Michael Montross – Farm level energy production through corn, methane and other biofuels.
6	Sept 30	Dr. David Hildebrand –Meeting Future Energy Needs: From the Big Bang to Biofuels
7	Oct 7	Drs. Todd Pfeiffer, Morris Bitzer, and Mike Barrett Hands on demonstration of sorghum, switchgrass and miscanthus production to be held at Spindletop Farm
8	Oct 14	Dr. Iin Handayani, Murray State University. “Environmental Effects of Palm Oil Production in Indonesia.
9	Oct 21	Dr. Jeff McElroy, Mendel Biotechnology; Mr. Don Halcomb, and John Halcomb, Walnut Grove Farms – “Miscanthus: A Viable Crop for a KY Grain Farmer?”
10	Oct 28	Discussion of grant proposal project required of all students
11	Nov 4	Dr. Mark Crocker, Associate Director Biofuels & Environmental Catalysis Center for Applied Energy Research, University of Kentucky : Biomass Conversion To Biofuels: Thermochemical Options
12	Nov 11	Dr. Chad Lee: Corn based biofuels: what are the future prospects?
13	Nov 18	Dr. Ling Yuan: Engineering Novel Enzymes for Production of Biofuels and Bioproducts
14	Nov 25	University Holiday
15	Dec 2	Student presentations
16	Dec 9	Student presentations

IPSS PROGRAM DISTRIBUTION OF COURSES BASED ON LEARNING OBJECTIVES

Common Courses – Communication and Professionalism (4 hours)

IPS 610
IPS 625
PLS 772 or 773

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 proposed)
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^a</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 470G
PLS 531	PLS 515	FOR 599	BIO 510	PLS 477G
PLS 602	PLS 520	FOR 601	BIO 520	PLS 468G
PLS 664	PLS 525	FOR 602	BIO 615	PLS 566
PLS 676	PLS 605	FOR 609	BIO 632	PLS 567
	PPA 400G	FOR 612	BIO 633	PLS 573
	PPA 640	PLS 650	IBS 607	PLS 575
		PLS 660	PGY 607	PLS 576
			PLS 601	PLS 650
			PLS 609	PLS 660
			PLS 620	PLS 671
			PLS 622	PLS 712
			PLS 623	PLS 741
			PPA 670	
			PPA 671	
			PPA 672	
			PPA 673	

^a 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.

Sample Academic Programs

Option 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

Option 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

Option Plant Biology (Emphasis in Seed Biology) – Total Credit Hours = 37

Common Courses – Communication and Professionalism (4 hours)

IPS 610
IPS 625
PLS 773

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

Option 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

Assessment Plan - Graduate Program in Integrated Plant and Soil Sciences

Graduate Program:

Integrated Plant and Soil Sciences (IPSS) MS and PhD

Contact:

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Inventory of Statements – Graduate Program in Integrated Plant and Soil Sciences (IPSS)

1. Mission Statement

The IPSS Program will provide the motivation and means to accomplish these goals:

- G. Develop a dynamic environment that can evolve interdisciplinary credentials and programs tailored to suit the needs of all graduate students in the plant and soil science disciplines.
- H. Provide a rigorous learning environment that is conducive to success and one that prepares graduates to deal with global issues.
- I. Ensure that students will develop the intellectual, technical, and communication skills needed for their success following graduation.
- J. Create opportunities for visibility and identity for research programs currently without separate graduate identity.
- K. Facilitate interdisciplinary activities by providing an inclusive approach to graduate education.

2. Articulated Learning Outcomes

At the completion of their program students will have achieved these learning outcomes:

1. Will have acquired an extensive knowledge of the sciences and technology that support research, education, and technological innovation in plant, soil, and environmental sciences (Abbreviated as 'Knowledge').
2. Will be conversant with the literature, current concepts, and experimental and analytical methods that support research, teaching, and technological innovation in plant, soil, and environmental sciences, and in their application to agriculture and the environment (Abbreviated as 'Skills').
3. Will have acquired skills in critical and analytical thinking and in communication skills that may be applied to research, education, industry, government, and public service (Abbreviated as 'Communication').
4. Will have acquired those elements of professionalism necessary for rewarding and developing careers in plant, soil, and environmental sciences in research, education, production agriculture, agribusiness, government, and public service ('Professionalism').

3. Methods of Assessing Learning Outcomes

Assessment Plan: Graduate Program in IPSS

1. Baseline Assessment: Incoming graduate students shall be assessed (see attached rubric) during their first semester when they are required to take two common classes (IPS 610 “Trans-Disciplinary Communication in IPSS” and IPS 625 “Trans-Disciplinary Research in IPSS”). Instructors, participating faculty, major advisor(s), and the Director of Graduate Studies (DGS), shall make a baseline assessment of each student by completing and summarizing the assessment rubric. The baseline assessment of graduate students starting in the spring semester shall be determined during the first meeting of the advisory committee.
2. Annual Assessments: For each student, all members of the advisory committee (3+ for M.S. students and 4+ for PhD students), and the Director of Graduate Studies, shall assess progress by completing and summarizing the assessment rubric at the first meeting of the advisory committee and every year as part of the annual review of progress (required by the Graduate School), which must be completed by 31 May each year.
3. Post Qualifying Assessment: Doctoral candidates shall be assessed after the qualifying examination by the members of their graduate committee and the DGS.
4. Assessment at Final Examinations: An assessment of progress of each M.S. and PhD candidate shall be made during or immediately after the final examination by the advisory committee persons.
5. Assessment of Major Artifacts (Theses and Dissertations): The advisory committees and DGS will be asked to provide a summative evaluation of theses and dissertations after they are finalized (see attached Final assessment of Thesis or Dissertation).
6. Post-Graduation Assessment: Graduates and their major advisor shall be asked to complete the assessment rubric one year after completion of program.
7. Annual Summary by Calendar Year: The DGS will collate individual assessments and provide the Associate Dean of Academic Programs with an annual summary of assessments of learning outcomes for the graduate program by 1 July each year.
8. Annual Summary by Academic Year: The DGS will compile metrics to determine progress by the students by year in program (ie. summary of metrics of students in first year, second year students, etc.)

9. Graduate students shall have access to individual assessments (the identity of the individual assessors shall be protected) and have the right to discuss and challenge outcomes consistent with the terms specified for Student Rights and Responsibilities.

The various point-in-time assessments of individual graduate students are related to the artifacts (e.g. presentations, publications, theses, dissertations) they generate at those points-in-time. The progress is largely evaluated on a formative basis during the annual reviews of progress, but also on a summative basis for the purpose of making competitive awards and on a summative basis at the end of a student's program to evaluate the productivity of the program as a whole.

Annual Assessment of Learning

Summary Year 20__

Name: _____

Program: _____ Option: _____

Current GPA _____

Cumulative GPA _____

Outcome* (Score)	Lagging (1)	Progressing (2)	On track (3)	Advanced (4)	Score
Knowledge					
Skills					
Communications					
Professionalism					

*To be completed by the major advisor until the thesis/dissertation committee is formed and then by the members of the thesis/dissertation committee

Summary of Annual Progress

Summary Year 20__

Name: _____

Outcome (Score)	Lagging (1)	Progressing (2)	On track (3)	Advanced (4)	Score
Rate of progress					
Productivity					
Quality					

*To be completed by the major advisor until the thesis/dissertation committee is formed and then by the members of the thesis/dissertation committee

**Annual Review of Progress of Graduate Students in Integrated Plant and Soil
Sciences (IPSS)**

For the Period 1 June 20__ to 31 May 20__

Name: _____ **Date of most recent review:** _____

Research area/thesis/dissertation title:

Advisory Committee: Date submitted to Graduate School: _____
(Graduate Faculty: SOI, PSSC, CRSC, other)

*Role	Core	Graduate Faculty	Status (Full/Assoc)	Department
Chair				
Co-Chair				
Member				
Member				
Member				

*See bulletin for committee composition

Date of start of graduate program: _____

Date of most recent advisory committee meeting: _____

Program Milestones (Complete only those applicable to the respective M.S., PhD, or non-thesis program)

Milestone	Date
Start of program	
Completion of prerequisites, if any	
Formation of advisory committee	
Outline of class program	
Drafting of research proposal	
Completion of required classes	
Scheduling of qualifying examination	
Passing qualifying examination	
Completion of thesis/dissertation	
Scheduling of final examination	
Passing of final examination	
Corrections to dissertation	
Submission of dissertation	
Exit seminar	
Assessment of learning	
Submission of research paper(s)	

Summary of progress in course work:

GPA: Last semester _____ **Cumulative** _____

Seminar activity

Note that seminars may become points of assessment for learning outcomes.

Title of Seminar	Event/Class	Grade (if applicable)

Summary of progress in research:

Summary of progress in thesis/dissertation

Thesis/Dissertation Format Classical [] (ETD) Electronic []

	In Progress	Date Completed
Research Plan		
Review of Literature		
Materials and Methods		
Results		
Data: Tables and Graphs		
Data: Tables and Graphs		
Statistical Analysis		
Discussion		
Summary		
Abstract		
Literature Cited		
Reviewed by Chair		
Reviewed by Committee		

Summary of Productivity Up to 31 May 20__

Publications/Abstracts/Posters

Presentations/Field days

Service activities

Awards/recognitions

Other notables

Recommendations/Requirements/Conditions/Censures:

Other issues relevant to progress towards completion of program (e.g. sickness):

Signatures

Major Advisor: _____ **Date** _____

Co-Major Advisor: _____ **Date** _____
(if applicable)

Student _____ **Date** _____

DGS: _____ **Date** _____

Department chair _____ **Date** _____

Due date: 31 May 20__

Final Assessment of Progress in the Achievement of Learning Outcomes

There will be a final assessment in the progress of individuals to achieving these learning outcomes that will occur during the final thesis/dissertation exam for students in those options. Reports must be completed concurrently with the completion of exam cards.

Final Assessment of Learning

Year 20__

Cumulative GPA _____

Manuscripts Submitted _____

Manuscripts Accepted/Published _____

Presentations Given _____

Society Memberships _____

Certifications _____

Awards _____

Courses/Labs Taught _____

Proposals Submitted _____

Proposals Accepted/Funded _____

External Recognition (specify)

Other (specify)

Thesis/Dissertation Defense

Year 20__

Outcome* (Score)	Poor Lower 25% (1)	Good 25-50% (2)	Superior 50-75% (3)	Excellent Upper 25% (4)	Avg. Score
Knowledge					
Skills					
Communication					
Professionalism					

*Relative to previous students the committee members have evaluated.

Final Assessment of Thesis/Dissertation

Year 20__

Outcome* (Score)	Poor Lower 25% (1)	Good 25-50% (2)	Superior 50-75% (3)	Excellent Upper 25% (4)	Avg. Score
Knowledge					
Skills					
Communication					
Professionalism					

*Relative to previous theses and dissertations the committee members have evaluated.

4. Curriculum Map

In the IPSS graduate program students complete 4 credit hours of required IPSS and PLS courses to reinforce and apply **Communications** and **Professionalism** and a minimum of 20 additional credit hours for the M.S. or 32 credit hours for the PhD. Eighteen of the hours at the PhD level may be waived with evidence of a prior M.S. degree, Nine hours of graduate level course work may be transferred into the program. All M.S. and PhD students must complete a minimum of 18 hours of courses in residence. These hours must include representative basic sciences (e.g. chemistry, biochemistry, physiology), computational courses (e.g. statistics and modeling), and disciplinary courses. The number and composition of the coursework selected is at the discretion of the thesis or dissertation committee. Coursework is designed to reinforce and apply **Knowledge** and **Skills**. The attached curriculum map for graduate level coursework available in Plant and Soil Sciences and Forestry illustrates a suite of courses available to IPSS students to enhance learning in all desired outcomes of the curriculum (**Knowledge, Skills, Communication, Professionalism**).

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
NRC 477G	Land Treatment of Waste	A	A	R	E
PLS 468G	Soil Use and Management	R	A	A	R
PLS 501	Reclamation of Disturbed Land				
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

CLASS	Subject matter	Outcome 1 “Knowledge”	Outcome 2 “Skills”	Outcome 3 “Communications”	Outcome 4 “Professionalism ”
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
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 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 749	Dissertation Research	A	A	A	R
PLS 767	Dissertation Residency Credit				
PLS 768	Residence Credit for Master’s Degree				
PLS 769	Residence Credit for the Doctor’s Degree				
PLS 772	Seminars in Plant and Soil Sciences	R	R	A/E	R
PLS 799	Research in Plant and Soil Sciences	A	A	A	R

5. Assessment Cycle and Assessment Plans

Assessment of each student occurs on an annual basis. Assessment of all learning outcomes will occur on a two- or three-year rotation consistent with the normative time to degree for M.S. and PhD students. During a student's initial orientation to graduate study, or at the time of the first committee meeting (if the student starts in Spring), the methods of assessment will be explained to the student and advisory committee by the DGS or appropriate designee.

Intermediate assessment of progress in the achievement of learning outcomes

There will be one annual assessment in the progress of individuals to achieving the learning outcomes. A detailed rubric is provided for assessing the student by his/her advisory committee and the DGS. At a minimum, the detailed rubric will be completed at the time of the student's first committee meeting, immediately after the qualifying exams (for PhD students), and at the completion of the dissertation defense. The summary assessment will be completed by the DGS. The assessment will be concurrent with the Annual Review of Progress required by the Graduate School. Reports must be completed by 31 May and filed with the relevant departmental office and Associate Dean of Academic Programs' office by 31 May.

Examples of Specific Assessment Criteria for Each Learning Outcome

Knowledge

- Cumulative GPA > 3.0
- Completion and successful defense of an M.S. thesis or PhD dissertation
- Employment involving original and independent teaching, research, or extension

Skills

- External Recognition (e.g. awards, profiles)
- Manuscripts Submitted /Accepted/Published
- Courses/Labs Taught
- Proposals Submitted/Accepted/Funded
- Employment involving original and independent teaching, research, or extension

Communication

- Presentations given
- Manuscripts Submitted /Accepted/Published
- Proposals Submitted/Accepted/Funded
- PhD dissertation completed and accepted

Professionalism

- Society Memberships
- Certifications
- Department/University/Community /Society Committee Service

Assessment Rubric – IPSS Graduate Program Learning Outcome #1 - Knowledge
 “Proficient” (3) to any criteria that you cannot assess.

Student: _____

Assign

Category	Limited proficiency (1)	Some proficiency (2)	Proficient (3)	Highly proficient (4)		Rating
Basic Interest in Science.	Not interested in science.	Limited interest in science.	Interested in sciences that support field.	Interest in many fields of science.		
Knowledge of Fields of Sciences That Contribute to Plant and Soil Science.	Not knowledgeable. Inadequate preparation in undergraduate or graduate courses.	Appropriate at undergraduate but lacking in graduate courses. Probably limited in continuing education.	Adequate knowledge from undergraduate and graduate courses. Would benefit from broader or deeper knowledge of key disciplines.	Excellent comprehension of the fields that encompass Plant and Soil Science.		
Knowledge of Literature in Field	Does not know the literature of the primary journals. Limited to Google search engines.	Familiar with a limited number of scientific journals. Weak knowledge of sources outside USA.	Familiar with a limited number of relevant journals. Limited knowledge of international journals.	Knows the primary journals that contribute to the scientific state of the fields that encompass Plant and Soil Science.		
Knowledge of Leading Research Institutions and Leading Researchers	Ignorant of leading researchers, groups, or institutions.	Familiar with regional programs but less familiar with national programs.	Some knowledge of regional, national, and international programs.	Familiar with many leading researchers and institutions nationally and internationally.		
Familiarity with Computer Technology in Plant and Soil Science	Computer illiterate.	Limited skills. Able to run software packages under supervision.	Good skills but requires some technical support.	Skilled in application of software in many fields in Plant and Soil Science. Capable of using new software packages.		
Environmental Sciences	Unaware	Limited	Aware	Knowledgeable		
				Overall Rating (Max=24)		

Assessment Rubric – IPSS Graduate Program Learning Outcome #2 - Skills Student: _____ Assign
 “Proficient” (3) to any criteria that you cannot assess

Category	Limited proficiency (1)	Some proficiency (2)	Proficient (3)	Highly proficient (4)		Rating
Quantitative Skills	Very limited.	Limited skills.	Satisfactory.	Highly skilled.		
Laboratory Skills	Unskilled/Inept.	Limited to a few routine lab methods.	Acceptable skills that should strengthen.	Skilled in current laboratory techniques and instrumentation.		
Field Research Skills	Unskilled/Inept.	Marginal.	Adequate.	Skilled in current field research techniques.		
Experimental Design and Analysis	Incapable of designing experiments and in the analysis of data.	Limited to data entry and to elementary statistics.	Skilled in the use of at least one statistical package and very capable with support of stats consultant.	Skilled in design and data analysis. User of SAS and other statistical packages.		
Records & Documentation	Poor	Needs improvement.	Adequate.	Excellent.		
Interpretation and Critical Analysis of Research Data.	No capacity to interpret and analyze data correctly.	Limited ability to analyze and interpret research data.	Capable of interpreting familiar research data but needs help in extrapolation.	Highly competent.		
Familiarity With Sources and Capabilities of the Internet as Applicable to Plant and Soil Science	Incapable of using the internet in research applications in Plant and Soil Science.	Has some limited internet user skills but needs technical support.	Possesses skills that apply to job with limited technical support.	Has good internet skills but is not reliant on the internet. Independent of technical support.		
				Overall Rating (Max=28)		

Assessment Rubric – IPSS Graduate Program Learning Outcome #3 - Communication
Assign “Proficient” (3) to any criteria that you cannot assess.

Student: _____

Criteria	Limited proficiency (1)	Some proficiency (2)	Proficient (3)	Highly proficient (4)		Rating
Fundamental Knowledge of Agriculture	Barely familiar with agriculture. Not capable of making a contribution.	Limited knowledge of agriculture and application of specific fields to agriculture.	Understands agriculture and how to contribute to its development.	Very familiar with agriculture in USA and in the world economy		
Originality/Innovation	Not likely to be innovative.	Some “eureka” potential.	Limited innovation in area of specialization; “in the box.”	Generates original ideas and concepts; “out of the box.”		
Action on Ideas	No action likely.	Some action.	Appropriate action.	Acts promptly on ideas.		
Verbal Communication	Inarticulate.	Marginal, but will improve slowly with experience.	Acceptable, but needs to work on presentation skills.	Great communicator.		
Written Communication	Marginal, unlikely to improve.	Marginal, may improve.	Acceptable, will improve	Excellent.		
Research Publications	None.	With assistance/supervision.	Acceptable minimal supervision.	Excellent/Independent.		
Media Skills	Few.	Requires technical help.	Capable of using media as needed.	Capable with many media formats.		
Teaching Skills	No potential as college teacher.	Limited potential as teacher; may be OK at as class or lab TA.	Acceptable teacher; will improve with experience.	Great teacher; candidate in college classes.		
Grant Writing Ability	Incapable of writing sound research proposals.	Has potential to write sound and successful research proposals as a cooperator and with much help from colleagues.	Has potential to write sound and successful research proposals with some assistance from co-investigators.	Has potential to write sound research proposals with high probability of success without experienced co-investigators.		
				Overall Rating (Max=36)		

Assessment Rubric – IPSS Graduate Program Learning Outcome #4 - Professionalism
 Assign “Proficient” (3) to any criteria that you cannot assess.

Student: _____

Criteria	Limited proficiency (1)	Some proficiency (2)	Proficient (3)	Highly proficient (4)		Rating
Ethics	Some question of ethics.	Marginal.	Ethical.	Highly ethical.		
Interpersonal Skills	Introverted loner, not a team player, aggressive.	Somewhat collegial, but little hope for change.	Indications that collegiality will develop favorably with maturation.	Extroverted gregarious team player; collegial and personable.		
Attitude and Bearing	Makes a bad impression of first contact. No indication of chance of improvement with age and experience.	Indicates some potential for improvement with maturity and experience.	Indicates improvement with maturity and experience.	Makes a very positive impression on first contact that is sustained.		
Work Habits	Lazy.	Not very productive.	Productive with moderate output.	Dedicated and industrious with high output.		
Productivity	Low.	Average.	Good.	High.		
Punctuality	Never on time.	Fairly punctual.	Acceptable punctuality.	Punctual.		
Leadership/Mgt Potential	No leadership capability.	Some leadership ability.	Acceptable leadership.	Exceptional leadership.		
Responsibility	Minimal responsibility limited to one’s own.	Marginal responsibility.	Adequate responsibility.	Highly responsible.		
Plagiarism	Prone to plagiarism.	Some unintentional plagiarism.	Not a problem.	Properly cites others.		
Civics	Questionable.	OK, but needs improvement.	Acceptable.	Perfect citizen.		
Maturity	Immature for age.	Improving maturity for age.	Age appropriate maturity.	Mature for age.		
Scientific Associations	None and unfamiliar.	Familiar; no membership.	Familiar; limited membership	Familiar with multiple memberships; active.		
				Overall Rating (48)		

Definitions:

Learning Outcome #1

Basic Interest in Science – Does the student demonstrate an appreciation and understanding of sciences that extends beyond their discipline or specific project?

Knowledge of Fields of Sciences That Contribute to Soil Science – Does the student have knowledge in multiple areas of soil science?

Knowledge of Literature in the Field – To what extent is the student familiar with all information sources related to their area of study?

Knowledge of Leading Research Institutions and Leading Researchers – Does the student know the leading laboratories and programs specific to their area of study?

Familiarity with Computer Technology in Soil Science – Has the student demonstrated familiarity with computers and the most basic software packages?

Environmental Sciences – Is the student familiar with the broad range of environmental sciences that impact or are impacted by Soil Science?

Learning Outcome #2

Quantitative Skills – How adept is the student at mathematical computations, equations, and other routine calculations?

Laboratory Skills – Does the student exhibit familiarity with a wide variety of laboratory skills and competence in their performance?

Field research Skills – Does the student show familiarity with and competence in field studies?

Experimental Design and Analysis – Does the student **understand different experiment designs, comparisons, and statistical analysis?**

Records and Documentation – Does the student keep good, clear, records that enable them to easily document their activities and data?

Interpretation and Critical Analysis of Research Data – Is the student able to evaluate data, understand its implications, and assess its implications?

Familiarity With Sources and Capabilities of the Internet as Applicable to Soil Science – Can the student use internet resources to facilitate both the treatment of data and its assessment?

Learning Outcome #3

Fundamental Knowledge of Agriculture – Does the student demonstrate familiarity with the scope of domestic and international agricultural systems?

Originality/Innovation – **Does the student demonstrate the potential to develop new ideas and find creative applications for old concepts?**

Action on Ideas – **Does the student show evidence of personal motivation or must they be prompted?**

Verbal Communication – **How easy is it for a student to communicate thoughts and concepts verbally to a wide variety of audiences?**

Written Communication – **How easy is it for the student to write easily understood thoughts and concepts to a wide variety of audiences?**

Research Publications – **Has the student published and are they likely to publish on an independent basis?**

Media Skills – **How familiar is the student with developing presentations in various communication media?**

Teaching Skills – **Does the student show the capacity to instruct others in the concepts they have learned?**

Grant Writing Ability – **Does the student show the ability to independently support their work through writing grants for extramural agencies?**

Learning Outcome #4

Ethics – Does the student appreciate and follow established norms of scientific behavior?

Interpersonal Skills – Does the student interact well and contribute to groups as necessary?

Attitude and Bearing – Is the student personable and interactive when appropriate to the situation?

Work habits – Does the student commit the effort required to complete tasks?

Productivity – Does the student produce deliverables as called for in assigned tasks?

Punctuality – Is the student on time when needed?

Leadership/Mgmt Potential – Does the student demonstrate the capacity to coordinate group activities and supervise others?

Responsibility – Can the student be counted on to perform tasks with minimal supervision?

Plagiarism – Does the student understand and avoid plagiarizing other work?

Civics – Does the student demonstrate behavior associated with good citizenship?

Maturity – Does the student act in an age-appropriate manner?

Scientific Associations – Is the student a member of and/or understand the purpose of participating in scientific associations?

The Assessment rubric is currently being evaluated with the most recent PhD candidates in the Soil Science PhD program as well as graduating students in the M.S. in PLS program.