Lab Methods for Plant Pathology Research PLPM 590

Instructor/Coordinator

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Introduction: The course will be taught 1 day a week (Tuesday) for 18 weeks of spring semester in alternate years beginning 2015. This course is 2 cr with length of class for each day (3-4 hours).

This course is for graduate students. It teaches students basic laboratory methods used for plant pathology research with hand-on experience. These methods are commonly used by plant pathologists in industry or research institutes to conduct studies related to plant pathogens or plant diseases. The course is coordinated by Dr. XB Yang and offered by faculty of department of Plant Pathology and Microbiology. A faculty members in the department will teach one or two topics of his/her expertise.

Goal: From this course, the students will learn the basic laboratory skills and be able independently to conduct basic plant pathology experiments when they are employed to work in laboratories or research units for seed companies, chemical companies or academic institutes.

Objectives: Following objectives are established for this course

1. Learn laboratory skills for plant nematodes
2. Learn laboratory skills for isolation and storage of fungal pathogens.
3. Learn laboratory skills for plant virus
4. Learn laboratory skills for plant bacteria
5. Learn basic molecular laboratory skills for DNA/RNA study for plant pathogens.
6. Learn quantitative skills for disease evaluation and data analysis.

Prerequisite: Students are required to have certain knowledge of plant pathology or microbiology. It is preferred that they have taken at least one plant pathology related course: such as Principle Plant Pathology PLPM408, Practical Plant Health PLPM391.

Topics of lab methods: The course consists of nine laboratory methods (see below). Each lab method will be offered as one section. Duration of each section is two weeks with one day in each week. Class in the first week will be used to teach a lab method or experiment protocol, following by conducting an experiment by students. For some lab methods, periodical observations are expected following the establishment of a test. In the second week, results will be summarized, and analyzed. In some sections, a discussion of the results may be held.

7. Basic methods for conducting plant nematode research -(extracting nematode from soil or plant tissues; Alternative topic: staining plant roots to visualize plant-parasitic nematodes within (Instructors: Tylka and Baum)
8. Culturing sugar beet cyst nematode on Arabidopsis in vitro (Instructors: Tylka and Baum)
9. Single spore isolation technique for culture and storage of plant pathogenic fungi (Instructor: Leandro)
10. In vitro methods to determine antagonism effects of biological agents against fungal pathogens (Instructor: Yang)
11. Quantitative methods to inoculate plants with fungal and bacterial plant pathogens” (Instructor: Nutter)
12. Barcode diagnostics for fungi (DNA extraction, PCR, electrophoresis, PCR product preparation, analysis of sequence electropherograms) (Instructor: Harrington)
14. Seed health testing methods: extraction and isolation of fungi and bacteria from seeds; Alternative topic: extraction/enrichment of pathogen DNA/RNA from seeds (Instructor: Munkvold)
15. Methods for long-term storage of pathogenic fungi for plant pathology research (Instructor: Yang)

**Assignment:** Students are expected to complete the procedure/experiment of a laboratory method by groups or by individuals depending on the topic to be taught. Some sections have tasks requiring periodical observations, data collection, and data analysis.

**Textbook and notes:** Protocols of a laboratory method or experiment is prepared by instructors of each lab method and will be provided at class.

**Academic Dishonesty**

The class will follow Iowa State University’s policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office. http://www.dso.iastate.edu/ja/academic/misconduct.html

**Disability Accommodation**

Iowa State University complies with the Americans with Disabilities Act and Sect 504 of the Rehabilitation Act. If you have a disability and anticipate needing accommodations in this course, please contact Dr. Carpenter or Dr. Miller to set up a meeting within the first two weeks of the semester or as soon as you become aware of your need. Before meeting with the instructors, you will need to obtain a SAAR form with recommendations for accommodations from the Disability Resources Office, located in Room 1076 on the main floor of the Student Services Building. Their telephone number is 515-294-7220 or email disabilityresources@iastate.edu. Retroactive requests for accommodations will not be honored.

**Dead Week**
This class follows the Iowa State University Dead Week policy as noted in section 10.6.4 of the Faculty Handbook http://www.provost.iastate.edu/resources/faculty-handbook.

Harassment and Discrimination

Iowa State University strives to maintain our campus as a place of work and study for faculty, staff, and students that is free of all forms of prohibited discrimination and harassment based upon race, ethnicity, sex (including sexual assault), pregnancy, color, religion, national origin, physical or mental disability, age, marital status, sexual orientation, gender identity, genetic information, or status as a U.S. veteran. Any student who has concerns about such behavior should contact his/her instructor, Student Assistance at 515-294-1020 or email dso-sas@iastate.edu, or the Office of Equal Opportunity and Compliance at 515-294-7612.

Religious Accommodation

If an academic or work requirement conflicts with your religious practices and/or observances, you may request reasonable accommodations. Your request must be in writing, and your instructor or supervisor will review the request. You or your instructor may also seek assistance from the Dean of Students Office or the Office of Equal Opportunity and Compliance.

Contact Information

If you are experiencing, or have experienced, a problem with any of the above issues, email academicissues@iastate.edu.