

Math 5399 Advanced Problems: Mathematical Epidemiology

Summer I 2020

Instructor: Dr. Angela Peace

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Office hours: by appointment

COVID-19 statement: Due to the current pandemic all class meetings will be held virtually, and collaborations will be done through a combination of Zoom meetings, google drive, online video lectures, and email.

Course time/place: We will meet weekly as an entire class on Tuesday from 2:00-3:30 using Zoom. Join the meeting with the link below:

<https://zoom.us/j/91289561969>

Meeting ID: 912 8956 1969

Student learning outcomes: The goal of this course is to become familiar with various mathematical modeling techniques important in the formulation and analysis of the dynamical behavior of biological processes: population growth and epidemics. Students will learn how to model the dynamics of biological systems using differential equations. **Matlab** will be used for simulations and **latex** will be used for written reports.

Methods of Assessment for Learning outcome: Continuous formative assessment of the progress of the course will occur via ongoing communication between the instructor and the students. To this end, all students are encouraged to ask questions and to seek the instructor's help when needed. Formal assessment occurs through course assignments and final projects.

Course assignments: Throughout the course students will be assigned weekly reading assignments followed by in class discussions. The majority of the course will be focused on independent research projects. Students may work alone or with one partner. The aim of the project will be one of the following 2 options.

- Project option 1: Analyze a published mathematical model of a biological system. You may choose from a set of recommended papers or pick a paper yourself (subject to my approval).
- Project option 2: Develop and analyze a new mathematical model of a biology system.

Course Grade breakdown:

- Weekly readings/discussion: 20%.
- Independent research project written report: 60%
- Independent research project oral presentation: 20%

Schedule		
Meeting date	Weekly readings	Videos
June 2		Modeling Covid-19: role of asymptomatic carriers Modeling Covid-19: dynamic survival analysis
June 9	Blackwood, Julie C., and Lauren M. Childs. "An introduction to compartmental modeling for the budding infectious disease modeler." <i>Letters in Biomathematics</i> 5.1 (2018): 195-221.	
June 16	McCallum, Hamish, Nigel Barlow, and Jim Hone. "How should pathogen transmission be modelled?." <i>Trends in ecology & evolution</i> 16.6 (2001): 295-300.	
June 23 Project abstracts due June 26.	Brauer, Fred. "Mathematical epidemiology: Past, present, and future." <i>Infectious Disease Modelling</i> 2.2 (2017): 113-127.	How to write a modelling paper
June 30	To be determined	
July 7 project presentations and reports due.		

* This schedule will be updated this throughout the course.

Interesting papers:

Academic Integrity:

<http://www.depts.ttu.edu/opmanual/OP34.12.pdf>

It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension.

"Scholastic dishonesty" includes, but it not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student

(such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor) or the attempt to commit such an act.

Observance of Religious Holy Day:

<https://www.depts.ttu.edu/opmanual/OP34.19.pdf>

"Religious holy day" means a holy day observed by a religion whose places of worship are exempt from property taxation under Texas Tax Code §11.20. A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence. A student who is excused may not be penalized for the absence; however, the instructor may respond appropriately if the student fails to complete the assignment satisfactorily.

Accommodation for Students with Disabilities:

<https://www.depts.ttu.edu/opmanual/OP34.22.pdf>

Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note: instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, please contact Student Disability Services in West Hall or call 806-742-2405.