

PLP 3002: Fundamentals of Plant Pathology, Fall 2017

COURSE INSTRUCTOR: Dr. Brantlee Spakes Richter

Office: 2519 Fifield Hall

Phone: 352-273-2014

Email: For class-related communications, please use email within Canvas

Office Hours: Drop-in TWR 4:00-5:00 PM,* or by appointment

LABORATORY TEACHING SUPPORT: Rosanne Healy (rhealy1@ufl.edu)

TEACHING ASSISTANTS:

Tuesday (Section 3931): James Fulton (pcvgt@ufl.edu)

Wednesday (Section 6959): Melissa Irizarry (irizarrym@ufl.edu)

Thursday (Grad, Section 3937): Ying-Yu Liao (yingfast@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 4th 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 the interactions between pathogens and hosts. 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 also 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. 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. The learning objectives of this course are:

1. Students are expected to attain sufficient mastery of vocabulary in plant pathology so that they can converse effectively with plant pathologists about disease problems.

* Please note that this time is immediately after laboratory meetings; if a lab runs late, I may still be in the lab room, rather than my office. It is okay to come in the lab room and find me, even if it is not your regular lab day!

2. Students will gain adequate familiarity with the resources and conventions of the field so that they can locate, understand, and evaluate information about plant diseases.
3. Students will develop firm comprehension of the mechanisms underlying disease so that they can effectively use information sources to solve problems that they will encounter in their own fields of work.
4. Students will gain a working familiarity with basic laboratory procedures and equipment relevant to diagnostics and research in the field of plant pathology, so that they can understand diagnostic and research reports and/or prepare for entry-level employment in a laboratory environment.

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 (i.e., 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, hands-on work with laboratory materials, and a “deliverable” to be handed in either at the end of the session or the beginning of the subsequent session. You are expected 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 build on one another and/or 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. Some of the lab activities are experimental in nature, and accurate, detailed record-keeping will be required.

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	100
Class Participation	50
Lab Assignments	150
Lab Exam	100
TOTAL	700

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 lab exam will be held during your last regularly scheduled laboratory session, November 28 or 29. **The final lecture examination (Final Exam, Group 11A) is scheduled for 7:30 – 9:30 AM, Monday, December 11,** in your regular classroom, 2316 Fifield Hall.

Participation: The class participation grade will come from periodic in-class quizzes and activities. Quizzes will be unannounced, open-book, and will typically be given during the first or last 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, very-late arrivals, or early departures.

Lab Assignments: Laboratory assignments will be given with each lab exercise. There will be 10 lab hand-ins, worth 8 points each, plus two lab assignments (10 and 16 points), and eleven 4-point lab quizzes, for a total of 150 lab assignment points. Most hand-ins will be due at the end of the lab period, but a few will require follow-up observations to complete and will be due at the beginning of the following lab session. Late hand-in submissions will receive half credit. Lab quizzes are designed to prepare you for the lab practical exam, and will begin during the second week of lab. Each quiz will consist of one or two questions or skills tests from the previous week’s lab. The two remaining assignments are lab group experiments which span multiple laboratory periods, and will require production of laboratory reports.

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, and will be reported for consideration of disciplinary action. For more information regarding the Student Honor Code, please see: <http://www.dso.ufl.edu/SCCR/honorcodes/honorcode.php>.

If you have any questions about expectations for a particular assignment, about what constitutes plagiarism, or about how to ensure that you are using and crediting sources appropriately, please speak with your instructor or a TA. We are here to help, and we would much rather give you the guidance you need to avoid academic integrity violations, than have to report them after they occur!

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

The University of Florida provides a wide range of student services to help with common issues which may interfere with your success, including disabilities, physical or mental illness, food insecurity, and personal safety. You can find links to many of these resources at <http://www.ufl.edu/student-life/health-safety/> If you are experiencing problems that are interfering with your studies and you don't see an appropriate resource listed here, contact the Dean of Students Office (<https://www.dso.ufl.edu/>), and they can help connect you with the appropriate support.

Counseling Services: 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/*
 - Counseling Services
 - Groups and Workshops
 - Outreach and Consultation
 - Self-Help Library
 - Training Programs
 - Community Provider Database
- *Career Resource Center, Second Floor JWRU, 392-1601, www.crc.ufl.edu/*
 - Career planning
 - Resume preparation
 - Internship and job search assistance
 - Professional development workshops
 - Mentoring programs

Services for Students with Disabilities: 0001 Reid Hall, 352-392-8565, 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

Date	#	Topic	Reading (Agrios 5 th ed.)*
Aug 22	1	Introduction to Plant Pathology, terminology	Ch. 1: 4-42, 71-75
Aug 24	2	Diagnosis & Abiotic diseases	Ch.10: 358-383
Aug 29	3	History of Plant Pathology	Ch. 1: 4-42, 71-75
Aug 31	4	Disease development and cycles	Ch. 2: 77-89, 96-102
Sept 05	5	Intro Plant Pathogenic Fungi & Fungal diseases	Ch. 11: 385-404
Sept 07	6	Fungal Pathogens: Zygomycota, Mucoromycota, Ascomycota	Ch. 11: 433-561
Sept 12	7	Fungal Pathogens: Basidiomycota	Ch. 11: 562-610
Sept 14	8	Non-Fungi Fungal Pathogens: Oomycota & Co.	Ch. 11: 404-433
Sept 19	9	Intro Plant Pathogenic Bacteria & Bacterial Diseases	Ch. 12: 615-627
Sept 21		Midterm exam #1 (Lectures 1-8)	
Sept 26	10	Bacterial Pathogens	Ch. 12: 627-703
Sept 28	11	Intro Plant Pathogenic Viruses & Viral Diseases I	Ch. 14: 724-756
Oct 03	12	Intro Plant Pathogenic Viruses & Viral Diseases II	Ch. 14: 724-756
Oct 05	13	Virus Pathogens	Ch. 14: 757-824
Oct 10	14	Plant Pathogenic Nematodes	Ch. 15: 826-836
Oct 12	15	Nematodes Pathogens	Ch. 15: 838-874
Oct 17	16	Effects of pathogens on plant physiology	Ch. 3: 106-121
Oct 19		Midterm exam #2 (Lectures 9-15)	
Oct 24	17	Genetics of Plant disease	Ch. 4: 125-174
Oct 26	18	Genetics of Plant disease	Ch. 4: 125-174
Oct 31	19	How pathogens attack plants	Ch. 5: 176-203
Nov 02	20	Plant defenses – structural & biochemical	Ch. 6: 210-236
Nov 07	21	Environmental factors & infectious diseases	Ch. 7: 249-265
Nov 09	22	Plant disease epidemiology	Ch. 8: 266-289
Nov 14	23	Cultural control of plant diseases	Ch. 9: 295-348
Nov 16		Midterm exam #3 (Lectures 16-22)	
Nov 21	24	Biocontrol of plant diseases	Ch. 9: 295-348
Nov 23		<i>Thanksgiving break – No class</i>	
Nov 28	25	Chemical control of plant diseases	Ch. 9: 295-348
Nov 30	26	Integrated approaches to disease management	Ch. 9: 295-348
Dec 05	27	Review Activity	
Dec 11		Final Exam, Group 11A (Monday, 7:30-9:30 a.m.)	

* Numbers refer to chapters/pages of Agrios 5th edition text which correspond to the lecture topics. You will not be responsible for materials within these chapters that are not also covered in lecture and/or lab. The Agrios text covers many more examples than will be highlighted in this class; use the course slides as a guide to direct your reading.

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LABORATORY SCHEDULE*

Date	Topic
Aug 22-23	Plant Pathology Lab Orientation <ul style="list-style-type: none"> • Lab Etiquette & Microscope protocols • Symptoms and Signs of Plant Diseases • Biotic vs. abiotic plant problems • Plant Pathology literature and diagnostic information
Aug 29-30	Lab skills & Koch's Postulates <ul style="list-style-type: none"> • Lab Media production • Diagnostics vs. Proof of pathogenicity • Fungal isolations
Sept 05-06	Groups of fungal plant pathogens <ul style="list-style-type: none"> • Sexual and asexual fungal structures • Identifying fungal phyla • Fungal culture examination & transfers (Koch's Postulates)
Sept 12-13	Foliar diseases by fungi <ul style="list-style-type: none"> • Leaf spots • Powdery & Downy Mildews • Rusts (<i>Puccinia</i> spp.) • Plant inoculations with foliar pathogens (Koch's Postulates)
Sept 19-20	Soilborne diseases by fungi <ul style="list-style-type: none"> • Oomycete zoospore production (<i>Phytophthora</i>, <i>Pythium</i>) • Take-All disease & hyphopodia • Sclerotia, microsclerotia, & rhizomorphs
Sept 26-27	Bacterial plant diseases <ul style="list-style-type: none"> • Bacterial isolation & inoculation techniques • Identification tests: KOH test, Hypersensitivity reaction test, Pectate degradation test • Fluorescent pigment (siderophore) demonstration
Oct 03-04	Plant Viruses – inoculation of plant viruses <ul style="list-style-type: none"> • Mechanical & Insect inoculation • (Koch's Postulates: re-isolation, discussion of KP with viruses)
Oct 10-11	Nematodes <ul style="list-style-type: none"> • Anatomical features used in identification: stylet types, esophagus types, sexual organs • Endo- vs. ectoparasites • Nematode extraction methods
Oct 17-18	Plant Viruses, part 2 – virus symptoms <ul style="list-style-type: none"> • Inoculation results: effects of host species and temperature • Symptoms associated with viral diseases • Confirmation via virus test strips (immuno-assay)
Oct 24-25	Pathogenicity Factors & Host Resistance <ul style="list-style-type: none"> • Appressoria production: genetics & environment • <i>S. sclerotiorum</i>: oxalic acid & appressoria • Bacterial virulence genes and bacterial races
Oct 31- Nov 01	Koch's Postulates wrap-up: confirmation of symptoms TA's Choice/ Molecular tools for pathogen identification

Nov 07-08	TA's Choice, part 2
Nov 14-15	Lab Review
Nov 21-22	No Labs (Thanksgiving week)
Nov 28-29	Laboratory Exam

**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.*