Course Syllabus: Plant Pathology 7002 (formerly 702)

Plant Disease Epidemiology
Spring Semester 2014

Instructor: Laurence V. Madden (Dept. of Plant Pathology; madden.1@osu.edu; 330-263-3839)

Credits: 3 semester hours

Description: An introduction to the study of the population dynamics of plant diseases and the analysis of plant disease epidemics.

14 weeks, Spring Semester (alternate, even years)

Prerequisites: STAT 5301 (Intermediate Data Analysis 1) or equivalent; PLNTPTH 3001 and 3002 (General Plant Pathology Lecture and Lab) or 6001 (Advanced Plant Pathology), or equivalent.

Text: Readings from:
1) The Study of Plant Disease Epidemics, by L. V. Madden, G. Hughes, and F. van den Bosch (2007);
2) Various book chapters and journal articles.

Students are expected to have access to a personal computer, and either MINITAB, SAS, or other appropriate statistical software

Website: http://www.oardc.ohio-state.edu/pp702/default.htm

Course Learning Goals and Outcomes:
Goal 1: Understand how plant disease epidemics occur in nature and how they can be monitored and analyzed.
   Outcome 1.1: Use statistical procedures for quantifying and comparing epidemics.
   Outcome 1.2: Explain how epidemiology is used to set the strategy of plant disease control.
   Outcome 1.3: Determine how plant diseases develop temporally and spatially in populations using simple mathematical models.
   Outcome 1.4: Describe how to predict crop loss.

The student’s understanding of these learning goals and outcomes will be assessed through the use of scheduled exams and writing assignments (using specifically aligned grading rubrics).

Grading: TWO TESTS (INCLUDING FINAL), PLUS ASSIGNMENTS = 100%

   FIRST TEST: 30%
   FINAL: 35%
   THREE HOMEWORK PROBLEM ASSIGNMENTS: 35% (TOTAL FOR ASSIGNMENTS)
### Schedule/Calendar (approximate):  

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
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| Week 1 | **Introduction to botanical epidemiology.**  
          History of plant disease epidemiology, and definition of key terms. |
| Week 2 | **Measuring plant disease** and plant host, and monitoring epidemics; precision and accuracy; metrics for precision and accuracy. |
| Week 3 | CONTINUE: Measuring plant disease and plant host, and monitoring epidemics; precision and accuracy; metrics for precision and accuracy. |
| Week 4 | **Introduction to data analysis, especially regression analysis.** |
| Week 5 | *(First assignment due by end of week 5)***  
          **Disease Progress over time:** Concepts of monocyclic and polycyclic epidemics; models for disease progress over time; analysis of disease progress curves; epidemics and plant disease control. |
| Week 6 | CONTINUE: Disease Progress over time: Concepts of monocyclic and polycyclic epidemics; models for disease progress over time; analysis of disease progress curves; epidemics and plant disease control. |
| Week 7 | CONTINUE: Disease Progress over time: Concepts of monocyclic and polycyclic epidemics; models for disease progress over time; analysis of disease progress curves; epidemics and plant disease control. |
| Week 8 | **Mid-term test.**  
          **Advanced topics in disease progress over time:** asymptotes, thresholds, components of disease, basic reproduction number; control implications. |
| Week 9 | CONTINUE: Advanced topics in disease progress over time: asymptotes, thresholds, components of disease, basic reproduction number; control implications. |
| Week 10| CONTINUE: Advanced topics in disease progress over time: asymptotes, thresholds, components of disease, basic reproduction number; control implications.  
          **Disease Progress in space:** Concepts for dispersal and spread; types of spread; models for disease gradients; analysis and comparison of gradients; control |
| Week 11| *(Second assignment due by middle of week 11)***  
          CONTINUE: Disease Progress in space: Concepts for dispersal and spread; types of spread; models for disease gradients; analysis and comparison of gradients; control implications |
| Week 12| CONTINUE: Disease Progress in space: Concepts for dispersal and spread; types of spread; models for disease gradients; analysis and comparison of gradients; control implications |
| Week 13| **Spatial patterns of epidemics:** concepts of dispersion and aggregation, and scale of aggregation; statistical distributions of disease incidence; analysis of spatial patterns and interpretation of results; sampling for incidence |
| Week 14| *(Third assignment due by Wednesday of week 14)***  
          **Crop loss assessment:** plant disease epidemics and resulting crop losses; models for crop losses; linkages between epidemiology and crop physiology; prediction of losses |
| Week 15| Final examination* |

* Exact dates for assignments and tests will be announced during the semester.  
**Assignments:** Three data-analytical problem assignments that involve the analysis of plant disease
epidemics and the interpretation of the results. Analysis is performed using MINITAB, SAS, other appropriate statistical software, or specialized programs. Students must write reports (in WORD) where they explain their results.

**Grading Scale:**

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<tr>
<th>Percentage</th>
<th>Grade</th>
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<tbody>
<tr>
<td>92% - 100%</td>
<td>A</td>
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<tr>
<td>89% - 91%</td>
<td>A-</td>
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<tr>
<td>86% - 88%</td>
<td>B+</td>
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<td>82% - 85%</td>
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<td>79% - 81%</td>
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<td>76% - 78%</td>
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<td>&lt;59%</td>
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**OSU: Academic Integrity, Academic Misconduct**

Academic misconduct may be found in any action that tends to distort the accurate assessment of any student’s individual accomplishments that are evaluated for the purpose of grading or conferring academic credit. Note that a student may be guilty of academic misconduct, for example, by cheating, collaborating, plagiarizing, or by allowing another student to cheat, collaborate, or plagiarize. Note also that the distortion applies, for example, to exams, homework assignments, and laboratory work. To the extent that any class activity (for example: attendance or participation) is used for evaluation for the purpose of grading or conferring academic credit, falsifying or distorting such activity, or permitting another student to falsify or distort such activity, represents academic misconduct.

**OSU: Academic integrity resources**

Additional guidance about what represents academic integrity and misconduct, and related university-wide policies and procedures.

**Video:** [OSU Academic Integrity video](#) The university has developed an excellent short video on the seriousness of this subject.

**OSU Committee on Academic Misconduct**

- COAM Frequently Asked Questions
- Ten Suggestions for Preserving Academic Integrity

**OSU Code of Student Conduct**

**OSU Student Advocacy Center**

**OSU Office of Academic Affairs**
Course-specific exceptions or amplifications to the departmental and university statements outlined above will be provided by the faculty instructor in writing, preferably as part of the course syllabus.

**Note:** Students should not request nor accept guidance on these matters from a teaching assistant, fellow student, or anyone other than the faculty instructor of record for this course.

**OSU Disabilities Statement**

Any student who feels s/he may need an accommodation based on the effect of a disability should contact the Office for Disability Services to coordinate reasonable accommodations for documented disabilities.

**OSU Office of Disability Services contact**

Web: [Office of Disability Services](#)

Phone: 614-292-3307  
VRS: 614-429-1334

Location:  
150 Pomerene Hall  
1760 Neil Ave.  
Columbus, OH 43210

Advice on such matters is also available from the MSE department’s undergraduate advisor (1xx-6xx courses) and graduate coordinator (7xx-9xx courses) whose offices may be found in room 477 Watts Hall.