

CHEM 4581 Syllabus

Biochemistry Laboratory I, 3 credits

Fall 2026

Instructor Information

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General Course Information

Description

Biochemistry Laboratory I introduces students to the hands-on experimental techniques used to study biological molecules and processes. Building on concepts from the lecture course Biochemistry I, the course emphasizes practical skills in preparing samples, performing experiments, analyzing data, and evaluating results while developing safe and independent laboratory habits. Students learn not only how biochemical methods work but also why they are used, gaining insight into their strengths and limitations. Through the maintenance of electronic notebooks, written reports, and a short problem-based project, the course highlights how biochemical research is carried out and why these skills are essential in fields such as biotechnology, medicine, and molecular research.

Course Learning Outcomes

Upon successful completion of this course, you should be able to...

- Apply fundamental biochemical concepts to design and carry out experiments that investigate the structure and function of biological macromolecules.
- Perform essential laboratory techniques safely and independently, including preparing solutions, handling biological samples, and operating common biochemical instruments.
- Analyze and interpret experimental data to evaluate the quality, reliability, and meaning of results.
- Document and communicate scientific work clearly through electronic laboratory notebooks, written reports, and oral presentations.

- Assess the strengths and limitations of biochemical methods and explain why particular experimental approaches are appropriate for specific research questions.

Required Course Materials

No textbook is required for this course. All readings, protocols, and supporting materials will be provided through Canvas, where students can access weekly instructions, background information, and assigned resources.

Laboratory coat (full-length; polyester/cotton blend or 100% cotton). Available for purchase at the Georgia Tech Bookstore or online scientific suppliers.

Safety glasses or chemical splash goggles, which may be purchased at the Georgia Tech Bookstore or through scientific supply retailers.

Appropriate laboratory attire, including closed-toed shoes and clothing that covers from torso to feet. Students must obtain their own attire prior to the first lab session.

Grading Policy

Final grades in this course are based on a weighted combination of all required coursework. Each component is designed to help you build technical, analytical, and communication skills essential to success in a biochemistry laboratory. The weight for each requirement is as follows:

- Laboratory Safety Pre-Lab Assignments: 10%
- Laboratory Performance and Conduct: 20%
- Electronic Laboratory Notebook (ELN): 30%
- Long Laboratory Reports: 20%
- GMO Project Presentation: 20%

Grades for each assignment will be posted on Canvas so that you can track your progress throughout the semester and understand how your work contributes to your final course grade. At the end of the term, your final grade will be calculated using the percentages above, and letter grades will be assigned according to the standard Georgia Tech grading scale defined in [Regulation V.A.](#)

Description of Graded Components

Laboratory Safety Pre-Lab Assignments (10%)

These online assignments prepare you for each laboratory session by introducing key safety practices, chemical hazards, and procedural considerations. Pre-labs must be

completed before the start of each lab period and are designed to ensure you can work safely and independently once in the laboratory.

Laboratory Performance and Conduct (20%)

Your weekly performance grade reflects your professionalism and preparedness in the lab. This includes arriving on time, reviewing protocols in advance, following safety rules, maintaining a clean workspace, using equipment appropriately, and collaborating respectfully when required. Consistent engagement and responsible laboratory behavior are essential for success in this course.

Electronic Laboratory Notebook (30%)

You will maintain an electronic lab notebook (ELN) in LabArchives as a detailed, organized record of your experimental work. Each entry should include goals, materials, procedures, observations, data, analyses, and conclusions. ELNs are due at the end of each experiment and are evaluated for completeness, clarity, accuracy, and adherence to proper scientific documentation standards.

Laboratory Report (20%)

One laboratory report will be submitted during the semester. The report mirrors the format of scientific journal articles and requires you to explain your experimental approach, present and interpret data, evaluate your results, and connect your findings to broader biochemical concepts. The lab report is assessed on scientific accuracy, clarity of writing, quality of analysis, and adherence to provided formatting guidelines.

GMO Project Presentation (20%)

In this short problem-based learning project, you will investigate whether a chosen food sample contains genetically modified material. Over two laboratory sessions you will extract DNA, perform PCR, and analyze your results, culminating in an oral presentation. Presentations are graded on clarity, accuracy, organization, visual design, and your ability to answer questions about your experimental work.

Course Policies

Attendance

Because this is an intensive, hands-on laboratory course, attendance at all scheduled lab sessions is required. Each lab builds on skills and techniques that must be practiced in real time, and missed laboratory work cannot be made up outside of class. Absences also affect group workflow, equipment scheduling, and the overall safety of the lab

environment, so regular attendance is essential for both your learning and the learning experience of others.

If you must miss a lab due to illness, personal emergency, religious observance, career-related events, or Institute-approved activities, you are expected to follow Georgia Tech's policies for excused absences. Students should notify the instructor as soon as possible and, when required, provide documentation through the Office of the Dean of Students. Students who are ill should stay home, and procedures for making up excused work will follow Institute guidelines. Unexcused absences from lab will result in a grade of zero for the missed work, as many laboratory activities cannot be made up.

Lecture content is provided asynchronously through Canvas; however, students are responsible for watching all assigned materials and completing any associated tasks. If you miss a lab due to an excused reason, you are responsible for reviewing posted materials, coordinating with your TA or instructor about missed content, and keeping up with all subsequent assignments.

Lab Safety

Safety is a central part of the learning experience in this course, and all students are expected to follow established laboratory safety practices at every class meeting. All students must complete the required Lab Safety 101, General Biosafety, and Recombinant DNA trainings during the first week of class; completion of these modules is necessary to participate in any laboratory activities. You must wear a full-length lab coat, approved safety glasses or goggles, and appropriate closed-toe attire whenever you are in the laboratory. Protective gloves will be provided for work involving hazardous chemicals, and all students are responsible for preventing chemical exposure by avoiding direct contact, minimizing inhalation risks, and keeping all food, drinks, and personal items out of the laboratory. Students are expected to read all protocols in advance, follow instructions carefully, use equipment responsibly, and maintain a clean and organized workspace. Any spills, accidents, or equipment issues should be reported immediately to the instructor or TA. Repeated or serious safety violations may result in dismissal from the lab session and a loss of associated points. These expectations help ensure not only your own safety but also the safety of everyone working around you, and they reflect the professional standards of modern biochemical research settings.

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.

Accommodations 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 e-mail 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.

Campus Resources for Students

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 \(gatech.edu\)](http://student-resource-guide(gatech.edu)))