The University of Iowa
The College of Liberal Arts and Sciences
Spring, 2024

Title of Course: Introduction to Mathematical Biology (MATH 4750)
Course meeting time and place: MWF 2:30 PM-3:20 PM, 105 MLH
Department of Mathematics: https://math.uiowa.edu

Course ICON site. To access the course site, log into Iowa Courses Online (ICON) https://icon.uiowa.edu/index.shtml using your Hawk ID and password.
The course material (weekly lecture notes, HW assignments, MATLAB Codes, and announcements) will be posted on ICON.

Instructor. Professor Zahra Aminzare
E-mail: zahra-aminzare@uiowa.edu
Office location: B1H MLH

Office Hours

- Tuesdays 10:00 – 10:30 am (on Zoom - https://uiowa.zoom.us/my/aminzare)
- Wednesdays 3:30 - 4:30 pm (after the lecture – in B1H MLH)
- Fridays 1:00 - 2:30 pm (before the lecture - in B1H MLH)

(Students are invited to drop by during these hours to discuss questions about the course. I am also available by appointment if you are unable to attend my drop-in hours.)

Course Home. The College of Liberal Arts and Sciences (CLAS) is the home of this course, and CLAS governs the add and drop deadlines, the "second-grade only" option (SGO), academic misconduct policies, and other undergraduate policies and procedures. Other UI colleges may have different policies.

DEO. Professor Ryan Kinser, 14A MLH, ryan-kinser@uiowa.edu

Description of Course. This course delves into the utilization and creation of mathematical models across a wide spectrum of topics. These include Population Growth, Epidemiology, Chemical Reaction Networks, Biochemical Kinetics, Gene Regulatory Networks, Neurobiology, Electrophysiology, and potentially Chemotaxis and Pattern Formation. Each topic follows a structured approach, beginning with an introductory overview. We then delve into modeling using simple differential equations with adjustable parameters. Subsequently, we simulate these models to explore system behaviors. We analyze the outcomes and make predictions employing qualitative techniques in dynamical systems, such as phase plane analysis and bifurcation theory. These predictions are then validated through further simulations. Throughout the course, interactive, in-class hands-on activities will be a regular feature, facilitating a deeper exploration of system behaviors on a weekly basis.

Learning Objectives. Throughout the course, students will acquire the ability to approach such systems from a mathematical perspective (modeling), learn to write basic codes to simulate these models and explore their behaviors, and finally, learn mathematical techniques to analyze these models and make predictions.

Textbook/Materials

The lecture notes that the instructor posts before each lecture are intended to be self-sufficient, however, most of the materials will be from the following references:

- Lecture Notes on Mathematical Systems Biology, Eduardo Sontag (Free from here)
- Mathematical Modeling in Systems Biology: An Introduction, Brian Ingalls (Free from here)

Course Expectations & Grading (+/- grading will be used)

Final course grades will be assessed based on your performance in the following activities:

- Lecture participation: Students are expected to attend all lectures and be active in all classes.
- Homework: 30%; ~10 assignments
- Midterms: 40%: 2 midterms during weeks 6 & 11
- Final Comprehensive Exam: 30%

  Date and Time of the Final Exam

  The final examination date and time will be announced by the Registrar generally by the fifth week of classes and it will be announced on the course ICON site once it is known. Do not plan your end of the semester travel plans until the final exam schedule is made public. It is your responsibility to know the date, time, and place of the final exam. According to Registrar's final exam policy, students have a maximum of two weeks after the announced final exam schedule to request a change if an exam conflict exists or if a student has more than two exams in one day (see the policy here).

Final grades will be awarded based on the following ranges:

A	**B**	**C**	**D**	**F**
A+ 98-100	B+ 87-89	C+ 77-79	D+ 67-69	F < 59
A 93-97	B 83-86	C 73-76	D 63-66	
A- 90-92	B- 80-82	C- 70-72	D- 60-62	

Student Collaboration

Student collaboration is permitted on Homework only (however you must typeset and submit your solutions yourself). It is NOT permitted for the exam. Any attempt to collaborate during the exam will result in a 0 score on that test.

General Recommendations

- You are strongly encouraged to prepare for all the lectures and participate in the class discussions.
- You are strongly encouraged to find a small team of classmates and study with them. The lecture examples and posted HW problems are useful resources for the discussion in those small teams. But remember to write the solutions of the problems on your own.
- Don't be shy and ask your questions in class.

Course Policies

- Students are expected to attend all lectures, do the homework, and take the exam. Students are responsible for everything covered in the lectures, textbook, and the prerequisites. Important announcements about changes (if necessary) to the syllabus,

homework, exam, etc. will be done in the lectures or they will be e-mailed to your UI e-mail address.

- *University regulations require that students be allowed to make up examinations which have been missed due to illness or other unavoidable circumstances. Students with mandatory religious obligations or UI authorized activities must discuss their absences with me as soon as possible. Religious obligations must be communicated within the first three weeks of classes.*

Academic Honesty and Misconduct
All students in CLAS courses are expected to abide by the CLAS Code of Academic Honesty. Undergraduate academic misconduct must be reported by instructors to CLAS according to these procedures. Graduate academic misconduct must be reported to the Graduate College according to Section F of the Graduate College Manual.

Student Complaints
Students with a complaint about a grade or a related matter should first discuss the situation with the instructor and/or the course supervisor (if applicable), and finally with the Director or Chair of the school, department, or program offering the course.

Undergraduate students should contact CLAS Undergraduate Programs for support when the matter is not resolved at the previous level. Graduate students should contact the CLAS Associate Dean for Graduate Education and Outreach and Engagement when additional support is needed.

Drop Deadline for this Course
You may drop an individual course before the deadline; after this deadline you will need collegiate approval. You can look up the drop deadline for this course here. When you drop a course, a "W" will appear on your transcript. The mark of "W" is a neutral mark that does not affect your GPA. Directions for adding or dropping a course and other registration changes can be found on the Registrar's website. Undergraduate students can find policies on dropping and withdrawing here. Graduate students should adhere to the academic deadlines and policies set by the Graduate College.

University Policies

Accommodations for Students with Disabilities
Basic Needs and Support for Students
Classroom Expectations
Exam Make-up Owing to Absence
Free Speech and Expression
Mental Health
Military Service Obligations
Non-discrimination
Religious Holy Days
Sexual Harassment/Misconduct and Supportive Measures
Sharing of Class Recordings