Syllabus Spring 2023
Biochemical/Cellular Sys Model - BINF 751
George Mason University, Bioinformatic and Computational Biology, School of System Biology

INSTRUCTOR: Aman Ullah.
Locations/times: Lecture: Tuesday 3:30PM - 6:30PM, Online (Zoom's link will be available on the blackboard).
Phone: (703) 993-7182; Email: aullah3@gmu.edu
Office Hour: Tuesday: 10:00 PM-1:00 PM or by an appointment through Zoom's Link.

Course Description

Students will learn the concepts and techniques that will enable them to study cellular and subcellular processes using computational and mathematical methods. They will learn how to describe a cellular or subcellular process by mathematical equations and analyze them using mathematical and computational methods in order to get insight into cellular function in normal and diseased organisms.

Textbooks

Computational Cell Biology: by Chris P. Fall, John Tyson, John Wagner, and Eric Marland. "*An Introductory Text on Computer Modeling in Molecular and Cellular Biology"*
Mathematical Physiology: by James Keener and James Sneyd.

Note: Lecture material will be based heavily on these textbooks.

Prerequisites

Calculus and knowledge of a programming language.
Knowledge of differential equations is helpful.

Grading Policy

The course grade will be determined as follows:

Activities:	**Percent of Final Grade:**
Homework-	30%
Mid-Term -	20%
Final Exam -	30%
Final Project -	20%

Grades are assigned on the following basis.

98 to 100%:	**A+**
90 to 97%:	**A**
87 to 89%:	**B+**
80 to 86%:	**B**

77 to 79%:	**C+**
70 to 76%;	**C**
60 to 69%;	**D**
Less than 60%;	**F**

Homework assignments will be assigned several times during the semester. They will be due two weeks after they are assigned. Late Homework will not be accepted.

Students are expected to attend all lectures and participate in the class discussions.

Class Announcements

Any pertinent class announcements will generally be sent to your GMU email accounts. The most current lecture content (including PowerPoint presentations) will be posted to the class Blackboard page following each class.

Academic Honesty Policy

This course adheres to the Mason honor code, which states that students must not cheat, plagiarize, steal, or lie in matters related to their academic work. Please ensure that all work you submit is original and contains proper attribution. That being said, you can help each other out on the homework (this does not mean that you can copy each other's homework). If you have any doubts about what constitutes as plagiarism, please contact me.

Tentative Course Schedule:

Tuesday, January 24 -- Overview of the course and Dynamic Phenomenon in cells
Tuesday, January 1st --- Biochemical Reactions
Tuesday, February 7th -- Voltage Gated Ionic Currents, The Hodgkin-Huxley Model
Tuesday, February 14th -- Excitability and action potential and Spiking
Tuesday, February 21st -- Transporters and pumps, Reduction of Scale
Tuesday, February 28th -- Reduction of Scale, Fast and Slow Time Scale
Tuesday, March 7th -- **Midterm**
Tuesday, March 14th -- **No class -- Spring Recess**
Tuesday, March 21st-- whole-cell models
Tuesday, March 28th-- intracellular communication
Tuesday, April 4th -- Spatial Modeling
Tuesday, April 11th-- Calcium dynamics, Modeling intracellular Calcium waves and sparks
Tuesday, April 18th -- Modeling intracellular Calcium waves and sparks
Tuesday, April 25th -- Final Project
Tuesday, May 2nd -- Final Project
Tuesday, May 9th -- Reading Day
Tuesday, May 16th -- **Final Exam 3:30-6:10**

Changes if needed will be announced in the class.

Advice

If you want to do well in course: 1) Do all the homework. 2) Ask questions in class and office hours. 3) If you are having difficulty doing the homework, be sure to see the instructor for additional help.

Student Services

Disabilities

If you have a documented learning disability or other condition that may affect academic performance you should: (1) make sure this documentation is on file with Office of Disability Services (SUB I, Rm. 4205; 703-993-2474; http://ods.gmu.edu) to determine the accommodations you need, and (2) talk with me to discuss your accommodation needs.

Mason Live/Email: Students are responsible for the content of university communications sent to their George Mason University email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students solely through their Mason email account.
University libraries: University Libraries provide resources for distance learning students [See Library website: http://library.gmu.edu/for/online].

WEATHER

For closings due to inclement weather, register for Mason-ALERT to receive text messages by email or phone.