CONSERVATION MEDICINE
Syllabus

GEORGE MASON UNIVERSITY
Fall Semester 2021
3 Credit Hours

EVPP 527-DL2(CRN: 84065)/BIOL 507-DL_ (Not entered)

Due to COVID-19 restrictions we will meet synchronously online weekly on Tuesdays from 5:30–7:00 p.m.*
in our Blackboard Zoom meeting room.

You will be responsible for preparing for the meeting by completing readings and assignments asynchronously. You will take quizzes and exams in Blackboard when scheduled.

Instructor:	Dr. Esther Peters	**Backup Instructor:**	Dr. Alonso Aguirre
Office:	David J. King Hall 3050	**Office:**	DK 3004
Office Hours:	4:30–5:30 p.m. Tuesdays*	in Blackboard Zoom meeting room	
Phone:	703-993-3462	**Phone:**	703-993-7590
Cell:	703-624-0143		
Email:	epeters2@gmu.edu	**Email:**	aaguirr3@gmu.edu

*Please let Dr. Peters know by e-mail if you will join or schedule other times BY APPOINTMENT (send email request to Dr. Peters)

Prerequisite(s): *Undergraduate students*: EVPP 301 OR BIOL 308 and 60 credit hours; or Instructor's permission.

Graduate Students: Courses on evolution, ecology, zoology, and conservation biology or instructor's permission.

Sign up for Mason Alert (e.g., weather closings, emergencies) at **https://alert.gmu.edu**
See Emergency Preparedness Guides at (http://ehs.gmu.edu/guides_EP.html)

*Please note that the syllabus may need to be changed after the start of the semester. Check your GMU e-mails and Blackboard announcements frequently.

Course Description

Conservation of biological diversity faces multiple challenges. The relationship of humans to impacts on terrestrial and aquatic organisms has been recognized, but conservation strategies traditionally have not included investigations of the symbioses and linkages among all organisms and the continuum of environment and health to frame protection policies and educate the public. In the 1990s, conservation medicine emerged as a transdisciplinary field that studies the relationships between human, animal, and ecosystem health and environmental conditions. Biomedical sciences are combined with conservation biology and other disciplines to trace the environmental sources of pathogens and pollutants, develop an understanding of the ecological causes of changes in human, biotic, and ecosystem health and address the consequences of diseases to populations and ecological communities. This advanced course will provide a framework in which to examine the connections between condition of the planet and health of all species. It will also challenge students in the ecological sciences, health sciences, and the natural sciences to think about new, collaborative ways to address ecological health. Understanding infectious and noninfectious diseases, pathogens, processes, impacts, and how to maintain healthy populations of species—and the ecosystem services the species provide—is the key to conservation.

Course Objectives and Student Learning Outcomes

The course will examine health issues from various standpoints, including the emergence and resurgence of infectious disease agents and how they are investigated; the effects of global climate change on health; the increasing impacts of toxic chemicals and hazardous substances; and the health implications of habitat fragmentation, degradation, and loss of biodiversity. Students will participate in individual and team assignments to be able to:

- Explain the difference between health and disease and impacts of diseases on ecosystems;
- Discuss the paradigm of disease using appropriate terminology in this field derived from pathology, ecology, epidemiology, and medicine;
- Identify and characterize 10 types of biotic and abiotic agents causing diseases;
- Describe and explain the rationale behind 5 methods used to investigate diseases of plants, animals, and humans;
- Identify ecological alterations and processes that can affect the health of plants, wildlife, domestic animals, and humans;
- Discuss 10 examples of diseases occurring in terrestrial and aquatic organisms (vertebrates) and their broader implications;
- Discuss 10 examples of diseases occurring in terrestrial and aquatic organisms (plants, invertebrates) and their broader implications;
- Analyze recent reports on emerging diseases in plants, wildlife, domestic animals, and humans and synthesize their effects on ecosystems;
- Evaluate and apply processes and procedures used in the practice of conservation medicine;
- Explain how disease investigations can improve the success of conservation projects; and
- Know where to find and how to access transdisciplinary resources that may be needed to help solve conservation medicine challenges.

Course Format

The synchronous online sessions will meet from 5:30–7:00 p.m. on Tuesdays in Zoom (link provided in Blackboard). These sessions will feature micro-lectures given by the instructor and guest speakers with breakout group discussions or other activities. The recorded lectures, readings, and other materials will be available asynchronously, posted on Blackboard. Access Blackboard from https://www2.gmu.edu by clicking on MYMASON in the top yellow bar, click on Blackboard, then log in with your Mason username and secure password. Then click on the upper left Courses tab and select this course (MASTER) from the Fall 2021 course list.

Course Expectations

Each session will combine readings, lectures, class exercises, quizzes, occasional guest speakers and student discussions. As with any cross-listed course (undergraduate/graduate) offering, ***this will not be an easy course***. The successful student **must read assignments, study supporting materials, and prepare assignments outside of class**. Self-directed study skills are important. Students need to organize material logically and communicate well orally and in writing.

Class Preparation

"He who hesitates is lost...." Reading, research, and assignments are detailed on the following class outlines. Any concerns about keeping up with assignments should be discussed with Dr. Peters. More students are juggling work, research, internships, shadowing, families, and COVID-19 issues. Please note: "Although many students must work to meet living expenses, employment must not take priority over academic responsibilities. Students employed more than 20 hours a week are strongly urged not to attempt a full-time academic load. Students employed more than 40 hours a week should attempt no more than 6 credits per semester. Students who fail to observe these guidelines may expect no special consideration for academic problems arising from the pressures of employment." (University catalog, section AP.1.2. Academic Load, see: http://catalog.gmu.edu/content.php?catoid=27&navoid=5365#attendance). Please consider your responsibilities and interests and plan accordingly to protect your health and GPA!

Class Participation

Students should join each synchronous session ready to participate in all activities. Each new learning unit begins after the online session on Tuesdays, so that you will read or review materials, write assignments, and complete a Pre-Class Quiz by Monday evening before the Tuesday online session. After each online session, you will complete a Post-Class Quiz. Then the next week's learning module begins. **Please turn off cell phones and eliminate other distractions before class begins.**

Absenteeism should be limited to illness or emergencies or discuss concerns with the instructor. Students should notify Dr. Peters before class if they must miss a class. **Multiple missed classes will affect student grades** as exercises are given in almost every lecture and the post-session quizzes will include questions based on the materials presented online.

If you need to miss class due to religious observances please let Dr. Peters know within the first two weeks of the semester (the University Life religious holiday calendar is here: https://ulife.gmu.edu/calendar/religious-holiday-calendar.

If you are a student with a disability and you need academic accommodations (see https://ds.gmu.edu) please notify Dr. Peters and contact the Office of Disability Services (ODS) at 993-2474. All academic accommodations must be arranged through the ODS and require appropriate documentation.

Remember the rules of "Netiquette" (http://albion.com/netiquette/corerules) and be careful when posting comments in Blackboard forums to avoid misinterpretation.

Student privacy and student rights are subject to the FERPA (https://registrar.gmu.edu/ferpa).

E-mail Communications

Dr. Peters will send e-mail messages only to your GMU e-mail account. Students must use their Mason email accounts to receive important University information, including messages related to this class. Please be sure you check it often and **respond to queries from Dr. Peters**! If you are not getting messages, please send Dr. Peters an alternate e-mail address.

Required Textbook

Aguirre, A. A., R. S. Ostfeld and P. Daszak. 2012. *New Directions in Conservation Medicine: Applied Cases of Ecological Health*, Oxford University Press, New York, 646 pp.

Chapters from the textbook that are required reading will be provided in the weekly Blackboard learning modules.

Course Assignments and Assessments

Assignments should be submitted by their due dates; let Dr. Peters know if you will not be able to meet the deadline. No work will be accepted after the last day of the course.

Weekly Required Readings, Lectures, Other Activities (Asynchronous)

These are indicated in the Course Schedule below and in the Learn Here: Weekly Lessons tab in Blackboard, which will show detailed information for each week of the semester. PDF versions of the chapters will be posted in the appropriate week in Blackboard. Pre-recorded lectures will also be posted in the designated week in Blackboard. Students will review and study these materials on their own before taking the Pre-class Quiz each week. Students will also take a Post-class Quiz after the online synchronous session, based on selected materials and discussions. The 10 highest scores on each of these quizzes will count toward the final grade. Graduate students will read one extra assigned peer-reviewed article each week and contribute 5 sentences to a Wiki, summarizing what you learned, questions you may have had while reading it, or critical thoughts on the value of the paper.

Definitions of Terms

Each student is expected to identify and define 100 common terms related to conservation medicine and disease ecology and submit them ***written by hand***. This is a way to expose you to common terminology used in conservation medicine, and to help you remember some of these definitions by writing them. The first 50 terms are provided in a list on Blackboard that everyone "needs to know." The remaining terms will be ones each student "wants to know." Further instructions are provided in Week 2 in Blackboard.

Commentaries

Graduate students will prepare two (2) commentaries. These single-spaced assignments, limited to 400 words, may compare, contrast, or critique a **technical (scientific) article recently published (2018 or later) on a disease ecology issue** (e.g., anthrax outbreak in bison; dolphins stranding on the Virginia coast; global Ebola outbreak; Zika virus spreading in the Americas). Instructions are provided in Week 4 in Blackboard.

Final Exam

Students will be assigned to transdisciplinary teams to work together as a team to find solutions to example conservation medicine scenarios, then write their responses to specific questions provided by Dr. Peters and submit them as the final examination in this course. Students will have three weeks to develop their solutions. For the final online synchronous meeting, each team will report briefly on their solution for one of the questions (to be assigned) and all will compare their solutions for additional insights. The final exam is worth 20% of the grade.

Final PowerPoint Presentation

Graduate students are required to submit a prerecorded **10-min presentation** using PowerPoint slides on a *contemporary* issue/topic relevant to conservation medicine. These presentations are worth *20% of your grade*. The issues/topics (*but not the contents*) for the presentations are not limited to those covered in the textbook. *Choose your favorite infectious disease, in a terrestrial or marine species or ecosystem from a newspaper, magazine article, or scientific journal article*. In your presentation, provide a brief background of the problem; describe the impacts of this disease to wildlife, domestic animals, humans, and ecosystems, and concerns from an economic, cultural, environmental, and conservation medicine perspective. More guidance and the grading rubric will be posted in Week 6 on Blackboard.

Grading Criteria

The total grade received for this course will be based on the following assignments and assessments:

Activity	EVPP527/BIOL507 Contribution to Total Grade
Definitions of Terms	10%

Class participation (synchronous sessions)	5%
Extra readings	5%
Written commentaries	20% (10% each)
11 Quizzes (Pre- and Post- synchronous sessions), lowest grades for each dropped, so 20 count	20%
Final Exam	20%
PowerPoint presentation	20%
TOTAL	**100%**

The final grade for graduate students will be based on this scale: A= 100–90%, B= 89–80, C = 79–70%, D= 69–60%, F < 59%. **A CURVE WILL NOT BE APPLIED.**

Academic Integrity

GMU is an Honor Code university; please see link to the Mason Honor Code at https://oai.gmu.edu/the-mason-honor-code-2 for a full description of the code and the honor committee process. The principle of academic integrity is taken very seriously and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form. Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification. Students are expected to complete the work on their own or as a team, depending on the assignment.

All quizzes and exams will be completed by individuals or as a team outside the classroom (those registered for the course).

Unless otherwise noted, these assessments will be taken without the use of study aids, memoranda, textbooks, other books, data, or other information available. The purpose of these assessments is to evaluate the student's progress in understanding the material.
It is important to note that materials produced for this course, particularly for the commentaries, require creativity in organization and presentation, but that the information presented within the paper or other product must be properly acknowledged as to its source. Statements of a general nature or that synthesize information from several sources need not be attributed to a specific source; however, statements of specific details or direct quotations ("between quotation marks") from books, journals, newspaper or other media articles, Internet web pages, or other authorities must be identified by number in the text and the full citation provided in the References and Notes section at the end of the paper.

Diversity

Mason values diversity, through the Office of Diversity, Inclusion, and Multicultural Education (ODIME), Mason seeks to create and sustain inclusive learning environments where all are welcomed, valued, and supported.

Other Useful Campus Resources

WRITING CENTER: Robinson Hall B213; 703-993-1200; https://writingcenter.gmu.edu

UNIVERSITY LIBRARIES: https://library.gmu.edu/for/online

COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS): 703-993-2380 or see https://caps.gmu.edu

LEARNING SERVICES: 703-993-2999; https://caps.gmu.edu/learningservices/ offer many good study skills workshops!

ACADEMIC COUNSELING PROGRAM: 703-993-2380: http://caps.gmu.edu/learningservices/academiccounseling.php

UNIVERSITY POLICIES
The University Catalog, https://catalog.gmu.edu, is the central resource for university policies affecting student, faculty, and staff conduct in university academic affairs. Other policies are available at http://universitypolicy.gmu.edu/. All members of the university community are responsible for knowing and following established policies.

Course Schedule*

Modifications may be required as the semester progresses… Date is the date of the online synchronous session meeting. The topic refers to the pre-recorded PowerPoint lecture you will review asynchronously. Additional learning materials and assignments will be provided in each week in Blackboard (click on **Learn Here: Weekly Lessons**). Quizzes will be completed both before and after the synchronous class meetings online.

Week	***Date***	***Textbook Chapters* and Tasks to do Before Online Class Meeting and Assessments***	***Online Focus Talks or Activities for Discussion and Assessments by ALL***
0	08/24	The following readings and associated assignments in Blackboard should be done BEFORE CLASS EACH WEEK	Online meeting to start the semester: Introductions, Syllabus review, course expectations, general concepts and definitions.
1	08/31	ALL read Foreword, Preface, Chapter 1 ALL view pre-recorded Lecture: Conservation Medicine: Ecological Health in Practice	Focus Talk: Building Eco-health, Dr. Peters Breakout Groups discuss biotic and abiotic pathogens, general discussion together

		ALL work on 20 "Need to Know" Definitions Grad students read assigned extra paper and post comment ALL take Pre-class Quiz	Take Post-class Quiz
2	09/7	ALL read Chapter 37 ALL view pre-recorded Lecture: Health and Disease: Concepts and Models ALL work on 20 "Need to Know" Definitions Grad students read assigned extra paper and post comment ALL take Pre-class Quiz	Focus Talk: Watch video, interview with Dr. Aguirre on conservation medicine Breakout Groups discuss the video, general discussion together Take Post-class Quiz
3	09/14	ALL read Chapter 6 ALL view pre-recorded Lecture: Eco-epidemiological Approaches to Infectious Disease ALL work on 10 "Need to Know" and 10 "Want to Know" Definitions Grad students read assigned extra paper and post comment ALL take Pre-class Quiz	Focus Talk: Watch video, Bahamas National Trust, ecotourism studies on iguanas and conservation medicine Breakout Groups discuss the video, general discussion together Take Post-class Quiz
4	09/21	ALL read Chapter 5 and Alaska Veterinary Pathologist Story ALL view pre-recorded Lecture: Disease, Biodiversity, and Species Extinction ALL work on 20 "Want to Know" Definitions Grad students read assigned extra paper and post comment ALL take Pre-class Quiz	Focus Talk: Dr. Peters, Habitat Loss, Fragmentation, and Disease Ecology with general discussion together Take Post-class Quiz

5	9/28	ALL read Chapter 10; work on 20 "Want to Know" Definitions ***Definitions due September 28 (submit in Blackboard)*** Pre-recorded Lecture: NOT THIS WEEK Grad students read assigned extra paper and post comment ALL take Pre-class Quiz	Focus Talk: Watch video, St. Louis Zoo turtles and conservation medicine Breakout Groups read resources on diseases affecting box turtles and discuss Take Post-class Quiz
6	10/5	ALL read Chapters 15 and 21 ALL view pre-recorded Lecture: Principles of Emerging Infectious Diseases (EIDs) Grad students read assigned extra paper and post comment ALL work on Commentary 1 ALL take Pre-class Quiz	Focus Talk: Listen to Dr. Peters pre-recorded lecture on Diseases of Plants then return to the online synchronous session for discussion Take Post-class Quiz
7	10/12	ALL read Chapters 16, 23 ALL view pre-recorded Lecture: Terrestrial and Aquatic Emerging Infectious Diseases – Vertebrates Grad students read assigned extra paper and post comment ALL work on Commentary 1 ALL take Pre-class Quiz	Focus Talk: Presented by the Breakout Groups after studying more diseases of selected aquatic and terrestrial organisms Take Post-class Quiz
8	10/19	ALL read Chapter 20 ALL view pre-recorded Lecture: Disease Ecology of Invertebrates Grad students read assigned extra paper and post comment ALL work on Commentary 1 ***Written Commentary 1 due October 19***	Focus Talk: Guest Speaker, Elizabeth Rush, "Mosquitos and Conservation Medicine" Take Post-class Quiz

		ALL take Pre-class Quiz	
9	10/26	ALL read Chapter 29 from Aguirre et al. 2002 and bioterrorism resources (will be provided in Blackboard) ALL view pre-recorded Lecture: Disease ecology, bioterrorism, and environmental security Grad students read assigned extra paper and post comment Grad students work on Commentary 2 ALL take Pre-class Quiz	Focus Talk: Dr. Peters, Environmental Security and Coral Reefs with general discussion together Take Post-class Quiz
10	11/2	***No online class due to Election Day***	**Watch one of the listed movies or read a paper and enter your impressions of it in the discussion forum in Blackboard**
11	11/09	ALL read Chapters 11 and 12 ALL view pre-recorded Lecture: Wildlife Trade, Bushmeat and the Spread of Disease Grad students read assigned extra paper and post comment Grad students work on Commentary 2 ALL take Pre-class Quiz	Focus Talk: Guest Speaker, Blake Klocke. "The *Batrachochytrium* era: Amphibian Declines and Conservation During an Ongoing Global Fungal Pandemic" Take Post-class Quiz

12	11/16	ALL read Chapter 42 (and Chapter 28, if not already done) ALL view pre-recorded Lecture: Prediction and Prevention of the Next Epidemic Grad students read assigned extra paper and post comment Grad students work on Commentary 2 ***Written Commentary 2 due November 16*** ALL take Pre-class Quiz	Breakout Groups discussion on Chapters 42, 28, and how do we deal with disease prospects in conservation medicine? Take Post-class Quiz
13	11/23	Teams work on Final Exam – NO ONLINE CLASS MEETING	
14	11/30	Teams work on Final Exam – NO ONLINE CLASS MEETING	
15	12/7	***Final Exams due December 7***	
	12/14	Final Exams Week – meet online 5:00 p.m.–7:10 p	**Graduate Student PPT Presentations**

** Chapter 29 from Aguirre et al. 2002 will be provided as a PDF.