

University of Florida
College of Public Health & Health Professions Syllabus
PHC6671: Emerging Infectious Diseases in One Health – The Ménage à trois of Emerging Infectious Diseases (3 credit hours)
Spring semester 2022
Delivery Format: On-Campus HPNP room TBD
Tuesdays 3:00-3:50 (1 period) and Thursdays 3:00-4:55 (2 periods)

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Office Hours: Mondays 8:30 – 9:30 AM
Teaching Assistant: N/A
Preferred Course Communications: Email

Prerequisites

MCB3020 Basic Biology of Microorganisms; MCB3023 Principles of Microbiology; MCB4203 Bacterial Pathogens; MCB4304 Genetics of Microorganisms or by permission of the instructor

PURPOSE AND OUTCOME

Course Overview

Applies One Health (the intersection of animal and human health and the environment) to understand the emergence of disease-causing microbes and the critical drivers of microbial evolution. Extensive discussion of the global emergence of new infectious disease agents and how factors within One Health influence microbial evolution and disease emergence.

Relation to Program Outcomes

We expect this course to fulfill elective requirements for students in One Health masters and PhD programs. In addition, it will be attractive to students in programs outside of EGH who are interested in applying a One Health approach to understanding emerging infectious disease issues. Concepts in this course emphasize the global nature of disease and public health. The course will teach students to identify, describe, and explain changes in animal and human health and the environment and show how the interdependence of these changes drives microbial evolution, adaptation to new hosts, and disease emergence.

Course Objectives and/or Goals

This course is designed to provide students with a basic understanding of microbiology, infectious diseases, disease transmission, and the concept of One Health. Students will learn how One Health and Public Health are intertwined. They will also learn the fundamentals of the molecular genetic basis of microbial evolution. Students will then apply this knowledge to understanding the multiple factors that drive the emergence and re-emergence of infectious diseases. Students will also be introduced to, and will discuss, some of the primary scientific research literature that serves as the foundation for our knowledge of infectious diseases. Taken together, the course is designed to enable students to master a specific content set and to develop critical thinking and communications skills.

Upon successful completion of this course, students should be able to:

Content

1. Compare and contrast the various drivers of evolution in the microbial world
2. Demonstrate how critical scientific discoveries contributed to our current understanding of these concepts
3. Appreciate the contribution of public health practitioners in surveillance and tracking of infectious disease outbreaks (Affective domain)
4. Evaluate how legal, ethical, economic and regulatory elements of health care and public health policy and the roles, influences and responsibilities of the different agencies and branches of government influence outbreak response

Critical Thinking

5. Explain the basic concepts of infectious diseases and routes of disease transmission
6. Evaluate what makes a successful pathogen; what makes a susceptible host

Communication

7. Describe the concept of One Health and how it relates to public health as well as its core values, concepts and functions across the globe and in society
8. Cite and explain examples of emerging infectious diseases and re-emerging infectious diseases
9. Explain how anthropogenic factors contribute to disease emergence
10. List the diverse environmental factors that contribute to disease emergence and examine how they contribute to emergence

Instructional Methods

This course is offered weekly, in-person. Class meetings will include the following:

1. Assigned readings
2. In-person lectures that meet twice a week
3. Class discussions and student presentations

Blended Learning (not applicable)

DESCRIPTION OF COURSE CONTENT

Topic Outline/Course Schedule

Week	Topic(s)
1	<p>Introduction to One Health</p> <ul style="list-style-type: none"> • Definitions • Intersections <p>Emerging Infectious Diseases</p> <ul style="list-style-type: none"> • Historical perspective • Morbidity and mortality in the 20th century • Definitions • Factors in disease emergence

Week	Topic(s)
2	<p>Principles of Molecular Diagnostic Tests</p> <p>Principles of Infectious Diseases (Parts 1 and 2)</p> <ul style="list-style-type: none"> • What is disease? • Normal flora • Koch's Postulates • What is a pathogen? Who is a host? • Mechanisms of disease transmission • Infectious dose • Elements of a successful pathogen • Factors that influence host (niche) colonization <p><i>Morbidity and Mortality Weekly Reports (MMWR)</i> https://www.cdc.gov/mmwr/index.html <i>WHO Weekly Epidemiological Record</i> http://www.who.int/wer/en/</p>
3	<p>Fundamentals of Microbiology (Parts 1-3)</p> <ul style="list-style-type: none"> • What is a microbe? • Growth and metabolism • Detection and measurement • Antimicrobial therapy • Horizontal gene transfer
4	<p>Fundamentals of Microbial Evolution/Adaptation (Parts 1-3)</p> <ul style="list-style-type: none"> • The bacterial advantage • Fitness and selection • How mutations arise • The Luria-Delbruck experiment • Gain of function • Loss of function <p>Content review</p>
5	Quiz and review
6	<p>How to read, write, and present a scientific paper</p> <p>The Animal-Human Interface (Parts 1, 2)</p> <ul style="list-style-type: none"> • The interface • Factors that influence contact • Animal meat products • The process of pathogen cross-over • Case study 1 – Hantavirus outbreak, Four Corners, 1993 • Case study 2 – Mad Cow Disease <p><i>Pathways to zoonotic spillover</i> – Plowright (2017) <i>The mouse-Pinon nut connection</i> – Stone (1993)</p>
7	<p>The Animal-Human Interface (Part 3)</p> <p>The Evolving Food Chain – farm to fork (Parts 1, 2)</p> <ul style="list-style-type: none"> • Adulterated food • <i>The Jungle</i> – Upton Sinclair and the birth of the FDA • PulseNet and the CDC • Centralized food processing • Case study 3 – <i>Salmonella</i> in peanut butter • Case study 4 – <i>Escherichia coli</i> O157:H7 • HACCP – Hazard Analysis Critical Control Point • Case study 5 – <i>Enterobacter sakazakii</i> • Bottlenecks to spillover <p><i>E. coli O104:H4 outbreak review</i> – Beutin and Martin (2012) Supplemental reading – <i>The Jungle</i> – Upton Sinclair</p>
8	Class presentations
9	Class presentations
	Spring Break – no classes

Week	Topic(s)
10	The Evolving Human Environment (Part 1) <ul style="list-style-type: none"> • Human behavior, practices, and beliefs • Case study 6 – Kuru • Case study 7 – Shigellosis in MSM • Case study 8 – Toxic Shock Syndrome
11	The Evolving Human Environment (Parts 2 and 3) <ul style="list-style-type: none"> • Medical advances and interventions • Vaccination programs • Case study 9 – Pneumococcal (PCV) vaccines • Case study 10 – Pertussis
12	The Evolving Human Environment (Part 4) <ul style="list-style-type: none"> • Case study 11 – The Swedish Variant The Evolving Physical Environment (Parts 1 and 2) <ul style="list-style-type: none"> • International travel • Global commerce • Technology • Case study 12 - Legionellosis • Case study 13 – <i>Pfisteria</i> <i>Pfisteria: Review of the science</i> - Samet et al (2001)
13	Politics, Policy, and Public Health <ul style="list-style-type: none"> • HIV, TB, and Star Wars • Military deployments • Case study 14 – Cholera in Haiti <i>The Cholera Outbreak In Haiti</i> – Lantagne et al (2014)
14	Class Presentations
15	Class Presentations

Course Materials and Technology

There is no required textbook for this course. A suggested textbook for microbial genetics is: *Molecular Genetics of Bacteria* (4th ed.) – Snyder, Peters, Henkin, and Champness. ASM Press, Washington, DC; <http://www.asmscience.org/content/book/10.1128/9781555817169>

Pertinent journal articles and reading materials as they apply to each module will be found on the course website; other journal articles will be accessible on-line.

ACADEMIC REQUIREMENTS AND GRADING

General Information

Assignments are to be submitted as a Word document or PowerPoint file unless otherwise indicated. They will be returned to students with comments. They may be submitted to Canvas or emailed to the course instructor directly. Assignments are intended as individual projects unless otherwise directed. Shared work may be treated as a form of plagiarism. Assignments may be required to be submitted via Turnitin in this course (this will be done automatically in the Canvas Assignment). This tool will pick up any passages in students' work that come from another source. Be sure to adequately cite your sources/references for these assignments to avoid plagiarism (see format below). Some similarity is expected and unavoidable, however if large portions are copied from other sources, it will be as considered plagiarism.

The Canvas assignment tool will notify you confirming the submission of your assignment. PLEASE check your UFL email at <http://webmail.ufl.edu> on a regular basis for these and other email notices from the course site. If you do not receive an email confirmation within 2 hours of submission, please return to the site and resubmit your assignment. It is a student's responsibility to verify that they turn in assignments on time and that they turn in the CORRECT assignment attachment. Please take a few moments to open your submitted

attachment and verify that you have submitted the correct file. You will be graded in the course through the use of written assignments, presentations, graded discussions, and exams.

Course Components

Reading course material as assigned. Attendance at lectures. Participation in discussions in class.

Quizzes – Up to two (2) quizzes will be given in class throughout the course to assess students' understanding of fundamental concepts. Quizzes will consist of multiple choice and/or short answer questions.

Class presentations – Students will be provided primary source papers related to emerging infectious diseases that they will present to the class. Presentations should be created in PowerPoint or equivalent format.

Presentation 1, concepts – students will present select topics to the class

1. 20 minutes + 5 minutes for class discussion and Q&A
2. Explain and clarify fundamental concepts covered so far

Presentation 2, case studies – students will present cases of emerging disease outbreaks

1. 25 minutes + 5 minutes for class discussion and Q&A
2. Historical context - describe conditions at time of outbreak
3. Describe outbreak
4. Describe and evaluate response to outbreak
5. List and explain factors leading to disease emergence
6. Analyze genetics and evolution of the pathogen (if known or applicable)
7. Summarize with “take-home” messages conclusion slide
8. Moderate discussion of the case for the class

Class participation

All students will be expected to make informed contributions during class lectures, case studies, and student presentations. Students will be expected to display a command of the fundamental concepts during class discussions of case studies and student presentations. A rubric for scoring professionalism is provided within Canvas.

Grading

Requirement	Due date	% of final grade
Quizzes	See Canvas for quiz dates	30%
Class presentation 1	Week 7, 8	20%
Class presentation 2	Weeks 14-15	40%
Class participation	Entire course	10%

Letter grades for the course will be based on the following grading scale:

Letter grade	Percentage
A	93 – 100
A-	90 – 92.9
B+	87 – 89.9
B	82 – 86.9
B-	80 – 81.9
C+	77 – 79.9
C	72 – 76.9

C-	70 – 71.9
D+	67 – 69.9
D	62 – 66.9
D-	60 – 61.9
E	<60%

Letter grade to grade point conversions shown below are fixed by UF and cannot be changed:

Letter Grade	A	A-	B+	B	B-	C+	C	C	D+	D	D-	E	WF	I	NG	S-U
Grade Points	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	0.67	0	0	0	0	0

Please be aware that a C- is not an acceptable grade for graduate students. The GPA for graduate students must be 3.0 in all 5000 level courses and above to graduate. A grade of C counts toward a graduate degree if based on a sufficient number of credits in courses numbered 5000 or higher have been earned with a B+ or higher.

For greater detail on the meaning of letter grades and university policies related to them, see the Registrar's Grade Policy regulations at:

<http://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Late Assignments and Make up Work

Assignments turned in up to 24 hours late will be deducted 10% of the grade that they would otherwise receive. Assignments turned in more than 24 hours late will not be graded and will contribute zero points toward the final grade unless arrangements have been made in advance with the instructor. Missed assignments will contribute zero points toward the final grade.

Special Circumstances. In the event of exceptional situations that may interfere with your ability to perform an assignment or meet a deadline, contact the instructor as soon in advance of the deadline as possible. Such special cases will be dealt on an individual basis, provided that you have sufficient documentation. For a missed quiz due to an excused absence, the student will work with the instructor to make up the missed quiz.

Please note: Any requests for make-ups due to technical issues MUST be accompanied by the UF Computing help desk (<http://helpdesk.ufl.edu/>) correspondence. You MUST e-mail me within 24 hours of the technical difficulty if you wish to request a make-up.

Policy Related to Required Class Attendance

Class attendance is a part of the Professionalism component of this course. It is expected that you will notify the instructor in advance when you know you will miss or be late to class.

Excused absences must be consistent with university policies in the Graduate Catalog (<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance>) and require appropriate documentation. Additional information can be found here: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

STUDENT EXPECTATIONS, ROLES, AND OPPORTUNITIES FOR INPUT

Expectations Regarding Course Behavior

All individuals in the classroom, including fellow students, instructors, and guests, are to be treated with respect at all times. All electronics are to be turned off upon entering the classroom. Cell phones must be turned to silent or off during class. Ringing and buzzing cell phones detract from a fruitful educational environment. Each student should make every attempt to arrive to, and be prepared for, class on time. The

use of laptops is permitted for class work. The class is meant to be interactive so students are encouraged to ask questions of the instructors and any guest lecturers. Side conversations are to be kept to a minimum.

Communication Guidelines

Students who have questions that cannot be answered during class time should use email or office hours as mechanisms for communicating with the instructors or TA. Office hours have been created to accommodate other courses as much as possible however a student may schedule alternate times to meet with the instructors or TA if the set times do not work. Students who cannot meet during office hours should use Canvas or email to contact the instructors or TA. Please be aware that students should allow two business days for a response to inquiries.

Academic Integrity

Students are expected to act in accordance with the University of Florida policy on academic integrity. Students at the University of Florida have committed themselves to uphold the Honor Code which includes the following pledge:

“We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.”

Students are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit at the University of Florida, the following pledge is either required or implied:

“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”

It is the individual student's responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Cheating, lying, misrepresentation, or plagiarism in any form is unacceptable and inexcusable behavior. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. Additional information regarding Academic Integrity, Student Conduct and Honor Code is available at: <https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>
<http://gradschool.ufl.edu/students/introduction.html>

Online Faculty Course Evaluation Process

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

Policy Related to Guests Attending Class:

Only registered students are permitted to attend class. However, we recognize that students who are caretakers may face occasional unexpected challenges creating attendance barriers. Therefore, by exception, a department chair or his or her designee (e.g., instructors) may grant a student permission to bring a guest(s) for a total of two class sessions per semester. This is two sessions total across all courses. No further extensions will be granted. Please note that guests are **not** permitted to attend either cadaver or wet labs. Students are responsible for course material regardless of attendance. For additional information, please review the Classroom Guests of Students policy in its entirety. Link to full policy: <http://facstaff.php.ufl.edu/services/resourceguide/getstarted.htm>

SUPPORT SERVICES

Accommodations for Students with Disabilities

If you require classroom accommodation because of a disability, you are strongly encouraged to register with the Dean of Students Office <http://www.dso.ufl.edu> within the first week of class. The Dean of Students Office will provide documentation of accommodations to you, which you then give to me as the instructor of the

course to receive accommodations. Please make sure you provide this letter to me by the end of the second week of the course. The College is committed to providing reasonable accommodations to assist students in their coursework.

Counseling and Student Health

Students sometimes experience stress from academic expectations and/or personal and interpersonal issues that may interfere with their academic performance. If you find yourself facing issues that have the potential to or are already negatively affecting your coursework, you are encouraged to talk with an instructor and/or seek help through University resources available to you.

- The Counseling and Wellness Center 352-392-1575 offers a variety of support services such as psychological assessment and intervention and assistance for math and test anxiety. Visit their web site for more information: <http://www.counseling.ufl.edu>. On line and in person assistance is available.
- You Matter We Care website: <http://www.umatter.ufl.edu/>. If you are feeling overwhelmed or stressed, you can reach out for help through the You Matter We Care website, which is staffed by Dean of Students and Counseling Center personnel.
- The Student Health Care Center at Shands is a satellite clinic of the main Student Health Care Center located on Fletcher Drive on campus. Student Health at Shands offers a variety of clinical services. The clinic is located on the second floor of the Dental Tower in the Health Science Center. For more information, contact the clinic at 392-0627 or check out the web site at: <https://shcc.ufl.edu/>
- Crisis intervention is always available 24/7 from:
Alachua County Crisis Center
(352) 264-6789
<http://www.alachuacounty.us/DEPTS/CSS/CRISISCENTER/Pages/CrisisCenter.aspx>

Do not wait until you reach a crisis to come in and talk with us. We have helped many students through stressful situations impacting their academic performance. You are not alone so do not be afraid to ask for assistance.

Inclusive Learning Environment

Public health and health professions are based on the belief in human dignity and on respect for the individual. As we share our personal beliefs inside or outside of the classroom, it is always with the understanding that we value and respect diversity of background, experience, and opinion, where every individual feels valued. We believe in, and promote, openness and tolerance of differences in ethnicity and culture, and we respect differing personal, spiritual, religious and political values. We further believe that celebrating such diversity enriches the quality of the educational experiences we provide our students and enhances our own personal and professional relationships. We embrace The University of Florida's Non-Discrimination Policy, which reads, "The University shall actively promote equal opportunity policies and practices conforming to laws against discrimination. The University is committed to non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information and veteran status as protected under the Vietnam Era Veterans' Readjustment Assistance Act." If you have questions or concerns about your rights and responsibilities for inclusive learning environment, please see your instructor or refer to the Office of Multicultural & Diversity Affairs website: www.multicultural.ufl.edu