AGRICULTURAL AND ENVIRONMENTAL PLANT SCIENCE (AEPS)

AEPS 502: Current Issues in Agricultural Innovation

2 Credits

Current Issues in Agricultural Innovation was designed to expose students to a broad overview of modern agricultural research topics and to consider how Scientific, Ethical, Legal and Social Issues impact their adoption. In this class, we will explore how modern agricultural technologies, particularly those related to cropping systems and plant-based foods, can provide substantial economic and nutritional benefits, while simultaneously reducing risks to the environment and human health generated by agricultural practices. We will also explore the risks of agricultural innovations and potential problems associated with them. Agriculture research and science innovation often intersect with ethical considerations and this theme will be one of the main topics and also dispersed throughout each of the class meetings. We will examine the social dimensions of scientific research and technology development. This includes reading and discussing work on how social contexts influence scientific research and technology diffusion, on variations among the public and expert on perceptions of research and technology risks, on differences between public and private research institutions, and on validity and integrity in regulatory systems.

AEPS 510: Ecology of Agricultural Systems

3 Credits

This course overviews current research on agroecological processed and management for long-term agricultural sustainability and ecosystem services given current and emerging issues such as population growth and climate change. Emphasis is placed on learning via reading and discussing the recent agricultural and agroecological scientific literature. Students gain experience critically analyzing scientific papers and theories and develop scientific communication and teaching skills through presentations and facilitation of class discussion. Students also briefly present their graduate research and facilitate discussion of one article that they select for the class to read.

Prerequisite: BIOL 546 or HORT 445 or the equivalent (Classic Ecology, Population Ecology or Plant Ecology)

AEPS 515: Professional Development for the Plant Sciences

3 Credits

Graduate students in the Plant Sciences receive excellent exposure and training in their field of expertise. However, in today's competitive and diverse job market, successful students will also benefit from exposure to professional development, career exploration, and leadership training. In addition to providing discussion-based content related to professional development, this product-oriented course will introduce students to tools and skills and provide space for practice and reflection. After completing this course, students will be able to: 1) Get the most benefit from their graduate program, 2) Identify possible future careers, and 3) Position themselves to be prepared and competitive for their chosen profession. Thus, this course will aid students as they both adjust to new expectations in Graduate School and actively navigate a path towards the career of their choice.

AEPS 555: Effective Scientific Communications

3 Credits

Students will learn to effectively present their research to scientific and non-scientific audiences. The overall goal of the course is to develop student skills in spoken and written communication of scientific concepts, methods, and data, and to provide effective evidence-based recommendations for practical application of such knowledge. In addition, students will develop skills in writing testable hypotheses, evaluating experimental approaches, considering alternative approaches, and envisioning expected outcomes of a research plan.

AEPS 573: Interpreting Data from Experiments with Quantitative Treatments

3 Credits

Interpreting Data from Experiments with Quantitative Treatments (AEPS 573) is an applied regression course that employs statistical analysis in the context of agricultural/horticultural experimentation. Analytical approaches include: descriptive statistics, data distribution(s), data graphing/representation, correlation, least squares linear regression, general linear models, mixed linear models, generalized linear mixed models, non-linear regression models, and discrete response regression models. Graphical techniques are demonstrated to identify unusual observations and recognize relationships. Discussions will focus on identifying the best models with linear, polynomial, and multiple linear regression techniques for data obtained from both observational and designed experiments. Fixed and/or mixed model approaches will be used for experiments with designs and treatment structures common to agricultural and horticultural experiments, such as blocked designs, and factorial and augmented factorial treatment structures. Analysis of covariance will be discussed in detail to include situations with homogeneous and nonhomogeneous slopes and factorial experiments involving repeated measures and/or additional indicator variables. Analysis of covariance will also be presented as an alternative to blocking. Practical applications of nonlinear and logistic regression methods will also be discussed.

Prerequisites: AEPS 808; ENT 535; STAT 500

AEPS 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars that consist of a series of individual lectures by faculty, students, or outside speakers.

AEPS 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

AEPS 600: Thesis Research

1-15 Credits/Maximum of 15

No description

AEPS 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description

AEPS 602: Supervised Experience in College Teaching

1-3 Credits/Maximum of 6

Supervised experience in teaching and orientation to other selected aspects of the profession at The Pennsylvania State University.

AEPS 610: Thesis Research Off-Campus

1-15 Credits/Maximum of 999

No description.

AEPS 808: Applied Computational Analysis

3 Credits/Maximum of 999

Comprehensive appraisal of designs for field, greenhouse, and growth-chamber experiments; and techniques for data collection, analysis, inference, and presentation. This course provides practical guidance in effective design, management, and interpretation of parametric experimentation by agricultural, environmental, and/or horticultural researchers. After successfully completing the course, students will be able to: define and specify appropriate experimental designs for field, greenhouse, and growth chamber research with consideration of the planned hypotheses, methodologies, and available resources; interpret/classify types of response data, describe components of experimental error and develop sampling/data collection strategies for control of error, bias, and confounding. Students will demonstrate proficiency in data organization and pre-processing for computational analysis; distinguish the required assumptions of analysis of variance (ANOVA), describe procedures to assess and resolve initially noncompliant data sets; implement software code for data analysis by experimental design; invoke appropriate mean separations, contrast statements, covariate structures, and linear estimators as necessary to optimize inference; employ software output to construct tables/figures that clearly depict sources/parameters/statistics; and construct line-, bar-, or scatter-plot graphs to describe mean response and/or significant trends/differences. The objective of Applied Computational Analysis is to expand the student's ability to conduct research through proficient experimental design, methodology, data analysis, and results inference.

AEPS 851: Applied Plant Population Biology

3 Credits

The course is designed to give potential superintendents and managers of large land holdings (such as golf courses, highway roadsides, game lands, military installations) and areas surrounding agricultural operations), the skills necessary for making sound ecological decisions regarding the choice and management of plant materials utilized in agriculture, land restoration and revegetation.