

Course Number and Title

ZOO4926-Spring 2021: Outbreaks

Catalog Description

This course will investigate biological and quantitative aspects of emerging pathogens. We will investigate transmission dynamics of infectious diseases during multiple phases of outbreaks. We will review biological, immunological, epidemiological, policy and logistical aspects of outbreaks of emerging pathogens in humans as well as other species. Students will gain familiarity with basic metrics used to quantify transmission dynamics, biological characteristics that contribute to the emergence of pathogens and policy actions taken in response to emerging pathogens.

Credit Hours

3 credit hours

Pre-requisites and Co-requisites

None.

Course Objectives

By the end of the course, the student will be expected to:

- Understand biological factors critical to the emergence of pathogens
- Link appropriate methods with fundamental research questions in infectious disease emergence and epidemics
- Use simple R code to complete a basic data exploration and analysis
- Critically evaluate literature describing biological aspects of pathogen emergence in human, plant and animal systems

Instructor Information

Name: Derek Cummings

Office location: Carr Hall 422

Telephone: (410)-916-1371

E-mail address: datc@ufl.edu

Web site: <http://www.ufiddynamics.org/>

Office hours: by appointment or Friday afternoon 1:00-3:00 PM

TA Information

Name: Angkana (Hat) Huang

E-mail address: a.huang@ufl.edu

Office hours: TBD

Course Meeting Time(s)

T, Th period 7 (1:55-2:45)

Course Meeting Location(s)

MAEA B 211

Recommended Materials

Textbooks or Other Readings

Readings to be made available

Software (Required)

R, freely distributed at <http://www.r-project.org>

Course Outline (topics covered by week or by class period)

| Week | Topic |
|------|-------------------------------------------------------------------------------------------------------------------|
| 1 | Introduction to Class |
| 2 | Natural history of infectious diseases: In class exercise EBTK: Variance and distributions |
| 3 | Intro Virology and Immunology |
| 4 | Quantifying pathogen spread Expanding biomedical tool kit: Logarithms and exponential growth |
| 5 | Reservoirs of infection and species jumps Stuttering chains of transmission INTRODUCE GROUP PROJECT |
| 6 | Characterizing attack rates: serology and detecting pathogens EBTK: Logarithms revisited: Titers and dilutions |
| 7 | Models of infectious diseases EBTK: Likelihood, P-values, Differential equations |
| 8 | Patterns of transmission: networks Group work |
| 9 | Phylogenetics EBTK: Sequencing and sequences |
| 10 | Interventions and policy |
| 11 | Evaluating a scientific paper EBTK: Confidence intervals |
| 12 | Persistence |
| 13 | Measuring Burden |
| 14 | Complete case study: SARS-CoV-2, MERS, Ebola, Chik, Zika, dengue,... chosen with input from class |
| 15 | In class group work |
| 16 | Review or 'catch up' week + poster presentation |

*EBTK: Extending your Biomedical Toolkit modules

Attendance Policy

Students are expected to attend class and to be on time for class. A maximum of 3 absences are allowed.

Conduct in Class

- Please be courteous and do not talk during lecture. This can be distracting to other students and the instructor.
- Only approved electronic devices may be used in class. Approved electronic devices are laptop computers and tablets (when used to take notes or otherwise participate in classroom activities).

Grading

- Homework/quizzes: 5 @ 10 points each (choose top 4 scores, 40% of final grade)
- Final Group Project (joint project): 25% of final grade
- Class Participation: 10% of final grade
- Final Exam: 25% of final grade

Make-up Exam Policy

No make up exam will be given unless the student informs the instructor one week in advance from the scheduled test/quiz. Students with disabilities that need special accommodations for testing are required to inform the instructor about it on the first day of class.

UF Counseling Services

- Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
 - UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
 - Career Resource Center, Reitz Union, 392-1601, career and job search services.
- Many students experience test anxiety and other stress related problems. “A Self Help Guide for Students” is available through the Counseling Center (301 Peabody Hall, 392-1575) and at their web site: <http://www.counsel.ufl.edu/>.

Honesty Policy

- All students registered at the University of Florida have agreed to comply with the following statement: “I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University.”
- In addition, on all work submitted for credit the following pledge is either required or implied: *“On my honor I have neither given nor received unauthorized aid in doing this assignment.”*
- If you witness any instances of academic dishonesty in this class, please notify the instructor or contact the Student Honor Court (392-1631) or Cheating Hotline (392-6999). For additional information on Academic Honesty, please refer to the University of Florida Academic Honesty Guidelines at: <http://www.dso.ufl.edu/judicial/procedures/academicguide.html>.

Accommodation for Students with Disabilities

- Students who will require a classroom accommodation for a disability must contact the Dean of Students Office of Disability Resources, in Peabody 202 (phone: 352-392-1261). Please see the University of Florida Disability Resources website for more information at: <http://www.dso.ufl.edu/drp/services/>.
- It is the policy of the University of Florida that the student, not the instructor, is responsible for arranging accommodations when needed. Once notification is complete, the Dean of Students Office of Disability Resources will work with the instructor to accommodate the student.

Software Use

All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal

penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.