

# Syllabus Fall 2021

## BINF 701-001/BIOS 701-001 - 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., Zoom Meeting)

**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. 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. Current research examples will be used to motivate and demonstrate these approaches.

**TEXTBOOK:** A first course in system biology (2<sup>nd</sup> 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:

<b>Activities:</b>	<b>Percent of Final Grade:</b>
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](mailto: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 24<sup>th</sup>**

**Chapter 1: Biological Systems**

**Lecture 2, Sep 31<sup>st</sup>**

**Chapter 2: Introduction to Mathematical Modeling**

**Lecture 3, Sep 7<sup>th</sup>**

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

**Lecture 4, Sep 14<sup>th</sup>**

**Chapter 3: Static Network Models**

**Lecture 5 Sep 21<sup>st</sup>**

**Chapter 4: The Mathematics of Biological Systems**

**Lecture 6, Sep 28<sup>th</sup>**

**Chapter 4: The Mathematics of Biological Systems**

**Lecture 7, Oct 5<sup>th</sup>**

**Midterm**

**Lecture 8, Oct 12<sup>th</sup>**

Fall Break (Classes do not meet this week)

**Lecture 9, Oct 19<sup>th</sup>**

**Chapter 5: Parameter Estimation**

**Lecture 10, Oct 26<sup>th</sup>**

**Chapter 8: Metabolic Systems**

**Lecture 11, Nov 2<sup>nd</sup>**

**Chapter 9: Signaling Systems**

**Lecture 12, Nov 9<sup>th</sup>**

**Fundamental of Calcium signaling**

**Lecture 13, Nov 16<sup>th</sup>**

## Physiological Modeling: The heart as an example

Lecture 14, Nov 23<sup>rd</sup>

Final Projects: presentation

Lecture 15, Dec 2<sup>nd</sup>

Final Projects: presentation

Lecture 16, December 9<sup>th</sup>

Reading week

**Final Exam, December 14<sup>th</sup> @ 4:30 PM.**

**Final exam will be held during exam week on class time.**

*Changes if needed will be announced in the class.*

### Safe Return to Campus Statement

- All students taking courses with a face-to-face component are required to follow the university's public health and safety precautions and procedures outlined on the university Safe Return to Campus webpage (<https://www2.gmu.edu/safe-return-campus>). Similarly, all students in face-to-face and hybrid courses must also complete the Mason COVID Health Check daily, seven days a week. The COVID Health Check system uses a color code system and students will receive either a Green, Yellow, or Red email response. **Only students who receive a "green" notification are permitted to attend courses with a face-to-face component.** If you suspect that you are sick or have been directed to self-isolate, please quarantine or get testing. Faculty are allowed to ask you to show them that you have received a Green email and are thereby permitted to be in class.
- Students are required to follow Mason's current policy about facemask-wearing. As of August 11, 2021, **all community members are required to wear a facemask in all indoor settings**, including classrooms. An [appropriate facemask](#) must cover your nose and mouth at all times in our classroom. If this policy changes, you will be informed; however, students who prefer to wear masks either temporarily or consistently will always be welcome in the classroom.