

FW467 & FW567– WILDLIFE DISEASE ECOLOGY – Fall 2019

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Course Objectives:

This course will provide students with exposure to the ecological, epidemiological, and evolutionary principles needed to understand the impact that disease has on fish and wildlife populations and, in turn, the impact wildlife disease has on humans. Fundamental concepts in disease ecology will be presented as well as contemporary, emerging issues in disease ecology. The course will be concept-driven rather than taxon-based. At the same time, through 'case studies' and lecture examples, the course will cover the etiology, pathology, and impact of a wide variety of wildlife diseases caused by a diversity of agents including bacteria, viruses, fungi, macroparasites, and environmental factors that affect the health of wildlife and fish. Discussion sessions will focus on contemporary issues in wildlife disease ecology.

Prerequisites/Requirements:

The course is presented for students with upper-level undergraduate (FW467) or graduate (FW567) standing in the biological sciences (e.g., Biology, FWCB, Ecology, MIP, Pre-vet, Clinical Sciences, others welcome) and previous coursework in ecology. Students will be expected to research and develop a written review on an issue in wildlife disease and to actively participate in discussions about papers from the primary literature (details below). Course readings will be provided on RamCT Blackboard from the current scientific literature and other relevant texts. The course may also feature guest lectures and (perhaps) opportunities outside of class to learn more about current research on wildlife diseases and disease management.

Course Reading:

As an emerging field, no single textbook exists that provides sufficient background or treats all topics relevant to wildlife disease ecology (in my opinion). We'll read from a variety of sources and use these readings and lectures to build a common foundation of key principles and concepts. Readings will come from some of the sources listed below and the primary literature. Papers or chapters listed on the course schedule will be provided as PDFs on the class RamCT Blackboard website.

Student Evaluation:

Students are expected to participate actively throughout the course through questions, comments, ideas, discussion, and feedback with all participants. We'll rely on the primary literature for readings about many contemporary topics and information for case studies so you should be proficient searching scientific databases (e.g., Web of Science) for pertinent literature. The course will be reading-intensive. Letter grades will be assigned with grade ranges – A (90% or higher), B (80-89%), C (70-79%), D (60-69%), and F (<60%) – and with the point distribution as follows:

Review Paper & Case Study	55%
5% - Concept note	
10% - Peer review	
25% - Final review paper	
15% - Short presentation (FW467); Guest lecture (FW567)	

Discussion	30%
20% - General discussion & in-class participation	
10% - Leading discussion (paper choice, discussion forum, etc.)	
Mid-term Exam (Take home, written)	15%

Course Assignments:

Class Discussion- During the semester, we'll have FIVE (5) in-class discussion sessions. Discussions will be student-led based on a paper chosen by the instructor and one or more papers chosen by the student leaders for that discussion (students in FW567 will be expected to take a stronger leadership role). The student-chosen paper will typically present an alternative perspective or a novel approach to solving the problem/issue under discussion. Student leaders should work together to develop a set of stimulating questions about the viewpoints expressed in the two papers (that's why choosing a paper that takes a contrary view will be especially helpful for leading a lively discussion). Finally, discussion leaders will monitor and promote a pre-discussion 'forum' on RamCT Blackboard.

Review Paper/Case Study - Over the course of the semester, everyone will research and develop a review of an emerging issue in wildlife disease of their choosing (I'll provide some ideas, too). Students will develop a concept note outlining the topic s/he has chosen including the central thesis and pieces that will be included in the final review paper. After getting feedback on the concept note, versions of the written review paper will be peer-reviewed by others in the class and this feedback should be incorporated into the final product. We'll use Journal of Wildlife Diseases guidelines for length and style of the review papers.

At the end of many lectures, a case study will be presented focusing on a particular disease agent (pathogens, parasites, noninfectious agents, etc.) that illustrates and reinforces a concept or principle developed during lecture. Students will choose their own agent as a case study to illustrate the concept/issue/idea developed in the review paper and this case study will be presented as a short oral presentation at the end of the semester. Students in FW567 will give 40-minute guest lectures in class as teams of two instead of the shorter oral presentation. Details on the form of the case study presentation and guest lectures will be provided and examples given throughout the semester will give you a good sense of what the case study entails. We'll have presentation sessions at the end of the semester to share findings about the reviews and the case study agent examples.

Exam- The course has one take home written exam at approximately the mid-term. The exam will be "open book" and "open notes" but you will not be permitted to seek help from fellow students in the course.

Course Policies and Additional Information:

The course will adhere to CSU's Academic Integrity Policy which is found at (<http://www.catalog.colostate.edu/Content/files/2012/FrontPDF/1.6POLICIES.pdf>) and the Student Conduct Code (<http://www.conflictresolution.colostate.edu/conduct-code>). At a minimum, violations will result in a grading penalty in this course and will be referred to the Office of Conflict Resolution and Student Conduct Services.

For me, academic integrity is at the heart of a University and is central to my job as an objective scientist. Academic integrity is conceptualized in this course as doing and taking credit for one's own work on written materials, exams, and other graded coursework. A number of excellent resources are available (<http://learning.colostate.edu/integrity/index.cfm>, http://learning.colostate.edu/integrity/ways_to_avoid.cfm) to help students better understand what constitutes plagiarism and why it's so important to give credit where it's due. We will also talk in class about how to properly cite outside sources.

*** Aspects of the syllabus and schedule may change as the course proceeds. Any change will be announced in class and schedule changes will be posted as an updated schedule on our RamCT Blackboard site.**

Additional Resources:

The literature in disease ecology is growing almost exponentially; in fact, a number of excellent books have come out or will come out in the next couple of months and every day, it seems, there's a new paper in the scientific literature. These resources might come in handy during your own research for this course or other endeavors. A number of websites with valuable information also exist.

Texts

- Aguirre et al. (eds.) 2012. New Directions in Conservation Medicine. Oxford University Press: New York.
- Brown C and C Bolin. 2000. Emerging Diseases of Animals. ASM Press: Washington DC.
- Childs, JE et al. (eds.) 2007. Wildlife and Emerging Zoonotic Disease: The Biology, Circumstances, and Consequences of Cross-Species Transmission. Springer Verlag: New York.
- Collinge, SK and C Ray. 2006. Disease Ecology: Community Structure and Pathogen Dynamics. Oxford University Press: New York.
- Grenfell, BT et al (eds). 1995. Ecology of Infectious Diseases in Natural Populations. Cambridge University Press: Cambridge, UK.
- Hatcher, MJ and AM Dunn. 2011. Parasites in Ecological Communities. Cambridge University Press: New York.
- Hudson, PJ et al (eds). 2001. The Ecology of Wildlife Diseases. Oxford University Press: New York.
- Hughes, DP, J Brodeur, and F Thomas (eds). 2012. Host Manipulation by Parasites. Oxford University Press: New York.
- Morand, S and BR Krasnov (eds). 2010. The Biogeography of Host-Parasite Interactions. Oxford University Press: New York.
- Nunn, CL and S. Altizer. 2006. Infectious Diseases in Primates. Behavior, Ecology and Evolution. Oxford University Press: New York.
- Ostfeld, RS, et al. 2008. Infectious Disease Ecology: The effects of ecosystems on disease and disease on ecosystems. Princeton University Press: Princeton, New Jersey.
- Poulin, R and S. Morand. 2004. Parasite Biodiversity. Smithsonian Books: Washington DC.
- Romich, JA. 2008. Understanding Zoonotic Diseases. Thomson Delmar Learning: New York.
- Schmid-Hempel, P. 2011. Evolutionary Parasitology. Oxford University Press: New York.
- Scott, ME and G Smith. 1994. Parasitic and Infectious Diseases Epidemiology and Ecology. Academic Press: New York.
- Stearns, SC (ed). 1999. Evolution in Health and Disease. Oxford University Press: New York.
- Thomas, F, J-F Guegan, and F Renaud (eds). 2009. Ecology and Evolution of Parasitism. Oxford University Press: Oxford.
- Wobeser, GA. 2006. Essentials of Disease in Wild Animals. Blackwell: Ames, IA.
- Wobeser, GA. 2007. Disease in Wild Animals: Investigation and Management, 2nd ed. Springer Verlag: New York.

Websites

<http://wildlifedisease.nbi.gov/index.jsp>
<http://www.nwhc.usgs.gov/>
http://www.nwhc.usgs.gov/publications/field_manual/index.jsp
http://www.aphis.usda.gov/ws/nwrc/research/disease_research.html
<http://www.cdc.gov/>
<http://www.wildlifedisease.org/>
<http://www.library.tufts.edu/vet/signature/exotwild.html>