BTNY 446: Integrated Plant Health Management For Ornamental Plants

Course Objectives:
To give students basic knowledge and experience in recognizing and diagnosing symptoms and signs of plant disease and insect damage and identifying the causal agents.

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Prof. Sadof; Smith B-1A; 494-5983; csadof@purdue.edu

Introduction: Within Indiana, and the United States, the Green Industry is a loose affiliation of nursery, greenhouse, landscape, floriculture, arboriculture, and turf grass professionals. Within these professional realms, tremendous overlap exists between plant materials and approaches to managing plant health problems. It is not uncommon for plants started in the greenhouse to be shipped to nurseries and retail outlets, planted in landscapes, and managed by arborists or lawn care companies. The objective of this course is to provide students with a basis for recognizing, diagnosing, and managing insect and disease problems of the greenhouse, nursery, and urban forest landscapes. In the process we will integrate general principles of botany, horticulture, plant pathology, and entomology.

Level: This is a senior level course, introducing students to integrated plant health management. It is designed for those students in urban forestry, horticulture and turf management who want a one-semester course on integrated plant health diagnosis and management. Students are expected to develop the problem-solving processes used by plant health practitioners to apply to their plant health problems. This goal will be pursued primarily in the classroom through the teaching method. It is obvious that daily preparation by the student is as integral to this class as preparation by the instructor.

Textbook: Course Package Available at Boiler Copy Center and on line via Blackboard Vista. All students are required to have a hard copy for class and lab.

Students are also strongly encouraged to obtain some combination of the following books.

Recommended Text and Reference Material


Supplemental Reading: Will be available

Preparation: In accord with University philosophy, you should anticipate spending a minimum of six (6) hours/week outside of class in study, preparation, and other activities related to this three (3) unit course.

<table>
<thead>
<tr>
<th>If your course is:</th>
<th>Time for reading the assigned text (per week)</th>
<th>Time for homework or laboratory assignments (per week)</th>
<th>Time for review and test preparation (average per week)</th>
<th>Total study time (per week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 credit hours</td>
<td>1 to 2 hours</td>
<td>2-4 hours</td>
<td>2 hours</td>
<td>6-9 hours</td>
</tr>
<tr>
<td>4 credit hours</td>
<td>3 to 4 hours</td>
<td>3-5 hours</td>
<td>3 hours</td>
<td>8-12 hours</td>
</tr>
</tbody>
</table>

Web study pages/on-line syllabus: This course is supported by Extension briefs, Web-Study Pages and the textbook. These pages are provided to assist the student with pre-class preparation, in-class note taking, and post-class review.

Note Cards: Each student will be provided with a stack of index cards. During the student’s preparation time prior to each class, the student will write one or more questions on a card that the student would like to have answered in class. Students are responsible for signing and turning in each card before class if they want cards to count towards potential extra credit.

In some classes the cards will be redistributed at random at the end of the class.
  - Students may be asked to indicate whether they feel the questions on the cards were answered.
  - Students may be asked to write a quiz question based on the day’s class on the back of the card for the next class meeting.

These cards are a very important communication device between the students and us, and are used to assess the level of pre-class preparation and how well the concepts of the class are being internalized by the student. **A student who fails to turn in a card prior to class**
will not be recorded as in attendance. Being present and being prepared are two distinct states. While attendance is not mandatory, it is used at the end of the semester as an indicator of student commitment to learning, therefore serves a guide for determining extra credit. While non-attending students are not penalized for non-attendance, they will not be given extra consideration for improving their grades.

**Attendance:** You are expected to be present for every class and laboratory. It is your responsibility to arrange for obtaining handouts. Lecture note outlines will be available on the BTNY/ENTM 446 web site for you to download and bring to class. As there are numerous studies showing a very strong correlation between attendance and higher scores, attendance will be scored for extra credit at a rate of 1-2 points per class, at my discretion. Attendance will be scored through the use of index cards that are turned in at the beginning of each class. Should attendance levels dip to an unsatisfactory level, bonus cards (gold = 10 extra credit; silver= 5 extra credit) will be called at the beginning of class and will only apply to those students present when offered. Late-comers, regardless of reason, will not be provided this opportunity for extra-credit.

**Office Hours:** We will be available after each class to answer questions, and in lab. Also, bring questions to class; if you don’t understand a point, other students probably don’t either. As both your professors have extension appointments, we are often not in the office on non-class days, and we don’t maintain scheduled office hours; however, we are happy to make appointments as needed. E-mail to both of us is also an easy way to reach us to set up a meeting or to ask questions.

**Laboratory:** The laboratory will emphasize principles and concepts of integrated plant health management through field trips, demonstrations, and hands-on exercises using living organisms and prepared specimens. You will be working primarily in pairs or small groups. Due to the annual occurrence of autumn, students are STRONGLY encouraged to begin collecting laboratory specimens early and during laboratory sessions, and independently. Students are expected to use these specimens later in the semester when we cover specific pest and pathogen topics. Students are expected to bring at least three (and up to five) appropriate specimens for each laboratory session (e.g., insects problems for insect labs, and pathogen problems for disease labs). Students are encouraged to complete these lab handouts during regular scheduled laboratory sessions. Starting in October, students will be expected to utilize these collections for laboratory assignments. At least 75% of individuals’ collection is expected to be their own. Failure to return a laboratory later than Thursday at 12 pm (unless otherwise noted) will result in a reduction of points (25% after noon on Thursday, 50% by Friday, and 100% by Monday). We know everyone has off moments; therefore, students receive only one pass, one time, to this rule.

**Plagiarism:** The Merriam-Webster dictionary defines plagiarism as the act or process where you “steal and pass off (the ideas or words of another) as one’s own: use (another’s production) without crediting the source; to commit literary theft: present as new and original an idea or product derived from an existing source.” Purdue has an outstanding website titled: Avoiding Plagiarism at:
http://owlenglish.purdue.edu/handouts/research/r_plagiar.html
Plagiarized labs or assignments will receive a zero, and students will be referred to the Dean of Students for disciplinary action.

**Cheating and Academic Dishonesty:** Students involved in academic dishonesty may receive a failing grade in the course, with the case referred to the Dean of Students for possible further disciplinary action. This action may range from academic probation to expulsion from Purdue with encumbered records (meaning that your credit at Purdue is not transferable to any other institution—ever). Students supplying materials in a dishonesty case are as guilty as those receiving the materials. If you are not clear on this subject, please review University Regulations Section III-B at [http://www.purdue.edu/ODOS/osrr/conductcode.htm](http://www.purdue.edu/ODOS/osrr/conductcode.htm)

**Exams and Grading:** There will be three scheduled exams (given during the lecture sessions), plus a final. The final exam will cover material after the third exam, as well as previous material. Questions on the exams will come from the lecture material, assigned readings, if any, and principles learned in lab exercises. Exam questions will be T/F, fill-in-blank, multiple choice, and matching, as well as short answer questions. Questions will come from turned in note cards, the back of the book chapters, laboratory questions, etc. **All exams are held during the laboratory section to provide additional time for completion.**

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Range ( % )</th>
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<tbody>
<tr>
<td>A+</td>
<td>97 - 100</td>
</tr>
<tr>
<td>A</td>
<td>94 - 96</td>
</tr>
<tr>
<td>A-</td>
<td>90 - 93</td>
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<tr>
<td>B+</td>
<td>87 - 89</td>
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<tr>
<td>B</td>
<td>84 - 86</td>
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<tr>
<td>B-</td>
<td>80 - 83</td>
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<tr>
<td>C+</td>
<td>77 - 79</td>
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<td>C</td>
<td>74 - 76</td>
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<tr>
<td>C-</td>
<td>70 - 73</td>
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<tr>
<td>D+</td>
<td>67 - 69</td>
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<tr>
<td>D</td>
<td>65 - 66</td>
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<tr>
<td>D-</td>
<td>63 - 64</td>
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<tr>
<td>F</td>
<td>0 - 64</td>
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**Method of Evaluation or Assessment:**

**Plant Health Management Profile:** 150 points; An extension style brief focusing on one insect or disease problem (See attached template). For graduate students, a more comprehensive literature review of the problem is required, with a published bulletin.

**Topic Selection:** *(Due September 14) 10/150 points.* During the first month of class and looking at landscapes we want you to think about possible topics. Please list 5 topics in order of preference on an 8 x 11 sheet of paper during lab on the due date. **These must be ornamental pests on ornamental crops.** In order to avoid multiple students handing in the same topic we will assign each student their topic by the following week.

**Outline and Principle References** *(Due October 17) 10/150 points* In order to encourage you to write this from scratch, we encourage you to use the topic headings on the Plant Health Brief Template to organize your outline. Then we expect you to list at least 5 references that you will consult while writing. References should be formatted as per the Reference List included in Blackboard. We will review the references to be sure that they are appropriate. Acceptable references include Text books, Trade Journal Articles and University Cooperative Extension, or Recognized Expert Web sites. Unacceptable references include
Advertisements, and self appointed experts (e.g. Grandma and Grandpa Smith’s Garden Advice Column), and on-line Q&A services (e.g., Ask Jeeves, Ask.com, etc.) (10 Points).

**First Draft (Due November 7) 40/150 points**

Submitting the first draft will allow us to give you feedback on the appropriateness of the writing, and images. This quick review will be sure that your efforts are proceeding in a direction that will result in a bulletin that is up to professional standards. During this time we will be checking to be sure that you have not simply “googled” a related publication and edited it until it looked like you wrote it yourself. **You will lose the entire 40 points if you simply give us a string of edited google blurbs of if you fail to follow the advice we gave you on your outline about references.** We will send you our feedback by November 21.

**Final Draft (Due December 7) (90/150 points)**

We expect you to incorporate and respond to our suggestions and produce a useful professional bulletin. If you disagree with our suggestions you are welcome to discuss them with us before November 30. **You will lose the entire 90 points if you simply give us a string of edited google blurbs.**

**Laboratory Worksheets** (200 pts): Worksheets are due at the beginning of laboratory one week after each lab. To improve field diagnosis students are encouraged to bring in specimens related to each week’s lab worksheet. When applicable this can be as much as 25% of the week’s laboratory.

**Exams** 300 pts = 100 pts X 3 Exams: These exams will be a combination of short answer and multiple choice. They will be taken in class and completed during the laboratory period.

**Final:** 100 point comprehensive final. Please note that the final exam is required unless a student is receiving an A prior to taking the final exam. The final exam will be given at the time slot scheduled to be for this class in accordance with University policy. No exceptions.

750 pt total

**Make-up Exam Policy:** You are expected to make every possible effort to take exams on the assigned day and time. There will be no make-up exams unless you make arrangements with us prior to the exam. No Exceptions. Call us and leave a phone message or send us an e-mail message if you are ill the day of the exam or quiz. Let us know in advance when you will be away on field trips for other classes. Written documentation of the doctor’s care will be requested. Extenuating circumstances are handled individually and must be reported immediately.

Grades will be posted on Blackboard and continually updated.

<table>
<thead>
<tr>
<th>Exam Schedule</th>
<th>points</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Lecture Exam</td>
<td>100</td>
<td>September 21</td>
</tr>
<tr>
<td>Second Lecture Exam</td>
<td>100</td>
<td>October 12</td>
</tr>
</tbody>
</table>
Third Lecture Exam 100 November 9
Final Exam 100 Exam Week (December)

Of the four exams (including the final), the lowest exam score will be dropped. Unless the student is receiving an A prior to the final exam, the final must be taken.

Removing Barriers for Differently-Abled Students: Students with disabilities must be registered with Adaptive Programs in the Office of the Dean of Students before classroom accommodations can be provided. If you are eligible for academic adjustments because you have a documented disability that will impact your work in this class, please schedule an appointment with us as soon as possible to discuss your needs and what can be done to assist you.

BTNY/ENTM 446 Web Site: All course information will be available via Blackboard (www.itap.purdue.edu/tlt/ecourses/). Login in to Vista and select the BTNY/ENTM446 link.

Tips for Success:
To be successful in BTNY/ENTM 446, and in any other college level course, you must be proactive. Earning the grade means you have to do the work. You may find the following study tips useful:

1. **Attend lecture** regularly, **concentrate** on what is being said, try to understand what is being explained (much easier now than later) and if you don’t understand, **ask questions** right away.

2. **As you complete each lecture, identify and write out each objective covered.** Many find it helpful to write each objective on one side of a note card and then write the answer on the back. Studies show that people learn material faster and retain it longer if that information is written by hand, or even better, written and spoken aloud, rather than just read. In other words, combine visual memory, muscle memory (writing), and auditory memory. The more senses you use, the better you remember.

3. **Note cards** are effective learning tools. Note cards aren’t going to impress a potential date (unless they are really into note cards), but neither does flunking out. Again, studies show that people learn material faster and retain it longer if that information is written by hand, or even better, written and spoken aloud, rather than just read. In other words, combine visual memory, muscle memory (writing), and auditory memory (Sound familiar?). The more senses you use, the better you remember. Note cards force you to do all of this.

4. **Do not cram!** The number one reason why students do not successfully complete this course is procrastination! You must set up a **regular weekly study schedule** in a location free of distractions and stick to that study schedule. However, **make the schedule reasonable.** Most studies suggest studying any one subject for no more than 1.5 hrs. **Break this down into three 30 min sections,** stretch, **take a walk or nap. Study the information in small, regular amounts,** maybe one or two hours at a time, and then **review** the accumulated information weekly. Before you take the exam, review all material a final time.
until you feel confident. Don’t forget to develop a note card with questions for the review section! Again, studies show that in doing this, you spend less total time studying and you retain the information longer.

**6. Get a good night’s sleep before any exam.** Students who fall asleep during an exam generally perform poorly (and their snoring disturbs the students around them, in addition to subjecting them to the remaining semester of ridicule by their peers). Studying while exhausted does not improve your test score.

**7. Retention:** To remember the information, write and rewrite the answers to the objectives, say it aloud to yourself, explain it aloud to yourself - or a patient friend, devise clue words to remember important points, use word associations, create visual pictures or images in your mind of the topic and the clue words you are studying, create acronyms and abbreviations for lists of information, etc. In other words, be creative rather than using rote repetition.

To help you understand and learn the material presented in the Lecture, the associated course website provides the lecture (in Powerpoint), and an extensive series of **illustrations, animations, photomicrographs, electron micrographs**, and links to other related plant pathology sites on the web. These are to be used hand-in-hand with the Lecture and text book to illustrate and enable you to visualize many of the principles discussed. **Make use of these visual aids!**

8. After you feel you understand the information, study with a friend or small study group - but only after you think you understand the material. Explaining the material to others helps you remember it better and catches any misinformation you may have learned.

**It is important to note that there may be unforeseen circumstances that may require a change in plans. We reserve the right to change the syllabus during the semester depending on time, circumstance, and interest.** Should this change be required, an announcement of this will be made in class and on the course Web site. You will be responsible for all announcements made in either of these ways; thus, if you miss class you are encouraged to view Blackboard course page to see whether the syllabus or readings have been updated or assignment due dates have been changed. Although you received a paper syllabus in class on day one, you should consider the online version of our syllabus to be the binding one.

**Course Outline of Topics/Syllabus:** We reserve the right to make adjustments and change the schedule as needed.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>22-Aug</td>
<td>A systematic approach to insect problem diagnosis</td>
<td>Chapter 1 and 2</td>
</tr>
<tr>
<td>24-Aug</td>
<td>A systematic approach to plant disease diagnosis</td>
<td>Chapter 5</td>
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<tr>
<td></td>
<td><strong>Lab: Campus tour for scouting and diagnosis.</strong></td>
<td></td>
</tr>
<tr>
<td>29-Aug</td>
<td>Pest management tactics (cultural, mechanical, biological, chemical)— Janna Disease</td>
<td></td>
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</tbody>
</table>
31-Aug Pest management tactics (cultural, mechanical, biological, chemical)—Cliff Insects
Lab Sampling and Scouting Landscape and Turf

5-Sep Labor Day Holiday

7-Sep Abiotic disorders—Cliff
Lab: Pesticide Labels, Safety and Calibration

12-Sep Fungicides—Janna

14-Sep Insecticides—Cliff
Lab: Local Nursery tour of Pest Problems

Health Brief Topics Must Be Approved

19-Sep Foliar insect problems (basic concepts, caterpillars)
Chapter 6

21-Sep Foliar insect problems (lacebugs, spider mites)
Chapter 6

Lab: Exam on Basic Concepts (Through 14-Sept)

26-Sep Foliar insect problems (leaf weevils, leaf miners aphids and leafhoppers)
Chapter 6

28-Sep Foliar insect problems (sawflies and beetles)
Chapter 6

Lab: Foliar Insects

3-Oct Foliar disease problems (powdery mildews, leaf spots, needlecasts)
Chapter 6

5-Oct Foliar disease (rusts, leaf curls, anthracnose)
Chapter 6

Lab: Foliar Disease

10-Oct Fall Break - No Classes

12-Oct Stem disease (wilts and galls)
Chapter 7

Lab: Exam on Foliar Problems (15 Sept – 5 Oct)

17-Oct Stem disease problems (canker rots, canker rusts)
Chapter 7

Health Brief Outlines Due

19-Oct Stem disease problems (cankers, shoot blights)
Chapter 7

Lab: Stem Diseases

25-Oct Stem insect problems (scales galls twig chewers)
Chapter 7

27-Oct Stem insect problems (Trunk borers EAB and others)
Lab: Stem Insects

31-Oct Root rot (Armillaria, Rhizoctonia, Thielaviopsis)
Chapter 8

2-Nov Root rot (Pythium, Phytophthora)

Lab: Root Rot Lab

7-Nov Root Feeding insects (fungus gnats, weevils, grubs)
Fungus gnat bulletin

Health Brief First Drafts Due

9-Nov Insects of turf
Handout E-61

Lab: Exam on Stem and Root Problems (12 Oct- 7 Nov)

14-Nov Nematodes pests of Ornamentals (foliar, RKN, Dagger, etc)

16-Nov Nematodes and biological control agents. pests—Lab: Nematode Video and Nematode Lab

21-Nov Vertebrate Pests

23-Nov No Class Thanksgiving break

28-Nov Viruses and Insect Vectored Diseases
Chapters 6,8

30-Nov Integrated greenhouse management (Virus diseases in ornamentals/ thrips, whitefly, fungus gnats) Lab: Greenhouse tour
Handouts-Check

5-Dec Exotic Invasives in the ornamental industry
Blackboard

7-Dec Review for Comprehensive Final Exam
Health Brief Final Drafts Due
Handouts-Check

Lab: Q&A about Comprehensive Final Exam