Syllabus BINF 701: Systems Biology

George Mason University· Bioinformatics & Computational Biology· Fall 2026

INSTRUCTOR

Aman Ullah, PhD, MSc, MS

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Phone: (703) 993-7182

OFFICE HOURS

Tuesday 10:00 AM – 1:00 PM

Or by appointment via Zoom

MEETING TIMES

Tuesday 4:30 – 7:10 PM

In-Person: PW Colgan 304B

Distance Learning: Zoom (see Canvas)

SECTIONS

BINF 701-002· BIOS DL1 701

Prerequisite: Ph.D. admission in Biosciences or Bioinformatics; BIOL 583 / CHEM 563 or equivalent

COURSE OBJECTIVES

This course introduces the principles of systems biology — an interdisciplinary field focused on understanding complex biological systems through the analysis of interactions and relationships among their components. By integrating concepts from biology, computer science, engineering, and bioinformatics, students will learn to:

- Predict system behavior over time and under varying conditions
- Develop solutions to critical health and environmental challenges
- Drive innovation in biology-based technologies and computational approaches

Using computational methods and modeling, students will integrate data from multiple scales and methodologies to gain a holistic understanding of biological systems. Real-world research examples will illustrate these concepts, inspiring exploration and innovation.

REQUIRED TEXTBOOK

A First Course in Systems Biology (3rd Edition)

Eberhard O. Voit· ISBN-13: 978-1032515434

Lecture material will primarily be drawn from this textbook. Additional topics may be covered using supplementary resources.

GRADING POLICY

Assessment Activity	% of Final Grade
Homework	25%
Mid-Term Exam	25%
Final Exam	30%
Final Project	20%

Grade Scale

A	B	C	D	F
90–100%	80–89.99%	70–79.99%	60–69.99%	< 60%

COURSE POLICIES

Attendance & Participation

Regular attendance and active participation are essential for success. Students are expected to attend all scheduled lectures — whether in-person or via Zoom — and to arrive prepared to engage with the material.

- Attend on time and remain for the full class duration
- Contribute actively to discussions and group activities
- Complete all assigned readings before class

Academic Integrity

Academic dishonesty — including cheating, plagiarism, and falsification of records — will not be tolerated. Collaboration is encouraged within these boundaries:

- **Discussing homework with classmates; seeking guidance from peers; collaborating to understand concepts.** ✅ Permitted:
- **Copying or submitting another's work as your own. All submitted work must be original.** ❌ Prohibited:

Policy on the Use of AI Tools

AI tools (e.g., ChatGPT, GitHub Copilot, Grammarly) can support learning when used appropriately. Their use is regulated as follows:

- **Clarifying concepts; improving grammar/clarity in your own writing; creating personal practice questions.** Permitted:
- **Submitting AI-generated work as your own; using AI on graded assessments; uploading course materials to AI platforms.** Prohibited:

Unauthorized AI use is treated as an academic integrity violation under university policy.

STUDENT SERVICES & RESOURCES

Disability Accommodations

Disability Services (SUB I, Suite 2500) ensures equitable access for all students. If you need accommodations, register at http://ds.gmu.edu/ then discuss approved accommodations with me early in the semester. Email: ods@gmu.edu · Phone: (703) 993-2474.

Campus Support Resources

Student Support & Advocacy Center (SSAC)	Counseling & Psychological Services (CAPS)
Writing & Communication Center	University Career Services
Learning Services	Library: library.gmu.edu

Additional policies: Privacy & Recording Policy, Mason Email, and Library Access apply per university standards. Zoom recordings are for enrolled students only and must not be shared externally.

TENTATIVE COURSE SCHEDULE

Lecture	Date	Topic
1	*Aug 25*	Ch. 1: Biological Systems
2	*Sep 1*	Ch. 2: Introduction to Mathematical Modeling
3	*Sep 8*	Ch. 3: Mathematical Modeling & Static Network Models
4	*Sep 15*	Ch. 4–5: Static Network Models & Discrete Biological Systems
5	*Sep 22*	Ch. 4: Discrete Biological Systems
6	*Sep 29*	Ch. 5: Continuous Biological Systems
7	*Oct 6*	MIDTERM EXAM
—	*Oct 13*	Fall Break — No Class
8	*Oct 20*	Ch. 9: Metabolic Systems
9	*Oct 27*	Ch. 10: Signaling Systems
10	*Nov 3*	Election Day — No Classes

11	*Nov 10*	Ch. 13: Systems Biology in Medicine & Drug Development
12	*Nov 17*	Ch. 12: Physiological Modeling — The Heart & Calcium Signaling | Ch. 14: Population Systems
13	*Nov 24*	Final Project Presentations
14	*Dec 1*	Final Project Presentations
-	*Dec 8*	Reading Week
16	*Dec 15*	FINAL EXAM — 4:30 PM

Changes to the schedule will be announced in class and on Canvas.