BSC 4956 – Understanding Infectious Diseases

SUMMER 2022: MERIDA, MEXICO

Instructor: Thomas J. Hladish (tjhladish@ufl.edu)
Office: Carr 417 Hours: Scheduled as needed, Zoom or in-person
Course website: Log in @ http://elearning.ufl.edu
Course location and time: TBA
Text: Infectious Disease: A Very Short Introduction, Wayne & Bolker 2015

Infectious diseases pose complex problems that require synthesis across many disciplines. After an initial look at how epidemics grow and the ways different professions think about diseases, each week we will discuss a different mode of transmission (e.g. air borne, food and water, sexual interactions) and the associated diseases. Although our textbook predates the COVID-19 pandemic, we will also be discussing many of the particular challenges that we have observed in the past two years due to the urgency of developing an effective response amidst rapidly changing data and knowledge about what is happening. Much of what we can learn from the pandemic has generic applications in addressing infectious disease problems, including: understanding biases in empirical data, triangulating data sources to support/eliminate hypotheses, using effective communication (with the public, policy makers, media, etc.), and knowing possible public health responses, including their scale, timing, impact, and costs/benefits.

This is primarily a discussion-based course, and thus student engagement is critical. There will be few lectures and no tests, but a lot of emphasis on critical thinking and effective oral and written communication.

Prerequisites: BSC 2011 and 2011L with minimum grades of C and undergraduate advisor permission.

COURSE REQUIREMENTS AND ASSESSMENT

Class participation	25%
Simulation assignment	10%
Written assignments (2)	20%
Presentation	10%
Final project	35%
	100%

Grading scale: Course grade is based on percentage of total possible points earned. To make things convenient, the expected possible total is 100 points. 'A' grades correspond to [90%, 100%], 'B' grades correspond to [80%, 90%), 'C' to [70%, 80%), 'D' to [60%, 70%), 'E' to [0%, 60%). Ranges are further subdivided into thirds for assigning +/-; for example a 'B+' corresponds to [86 $\frac{2}{3}$%, 90%), and an 'A-' to [90%, 93 $\frac{1}{3}$%). Exceptions: there is no 'A+', 'E+', or 'E-'.

Attendance, participation and engagement: Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Click here to read the university attendance policies.

Class meetings: Attendance at class meetings is mandatory. The class will meet for two hours daily, typically four times per week. Because this is a study abroad course, we will all need to be somewhat flexible at times. Changes to the schedule, e.g. to accommodate a guest lecturer or to deal with unpredicted logistical challenges, will be announced with as much advance notice as possible and made in coordination with other scheduled activities. Due to the active learning nature of the class, your presence and participation are essential. Any missed classes for reasons other than sickness will be penalized by a 1 point (==5%) deduction from your participation grade. If you are sick and thus absent, please notify me within 24 hours by email. Class is offered for a letter grade; no S/U option is

possible. The topics listed below are examples of what we will discuss in class, but I will work to incorporate students' interests that are within the scope of the course. We will also incorporate topics related to ongoing or emerging epidemics.

Week of	Topics	Assignments
06/27/22	Syllabus & perspectives on infectious diseases	
	Discussion of Ch 1 & 2	Ch 1 & 2 Questions
	Mathematical modeling	Install EpiFire
	Designing and implementing a simulation experiment	Essay 1
07/04/22	Discussion of Ch 3	Ch 3 Questions
	Predicting disease dynamics and burden	
	Discussion of Ch 5	Ch 5 Questions
	Immunity & transmission dynamics	
	Interventions: types, impact, and limitations	Simulation
07/11/22	Discussion of Ch 4	Ch 4 Questions
	Vaccine development and trials	
	Communicating science	Press release
	Reporting lags & systematic data biases	
07/18/22	Polio vaccine development	
	Vector-borne infection presentations	Presentations
	Agent-based modeling & intervention design	Final project: outline
07/25/22		
	Final project: group work	Final project: rough draft
	Final project: presentations	Final project: slides
		Final project: article

Class participation: Class participation is extremely important. Whether you are highly knowledgeable about the topic at hand or completely ignorant, I expect you to be engaged and contributing by providing either insights or questions. There is no penalty for being wrong—figuring out how we're wrong is kind of what science is all about. Knowing the answer is great, but thinking carefully and making intelligent guesses is more important: "truth" changes in science, but rigorous thinking is constant.

Some class days will have required readings that will be the basis for that day's discussion. Readings will be provided on Canvas at least 5 days before the discussion. On days with assigned readings, you must do the reading prior to coming to class. Please come to class prepared with three questions you have, about or prompted by the reading.

SIR simulation assignment: The intent of this experiential assignment is to help you understand what it's like to do research in mathematical epidemiology. As in research, a critical part of the assignment is figuring out what you need to do. Do not be put off by confusion and uncertainty! I will provide critical background knowledge, but you will have to make decisions about how to fulfill the assignment.

You will use simulation software called EpiFire to explore the relationship between how infectious a disease is and how many people end up getting infected. You will design a simulation experiment, produce data, and create a figure illustrating the relationship you discover. This figure should be accompanied by an approximately 100 word caption explaining (not describing) the relationship, and any details I would need in order to reproduce your experiment.

Short essays & media assignments: Effective communication in managing infectious disease responses is critical, and takes many forms that we will consider, including persuasive writing, public outreach, press releases, and presentations. The format and style will vary to suit the topic and goal of the communication. The emphasis here will be on quality over quantity, with work evaluated based on whether it is clear, persuasive and concise, with appropriate stylistic choices and use of sources, as applicable. Assignment details will be provided to you on Canvas and reviewed in class no later than the week before the due date.

For the first assignment, write a >= 300 word persuasive essay: consider our in-class discussions and your own sources, and argue that formal, non-pharmaceutical intervention policies (lock-downs, masking, mandatory testing and isolation, etc.) are either a fundamentally necessary or fundamentally unnecessary part of outbreak response. Additional details will be provided on Canvas.

Late assignments will be penalized 5 points each day or fraction thereof.

Final project: For your final project, you will work in small groups to prepare a high-quality article (think *New Scientist*) and oral presentation about a recent event or discovery within the scope of the course. The audience you are writing for is well-educated and scientifically literate, but not necessarily experts in your subject—essentially, your classmates. Your article should incorporate illustrations or images, and citations from primary literature. Your final project grade will depend both on your individual work, and on the results of your collaborative work.

UNIVERSITY AND PROGRAM POLICIES

Academic Integrity: All students are required to abide by the Academic Honesty Guidelines of the University. The UF Honor Code reads: "*We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity."* On all work submitted for credit by students 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." For more information please refer to http://www.dso.ufl.edu/studentguide.

Accommodations: Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center. Click here to get started with the Disability Resource Center. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Grade points and UF grading policies: https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

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. Click here for guidance on how to give feedback in a professional and respectful manner. 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 ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students here.