I. General Information

AGRN 374 (Diseases of Economic Plants) is a 3 credit hour course focusing on “Identification of agricultural plant diseases; biology of common plant pathogens; pathogen-plant interactions; fungicide classification and use; management of plant diseases through chemical cultural, biological and mechanical control methods.”

Prerequisite: AGRN 373 – Integrated Pest Management

Lecture: MW 9:00-9:50 a.m., Knoblauch 152
Lab: Th 8:00-9:50 a.m., Knoblauch 226

Instructor: Dr. Mark Bernards
227 Knoblauch Hall
Tele: 309-298-1569
Mobile: 309-313-5917
Email: ml-bernards@wiu.edu

Office Hours: M 12:00-12:50 p.m.; T 9:00-9:50 a.m., Th 11:00-11:50 a.m., F 10:00-10:50 a.m. or by appointment.

Required Text:
Additional readings will be made available through Western Online or the Internet.

Recommended Text:

References:

II. University Policies and Expectations

Student rights and responsibilities: A complete description is available at www.wiu.edu/provost/students.

Academic Integrity (http://www.wiu.edu/policies/acintegrity.php): Western Illinois University, like all communities, functions best when its members treat one another with honesty, fairness, respect, and trust. . . It is the student’s responsibility to be informed and to abide by all University regulations and policies on Academic Integrity. Plagiarism, cheating, and other forms of academic dishonesty constitute a serious violation of University conduct regulations. Students who engage in dishonesty in any form shall
be charged with academic dishonesty... Any student, faculty member, or staff person who has witnessed an apparent act of student academic dishonesty, or has information that reasonably leads to the conclusion that such an act has occurred or has been attempted, has an ethical responsibility for reporting said act(s).

The policy for AGRN 374: Any confirmed act of academic dishonesty (especially plagiarism or cheating) will result in the loss of all points associated with that assignment, and may result in an “F” for the course.

Non-Discrimination (http://www.wiu.edu/policies/affirmact.php): Western Illinois University is committed to providing equal opportunity and an educational and work environment for its students, faculty, and staff that is free from discrimination based on sex, race, color, sexual orientation, gender identity and gender expression, religion, age, marital status, national origin, disability, or veteran status.

Disabilities: In accordance with University policy and the Americans with Disabilities Act (ADA), academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. For the instructor to provide the proper accommodation(s) you must obtain documentation of the need for an accommodation through Disability Resource Center (DRC) and provide it to the instructor. It is imperative that you take the initiative to bring such needs to the instructor’s attention, as he/she is not legally permitted to inquire about such particular needs of students. Students who may require special assistance in emergency evacuations (i.e. fire, tornado, etc.) should contact the instructor as to the most appropriate procedures to follow in such an emergency. Contact Disability Resource Center (DRC) at 298-2512 for additional services.

Education Majors: The changes within the state certification requirements go into effect immediately for all of those students who graduate in the spring 2012 and after. You are required to receive a grade of a “C” or better in this course. With the new university +/- grading system, receiving a “C-” or below will require you to retake this course or find a substitute course to meet School of Agriculture graduation requirements.

III. Course Expectations and Policies

1. Live the Golden Rule. Treat others with respect and courtesy in your conversation and actions. Turn off and put away electronic devices during the class period unless directed to use them for class activities. Class is not the time to read the newspaper or magazines.
2. Show up. Attendance and punctuality is expected. Notify the instructor in advance if you have any reason to miss a class period through the O.A.R.S system (http://wiu.edu/oars). A minimum of 24 h notice (email or phone) is required if there is any cause to miss an exam or quiz. If you do miss a class period, do not ask the instructor “Did I miss anything important?” It is your responsibility to make arrangements to get the information you missed and to make up any missed assignments.
3. Participate. Be prepared for class discussions by completing readings, taking notes, asking questions, and working effectively with other students on lecture activities.
4. Study. You should plan to spend a minimum of 5 hours outside of class each week to adequately learn the material.
5. Complete assignments. Assignments not turned in on the assigned date will have 10% of the total potential points deducted for each day after the due date. The instructor will generally return exams and assignments within 1 week.
6. The use of tobacco is prohibited in Knoblauch Hall.

Two dismissals due to disruptive or unprofessional behavior will result in a permanent disbarment from the course and a final grade of “F” will be assigned.

IV. Grading

Attendance will be factored into the grade. Each student will be allowed 2 “vacation” days (for funerals, interviews, overslept, etc). Absences that exceed “2” will result in the lowering of the grade one step for each absence (e.g., B+ to B). Absence for WIU-sanctioned activities like
livestock judging competitions will not count against the “vacation” days. Absence due to illness will be evaluated on a case-by-case basis and will not count against the vacation days.

<table>
<thead>
<tr>
<th>Grade components</th>
<th>Portion*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams</td>
<td>42%</td>
</tr>
<tr>
<td>Term Paper and Presentation</td>
<td>24%</td>
</tr>
<tr>
<td>Other Assignments</td>
<td>15%</td>
</tr>
<tr>
<td>Participation/Preparedness</td>
<td>5%</td>
</tr>
<tr>
<td>Final exam</td>
<td>14%</td>
</tr>
</tbody>
</table>

*These percentages are subject to modification. However, changes will be discussed during a class lecture prior to being implemented.

V. Learning Assessment

Exams: A 20-30 question quiz will be given at least once every three weeks. Quizzes will include multiple choice, fill in the blank, true-false, matching and short essay questions and will cover material.

Term Paper: Each student will submit a written report on a selected plant pathogen. Details are described below.

Assignments: There will be assignments associated with lecture topics that will be designed to help you better understand the material and benefit from resources you can use after you graduate from WIU. Assignments will be graded on completeness and/or accuracy, and will include short answer or short writing assignment formats.

Preparedness: Each student will receive points based on their attendance and preparedness for class lectures and discussions. Readings/exercises will be assigned prior to many lectures. The expectation is that you will have completed those activities so you are prepared to participate in class discussion and application of the material. Preparedness quizzes may be administered unannounced.

Final Exam: The final exam will be comprehensive, and will include multiple choice, matching, fill in the blank, true-false and short essay questions.

VI. Course Objectives

At the conclusion of this course, it is expected that you will be able to:
1. Define plant disease and explain the various causes of plant disease.
2. Provide examples of how plant diseases negatively affect individuals and society.
3. Explain the disease triangle and the factors necessary for a disease to develop and spread.
4. Diagram disease cycles for bacteria, fungi, nematodes, viruses and parasitic plants.
5. Demonstrate how understanding a plant disease cycle enables one to better identify and manage the disease, including its survival and spread.
6. Diagnose the disease causing pathogen (fungi, bacteria, virus, nematode or parasitic plant) based on symptoms and signs evident on the diseased plant and the corresponding environmental factors.
7. Diagnose the disease-causing abiotic factors based on plant symptoms and environmental factors.
8. Identify at least 30 important diseases of crops and landscaping plants common in the United States (and particularly the Midwest) based on symptoms, signs and/or environmental factors.
9. Explain how plants defend themselves against pathogens and how pathogens overcome those defenses.
10. Explain how people influence the spread of plant disease epidemics.
11. Describe strategies available for preventing or minimizing the damage caused by plant pathogens or abiotic factors.
12. Differentiate among classes of fungicides and their strengths and weaknesses with regards to controlling various disease-causing organisms.
13. Calculate correct rates of fungicides for application, and describe the optimal way to apply those fungicides to maximize their efficacy in managing disease.
14. Formulate disease management strategies to prevent or minimize disease epidemics, especially of diseases common to crops or vegetation grown in the Midwestern U.S.
15. Identify, locate and review scientific literature pertaining to plant disease management. Organize this information in the preparation of a disease summary that will enable other students to learn how to identify and manage it.

VII. Presentation and Term Paper

The purpose of the presentation and term paper is to introduce you to some of the scientific literature in the field of Applied Plant Pathology AND to give you experience writing in the discipline. Both presentation and term paper need to have proper grammar, correct spelling, follow logical thought sequences and provide accurate, up-to-date technical information. A list of potential pathogens will be provided the first day of class. If there is a particular pathogen that you are interested in that is not on the list, you may propose that to the instructor. Pathogens must be selected by Jan 22.

Presentation

You are to prepare a 7-10 minute class presentation about your chosen pest in PowerPoint. The presentation should enable the other students in the class to:

1) Give the proper nomenclature associated with the disease (common name and Latin binomial, if applicable).
2) Explain why/when/where the disease is significant.
3) Correctly identify the disease.
4) Describe conditions necessary for the disease to develop and spread, including a general description of the life cycle.
5) Recommend effective ways to manage the disease.

The presentation will be evaluated based on its content (30 point), visual appeal (10 pt), and delivery (effectiveness at achieving the above learning objectives) (10 pt). You may have your presentation reviewed by the instructor prior to presenting it by scheduling a visit during office hours.

Paper

Perspective

Your paper must be written in first person. You are to assume the identity of the plant pathogen. The disease name that we recognize is the response of the plant to the pathogen. Your paper will be more successful if you really imagine yourself as the pathogen in your writing. This is an opportunity to be creative.

Paper Works Cited

You must cite a minimum of 4 referred journal articles and 4 websites or media articles. Papers that do not include the required references will be returned without being graded. One of your referred publications must be a recent report (published within last 5 years). At least one of your
websites or non-referred articles must be an Extension publication.

For the purposes of this paper a refereed publication is a technical scientific publication (e.g. Phytopathology Journal, Plant Disease, Plant Disease Reporter, etc.) where the author(s)' work is sent to other experts (usually 2 or 3) to determine if the paper is worthy of publication. Industry publications, nursery catalogs, Extension publications, textbooks, book chapters, world wide web, videos, CDs, and other general publications contain very useful information and may also be “reviewed” but will not be considered a referred journal publication.

Whenever you describe information that you learned from a source you should cite the reference. In the text you should end the sentence(s) by using the following format (Author(s) Year of publication). Example: (Jackson et al. 2011). At the conclusion of the paper there should be a Major subheading titled “Works Cited.” For all articles it is critical that you have the journal name, volume number, and page numbers or the unique “doi” number for online-only journals. The references should be arranged alphabetically by the first author’s last name.

Journal article (for journals published both in print and online)
Author(s) (Year of publication) Title. Journal name Vol #:page #s.

Journal article (published online only)

Web article from a newsletter
Author(s) (Year) Title. Newsletter name, Publisher. Website address. Date accessed.

Web article from company or other organization (no listed author)
Publisher of website. (Year of posting [if known]) Title. Website address. Date accessed.

Book
Author(s) or Editors (Year) Title. City: Publisher.

Book chapter or section
Author (Year) Chapter (or section) title. Pages #–# in Name(s) ed. Book title. City: Publisher.

Paper Formatting
Margins: 1" left, right, top and bottom
Text: All text must be Times 12 point
Title: Times 12 point Bold (double space to author)
Author: Times italic 12 point (double space to text body)
Major Subheadings: Center Bold
Minor Subheadings: Left justified
Indent all paragraphs 0.5"
References in works cited should have a 0.5” hanging indent.
Rough Drafts: text body double space.

Sections
The paper will be prepared in three sections. Each section will be evaluated and returned.
Suggested changes should be included on all subsequent submissions. Below are questions to
guide you in what information to include, and will be the basis for the “content” evaluation.

1. Nomenclature, History and Economic Significance. (Must include at least 4 references, including
   at least 1 extension and 1 peer review journal article)
   a. What is your Common name and scientific name, including author (Genus species of any
      organism must be in italics)
   b. What Kingdom and Phylum do you belong to?
   c. What is your history? When did humans first describe you? What plants do you infect? Where
      in the world do you occur?
   d. What diseases are you similar to? Are there other organisms in your genus that also cause
      plant diseases?
   e. How frequently do you cause economic losses? How do you damage the plant to cause
      economic losses? What is your impact on society?

2. Identification and Biology. (Must include at least 6 references, including at least 1 extension and 3
   peer review journal article)
   a. What symptoms are expressed by the plants you infect?
   b. What are the signs that you produce, i.e., what do you, the organism look like? Do you
      assume different aliases (appearances) in different portions of your life cycle? What do each
      of those look like?
   c. What is your life cycle? How do you get into the plants to infect them? How do you grow
      once you are in the plant? How do you reproduce? How do you survive between infections?
   d. What are the environmental conditions you need in order to infect plants? Are there ways
      plants fight back to prevent you from entering?

3. Recent knowledge and Management (Must include at least 8 references, including at least 1
   extension and 4 peer review journal article)
   a. What has science recently learned about you? Summarize a peer-review study(or studies) –
      what did the scientists test or try on you and what did they show them.
   b. What are your weaknesses that people can exploit in order to prevent you from infecting their
      plants, i.e., if someone wanted to stop you from causing problems, how should they do it? Do
      you have any tricks for thwarting their management strategies?

Evaluation
First submissions of each section:
   Content – 10 pt
   Formatting – 5 pt
   Spelling – 5 pt
   Grammar – 5 pt
   Works Cited (formatted correctly) – 5 pt
   Copy of previous submission (with Sections 2 & 3) – 5 pt
   Made changes from previous submission (Sections 2 & 3) – 10 pt

Final Draft:
   Readability – 10 pt (Is it well written, easy to understand, and pleasant to read?)
   Content – 10 pt
   Formatting – 5 pt
   Spelling – 5 pt
   Grammar – 5 pt
   Works Cited (formatted correctly) – 5 pt
Included copy of reviewed 3rd submission – 5 pt  
Made changes recommended in review of 3rd submission – 10 pt

**Due Dates**

Section 1 – Feb 10  
Section 2 – Feb 27  
Section 3 – Mar 20  
Final Draft – April 21

**Extra Credit opportunity**

You may earn up to 10% of the value of the section in extra credit on each section by visiting the University Writing Center prior to submitting the each section. Please ask them for feedback on organization, sentence structure and clarity. To get the points, you need to bring evidence of having visited the Writing Center.

“The University Writing Center is available to assist you with general and specific questions on writing assigned in any discipline and at any academic level. The one-on-one assistance available at the University Writing Center is valuable for generating ideas, talking about global-level issues such as organization, and even working through grammatical problems. The University Writing Center is located in Malpass Library (3rd floor, west side). Call for an appointment (298-2815) and be sure to bring a copy of your assignment.”

**VII. Probable Course Calendar**

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture Topics</th>
<th>Reading Assign.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 13</td>
<td>Introduction, Syllabus, Course Expectations</td>
<td></td>
</tr>
<tr>
<td>Jan 15</td>
<td>A Brief History of Plant Disease, Applying the Disease Triangle</td>
<td>pp. 1-8</td>
</tr>
<tr>
<td>Jan 16</td>
<td>Koch’s Postulates and Disease Cycles, Disease Cycle Assignment</td>
<td>pp. 8-16</td>
</tr>
<tr>
<td>Jan 20</td>
<td>No Class. Martin Luther King Day.</td>
<td></td>
</tr>
<tr>
<td>Jan 22</td>
<td>Reading scientific articles; paper assignment; model presentation</td>
<td>Posted article</td>
</tr>
<tr>
<td>Jan 23</td>
<td>Library tour – Search tools to obtain peer-review articles and other useful information</td>
<td></td>
</tr>
<tr>
<td>Jan 27</td>
<td>Disease Symptoms</td>
<td>pp. 143-149</td>
</tr>
<tr>
<td>Jan 29</td>
<td>Disease Symptoms</td>
<td>pp. 149-161</td>
</tr>
<tr>
<td>Jan 30</td>
<td>Disease Symptoms and Diagnosis</td>
<td>pp. 161-171</td>
</tr>
<tr>
<td>Feb 3</td>
<td>Exam 1, Disease Management</td>
<td>Online lesson</td>
</tr>
<tr>
<td>Feb 5</td>
<td>No class – Disease Management</td>
<td>Online lesson</td>
</tr>
<tr>
<td>Feb 6</td>
<td>No class</td>
<td>Online lesson</td>
</tr>
<tr>
<td>Feb 10</td>
<td>Review Exam 1, Disease Management discussion</td>
<td>pp. 257-291</td>
</tr>
<tr>
<td>Feb 12</td>
<td>No class. Lincoln’s Birthday</td>
<td></td>
</tr>
<tr>
<td>Feb 13</td>
<td>Disease Management Case Studies</td>
<td></td>
</tr>
<tr>
<td>Feb 17</td>
<td>What are Fungi?</td>
<td>pp. 21-26</td>
</tr>
<tr>
<td>Feb 19</td>
<td>True Fungi</td>
<td>pp. 26-31</td>
</tr>
<tr>
<td>Feb 20</td>
<td>Structures and Life Cycles of True Fungi</td>
<td>pp. 39-45</td>
</tr>
<tr>
<td>Feb 24</td>
<td>Exam 2, Plant Pathogens formerly classified as Fungi; Survival and Spread</td>
<td>pp. 31-35</td>
</tr>
<tr>
<td>Feb 26</td>
<td>Review Exam 2; Key fungal diseases (student presentations)</td>
<td></td>
</tr>
<tr>
<td>Feb 27</td>
<td>Fungal disease diagnosis; Key fungal diseases (student presentations)</td>
<td>pp. 35-37</td>
</tr>
<tr>
<td>Mar 3</td>
<td>Nematodes biology, classification, signs and symptoms</td>
<td>pp. 69-75</td>
</tr>
<tr>
<td>Mar 5</td>
<td>Nematode survival &amp; spread, Key nematode diseases (student presentations)</td>
<td>pp. 75-76</td>
</tr>
<tr>
<td>Mar 6</td>
<td>Nematode diagnosis and management; Exam 3</td>
<td>pp. 77-83</td>
</tr>
<tr>
<td>Date</td>
<td>Event</td>
<td>Notes</td>
</tr>
<tr>
<td>----------</td>
<td>------------------------------------------------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>Mar 10-14</td>
<td><strong>No class – Spring Break.</strong></td>
<td></td>
</tr>
<tr>
<td>Mar 17</td>
<td><em>Review Exam 3; Fungicide terminology and classification</em></td>
<td>FCF, pp. 3-7</td>
</tr>
<tr>
<td>Mar 19</td>
<td>Fungicide Resistance and Fungicide Mode of Action</td>
<td>FCF, pp. 13-28</td>
</tr>
<tr>
<td>Mar 20</td>
<td>Fungicide Mode of Action and Fungicide Selection</td>
<td></td>
</tr>
<tr>
<td>Mar 24</td>
<td>Kurt Maertens, BASF – Plant disease management employment in industry/Current trends for plant disease management with fungicides and nematicides</td>
<td></td>
</tr>
<tr>
<td>Mar 26</td>
<td>Dr. Angie Peltier, Climate change and disease/University recommendations for effectively using fungicides</td>
<td></td>
</tr>
<tr>
<td>Mar 27</td>
<td>Fungicide Safety and Calculations</td>
<td></td>
</tr>
<tr>
<td>Mar 31</td>
<td><em>Exam 4; Bacteria Jeopardy 1</em></td>
<td>pp. 51-56</td>
</tr>
<tr>
<td>Apr 2</td>
<td><em>Review Exam 4; Bacteria Jeopardy 2</em></td>
<td>pp. 57-65</td>
</tr>
<tr>
<td>Apr 3</td>
<td>Bacterial disease management; Key bacterial diseases <em>(student presentations)</em></td>
<td></td>
</tr>
<tr>
<td>Apr 7</td>
<td>What are Viruses?</td>
<td>pp. 87-92</td>
</tr>
<tr>
<td>Apr 9</td>
<td>Virus survival and spread, Key viral diseases <em>(student presentations)</em></td>
<td>pp. 93-96</td>
</tr>
<tr>
<td>Apr 10</td>
<td>Virus diagnosis and management</td>
<td>pp. 96-104</td>
</tr>
<tr>
<td>Apr 14</td>
<td><em>Exam 5; Abiotic diseases diagnosis 1</em></td>
<td>pp. 121-138</td>
</tr>
<tr>
<td>Apr 16</td>
<td><em>Review Exam 5; Abiotic diseases diagnosis 2</em></td>
<td>pp. 121-138</td>
</tr>
<tr>
<td>Apr 17</td>
<td>Dr. Thomas Green, Abiotic diseases of trees</td>
<td></td>
</tr>
<tr>
<td>Apr 21</td>
<td>Parasitic plants</td>
<td>pp. 109-118</td>
</tr>
<tr>
<td>Apr 23</td>
<td>Ecological interactions of plants and pathogens</td>
<td>pp. 181-195</td>
</tr>
<tr>
<td>Apr 24</td>
<td>Pathogen Attack, Plant Defense</td>
<td>pp. 197-209</td>
</tr>
<tr>
<td>Apr 28</td>
<td>Genetic interactions between plants and pathogens</td>
<td>pp. 211-225</td>
</tr>
<tr>
<td>Apr 30</td>
<td><em>Exam 6; Predicting plant diseases</em></td>
<td>pp. 229-238</td>
</tr>
<tr>
<td>May 1</td>
<td><em>Review Exam 6; Disease models and management risks</em></td>
<td>pp. 238-253</td>
</tr>
<tr>
<td>May 7</td>
<td><strong>Final Exam, 8 a.m.</strong></td>
<td></td>
</tr>
</tbody>
</table>