

## PLP 3002: Fundamentals of Plant Pathology, Fall 2016

**COURSE INSTRUCTOR: Dr. Brantlee Spakes Richter**

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**Office Hours: Wednesdays 9:30am-11:30am, or by appointment**

**LABORATORY SUPPORT: Rosanne Healy ([rhealy1@ufl.edu](mailto:rhealy1@ufl.edu))**

**TEACHING ASSISTANTS: Shamsun Naher, ([snaher1981@ufl.edu](mailto:snaher1981@ufl.edu)), James Orrock ([jorrock90@ufl.edu](mailto:jorrock90@ufl.edu))**

**COURSE:** Fundamentals of Plant Pathology (PLP 3002C) and General Plant Pathology (PLP 5005C) are taught with concurrent lectures. Undergraduates are enrolled in PLP 3002, while Graduate and DPM students are encouraged to enroll in PLP 5005, so that they can receive graduate credits for the class. Lectures are the same for both courses, but the exams and grading structures are different; students enrolled in PLP 5005 are required to participate in additional discussions within the lab, have additional assignments beyond the requirements of PLP3002, and have slightly different exams, reflecting the higher expectations for graduate level study.

**PREREQUISITE:** BOT 2010 or BSC 2010

**CREDITS:** 4

**COURSE WEB SITE (Canvas): <https://lss.at.ufl.edu/>**

**CLASS TIME/LOCATION:**

Lectures: 2316 Fifield Hall, Tuesday and Thursday period 4 @ 10:40-11:30 am

Labs: 2306 Fifield Hall, Tuesday (sec. 3931) or Wednesday (sec. 6959), Periods 6-8 @ 12:50-3:50 pm

**TEXT:** Plant Pathology 5th Ed. (2005) by G. N. Agrios, Elsevier Academic Press, Inc. (The 4<sup>th</sup> edition of this book is also acceptable; published by Academic Press, Inc. NY.)

**INTRODUCTION & OBJECTIVES:** Plant pathology is the science of plant diseases, the microorganisms that cause them, and their interactions. The ultimate goal of plant pathology is to reduce the losses caused by plant diseases, thereby increasing quality and quantity of plant yields. Plant diseases are caused by many of the same types of organisms that cause diseases in animals and humans and, as such, many of the principles that apply to animal and human medicine apply to plant diseases. This course introduces students to the many different types of plant pathogens, their basic biology, examples of the types of disease they cause, and the basic principles and concepts of disease development, spread, and management. The learning objectives of this course are:

1. This course will provide students with a solid, foundational understanding of disease cycles, host-pathogen interactions, and pathogen biology, sufficient to prepare them for higher-level coursework in plant pathology and/or entry-level positions in plant health related employment.
2. Students are expected to attain adequate mastery of vocabulary in the subject that they can converse effectively with plant pathologists about disease problems, adequate familiarity with the resources and conventions of the field that they can locate and understand information about plant diseases, and adequate comprehension of the mechanisms underlying disease that they can effectively use those information sources to solve problems that they will encounter in their own fields of work.

**ATTENDANCE:** You are expected to participate in every class and laboratory, and there will be weekly quizzes and/or class activities which will contribute to your course grade. Missed activity grades may only be made up for excused absences, at the discretion of the instructor. Absences due to illness or emergency will be excused; documentation may be requested (doctor's note, accident report, etc.). Absences due to observation of religious holidays or participation in official university functions will be excused *only with advance notice*. Absences due to personal planning (ie, planning to be somewhere other than class during class time) will not be excused, and missed points may not be made up. There will be no make-up lab sessions. If you know in advance that you must miss a lab meeting with an excused absence, you may make arrangements to attend the other section, or to view the materials outside of the lab period (contingent upon specific lab exercise; some materials are time-sensitive and cannot be saved). If you miss a lab due to illness or emergency, it is your responsibility to contact the instructor before the end of the class time on Thursday; most laboratory materials are discarded at the end of Thursday's graduate lab/discussion session, and will no longer be available for your observation. Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

**LABORATORY:** The laboratory will emphasize principles and concepts of plant pathology through demonstrations and hands-on exercises using living organisms and prepared specimens. Labs will typically include an introduction to the lab exercise, work with demonstration materials, and a “deliverable” to be handed in either at the end of the session or the beginning of the subsequent session. You are strongly advised to keep all laboratory hand-outs and assignments in a designated lab notebook, and bring all previous hand-outs to every class. Many of the lab exercises extend over several lab and class periods, and you will be expected to have your hand-outs and notes at each stage of the activity.

**EXAMS AND GRADING:** There will be a total of 700 possible points, as follows:

Component	Points
Exam 1	100
Exam 2	100
Exam 3	100
Final Exam (Comprehensive)	150
Class Participation	50
Lab Assignments	100
Lab Exam	100
<b>TOTAL</b>	<b>700</b>

**Exams:** There will be four lecture exams (three mid-term exams and a final) and one laboratory exam. Exams 1-3 are not comprehensive; each will focus on material from the preceding set of lectures and supporting labs. The laboratory and final exams will be comprehensive, covering material from the entire semester. **The final lecture examination (Exam Group 14A) is scheduled for 7:30 – 9:30 AM, Wednesday, December 14,** in room 2316 Fifield. The lab exam will be held during your last regularly scheduled laboratory session, November 29 or 30.

**Participation:** The class participation grade will come from periodic in-class quizzes and attendance checks. Quizzes will be unannounced, open-book, and will typically be given during the first 5 minutes of class time. Late arrivals will not be given extra time to complete the quiz, and there will be no make-up quizzes for unexcused absences or very-late arrivals.

**Lab Assignments:** Laboratory assignments will be given with each lab exercise. There will be 10 assignments, worth 10 points each. Most will be due at the end of the lab period, but a few will require time outside of class to complete and will be due at the beginning of the following lab session. Late submissions will receive half credit.

**Grade Scale:** Final grades will be designated according to the following grade scale. This course uses the grade book function in Canvas for records-keeping and grade calculation; grades will be calculated on a percentage basis, but total course points associated with each percentage are given here for your convenience. For information on current UF policies for assigning grade points, see: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Letter Grade	Percentage	Points
A	92.00 – 100	644 – 700
A-	90.00 – 91.99	630 – 643
B+	88.00 – 89.99	616 – 629
B	82.00 – 87.99	574 – 615
B-	80.00 – 81.99	560 – 573
C+	78.00 – 79.99	546 – 559
C	72.00 – 77.99	504 – 545
C-	70.00 – 71.99	490 – 503
D+	68.00 – 69.99	476 – 489
D	62.00 – 67.99	434 – 475
D-	60.00 – 61.99	420 – 433
E	00.00 – 59.99	644 – 419

## **ACADEMIC HONESTY**

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following pledge: *"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."* You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."*

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see:

<http://www.dso.ufl.edu/SCCR/honorcodes/honorcode.php>.

## **SOFTWARE USE**

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

## **CAMPUS HELPING RESOURCES**

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, [www.counseling.ufl.edu/cwc/](http://www.counseling.ufl.edu/cwc/)*
  - Counseling Services
  - Groups and Workshops
  - Outreach and Consultation
  - Self-Help Library
  - Training Programs
  - Community Provider Database
- *Career Resource Center, First Floor JWRU, 392-1601, [www.crc.ufl.edu/](http://www.crc.ufl.edu/)*

**Services for Students with Disabilities**, 0001 Reid Hall, 352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation

**THE INSTRUCTOR RESERVES THE RIGHT TO CHANGE OR MODIFY INFORMATION PROVIDED IN THE SYLLABUS. CLASS ANNOUNCEMENTS SUPERSEDE SYLLABUS STATEMENTS.**

## COURSE LECTURE SCHEDULE Fall 2016\*

(Numbers refer to chapter and page no. of the reading assignment in Agrios 5<sup>th</sup> edition text)

Date	#	Topic	Readings (Agrios 5 <sup>th</sup> ed.)
Aug 23	1	Introduction to Plant Pathology, terminology	Ch. 1: 3-27, Ch. 1: 71-75
Aug 25	2	Diagnosis & Abiotic diseases	Ch.10: 357-383
Aug 30	3	History of Plant Pathology	Ch. 1: 29-53 and 65-69
Sept 01	4	Disease development and cycles	Ch. 2: 77-89 and 96-102
Sept 06	5	Plant Pathogenic Fungi & Fungal diseases	Ch. 11: 383-404
Sept 08	6	Plant Pathogenic Fungi & Fungal diseases	Ch. 11: 383-404
Sept 13	7	Plant Pathogenic Fungi & Fungal diseases	Ch. 11: 383-404
Sept 15	8	Plant Pathogenic Fungi & Fungal diseases	Ch. 11: 383-404
Sept 20	9	Plant Pathogenic Bacteria & Bacterial Diseases	Ch. 12: 615-627
Sept 22		<b>Midterm exam #1 (Lectures 1-8)</b>	
Sept 27	10	Plant Pathogenic Bacteria & Bacterial Diseases	Ch. 12: 615-627
Sept 29	11	Plant Pathogenic Viruses & Viral Diseases	Ch. 14: 724-756
Oct 04	12	Plant Pathogenic Viruses & Viral Diseases	Ch. 14: 724-756
Oct 06	13	Plant Pathogenic Viruses & Viral Diseases	Ch. 14: 724-756
Oct 11	14	Plant Pathogenic Nematodes	Ch. 15: 826-836
Oct 13	15	Plant Pathogenic Nematodes	Ch. 15: 826-836
Oct 18	16	Effects of pathogens on plant physiology	Ch. 3: 106-121
Oct 20		<b>Midterm exam #2 (Lectures 9-15)</b>	
Oct 25	17	Genetics of Plant disease	Ch. 4: 125-174
Oct 27	18	Genetics of Plant disease	Ch. 4: 125-174
Nov 01	19	How pathogens attack plants	Ch. 5:176-203
Nov 03	20	Plant defenses – structural & biochemical	Ch. 6:210-236
Nov 08	21	Environmental factors & infectious diseases	Ch. 7: 249-265
Nov 10	22	Plant disease epidemiology	Ch. 8: 266-289
Nov 15	23	Cultural control of plant diseases	Ch. 9: 295-348
Nov 17		<b>Midterm exam #3 (Lectures 16-22)</b>	
Nov 22	24	Biocontrol of plant diseases	Ch. 9: 295-348
Nov 24		<i>Thanksgiving break – No class</i>	
Nov 29	25	Chemical control of plant diseases	Ch. 9: 295-348
Dec 01	26	Integrated approaches to disease management	Ch. 9: 295-348
Dec 06	27	Review Activity	
Dec 14		<b>Final Exam, Group 14A (Wednesday, 7:30-9:30 a.m.)</b>	

\*This is a tentative schedule, based on previous semesters; topics and dates may be adjusted. Students will be notified in class of any changes to the course schedule.

**PLP 3002, Fall 2016  
LABORATORY SCHEDULE\***

Date	Topic
Aug 23-24	Plant Pathology Lab Orientation <ul style="list-style-type: none"> <li>• Lab Etiquette &amp; Microscope protocols</li> <li>• Symptoms and Signs of Plant Diseases</li> <li>• Biotic vs. abiotic plant problems</li> <li>• Plant Pathology literature and diagnostic information</li> </ul>
Aug 30-31	Koch's Postulates <ul style="list-style-type: none"> <li>• Diagnostics vs. Proof of pathogenicity</li> <li>• Observation of potential pathogens</li> <li>• Fungal isolations</li> </ul>
Sept 06-07	Groups of fungal plant pathogens <ul style="list-style-type: none"> <li>• Sexual and asexual fungal structures</li> <li>• Identifying fungal phyla</li> <li>• Fungal culture examination &amp; transfers (Koch's Postulates)</li> </ul>
Sept 13-14	Foliar diseases by fungi <ul style="list-style-type: none"> <li>• Leaf spots</li> <li>• Powdery &amp; Downy Mildews</li> <li>• Rusts (<i>Puccinia</i> spp.)</li> <li>• Plant inoculations with foliar pathogens (Koch's Postulates)</li> </ul>
Sept 20-21	Soilborne diseases by fungi <ul style="list-style-type: none"> <li>• Oomycete zoospore production (<i>Phytophthora</i>, <i>Pythium</i>)</li> <li>• Take-All disease &amp; hyphopodia</li> <li>• Sclerotia, microsclerotia, &amp; rhizomorphs</li> </ul>
Sept 27-28	Bacterial plant diseases <ul style="list-style-type: none"> <li>• Bacterial isolation &amp; inoculation techniques</li> <li>• Identification tests: KOH test, Hypersensitivity reaction test, Pectate degradation test</li> <li>• Fluorescent pigment (siderophore) demonstration</li> </ul>
Oct 04-05	Plant Viruses – inoculation of plant viruses <ul style="list-style-type: none"> <li>• Mechanical &amp; Insect inoculation</li> <li>• (Koch's Postulates: re-isolation, discussion of KP with viruses)</li> </ul>
Oct 11-12	Nematodes <ul style="list-style-type: none"> <li>• Anatomical features used in identification: stylet types, esophagus types, sexual organs</li> <li>• Endo- vs. ectoparasites</li> <li>• Nematode extraction methods</li> </ul>
Oct 18-19	Plant Viruses, part 2 – virus symptoms <ul style="list-style-type: none"> <li>• Inoculation results: effects of host species and temperature</li> <li>• Symptoms associated with viral diseases</li> <li>• Confirmation via virus test strips (immuno-assay)</li> </ul>
Oct 25-26	Pathogenicity Factors & Host Resistance <ul style="list-style-type: none"> <li>• Appressoria production: genetics &amp; environment</li> <li>• <i>S. sclerotiorum</i>: oxalic acid &amp; appressoria</li> <li>• Bacterial virulence genes and bacterial races</li> </ul>
Nov 01-02	Koch's Postulates wrap-up: confirmation of symptoms TA's Choice/ Molecular tools for pathogen identification
Nov 08-09	TA's Choice, part 2
Nov 15-16	Lab Review
Nov 22-23	No Labs (Thanksgiving week)
Nov 29-30	Laboratory Exam

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