

BIOS 3450 Syllabus

Section A, 3 Credits
Fall 2026

Faculty Information

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General Course Information

Description

All living things are made up of basic building blocks called CELLS. The human body contains billions perhaps trillions of cells, all intricately organized to form various organ systems. As the 21st century opens with the sequence of the human genome in hand, we face explosion of new data about the components of cells and what structures they contain. Cell biology is a rich integrative science at the intersection of two themes first, astonishing variety in individual particulars and second, astonishing constancy in fundamental mechanisms.

This course is designed to give students a conceptual framework of what is currently known about cell structure and function. It will cover key topics, including current and classical work on protein structure, membrane transport and function, organelle biogenesis, protein trafficking, vesicular transport, the cytoskeleton, cell signaling, cell cycle progression. With each topic, the cellular basis of applicable diseases will also be discussed. The goal is to learn how to put facts to use, to reason, to predict and appreciate the way simple and mindful experiments can lead to an understanding of how cells work.

Course Learning Outcomes

1. **Relate amino acid properties to protein structure and function**, including the forces that stabilize protein folding.
2. **Explain how enzymes function and are regulated** to control biochemical reactions in the cell.
3. **Analyze mechanisms of protein quality control**, including folding, chaperone activity, and degradation pathways.
4. **Describe the structure and dynamics of biological membranes** and how they enable transport and cellular excitability.
5. **Evaluate mechanisms of membrane transport and ion channel regulation** in maintaining cellular homeostasis and signaling.

6. **Explain the flow of genetic information and protein trafficking** within eukaryotic cells.
7. **Integrate principles of cell signaling and cell cycle regulation** to understand how cells coordinate growth, communication, and division

Required Course Materials

Molecular Biology of the Cell, (7th Edition, **NEW EDITION**), Alberts *et al*, 2022.
W.W.Norton & Company

Go to **Ebook link (Syllabus module) in Canvas (NOT Norton website)** for purchasing options.

Yellow tab at the top right says “purchasing options.” The Ebook is linked to Cell and Molecular Biology course in Canvas. Register using your Georgia Tech email. Ebook chapters can be viewed in “classic view” by clicking email address in top right corner. This view allows running pagination on the page as you scroll down. I have included an Ebook by Topic in each unit for topic headings.

Purchase of NEW text includes Digital Problems book (Smartwork)

Ebook + Reg Card 978-0-393-88481-4 (\$94), linked in Canvas

Hardcover: 978-0-393-88482-1 (\$223.75), GT bookstore

Loose-Leaf 978-0-393-88484-5 (\$179), GT bookstore

***Purchase of New text (hard copy or loose leaf) includes the Ebook and Smartwork Digital Problem**

NOTE: You CAN purchase the Digital Problems book as a separate purchase. The Digital Problems book is required for this course.

Grading Policy:

Your final grade will depend on the following combination of grades:

Exams	60%
Digital Problems	20%
In-Class Worksheets	15%
Point Solutions Attendance	5%

A: $\geq 90.0\%$

B: $\geq 80.0\%$ and $< 90.0\%$

C: $\geq 70.0\%$ and $< 80.0\%$

D: $\geq 60.0\%$ and $< 70.0\%$

F: < 60.0

Description of Graded Components

Exams: 60% of the Course Grade

Students are required to take three Midterm Exams and a Final Exam. Midterm exams And Final exam will be administered online in Gradescope. **Students will take the exam in class using their laptop.** Each Exam is weighted equally (each worth 15% of your course grade). The Midterm exams will be spaced evenly throughout the semester and will cover the material in that quarter (exam dates in schedule). The Final Exam will cover the last section of the course only. All students are required (by the University) to take the Final as scheduled. The exam format and question distribution will be announced closer to the exam date. Students will receive question feedback after each exam in gradescope.

Digital Problems Assignments: 20% of the Course Grade

Grade based on completion of practice problems (Digital Problems Assignment). Purchase of a new edition MBOC text includes the Digital Problems book in Smartwork. I have customized these problem sets. These are formative assessments that will provide you with immediate feedback. I will assess you based on **completion of these problem sets**, not assignment grade. I will **drop one** digital assignment without penalty. Please complete Digital assignments using Canvas Assignments.

In-class worksheets: 15% of your course grade.

The assignments are **graded based on participation**, not assignment grade. Students will be expected to work on the activity during class. Assignments do not have to be complete before submission (**partial completion is ok**). I will **drop one** in-class worksheet without penalty. In-class worksheets promote student engagement, peer learning, and review of lecture topics. The worksheet may include a review chart, analysis questions, or experiment analysis. In-class worksheets will need to be scanned and uploaded into Canvas Assignment (Instructions provided in Canvas) by the **end of class**. In-class worksheets folder located in each Unit module.

Point solutions Attendance: 5% of your course grade.

I will integrate a Point Solutions polling question periodically throughout the semester to check attendance. Participation will be recorded. **Please do not send documentation for missed lecture UNLESS you have missed more than four attendance checks. You can drop 4 attendance checks without penalty.** You will earn 1 point for attendance and 0 for absence. Stay organized and on track by taking detailed notes in class, participating during the in-class activities, and reviewing lecture concepts daily.

Attendance and/or Participation

I will use **point solutions poll questions** periodically throughout the semester to check attendance

Students apply topics during class with **in-class review worksheets**. Peer learning provides students with opportunities to ask and respond to questions.

Canvas Resources

- PowerPoint slides will be posted on Canvas. **However, you will need to fill in additional information during class.** I will post links and supplementary resources on Canvas. Class reminders and changes will be communicated in Canvas announcements
- **Course Schedule** located in the Canvas Syllabus Module
- **Unit Study Guide:** Located in each Unit folder
- **Ebook by topic:** Located in each Unit folder. List of textbook headings covered in each Unit.
- **Office hours:** Canvas Home Page

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review [Georgia Tech's Honor Code](#) and the student [Code of Conduct](#).

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Accommodation for Students with Disabilities

If you are a student with learning needs that require special accommodation, [contact the Office of Disability Services](#) (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also email me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. [The Student-Faculty Expectations](#) articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Prerequisites

BIOS 1107 and BIOS 1107L OR BIOS 1207 and BIOS 1207L

AND

CHEM 2311 OR CHEM 1315

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

In-class worksheets: Extensions of one day with documentation provided (medical documentation or approved institute activities). Documentation must be sent to the instructor within 24 hours of scheduled activity.

Digital Problems: Extensions are not provided since students have a longer time period to complete these assignments (approximately a week)

Point Solutions attendance: Extension not provided due to purpose of point solutions in promoting attendance and built in flexibility of missed attendance checks (description of graded components)

Make up exam policy: If you know you will miss an exam, please coordinate with the instructor at least one week in advance to set up a time to take a makeup exam ahead of the scheduled exam date. If you miss an exam without notifying your instructor, you will receive a grade of 0 (zero) unless you have a legitimate reason for missing the exam. Examples of legitimate reasons to miss an exam include illness, illness or death in your immediate family, and participation in official university activities.

Documentation is required for any exam to be considered excused; medical documentation should be submitted to the Dean of Students (<https://studentlife.gatech.edu/request-assistance>) and not to the instructors. Makeup exams will be arranged **within 3 business days** of the missed exam.

Missed lecture notes: If you miss class and have an excuse (illness, university approved absence, etc.), please send me an email with documentation (reason for absence). I will then send an email to you and one of my TAs for missed lecture notes and assistance.

Inclement Weather and Digital Learning Days

I will move class to online, synchronous zoom session during inclement weather. I will communicate changes to class schedule using Canvas Announcement.

Student Use of Mobile Devices in the Classroom

Students may use mobile devices for instructional purpose (ie polling question in Point Solutions). Laptops and iPads are permitted for group work (in-class worksheets) and taking notes if needed.

Undergraduate Student Academic Success Resources:

Academic Support: Academic Success and Advising (a unit in the Office of Undergraduate Education & Student Success) provides free support for your courses. Students can attend scheduled supplemental review (PLUS) sessions, stop by Drop-In Tutoring, or schedule a one-on-one appointment through Knack. To explore what options work best for you, please visit us online at success.gatech.edu/tutoring, email us at tutoring@gatech.edu, or come see us at Clough Undergraduate Learning Commons, Suite 283.

Student Well-Being:

“At Georgia Tech, we are concerned about your overall physical, social, and mental well-being.” A [comprehensive list](#) of wellness related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being ([student-resource-guide \(gatech.edu\)](#))