

## PLNT 4570 Research Methods in Plant Pathology

### Term II - January - April

#### Instructors

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#### Goals

This course will provide a practical training in the field of plant pathology. Students will learn plant disease diagnosis, pathogen isolation, identification, inoculation and storage. Some of the molecular techniques currently used in the study of plant pathogens will be covered. The course has a large laboratory component to prepare the student for a professional career in plant protection and research in plant pathology.

#### Prerequisite

At least one course in plant pathology or consent of instructor.

#### Support materials

- No mandatory textbook.

- Suggested books:

- Plant Pathology: concepts and laboratory exercises. R.N. Trigiano, M.T. Windham and A.S. Windham, CRC Press 2003
- Plant Pathology, 5 th Edition. G. Agrios. Academic Press, San Diego, CA. 2005.
- Methods for evaluating plant fungicides, nematicides and bactericides The American Phytopathological Society (1978)
- Seed Treatment by K.A. Jeffs, British Crop Protection Council, 1986
- Soilborne plant pathogens by G.W. Bruehl 1986, MacMillan Publishing Company ( New York)
- Laboratory guide for identification of plant pathogenic bacteria. N.W. Shaad. APS Press, St. Paul, MN, 1980
- Assess: software for plant disease quantification. L. Lamari. APS Press, St. Paul, MN, 2002 [teaching version, provided by instructor]

#### Course content

The following topics will be covered through case studies, lectures, and discussions (not necessarily in the same order)

- Review of basic concepts in plant pathology
- Pathogen isolation, culturing and storage
- Soil-borne pathogens
- Foliar pathogens
- Obligate parasites
- Seed-borne pathogens
- Host-specific toxins: production, assay and genetics
- Molecular approaches in plant pathology
- Disease quantification: traditional techniques and digital image analysis
- Fungicides in disease control

Laboratory case studies may include:

- Aseptic techniques, media preparation, culturing of bacteria and fungi
- Soil-borne pathogens: Isolation, inoculum preparation, inoculation and disease evaluation
- Foliar pathogens: Isolation, identification, inoculum preparation, inoculation and disease assessment
- Infection process: observation of infection structures
- Detection of pathogens using PCR
- Disease assessment: training in visual and computer-assisted plant disease quantification (image analysis)
- pathogen's dose-response to fungicides
- Host-specific toxins
- Chromatography analysis of plant responses to diseases

### Evaluation

- Project: 40% (report 20% + presentation 20%)  
Students will carry out a project on a selected topic (topics provided by instructors).
- Paper presentations: 20%. Each student will read, prepare and present two assigned papers.
- Laboratory book: 20%. Lab books will be provided by the instructors. Students will log all their work on these books and keep them up to date.
- Final oral examination: 20%

#	Topic	%
01	Project	40
02	Paper presentations	20
03	Laboratory book	20
04	Final oral examination	20
	TOTAL	100%

### General Academic Regulations

Students are reminded to familiarize themselves with general academic regulations and policy of the University of Manitoba (see University Calendar) and in particular those sections dealing with plagiarism and cheating, and examinations-personation. These are serious offences which can lead to academic suspension or expulsion.

Please note that assignments, reports, or exams which are illegible or poorly written may be subject to refusal or deduction of the final grade.

### Project

Information about the project will be given to students.