SYLLABUS Fall 2023
The University of Iowa
The College of Liberal Arts and Sciences
Department of Mathematics
Mathematical Biology I, MATH:5750
Time and Location: MWF 12:30 PM - 1:20 PM, 213 MLH

Corequisites: MATH:5600 and MATH:5700, if not taken as prerequisites.
Some of the policies relating to this course (such as the drop deadline) are governed by
its administrative home, the College of Liberal Arts and Sciences, 120 Schaeffer Hall.

Instructor: Professor Zahra Aminzare
E-mail: zahra-aminzare@uiowa.edu
Website: https://homepage.divms.uiowa.edu/~zaminzare/
Office location: B1H MLH
Student drop-in hours: WF 1:30 PM – 3:00 PM or by appointment
(Students are invited to drop by during these hours to discuss questions about the
course material or concerns. I am also available by appointment if you are unable to
attend my drop-in hours.)

Supervisor: For this course, see the DEO.
DEO Contact Information: Professor Ryan Kinser, 14 MLH, ryan-kinser@uiowa.edu

Description of Course: This course covers the following topics:
- An introduction to (mathematical) neuroscience:
  - neurons, action potentials, synapses, central and peripheral nervous systems
- Single neuron excitability, oscillations, and bursts:
  - Hodgkin-Huxley model and its important reduced/simplified models
- Neuronal networks structure and synchrony
- Decision making/evidence accumulation:
  - 2-alternative forced-choice task, drift-diffusion model.

Course Materials: You don’t need to buy any textbooks!
- ICON: Most resources will be uploaded to the course ICON site through the
  semester. Please check ICON frequently for the updates.
- Course Lecture Notes will be sent to ICON.
- Recommended Free Textbooks:
  - Mathematical Foundations of Neuroscience. B. Ermentrout and D. Terman, 2010
  - Dynamical Systems in Neuroscience: The Geometry of Excitability and Bursting,
    E. Izhikevich
- MathBio Seminar: I strongly encourage you to attend our weekly MathBio seminar.
Course Expectations & Grading (+/- grading will be used): Final course grades will be assessed based on your performance in the following activities:

- Lecture participation: You are expected to attend all lectures and in particular be active in all classes.
- Homework: 25%; ~6 bi-weekly assignments except during the first and last week of the semester and the weeks of midterms (weeks 1, 5, 10, 15).
- Midterms: 50%; 2 midterms during weeks 5 & 10
- Final Comprehensive Exam: 25%

Final grades will be awarded based on the following ranges:

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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.

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).
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