

## Syllabus

### PLANETARY HEALTH

EVPP 490 / BIOL 435 / GCH 494

EVPP 505 / BIOL 507 / GCH 594

3 Credit Hours

Fall Semester 2020

Lecture: Fridays 4:30–7:10 p.m.

Planetary Hall 126

#### Instructor Information

**Instructor:** A. Alonso Aguirre, DVM, PhD  
Professor and Department Chair  
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#### Prerequisite/Co-Requisites

*Undergraduate Students:* At least one ecology, conservation biology, epidemiology, disease ecology or one health course. Or permission of instructor.

*Graduate Students:* Courses on Evolution, Disease Ecology, One Health or Conservation Biology. Or permission of instructor.

Sign up for Mason Alert (e.g., weather closings, emergencies) at <https://alert.gmu.edu>

#### Course Description

Very rapid human population growth combined with even more rapid growth in per capita consumption are driving an extraordinary transformation of most of Earth's natural systems including its climate system, its oceans, land cover, biogeochemical cycles, biodiversity, and coastal and fresh water systems. These are the biophysical systems that underpin global food production, our exposure to infectious disease and natural hazards, even the habitability of the places where we live, and global environmental change is a major driver of disease burden over the coming decades. The course covers interdisciplinary scientific issues and seeks solutions to many of the planetary problems we face today including biodiversity changes, ecosystem modifications, climate change, agriculture development, intensive farming, transcontinental air transport, international trade, emerging and resurgent diseases. Planetary Health (PH) will

provide students with a big picture perspective, research, policy and practice issues and the implications and opportunities related to planetary health for public and population health globally. A key theme throughout will be consideration of health and social equity issues and the differential impacts of climate and other environmental changes on species and ecosystems in light of these issues.

### Course Objectives and Student Learning Outcomes

Students will be able to use a Planetary Health (PH) lens to understand the connectedness between environmental change and human health outcomes. Also, they will be able to examine ecological determinants of human health and to predict the likely health consequences of environmental change. By the end of the course, students will understand how humanity manages Earth's natural systems and is a primary determinant of future global health. Upon completion of the course, students will be able to:

- Broadly understand the concept of PH, its distinguishing characteristics relative to the ecological determinants of health, Conservation Medicine, EcoHealth, and One Health.
- Articulate the nature of the Anthropocene and discuss current trends in knowledge and thinking about the impacts on humans, biodiversity and ecosystem services.
- Identify key human health effects and indicators across the lifespan related to PH and global environmental change.
- Identify key sources of data on surveillance systems and understand key methodological challenges and limitations in studying PH.
- Expand thinking about implications for research, policy and practice, conservation of biodiversity, ecological health, global health and agricultural policy; and
- Formulate research and policy perspectives with the PH lens.

### Course Expectations

Each session will combine lectures, class exercises, occasional guest speakers and student discussion. As with any cross-listed course (undergrad/grad) 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 Prof. Aguirre. More students are juggling work, research, internships, shadowing, and families. 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 come to class ready to participate in all activities (assignments completed prior to class). They should behave in a mature and professional manner and abide by the GMU honor code. **Please turn off cell phones before class begins.**

*Absenteeism should be limited to illness or emergencies, or discuss concerns with the instructor.*

Students should notify the instructor before class if they must miss a class. **Multiple missed classes will affect student grades** as class exercises are given in almost every lecture. PowerPoint TEXTS will be posted so you have the highlights of each lecture. However, you need to make every effort to attend. Students should contact classmates to obtain lecture notes and assignments as quizzes and exams will be based from the lectures, PPTs and other reading materials.

Students may record the lectures (sound), but may not take photographs or videos. Instead, they should take notes, which will help them study for the quizzes. If using electronic devices (such as laptops, notebooks, tablets) please be respectful of your peers and instructor and do not engage in activities unrelated to class. Such disruptions show a lack of professionalism and can affect your grade.

*If you are a student with a disability and you need academic accommodations, please notify the instructor and contact the Office of Disability Services (ODS) at 993-2474. All academic accommodations must be arranged through the ODS.*

### **E-mail Communications**

Prof. Aguirre will send e-mail messages only to your GMU e-mail account. Students must use their Mason email accounts— “MASONLIVE” account—to receive important University information, including messages related to this class. See <http://masonlive.gmu.edu> for more information. Please be sure you check it often and keep your mailbox from getting “over quota” (filled up so you won’t get any)! If you are not getting messages (e.g., MasonLive issues), please give an alternate e-mail address.

## Required Textbook

Myers S. and H. Frumkin (eds.). 2020. *Planetary Health: Protecting nature to protect ourselves.*, Island Press, Washington DC, 456 pp.

## Course Assignments

### *Definitions of Terms*

Each student is expected to identify 100 common terms related to Planetary Health and submit them **written by hand**. This is a way to expose you to common terminology used in this emerging field, and to help you remember some of these definitions while writing them. Terms must be selected from class materials and reliable internet sources. Terms must be written legibly on lined paper (notecards will not be accepted). Terms are not required to be in alphabetical order. If you choose to define **theories, hypotheses or postulates**, you **MUST** cite the original publication, AND thoroughly explain the premise.

### *Written Assignments*

In addition to reading and studying the textbook **undergraduates will prepare one written assignment and graduate students will prepare two written assignments** of 400 words not including references drafted as commentaries, comparing, contrasting, or critiquing a technical (scientific) article recently published (2019 or later) on a Planetary Health issue (i.e. COVID-19 impacts on global economy), in the style of *Letters to Science*

<http://www.sciencemag.org/site/collections/online/eletters/guidelines.xhtml>

**You must attach the paper you are reviewing to your submission.** Attachments can be .doc, .pdf, or other downloadable files. Attachments may NOT be in the form of a hyperlink.

Identify **specific** issues/critiques you have with **an article of your choice from a refereed journal**. This can be something that you found problematic, interesting, ridiculous, missing, etc. Compare and support your arguments with other sources in the literature. You are **encouraged** to search articles from all sources. Use Web of Science or other journal databases to do additional literature searches.

Make your critiques **explicit and clear**, e.g.: “I find three main critiques in the way this argument was presented.” ... paragraphs 1, 2, 3. Preferable to critique is a piece of **primary** literature, popular magazine or even a TV news report, not a review paper or chapter.

Do not spend too many words describing the intro, methods, conclusions, etc. of the article or report that you are critiquing. Try to give a very **brief** overview of the important points or methods and spend the rest of your paper giving **your own** “two-cents”! A good idea is to end with what you think needs to be done in the future based on your critique. **Don’t be repetitive** with your points, you only have up to 400 words, therefore be concise and clear. Make every

word count (this may be one of the big challenges of the assignments and will train you for real manuscript writing with editor-imposed word limits).

**Proofread:** Review your spelling and grammar before handing your work in! Avoid run-on or ambiguous sentences.

Each paper should be neatly prepared and proofread, especially checking for consistency, completeness, and correctness (Help: The Writing Center, OWL/On-line Writing Lab). Many online grammar resources are now available. This book might help when writing:

Ross-Larson, B. 1996. *Edit Yourself: A Manual for Everyone Who Works With Words*. W.W. Norton & Co., New York, NY.

All statements of fact in your paper need to be referenced to the original research. You can of course access that material electronically, BUT the use of web sites as a primary source of information is discouraged. You should be using primary literature (e.g. peer reviewed journal articles) and reports for your authority. Limit web citations to no more than about 25% of the total. Full references (all author names) should be provided in the Literature Cited section of your paper. As for citation style – use *Letters to Science*, but include all authors in the Literature Cited portion of the paper. Footnotes are reserved for limited explanatory material only. In the body of the text use numbers with an alphabetized Literature Cited section. Please use Zotero or EndNote as your reference manager as this will be very useful in your future research.

Use **proper reference structure**, author-year e.g., “AbuBakar *et al.* (2011) isolated Nipah virus from pigs” or numbered reference (if you want to save words), e.g. “Nipah virus was isolated from pigs [1]”.

### References:

1. AbuBakar, S., L.-Y. Chang, A.R.M. Ali, S.H. Sharifah, K. Yusoff, and Z. Zamrod, Isolation and molecular identification of Nipah virus from pigs. *Emerging Infectious Diseases*, 2004. 10:2228-2230.

Please use Word (either .doc or .docx files only) and post in Blackboard at the due date.

### ***Final PowerPoint Presentation***

**Not for Undergrads!** Graduate students are required to give a 10-12-min presentation (+5 min Q&A) via PowerPoint slides on a *contemporary* issue/topic relevant to *Planetary Health*. **This assignment is optional for undergraduate students to improve their grades.** 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 Planetary Health topic, in an ecosystem from a scientific journal article.* In your presentation, provide a

brief background of the issue; describe the impacts to humans, domestic animals and wildlife, and ecosystems and concerns from an economic, cultural, environmental, and planetary health perspective. Impacts can be considered from species to ecosystems and from molecular to global. Management implications may include discussion of mechanisms of control, prevention measures and proactive intervention to control impacts. Presentations will be **15 minutes total**.

The slide presentation “rule of thumb” is 1 slide per minute, so plan accordingly. Your 1<sup>st</sup> slide should be a title slide with your name and title of the talk. Next should be an introduction & overview to the topic followed by more specifics. Next you should discuss the implications of the issue and management recommendations if any. Finally, you should provide conclusions and highlight the main points.

Presentations will be graded on the clarity of the presentation, the professionalism of the slides, the content of the material presented and your ability to answer questions posed by classmates and instructor.

Each topic below will get a score ranging from **1** (poor), **2** (good), **3** (very good) **4** (excellent).

**Literature Review-** Scope of information gathering.

**Scientific knowledge-** How accurate is the information presented.

**Management Implications-** all presentations should address *at least* 3 of the following areas:

- a) Planetary health issue and implications to humans, species and ecosystems.
- b) Economic perspectives.
- c) Cultural perspectives.
- d) Socioeconomic perspectives.
- e) Environmental policy angle.
- f) Perspectives from development, agriculture and/or conservation.
- g) Public health angles.
- h) Solutions to the issues outlined.

**Conclusions-**Conclusions are sound and supported by data.

**Slides-**Slides are well organized, logical, and easy to read and to interpret.

**Style-**Delivery is clear, audible, with proper elocution and eye contact with audience.

**Time-**Speaker adheres strictly to time limit.

## Grading Criteria

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

Activity	EVPP490/BIOL435/GCH494 % Contribution to Total Grade	EVPP505/BIOL507/GCH594 % Contribution to Total Grade
Definitions of Terms	10%	10%
Class participation	10%	5%
Extra readings	-	5%
Written commentaries:	20% (one only)	20% (10% each)
4 quizzes: 5 given	40% (10% each)	20% (5% each)
Mid-term Exam:	20%	20%
Final PPT presentations:	-	20%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>

The final grade for undergraduate students will be based on this scale: A = 100–93%, A- = 92–90%, B+ = 89–86%, B=85–83, B- = 82–80%, C = 79–70%, D = 69–60%, F < 59%.

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 the University Catalog 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 exams will be completed by individuals in the classroom 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.***



It is important to note that materials produced for this course, particularly for the research paper, 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 with the name of the author and year in the text and the full citation provided in a literature cited section at the end of the paper. The instructor will provide the format for citations.

### **Other Useful Campus Resources**

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

UNIVERSITY LIBRARIES: “Ask a Librarian” <http://library.gmu.edu/mudge/IM/IMRef.html>

COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS): 703-993-2380;  
<http://caps.gmu.edu>

LEARNING SERVICES: 703-993-2999; <http://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, <http://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\***

<b>Week</b>	<b>Date</b>	<b>Topic</b>	<b>Book Chapters</b>
<b>1</b>	08/28	Introductions. Syllabus. Course expectations. From Conservation Medicine to Planetary Health	Chapters 1 & 2
<b>2</b>	09/4	The human ecological footprint	Chapter 3
<b>3</b>	09/11	Transformation of Earth's environmental conditions	Chapter 4
<b>4</b>	09/18	The 'triple challenge' for the global food system	Chapter 5
<b>5</b>	09/25	Emerging infectious diseases & Planetary Health	Chapter 6
<b>6</b>	10/2	Pathways from global environmental change to non-communicable diseases	Chapter 7
<b>7</b>	10/9	Environmental change, migration, conflict and health	Chapter 8
<b>8</b>	10/16	<b>Midterm Exam</b>	
<b>9</b>	10/23	Climate Change and Planetary Health	Chapter 10
<b>10</b>	10/30	Energy and Planetary Health <b>Written Commentary 1</b>	Chapter 12
<b>11</b>	11/6	Urbanization and Planetary Health	Chapter 13
<b>12</b>	11/13	Global toxification and Planetary Health	Chapter 14
<b>13</b>	11/20	Business and economics in a changing planet	Chapters 15 & 16
<b>14</b>	11/27	<b>Thanksgiving Holiday</b>	<b>No class</b>
<b>15</b>	12/4	The Great Transition to a healthier planet <b>Written Commentary 2</b>	Chapter 18
<b>16</b>	12/11	<b>Final Exam</b>	

\*In addition to the chapters for each session, ALL graduate students are required to read *extra preselected, refereed papers/chapters* that will be discussed in class.