

FNR 598/BIOL 595: Disease Ecology, Spring 2018

Instructors:

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Lecture: Tuesdays and Thursdays 9:00 to 10:15 AM in Lilly 3-118

Required text: There is no required textbook for the course. Readings will be provided via Blackboard.

Website: <https://mycourses.purdue.edu>

Course Description: *Disease ecology* is designed to provide upper level undergraduate and graduate students with an understanding of the ecological and evolutionary complexity inherent to host-pathogen interactions. The course will draw heavily on case studies representing a diverse array of systems (e.g., plants, animals, aquatic systems, terrestrial systems). Additionally, the course will emphasize the increasing importance of understanding the interactions between multiple hosts and multiple pathogens within complex and dynamic environments. Our goal is to introduce students to parasite and pathogen diversity, core concepts in disease ecology (e.g., pathogen population dynamics, transmission, disease models, virulence), host-pathogen coevolution, community ecology of host-pathogen interactions, and the importance of pathogens in conservation and management. The course will use a combination of lectures supplemented with readings from the primary literature, guest lectures by researchers at Purdue and beyond, breakout discussion sections, case studies, documentary films, and writing assignments. This course is reading and writing intensive.

Course Objectives:

- Evaluate the roles played by the diversity of parasites and pathogens found in complex natural systems
- Apply the foundational principles of disease ecology – the importance of hosts, pathogens, and the environment – to understanding disease dynamics in natural systems
- Evaluate the strengths and weaknesses of different modeling approaches in disease ecology
- Understand how disease models are used in management and conservation
- Apply both ecological and evolutionary theory to examine the impact of infectious disease on host populations, communities, and ecosystems
- Demonstrate an understanding of patterns in pathogen diversity and abundance across landscape to regional scales
- Articulate understanding of disease ecology through written and oral communication
- Demonstrate an understanding of the scientific literature and an ability to critically evaluate this research for an interdisciplinary topic

Student Evaluation: Students are expected to participate actively within the course by taking notes, answering questions posed by the instructors, asking questions during the class, providing feedback to fellow students and the instructors, and participating in group activities. There will be 3 mid-term exams, a final group paper, a final group presentation, presentation of disease in the news, and participation. The percentage of the final grade allotted to each of these evaluations and the grading scales for the course are detailed in the tables below.

Undergraduate student grading

Evaluation	% of grade
Exam 1	20%
Exam 2	20%
Exam 3	20%
Final paper/presentation	20%
Disease in the news	10%
Participation	10%

Graduate student grading

Evaluation	% of grade
Exam 1	20%
Exam 2	20%
Exam 3	20%
Final paper	20%
Disease in the news	5%
Participation	5%
Lecture	10%

Grading scale

Grade	Final Weighted Percent
A	90–100%
B	80–89%
C	70–89%
D	60–69%
F	<60%

General Course Policies: We expect professionalism from all students in the course. Students are expected to:

- 1) Come to class on time. If you are late, please quietly come into class at the back of the room.
- 2) Turn off phones or place into silent mode. Do not text message during class.
- 3) Do not chat with your neighbors during class, except during organized discussions.
- 4) Respect other students.
- 5) Feel free to use a computer to take notes but do not 'surf' the web - this can be very distracting for other students.
- 6) Our preferred means of communication is in person before or after class.
- 7) Emails should be reserved for urgent issues. We expect professionalism in emails!

Web Site: The course web site is very important for this class. Here you can check your current grade and access readings, lecture notes, supplementary class materials, and study guides. To access the class web site, use Blackboard Learn, URL (<https://mycourses.purdue.edu>) and log on using your career account.

Lecture format: Because there is no textbook for the class, we will rely heavily on readings from the primary literature. For each lecture, students will be provided with a reading list that includes required and supplemental material. Required materials are readings that students must complete before coming to class. Supplemental materials are extra readings that are recommended. Collectively, these materials will form the basis of the lectures and provide more in-depth coverage of the focal topic. We will strive to make these materials available a week before each lecture. As part of their participation grades, students may be asked to answer questions related to the required reading material before or during class. These answers will be turned in for participation grades. Thus, it is important for students to read the required materials before coming to class.

You will be assigned to groups for discussions and activities that take place during class. You are expected to sit with the members of your group during the lectures so that you may easily talk with each other and/or work on activities. Assigned groups will switch after exams, so each student will be in three different groups throughout the semester.

Students are encouraged to attend all lectures and take notes. Lecture notes will be provided on Blackboard Learn when possible. Be aware that the lecture notes we provide are incomplete and require you to fill in the missing information or take notes on topics that are discussed. This is a form of active learning and will help you remember the lecture material. In the event that lecture notes are not provided, it is the student's responsibility to take notes. This is most likely to occur when there are guest lecturers for the class. Students who miss class are encouraged to contact others in the class for the notes. Do not simply show up to office hours and ask if there was anything you missed.

Class Attendance Policy: Students are expected to attend all classes. It is recognized that occasionally it may be necessary for a student to be absent from a scheduled course activity for personal reasons beyond his/her control (e.g., illness, family emergency, bereavement, etc.) or for planned University sponsored events. It is the student's responsibility to contact us **IN WRITING** as far in advance as possible regarding these events so that options can be discussed. Students will be responsible for class-related work that is missed as a result of absence. We recommend obtaining notes from your fellow classmates if you must miss class.

Exams: There will be three mid-term exams during the course. Exams will test knowledge of disease-related concepts covered during the course. The exams will not be cumulative but the students may need to draw upon the knowledge gained earlier in the course to address exam questions. Exams will be conducted during regular class time and will include multiple choice, fill in the blank, short answer, and essay questions.

Makeup Exam Policy and Late Assignments: Makeup exams or late assignments are only acceptable with prior consent or in cases of documented emergencies. Requests for late/makeup status are to be made IN WRITING prior to the official deadline or exam date. Makeup exams may be administered up to 2 weeks after the date of the official exam. If you do not take the exam on the specified date without prior consent, you will be allowed to retake the exam with a 25% grade reduction and with no extra credit questions. Without prior consent, assignments related to the paper will receive a 10% grade reduction for each day that it is late and will not be accepted more than 5 days late. Missed presentations (e.g. Disease in the News or final presentations) cannot be made up without prior consent.

Disease in the News: Each student is expected to bring in and present recent news stories related to disease ecology. These presentations will be no more than 2-3 minutes, and will simply relay to the class the main details of the story and why you found it interesting. Our hope is that these stories will spark some discussion so be prepared to answer questions related to the story. Your choice of topic is up to you, as is the source from which you draw the information (newspaper, magazine, journal, etc.), but be sure to present articles that related to disease ecology. For example, articles that focus on the clinical aspects of disease (e.g. vaccine development, disease treatments) or patterns of disease in captive populations are general not relevant unless there is a clear link to disease in natural systems. These presentations will comprise the beginning of class sessions (10-15 minutes). Each student is expected to present 3 times during the semester. The student should turn in a print out of the story with his/her name written on the top. We will develop a schedule that determines when students are required to present their news story.

Undergraduate Final Papers and Presentations: Undergraduate students will be divided into groups of 3 to 4 and allowed to select a topic for their group paper and presentation. Each group will choose a disease of interest from a list provided by the instructors and present a thorough ecological examination of the factors that influence it (or are influenced by it). Each group will also be required to present a 20-minute presentation based on the paper. Additional details regarding the paper and presentation will be posted on Blackboard.

Graduate Student Papers and Lectures: Each graduate student in the course will select a pathogen of relevance to his or her research system. Similar to the final papers for the undergraduates, the graduate student will write an independent paper based on the selected pathogen. Additionally, each graduate student will be required to present one lecture (60 minutes) based on the paper or another topic of interest. Additional details regarding the paper and lecture will be posted on Blackboard.

Use of copyrighted materials: We will provide you with note templates for each lecture to assist with your learning. These notes are NOT to be made available for others to purchase via a commercial note taking service. Please review Purdue's University Regulations on these policies described below:

Among the materials that may be protected by copyright law are the lectures, notes, and other material presented in class or as part of the course. Always assume the materials are protected by copyright unless the instructor has stated otherwise. Students enrolled in, and authorized visitors to, Purdue University courses are permitted to take notes, which they may use for individual/group study or for other non-commercial purposes reasonably arising from enrollment in the course or the University generally.

Notes taken in class are generally considered to be "derivative works" of the instructor's presentations and materials, and they are thus subject to the instructor's copyright in such presentations and materials. No individual is permitted to sell or otherwise barter notes, either to other students or to any commercial concern, for a course without the express written permission of the course instructor. To obtain

permission to sell or barter notes, the individual wishing to sell or barter the notes must be registered in the course or must be an approved visitor to the class. Course instructors may choose to grant or not grant such permission at their own discretion, and may require a review of the notes prior to their being sold or bartered. If they do grant such permission, they may revoke it at any time, if they so choose.

Students with Disabilities: If you have a disability that requires special academic accommodation, please make an appointment to speak with us within the first three (3) weeks of the semester in order to discuss any adjustments. It is important that we talk about this at the beginning of the semester. It is the student's responsibility to notify the Disability Resource Center (<http://www.purdue.edu/drc>) of an impairment/condition that may require accommodations and/or classroom modifications.

Academic Dishonesty: Incidents of academic misconduct in this course will be addressed by the instructor and referred to the Office of Student Rights and Responsibilities (OSRR) for review at the university level. Scholastic dishonesty includes, but is not limited to, cheating, use of illegal crib notes, copying during examinations, copying of assignments, exercises, and computer programs, plagiarism, and knowingly furnishing false information. Moreover, knowingly aiding and abetting, directly or indirectly, other parties in committing dishonest acts is in itself dishonest.

Any violation of course policies as it relates to academic integrity will result minimally in a failing or zero grade for that particular assignment, and at the instructor's discretion may result in a failing grade for the course. In addition, all incidents of academic misconduct will be forwarded to OSRR, where university penalties, including removal from the university, may be considered. In addition, students should be made aware that they can report issues of academic integrity that they observe, either through the Office of the Dean of Students (purdue.edu/odos), call 765-494-8778 or email integrity@purdue.edu. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern.

It is expected that students will follow the Purdue Honors Pledge in this class: "As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together – we are Purdue."

Diversity Statement: In this course, each voice in the classroom has something of value to contribute. Please take care to respect the different experiences, beliefs and values expressed by students and staff involved in this course. We support Purdue's commitment to diversity, and welcome individuals of all ages, backgrounds, citizenships, disability, sex, education, ethnicities, family statuses, genders, gender identities, geographical locations, languages, military experience, political views, races, religions, sexual orientations, socioeconomic statuses, and work experiences.

Anti-Harassment Policy: Harassment in the workplace or the educational environment is unacceptable conduct and will not be tolerated. Purdue is committed to maintaining an educational and work climate for faculty, staff and students that is positive and free from all forms of Harassment. This policy addresses harassment in all forms, including harassment toward individuals with legally protected status for reasons of race, gender, religion, color, age, national origin or ancestry, genetic information or disability and Harassment toward individuals for other reasons such as sexual orientation, gender identity, gender expression, marital status or parental status. The University will not tolerate harassment of its faculty, staff or students by persons conducting business with or visiting the University, even though such persons are not directly affiliated with the University. Purdue Anti-Harassment Policy (III.C.1): <http://www.purdue.edu/policies/ethics/iic1.html>

Mental Health: Purdue is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at 765-494-6995 and <http://www.purdue.edu/caps/> during and after hours, on weekends and holidays or through its counselors physically located in the Purdue University Student Health Center (PUSH) during business hours.

Campus Emergencies: In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Here are ways to get information about changes in this course: Blackboard Learn (<https://mycourses.purdue.edu>), email (jhoverm@purdue.edu, searle@purdue.edu), and phone (Dr. Hoverman 496-3263, Dr. Searle 496-0062).

Campus Emergencies Safety Briefing: Purdue University is a very safe campus and there is a low probability that a serious incident will occur here at Purdue. However, just as we receive a “safety briefing” each time we get on an aircraft, we want to emphasize our emergency procedures for evacuation and shelter in place incidents. Our preparedness will be critical if an unexpected event occurs.

Emergency preparedness is your personal responsibility. Purdue University is continuously preparing for natural disasters or human-caused incidents with the ultimate goal of maintaining a safe and secure campus. Let’s review the following procedures:

- To report an emergency, call 911.
- To obtain updates regarding an ongoing emergency, and to sign up for Purdue Alert text messages, view www.purdue.edu/ea
- There are nearly 300 Emergency Telephones outdoors across campus and in parking garages that connect directly to the Purdue Police Department (PUPD). If you feel threatened or need help, push the button and you will be connected immediately.
- If we hear a fire alarm, we will immediately suspend class, evacuate the building, and proceed outdoors, and away from the building. Do not use the elevator.
- If we are notified of a Shelter in Place requirement for a tornado warning, we will suspend class and shelter in the lowest level of this building away from windows and doors.
- If we are notified of a Shelter in Place requirement for a hazardous materials release, or a civil disturbance, including a shooting or other use of weapons, we will suspend class and shelter in our classroom, shutting any open doors or windows, locking or securing the door, and turning off the lights.
- Please review the syllabus and the Emergency Preparedness website for additional information. http://www.purdue.edu/ehps/emergency_preparedness/index.html

Day	Topic	Lecturer	Assignment
Week 1			
Tu – 1/9	Overview of course + disease causing agents	Searle/Hoverman	Group survey
Th – 1/11	Disease causing agents – parasite diversity	Hoverman	
Week 2			
Tu – 1/16	Detecting, describing, and measuring disease	Hoverman	
Th – 1/18	Principles of disease ecology	Searle	Paper topics due
Week 3			
Tu – 1/23	Individual-level dynamics	Searle	
Th – 1/25	Immunology	Turner DeBlieux	
Week 4			
Tu – 1/30	Humans and disease risk	Searle	
Th – 2/1	Guest lecture: Schistosomes in humans	Stephanie Gutierrez	Literature list due
Week 5			
Tu – 2/6	Exam 1		Exam 1
Th – 2/8	Work day for papers – attendance required		
Week 6			
Tu – 2/13	Behavior and disease	Searle	
Th – 2/15	Introduction to basic disease models	Hoverman	
Week 7			
Tu – 2/20	Host-parasite evolution	Searle	
Th – 2/22	Applying community ecology to disease	Hoverman	Paper outline due
Week 8			
Tu – 2/27	Biodiversity and disease risk	Searle	
Th – 3/1	Climate change and disease	Searle	
Week 9			
Tu – 3/6	Guest lecture: Behavior and disease in frogs	Dr. Ximena Bernal	
Th – 3/8	Exam 2		Exam 2
Week 10	<i>Spring Break!</i>		
Tu – 3/13	Go get some sun ☺		
Th – 3/15	Think about coming back ☹		
Week 11			
Tu – 3/20	Coinfection	Hoverman	
Th – 3/22	Guest lecture: Disease in crop systems	Dr. Janna Beckerman	
Week 12			
Tu – 3/27	Predation	Hoverman	
Th – 3/29	Habitat fragmentation and invasive species	Hoverman	Paper draft due
Week 13			
Tu – 4/3	Disease and contaminants	Logan Billet	
Th – 4/5	Guest lecture: Vector ecology in plants	Dr. Laura Ingwell	
Week 14			
Tu – 4/10	Emerging diseases across the world	Turner DeBlieux	
Th – 4/12	Work day for papers – optional attendance		
Week 15			
Tu – 4/17	Exam 3		Exam 3
Th – 4/19	Group presentations – attendance required		
Week 16			
Tu – 4/24	Group presentations – attendance required		
Th – 4/26	Group presentations – attendance required		Final paper due
Week 17	Finals week		

The instructors reserve the right to modify the course schedule during the semester.