PLP 5005: General Plant Pathology, Fall 2025

INSTRUCTOR: Dr. Brantlee Spakes Richter
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CLASS TIME/LOCATION:

Lectures:	FIF 1306	Tuesday and Thursday period 4 @ 10:40-11:30 am
Laboratory:	BLRB 152	Thursday, Periods 6-8 @ 12:50-3:50 pm

COURSE DESCRIPTION & CREDITS: Principles and practices of plant pathology. In-Person or Hybrid, 4 Credits. 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 students are enrolled in PLP 5005. 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, have additional assignments beyond the requirements of PLP3002, and have slightly different exams, reflecting the higher expectations for graduate level study.

COURSE PREREQUISITES: Graduate standing, prior course work in plant biology and general biology.

TEXTBOOKS, LEARNING MATERIALS, AND SUPPLY FEES:

Recommended Text: Plant Pathology 5th Ed. (2005) by G. N. Agrios, Elsevier Academic Press, Inc. Free access is available in both print and electronic formats through UF course reserves. This text is optional, and is recommended as a reference to reinforce subject matter covered in the course.

Learning Materials: The required laboratory course pack for this course is available at Target Copy (1412 W. University Ave.). All other supporting materials are available on the course Canvas site in eLearning (elearning.ufl.edu).

Software: This course will utilize LabArchives electronic lab notebook (ELN) software, which is freely available online for all registered UF students. Instructions for access are provided in Canvas.

Supply Fees: This course carries a laboratory supply fee of $88.56, used to cover materials and supplies for the laboratory activities.

INTRODUCTION & COURSE 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 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 or research in plant pathology, and/or prepare them to manage plant health issues that may arise within any plant science related career. The learning objectives of this course are:

1. Students are expected to attain mastery of vocabulary in the subject, familiarity with the resources and conventions of the field, and comprehension of the mechanisms underlying disease, such that they can effectively assess and use both primary and secondary literature to make disease management decisions.

2. Students will gain a working familiarity with basic laboratory procedures and equipment relevant to diagnostics and research in the field of plant pathology, such that they may understand and assess the methods used in laboratory reports and research literature sources, and/or confidently incorporate and perform common plant pathology procedures within their own work.
3. Students will be prepared to engage in written and verbal critical discourse about plant disease research methods and applications.

ATTENDANCE: You are expected to participate in every class and laboratory. If you must miss a lecture meeting due to illness or professional travel (e.g., conference or field work), you can arrange for online streaming access to the lecture meeting; a minimum of 2 hours notice is required to set up online access. Online access will be available for all REC students for Tuesday lecture meetings. Absences due to illness or emergency will be excused; absences due to observation of religious holidays or participation in official university or professional functions will be excused only with advance notice. 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 one of the undergraduate sessions, 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 Thursday lab meeting (3:50 PM); most laboratory materials are discarded at this time, 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 MEETINGS: 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 a short quiz on the previous week's materials, 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. You will also be engaged with your lab team on a semester-long lab project, which will utilize a shared electronic lab notebook (ELN). The team project is experimental in nature, and accurate, detailed record-keeping will be required. Your team ELN will be checked at key points in the semester to ensure that you are recording all necessary information.

COURSE GRADING: Points will be distributed as follows:

Component	Percent of Grade
Exam 1	7
Exam 2	10
Exam 3	10
Exam 4	10
Final Exam (Comprehensive)	15
Lab Assignments & Quizzes	20
Lab Exam	13
Discussion Assignments (3)	15
TOTAL	100

Exams: There will be five lecture exams (four mid-term exams and a final). The in-term exams (1-4) will be given online, and you will have a 3-day window in which to take each one, beginning immediately after the last lecture period in the unit. This will allow you to (1) have some flexibility in scheduling your study time around other courses, (2) take the exam at the time of day you are most alert and in an environment in which you are comfortable, and (3) have more time to complete the exam than the standard 50-minute class period. Exams 1-4 are not comprehensive; each will focus on material from the preceding set of lectures and supporting labs. The final and laboratory exams will be comprehensive, covering material from the entire semester. The **lab exam** will

be held during your last regularly scheduled laboratory session. **The final lecture examination** will be held in the regular lecture room during the university-assigned exam period. REC students may arrange to take the final with a designated proctor at their station.

Lab Assignments: Laboratory assignments will be given with each lab exercise. There will be weekly lab hand-ins (8-10 points each) and lab quizzes (4 points each), and one semester-long lab team assignment (20 points for check-in assignments, 50 points for the final report). 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 following lab session. Late hand-in submissions will receive half credit, and no lab assignments will be accepted after the lab practical exam. 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. Quizzes will be given during the first 5 minutes of the lab meeting; late arrivals will not be given extra time to complete the quiz.

Discussion Assignments: Students will participate in three online reading and discussion assignments, with optional wrap-up discussions held during lab sessions. Each article discussion will be worth 50 points. You will find the complete assignment description and discussion articles on the class site in Canvas.

Class Participation: The undergraduate and online sections of this class have a participation grade, which will come from in-class quizzes. Graduate students are invited to take the quizzes as practice, but the quizzes will not be included in the final course grade for graduate students.

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. For information on current UF policies for assigning grade points, see: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Letter Grade	Percentage
A	92.00 – 100
A-	90.00 – 91.99
B+	88.00 – 89.99
B	82.00 – 87.99
B-	80.00 – 81.99
C+	78.00 – 79.99
C	72.00 – 77.99
C-	70.00 – 71.99
D+	68.00 – 69.99
D	62.00 – 67.99
D-	60.00 – 61.99
E	00.00 – 59.99

ACADEMIC HONESTY

It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. In this course, any violation of the academic integrity expected of you will result in a minimum academic sanction of a failing grade on the assignment or assessment. Any alleged violations of the Student Honor Code will result in a referral to Student Conduct and Conflict Resolution. Please review the Student Honor Code and Student Conduct Code at https://sccr.dso.ufl.edu/process/student-conduct-code/. Some assignments in this course will require collaboration, and collaborative study is generally encouraged. You may discuss your answers on lab hand-in sheets and in-class participation quizzes, unless otherwise notified, but your answers should be in your own words. You may not work or collaborate with others on lecture exams, lab quizzes, lab exams, or any other take-home exams or assignments. 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!

Artificial Intelligence:
Work generated by AI programs, such as ChatGPT, is not your own work. Submission of work generated by another person or program *as your own* is a violation of the UF Honor Code. Written assignments are designed for students to learn about a subject and organize their thoughts to communicate what they have learned. Chat GPT is not a student in this course, and contrary to the popular vernacular, does not learn. Generative AI programs can only parrot (often badly) what others have written, and handing your assignment over to an AI program does nothing to enhance your own understanding of a subject, or your own ability to formulate a thought and express it. In this course, you are responsible for the content of all work that you present as your own.

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.

Course Recordings:
Publication of course recordings without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code. The complete UF recording policy can be found at: https://syllabus.ufl.edu/syllabus-policy/uf-syllabus-policy-links/

CAMPUS HEALTH AND WELLNESS RESOURCES

Visit https://one.uf.edu/whole-gator/topics for resources that are designed to help you thrive physically, mentally, and emotionally at UF. Please contact UMatterWeCare for additional and immediate support.

TECHNICAL SUPPORT

UF Computing Help Desk & Ticket Number: All technical issues require a UF Helpdesk Ticket Number. The UF Helpdesk is available 24 hours a day, 7 days a week. https://helpdesk.ufl.edu/ | 352-392-4357

PRIVACY AND ACCESSIBILITY POLICIES

- Instructure (Canvas)
  - Instructure Privacy Policy
  - Instructure Accessibility
- Zoom
  - Zoom Privacy Policy
  - Zoom Accessibility
- Microsoft Teams
  - Microsoft Privacy Policy
  - Teams Accessibility

The instructor reserves the right to change or modify information provided in the syllabus. Class announcements supersede syllabus statements. Any changes to the syllabus or schedule will be posted as announcements in the class site in Canvas. If substantial schedule changes are needed (e.g. due to hurricane closures, etc.), a revised syllabus will also be posted.

COURSE LECTURE SCHEDULE

Date		Topic	Reading (Agrios 5th ed.)*
		Unit 1: Central Concepts in Plant Pathology	
Aug 21	01	Introduction to Plant Pathology, terminology	Ch. 1: 4-42, 71-75
Aug 26	02	Diagnosis & Abiotic disorders	Ch.10: 358-383
Aug 28	03	History of Plant Pathology	Ch. 1: 4-42, 71-75
Sept 02	04	Disease development and cycles; **Exam 1 Opens**	Ch. 2: 77-89, 96-102
		Unit 2: Fungal & Bacterial Pathogens	
Sept 04	05	Intro Plant Pathogenic Fungi & Fungal diseases	Ch. 11: 385-404
Sept 09	06	Fungal Pathogens I: Chytrids, Mucoromycota, Ascomycota	Ch. 11: 433-561
Sept 11	07	Fungal Pathogens II: Basidiomycota	Ch. 11: 593-610
Sept 16	08	Fungal Pathogens III: Rusts & Smuts	Ch. 11: 562-592
Sept 18	09	Non-Fungi Fungal Pathogens: Oomycota & Co.	Ch. 11: 404-433
Sept 23	10	Intro Plant Pathogenic Bacteria & Bacterial Diseases	Ch. 12: 615-627
Sept 25	11	Bacterial Pathogens	Ch. 12: 627-703
Sept 30		Catch-up and Review; **Exam 2 Opens**	
		Unit 3: Virus & Nematode Pathogens	
Oct 02	12	Intro Plant Pathogenic Viruses & Viral Diseases I	Ch. 14: 724-756
Oct 07	13	Intro Plant Pathogenic Viruses & Viral Diseases II	Ch. 14: 724-756
Oct 09	14	Virus Pathogens	Ch. 14: 757-824
Oct 14	15	Plant Pathogenic Nematodes	Ch. 15: 826-836
Oct 16	16	Nematode Pathogens	Ch. 15: 838-874
Oct 21	17	Genetics of Plant disease; **Exam 3 Opens**	Ch. 4: 125-174
		Unit 4: Pathogenicity & Host Defense	
Oct 23	18	Genetics of Plant disease	Ch. 4: 125-174
Oct 28	19	How pathogens attack plants	Ch. 5: 176-203
Oct 30	20	Plant defenses – structural & biochemical	Ch. 6: 210-236
Nov 04	21	Environmental factors & infectious diseases	Ch. 7: 249-265
Nov 06	22	Plant disease epidemiology; **Exam 4 Opens**	Ch. 8: 266-289
Nov 11		*Veterans Day Holiday – No classes*	
		Unit 5: Epidemiology & Management	
Nov 13	23	Cultural control of plant diseases	Ch. 9: 295-348
Nov 18	24	Biocontrol of plant diseases	Ch. 9: 295-348
Nov 20	25	Chemical control of plant diseases	Ch. 9: 295-348
		Thanksgiving break – No classes Nov 25-30	
Dec 02	26	Integrated approaches to disease management	Ch. 9: 295-348
Dec 11		Final Exam @ 10:00 AM - 12:00 PM (In-person, in regular classroom or REC location)	

* Numbers refer to Agrios 5th edition text corresponding 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.

LABORATORY SCHEDULE*

Date	Topic	KP tentative schedule
Aug 28	Plant Pathology Lab Orientation • Lab Etiquette & Microscope protocols • Observing pathogens • Symptoms and Signs of Plant Diseases & Abiotic Disorders	
Sept 04	Lab skills & Koch's Postulates • Lab Media production • Diagnostics vs. Proof of pathogenicity • Fungal isolations	Fungal Isolations ☑
Sept 11	Groups of fungal plant pathogens **(Discussion #1 due)** • Sexual and asexual fungal structures • Identifying fungal phyla • Fungal culture examination & transfers (Koch's Postulates)	Culture examination & transfers; assess "consistency" ☑
Sept 18	Foliar diseases by fungi • Leaf spots • Powdery & Downy Mildews • Rusts (*Puccinia* spp.) • Plant inoculations with foliar pathogens (Koch's Postulates)	Examine transfers, re-transfer as needed to isolate
Sept 25	Soilborne diseases by fungi • Oomycete zoospore production (*Phytophthora, Pythium*) • Take-All disease & hyphopodia • Sclerotia, microsclerotia, & rhizomorphs	Examine transfers for sporulation; ID to genus if possible (homework: methods reference!)
Oct 02	Bacterial plant pathogens **(Discussion #2 due)** • Bacterial isolation & inoculation techniques • Identification tests • Fluorescent pigment (siderophore) demonstration	Inoculations ☑
Oct 09	Plant Viruses – inoculation of plant viruses • Mechanical & Insect inoculation • (Koch's Postulates: re-isolation, discussion of KP with viruses)	Symptom check, reisolate if ready
Oct 16	Nematodes • Anatomical features used in identification • Endo- vs. ectoparasites • Nematode extraction methods	Symptom check, reisolate if ready
Oct 23	Plant Viruses, part 2 – virus symptoms **(Discussion #3 due)** • Inoculation results: effects of host species and temperature • Symptoms associated with viral diseases • Confirmation via virus test strips (immuno-assay)	Symptom Confirmation Re-isolations, transfers (to pure culture) ☑ DNA extraction & PCR
Oct 30	Pathogenicity Factors & Host Resistance • Appressoria production: genetics & environment • *S. sclerotiorum*: oxalic acid & appressoria • Bacterial virulence genes and bacterial races	Gel Electrophoresis
Nov 06	Koch's Postulates wrap-up • Molecular tools for pathogen identification	Sequence data analysis
Nov 13	*Veterans Day Holiday: No Classes Nov 11; Open Lab Nov 12-13* • Koch's Postulates wrap-up • Lab Exam Review	
Nov 20	Laboratory Exam	Report Due

**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.*

☑ indicates check-in assignment associated with this task. We will be checking your electronic lab notebook at these points to ensure that your entries are up-to-date and contain all required information.

Laboratory PPE Requirements:

Laboratory meetings will begin the first full week of class, so please be prepared with proper laboratory attire. Although we do our best to reduce or eliminate potential hazards in the lab activities, participation in laboratory meetings will require the following PPE (personal protective equipment).

- **Closed-toe shoes** must be worn at all times in the lab. We use glass routinely and harsh chemicals occasionally. Broken glass and exposed toes are a bad combination.
- **Face masks** are strongly recommended throughout the lab meetings. We work with unidentified fungi and other potential biohazards, and masks reduce exposure as well as contamination issues. We will provide masks for students who do not bring their own.
- **Eye protection** is recommended for all lab meetings and will be required for specific lab activities. If you normally wear contact lenses, please consider wearing glasses during lab meetings. Contact lens wearers are particularly vulnerable to eye infections (keratitis), and we absolutely will encounter the two most common fungal genera that cause opportunistic eye infections, *Fusarium* and *Aspergillus*, as well as common bacterial infection agents such as *Pseudomonas aeruginosa*.
- **Gloves** will be available for your use throughout the semester, and will be recommended or required for specific lab activities. If you have any open cuts or abrasions on your hands, please request gloves for the lab period, regardless of the activity.

Plant Pathology lab courses are a great way to learn general pathology techniques. We use many of the same techniques that you would find in a medical diagnostic clinic, but we work with organisms that present lower risk to our health than most human and animal pathogens. Even so, we will encounter some organisms that can infect humans, or that frequently cause allergic or inflammatory responses. Any unknown microbe growing in a dish should be treated as a potential hazard.

Further reading on hazards from plant-associated organisms:
https://www.cdc.gov/contactlenses/fungal-keratitis.html CDC summary of fungal keratitis (corneal infections)
https://www.aao.org/eye-health/diseases/what-is-bacterial-keratitis American Academy of Ophthalmology summary of bacterial keratitis
https://www.cedars-sinai.org/health-library/diseases-and-conditions/a/allergic-fungal-sinusitis.html Cedars Sinai overview of allergic fungal sinusitis. The most common fungi that cause both allergic and invasive sinusitis are *Aspergillus* spp., which are found in decaying plant material. These fungi are commonly isolated as "contaminants" when working with plant pathogens, as are *Mucor* spp., which can cause very rare but more devastating mucormycosis infections.