CHBE 6779 Syllabus

Bioprocess Engineering, Section A, 3 credit hours, Fall 2026

Instructor Information

Instructor: Lily S. Cheung

General Course Information

Description

Integrating several ChBE core concepts, bioprocess engineering applies the engineering principles to biological systems. Topics covered include enzyme kinetics, fermentation, downstream processing, and integrated bioprocesses important to biotech industries.

Course Learning Outcomes

By the end of this course, a student should be able to:

1) Use correct biological terms to describe and analyze phenomena/problems in bioprocesses;
2) Explain major differences between different cell types (such as Gram- negative/Gram-positive bacteria, simple eukaryotes vs. mammalian cells) and their respective cell growth requirements in bioprocesses;
3) Explain how environmental conditions influence cell growth and the means to achieve optimal cell growth on a large scale;
4) Analyze the kinetics of cell growth or enzyme-catalyzed reactions and identify limiting factors;
5) Derive or select appropriate bioreactor models based upon bioproducts, cell lines, and other process criteria;
6) Design a suitable scheme of bioproduct separations based upon the molecular characteristics of the product and other process criteria;
7) Analyze major metabolic pathways and identify common regulatory mechanisms; and
8) Analyze molecular biology elements used to construct recombinant cell lines and identify potential genetic instability in bioprocesses.

Required Course Materials

Bioprocessing Engineering, Basic Concepts (2nd edition), Shuler, Kargi and DeLisa, 2017.

Grading Policy:

The following graded assessments are used to determine the course grade:

Quizzes	10%
Class participation	5%
Midterm exam I	25%
Midterm exam II	25%
Project report I	10%
Project report II	10%
Project presentation	11%
Peer project evaluation	4%

The letter grade cutoffs in this class are 90%+ for A, 80%+ for B, 70%+ for C, 60%+ for D, based on the overall score, relative to the weights above. These cutoff points may be lowered (resulting in a higher grade for some students) but will never be increased.

Course Policies

Attendance and/or Participation

Your academic success will depend strongly on the level of engagement with the course material. Actively participating in all lectures and taking advantage of other learning opportunities (e.g., office hours) is critical to achieving the learning outcomes. The Georgia Tech Catalog describes policies on "approved Institute activities" (e.g., field trips and athletic events) and on accommodations for religious observances.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act in accordance with the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

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

Core IMPACTS

Not applicable for this course.

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 schedule an

appointment to discuss your needs and obtain an accommodations letter. Please also email me during the first week of class to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe it is important to foster an atmosphere of mutual respect, acknowledgment, and responsibility between faculty members and the student body. The Student-Faculty Expectations outline basic expectations 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 and to reach out if you think there is anything I can do to improve your learning experience.