Syllabus Fall 2022

BINF 701-002/BINF DL1 701 - Systems Biology
BIOS 701-001/BIOS DL1 701 - Systems Biology

George Mason University, Bioinformatic and computational biology

INSTRUCTOR: Aman Ullah.
Locations/times: Lecture: Tuesday 4:30-7:10 p.m., PW: Colgan 304B & DL (Zoom's link is available on the blackboard i.e., Web Conference- Zoom)

Phone: (703) 993-7182; Email: aullah3@gmu.edu
Office Hour: Tuesday: 10:00 PM-1:00 PM or by appointment through Zoom's Link

Prerequisite

Admission to the Ph.D. program in biosciences or bioinformatics, CHEM 663 or equivalent.

Objective of the course:

Systems biology seeks to understand how complex biological systems function. Systems biology is based on the understanding that the whole is greater than the sum of the parts. It is collaborative, integrating many scientific disciplines, including biology, computer science, engineering, bioinformatics, and others, to predict how these systems change over time and under various conditions and to create solutions to the most urgent health and environmental problems facing the globe. This involves the use of computational methods and models to integrate information obtained about these systems through a wide range of methods spanning multiple spatial and temporal scales.

Systems biology, ultimately, creates the potential for entirely new kinds of exploration, and drives constant **innovation** in biology-based technology and computation. Current research examples will be used to motivate and demonstrate these approaches.

TEXTBOOK

A first course in system biology (2nd Edition) by Eberhard O. Voit (ISBN-13: 978-0815345688**).** You can find this book at the GMU bookstore or on Amazon.com (Amzon's Link). Lecture material will be based heavily on this textbook.

Grading Policy

The course grade will be determined as follows:

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

Grades are assigned on the following basis:

90 to 100%: A;

80 to 89.99%: B;

70 to 79.99%: C;

60 to 69.99%: D;

Less than 60%: F.

Students are expected to attend lectures in class and via Zoom (DL section) during class time, and participation is highly recommended. Students are asked to take the initiative and read the references mentioned in class.

Academic Honesty Policy:

Academic dishonesty will not be tolerated. This includes cheating, plagiarism, and falsification of academic records. That being said, you can help each other out on the homework (this does not mean that you can copy each other's homework).

Student Services

Disabilities

Disability Services at George Mason University is committed to providing equitable access to learning opportunities for all students by upholding the laws that ensure equal treatment of people with disabilities. If you are seeking accommodations for this class, please first visit http://ds.gmu.edu/ for detailed information about the Disability Services registration process. Then please discuss your approved accommodations with me. Disability Services is located in Student Union Building I (SUB I), Suite 2500. Email:ods@gmu.edu | Phone: (703) 993-2474.

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.

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].

Tentative Course Schedule

Lecture 1, Aug 23rd

Chapter 1: Biological Systems

Lecture 2, Sep 30th

Chapter 2: Introduction to Mathematical Modeling

Lecture 3, Sep 6th

Chapter 2, and Chapter 3: Introduction to Mathematical Modeling and Static Network Models

Lecture 4, Sep 13th

Chapter 3: Static Network Models

Lecture 5 Sep 20th

Chapter 4: The Mathematics of Biological Systems

Lecture 6, Sep 27th

Chapter 4: The Mathematics of Biological Systems

Lecture 7, Oct 4th

Midterm

Lecture 8, Oct 11th

Fall Break (Classes do not meet this week)

Lecture 9, Oct 18th

Chapter 5: Parameter Estimation

Lecture 10, Oct 25th

Chapter 8: Metabolic Systems

Lecture 11, Nov 1st

Chapter 9: Signaling Systems

Lecture 12, Nov 8th

Fundamental of Calcium signaling

Lecture 13, Nov 15th

Physiological Modeling: The heart as an example

Lecture 14, Nov 22nd

Final Projects: presentation

Lecture 15, Nov 29th

Final Projects: presentation

Lecture 16, December 6th

Reading week

Final Exam, December 13th @ 4:30 PM.

Changes if needed will be announced in the class.