

PIP 429 - General Plant Pathology, 3 credits

Fall 2021

Drs. Wheeler and Pappu

GENERAL COURSE INFORMATION

LOCATION & TIME:

- **LECTURE:** 343 Johnson Hall, M W 8:10-9am
- **LAB:** 343 Johnson Hall, W 2:10-5pm

OBJECTIVES:

To develop the concepts and define the terminology associated with the classification, symptoms, causes, development, and control of plant diseases. The emphasis will be on the concepts and terminology related to Plant Pathology. Principles of plant disease development and control will be illustrated with specific examples. Diagnosis and control of specific diseases will not be emphasized.

STUDENT LEARNING OUTCOMES:

- Use discipline-specific terminology appropriately
- Recognize, define and differentiate causes of plant diseases
- Recognize, define and differentiate major types of plant diseases
- Integrate knowledge of plant and pathogen biology and their interaction with the environment to implement effective disease control practices
- Recognize the impact of plant disease in the environment around us

PREREQUISITES: Bio S 102 and/or Bot 120

REQUIRED TEXT: Schumann, G.L. and C.J. D'Arcy. 2009. Essential Plant Pathology. 2nd edition. American Phytopathological Society. 384 pp.

WEB PAGE: We will use the Canvas Learn site for this class

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EXAMINATIONS, EVALUATION, AND GRADING:

Dates for midterm and final exams are listed in the lecture outline. All exams will be held online during class hours. Students are expected to be present for examinations at the designated time. **Make-up exams will not be given. IN CASE OF EMERGENCY**, one of the instructors or the Plant Pathology Department Office (509-335-9541) should be notified of your absence prior to the exam.

Points will be awarded for two in-class lecture exams and a final exam during exam week, weekly laboratory quizzes (12 quizzes), one laboratory case study report (Factsheet), and your laboratory reports. Grades are determined by the percentage of the total points accumulated. In past years, at least 95% was needed for an A, 90% for an A-, 85% for a B, 80% for a B-, 75% for a C, 70% for a C-, and 60% for a D.

Point totals are as follows:

3 Lecture examinations	300
12 Laboratory quizzes	120
1 Lab Case Study (factsheet)	50
13 Laboratory reports	130
Total	600

Note: University policy (Acad. Reg. #90) states that Incompletes may only be awarded if: "the student is unable to complete their work on time due to circumstances beyond their control"

Expectation of Student Effort: For each hour of lecture equivalent, students should expect to have a minimum of two hours of work outside class.

Mental health resources & support are available: <https://cougarhealth.wsu.edu/crisis/>

Students with Disabilities: Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center. For more information contact a Disability Specialist on your home campus:

Pullman or WSU Online: 509-335-3417 <http://accesscenter.wsu.edu>, Access.Center@wsu.edu

Spokane: <http://spokane.wsu.edu/students/current/studentaffairs/disability/>

Tri-Cities: <http://www.tricity.wsu.edu/disability/>

Vancouver: 360-546-9138 <http://studentaffairs.vancouver.wsu.edu/student-resource-center/disability-services>

Academic Integrity Policy: Academic integrity is the cornerstone of the university. You assume full responsibility for the content and integrity of the academic work you submit. You may collaborate with classmates on assignments, with the instructor's permission. However the guiding principle of academic integrity shall be that your submitted work, examinations, reports, and projects must be your own work. Any student who violates the University's standard of conduct relating to academic integrity will be referred to the Office of Student Conduct and may fail the assignment or the course. You can learn more about Academic Integrity on your campus using the URL listed in the Academic Regulations section or to <http://conduct.wsu.edu/academic-integrity-policies-and-resources>. Please use these resources to ensure that you don't inadvertently violate WSU's standard of conduct.

The Campus Safety Plan: Washington State University is committed to enhancing the safety of the students, faculty, staff, and visitors. It is highly recommended that you review the Campus Safety Plan (<http://safetyplan.wsu.edu/>) and visit the Office of Emergency Management web site (<http://oem.wsu.edu/>) for a comprehensive listing of university policies, procedures, statistics, and information related to campus safety, emergency management, and the health and welfare of the campus community

Everyone should also become familiar with the **WSU ALERT site** (<http://alert.wsu.edu>) where information about emergencies and other issues affecting WSU will be found. This site also provides information on the communication resources WSU will use to provide warning and notification during emergencies. It should be bookmarked on computers.

Finally, all students should go to the MyWSU portal at <http://mywsu.edu> and register their emergency contact information for the Crisis Communication System (CCS). Enter your network ID and password and you will be taken to the mywsu portal page. Look for the Pullman Emergency Information box on the left side of the page and click on Update Now to be taken to the registration page where you can enter your cell, landline, and email contact information as well as arrange for emergency text messages to be sent to your cell phone.

COVID-19 Policy: Per the proclamation of Governor Inslee on August 18, 2021, masks that cover both the nose and mouth must be worn by all people over the age of five while indoors in public spaces. This includes all WSU owned and operated facilities. The state-wide mask mandate goes into effect on Monday, August 23, 2021, and will be effective until further notice.

Public health directives may be adjusted throughout the year to respond to the evolving COVID-19 pandemic. Directives may include, but are not limited to, compliance with WSU's COVID-19 vaccination policy, wearing a cloth face covering, physically distancing, and sanitizing common-use spaces. All current COVID-19 related university policies and public health directives are located at <https://wsu.edu/covid-19/>. Students who choose not to comply with these directives may be required to leave the classroom; in egregious or repetitive cases, student non-compliance may be referred to the Center for Community Standards for action under the Standards of Conduct for Students.

Policy Prohibiting Discrimination and Harassment (Executive Policy 15): This policy expresses WSU's commitment to maintaining an environment free from discrimination, including sexual harassment. This policy applies to all students, faculty, staff, or others having an association with the University.

Discrimination, including discriminatory harassment, sexual harassment, and sexual misconduct (including stalking, intimate partner violence, and sexual violence) is prohibited at WSU (See WSU Policy Prohibiting Discrimination and Harassment (Executive Policy 15) and WSU Standards of Conduct for Students).

If you feel you have experienced or have witnessed discriminatory conduct, you can contact the WSU Office of Compliance and Civil Rights (CCR) and/or the WSU Title IX Coordinator at 509-335-8288 to discuss resources, including confidential resources, and reporting options. (Visit <https://ccr.wsu.edu/> for more information).

Most WSU employees, including faculty, who have information regarding sexual harassment or sexual misconduct are required to report the information to CCR or a designated Title IX Coordinator or Liaison. Visit <https://ccr.wsu.edu/file-a-complaint/> for more information.

Accommodation for Religious Observances or Activities: Washington State University reasonably accommodates absences allowing for students to take holidays for reasons of faith or conscience or organized activities conducted under the auspices of a religious denomination, church, or religious organization. Reasonable accommodation requires the student to coordinate with the instructor on scheduling examinations or other activities necessary for course completion. Students requesting accommodation must provide written notification within the first two weeks of the beginning of the course and include specific dates for absences. Approved accommodations for absences will not adversely impact student grades. Absence from classes or examinations for religious reasons does not relieve students from responsibility for any part of the course work required during the period of absence. Students who feel they have been treated unfairly in terms of this accommodation may refer to Academic Regulation 104 – Academic Complaint Procedures.

Lecture Schedule

Topic	Instructor	Date
Introduction to the course	Pappu	Aug 23
Causes of Plant Disease	Pappu	Aug 25
Disease Cycle	Wheeler	Aug 30
Disease Cycle	Wheeler	Sept 1
LABOR DAY (no class)		Sept 6
Plant Pathogenic Fungi	Wheeler	Sept 8
Plant Pathogenic Fungi	Wheeler	Sept 13
Fungi - Disease Cycle Discussion	Wheeler	Sept 15
Plant Pathogenic Fungi	Wheeler	Sept 20
Plant Pathogenic Fungi	Wheeler	Sept 22
Plant Pathogenic Fungi	Wheeler	Sept 27
EXAMINATION #1		Sept 29
Plant Pathogenic Bacteria	Pappu	Oct 4
Plant Pathogenic Bacteria	Pappu	Oct 6
Plant Pathogenic Bacteria	Pappu	Oct 11
Plant Pathogenic Bacteria	Pappu	Oct 13
Viruses	Pappu	Oct 18
Viruses	Pappu	Oct 20
Viruses	Pappu	Oct 25
Nematodes	Gleason	Oct 27
EXAMINATION #2		Nov 1
Epidemiology I	Wheeler	Nov 3
Epidemiology II	Wheeler	Nov 8
Why Manage Diseases? Lessons from History	Pappu	Nov 10
Disease Management I	Pappu	Nov 15
Disease Management II	Pappu	Nov 17

Lecture Schedule Continued

Topic	Instructor	Date
THANKSGIVING BREAK		Nov 22
THANKSGIVING BREAK		Nov 26
Disease Management III	Pappu	Nov 29
Disease Management – Tree Fruits	Amiri	Dec 1
Disease Management – Small Fruits	Mattupalli	Dec 6
Forest Pathology	Hulbert	Dec 8
Final Exam Week		Dec 13-Dec 17
<i>FINAL EXAM: 12/16 @ 8 to 10am</i>		

Laboratory Information

OBJECTIVE:

To provide virtual experience observing symptoms and signs of plant disease, methods for observing, culturing and identifying plant pathogens, learning the disease cycles of representative diseases, and approaches for controlling these diseases. Experience will also be gained in performing scientific experiments with plant pathogens and their host plants.

STRUCTURE:

A description of the activities for each laboratory is below. **Students are expected to prepare for each lab by reading the exercise (provided by the instructors and TAs) before attending class!** Each lab period will begin with a quiz covering the previous week's lab followed by a brief introduction to the material to be studied that day. **Attendance is required at each laboratory.** Due to the time-sensitive nature of the laboratory materials, make-up labs cannot be provided.

LAB QUIZZES:

Lab quizzes will consist of practical questions requiring students to identify types of diseases, pathogen structures and their role in the disease cycle, symptoms and signs, and control measures. Questions based on material contained in the syllabus including scientific names of pathogens, disease cycles, control measures, and isolation techniques, also will be included on the lab quizzes. Lab quizzes will make up ~20% of your final grade in the class.

LAB GUIDES:

The purpose of the laboratory guides is to guide students through each lab and provide a space for students to record observations and data from laboratory exercises **at the time these observations are made.** Notes and drawings from the laboratory exercises must be kept in the space provided after each exercise in the lab guides and must be original, that is, taken during the laboratory period and not transcribed after class.

Lab guides will be turned in as *lab reports* and graded on completeness, organization, and quality of the drawings and descriptions. To be considered excellent, a notebook should be neat, well-organized, and contain labeled drawings, labels with lines and arrows indicating important structures, notes on symptoms and signs of diseases observed in lab, descriptions of student exercises or demonstrations, and the results and conclusions from these exercises or demonstrations. Questions follow each lab exercise to emphasize specific aspects of the lab and provoke thought. Lab questions should be answered before the quiz on that exercise, but need not be answered during the lab period.

WRITING ASSIGNMENT:

Each student will be required to write a “factsheet” that describes the (i) disease symptoms, (ii) disease cycle, and (iii) recommendations for control from the exercises in Laboratory 6. Factsheets are routinely prepared by plant pathologists for use by various plant health practitioners and examples of these will be provided to you to use as a template for your

factsheet. Students are encouraged to discuss with others (while practicing physical distancing) to prepare the elements of the factsheet but each student must prepare his/her own factsheet. The instructors will provide several templates and a description of the elements we expect to see in your factsheets well in advance of the due date. **Factsheets will be due at the beginning of Lab 11 on Nov 3, 2021.**

STUDENTS WITH DISABILITIES:

Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.

CAMPUS EMERGENCIES:

Washington State University is committed to providing a safe and secure environment for students, faculty, staff, and visitors on the Pullman campus. WSU engages in a broad array of activities supporting this goal, including disaster and emergency preparedness planning, and other activities aimed at preventing problems before they occur. Visit the Office of Emergency Management (<http://www.oem.wsu.edu/>) and WSU ALERT-Pullman (<http://alert.wsu.edu/>) websites for additional information. Crisis Communications are guided by the WSU Crisis Communication Plan (<http://alert.wsu.edu/utils/File.aspx?fileid=3923>).

Laboratory Schedule

Lab	Date	Topic
1	8/25	Diagnosis of plant problems, Type disease concept, Symptoms vs. Signs.
2	9/1	Koch's postulates I: Plant Disease Examination
3	9/8	Koch's postulates II: Isolation and Purification
4	9/15	Koch's postulates III: Inoculation
5	9/22	Bacterial Diseases
6	9/29	Fungal and Oomycete Soil-borne Diseases
7	10/6	Fungal Diseases II
8	10/13	Disease Control with Fungicides
9	10/20	Epidemiology and Integrated Disease Management
10	10/27	Plant Diseases caused by Nematodes
11	11/3	Plant Diseases caused by Viruses Transmission of Plant Viruses
12	11/10	Pathogen Detection I: ELISA
13	11/18	Pathogen Detection II: PCR
	11/24	THANKSGIVING BREAK – No Lab
	12/1	No lab
	12/9	No Lab

SUPPLEMENTAL READING

- Agrios, G.N. 2005. *Plant Pathology*, 5th Ed. Elsevier Academic Press, New York. 922 pp.
- Alexopoulos, C.J. and C.W. Mims. 1979. *Introductory Mycology*. John Wiley & Sons, New York. 632 pp.
- Campbell, C.L. and L.V. Madden. 1990. *Introduction to Plant Disease Epidemiology*. John Wiley & Sons, New York. 532 pp.
- Carefoot, G.L. and E.R. Sprott. 1967. *Famine on the Wind: Man's Battle against Plant Disease*. Rand McNally & Co., 231 pp.
- Cook, R.J. and K.F. Baker. 1983. *The Nature and Practice of Biological Control of Plant Pathogens*. The American Phytopathological Society, St. Paul. 539 pp.
- Hull, R. 2002. *Matthews' Plant Virology*. Academic Press, San Diego, 1001 pp.
- Large, E.C. 1962. *The Advance of the Fungi*. Dover Publications, Inc, New York. 488 pp.
- Lucas, J. 1998. *Plant Pathology and Plant Pathogens*. Blackwell Science, Oxford. 274 pp.
- Maloy, O.C. 1993. *Plant Disease Control: Principles and Practice*. John Wiley & Sons, Inc., New York. 346 pp.
- Maloy, O. C. and T. D. Murray, eds. 2000. *Encyclopedia of Plant Pathology*. John Wiley & Sons, Inc, New York. 1346 pp.
- Parry, D. 1990. *Plant Pathology in Agriculture*. Cambridge University Press, Cambridge. 385 pp.
- Schumann, G.L. 1991. *Plant Diseases: Their Biology and Social Impact*. APS Press, St. Paul. 397 pp.
- Shurtleff, M.C. and C.W. Averre III. 1997. *Glossary of Plant-Pathological Terms*. APS Press, St. Paul. 361 pp.
- Walker, J.C. 1969. *Plant Pathology*. 3rd Edition. McGraw-Hill, Inc., New York. 819 pp.