



BIO 115 Bioengineering: Problem-Solving Approaches

Summer 2024

Course Credits: 4

Contact Hours: 56 hours

Instructor: TBA

Email: TBA

COURSE OBJECTIVES

Bioengineering is a multidisciplinary field that applies principles of engineering, biology, and medicine to develop solutions for healthcare, agriculture, and environmental challenges. This course focuses on problem-solving approaches within bioengineering, covering topics such as biomaterials, tissue engineering, biomechanics, and biomedical imaging. Through lectures, case studies, and hands-on projects, students will develop critical thinking skills and practical techniques to address complex problems in bioengineering.

Upon Completion of this Course, students will be able to:

1. Understand fundamental concepts and principles of bioengineering;
2. Apply problem-solving strategies to analyze and address challenges in bioengineering;
3. Evaluate and critique existing bioengineering solutions;
4. Design and propose innovative solutions to real-world bioengineering problems;
5. Communicate effectively about bioengineering concepts and solutions.

PREREQUISITES

None

GRADING

Grades will be determined by accumulating points, with 100 points being the maximum, as follows:



ITEM	POINTS
2 Assignments	20 Points
2 Quizzes	20 Points
Midterm Exam	25 Points
Final Exam	35 Points
Total	100 Points

Late submissions will be graded at the end of the course. Grades will be assigned according to the following rule:

$A \geq 90 > B \geq 80 > C \geq 70 > D \geq 60 > F$.

We reserve the right to make adjustments to the overall grading policy.

COURSE MATERIALS

Required Texts:

There is no required textbook.

Recommended (Optional) Texts or Other Materials:

None

COURSE TOPICS

MODULE	TASKS
Module 1	Topics: Topic 1: Introduction to Bioengineering Topic 2: Biomaterials in Bioengineering Topic 3: Tissue Engineering Topic 4: Biomechanics Assessments: Assignment #1
Module 2	Topics: Topic 5: Biomedical Imaging Techniques Topic 6: Biosensors and Bioelectronics Topic 7: Computational Modeling in Bioengineering Topic 8: 3D Bioprinting Technologies Assessments: Quiz #1



Module 3	Topics: Topic 9: Bioethics in Bioengineering Topic 10: Creative Problem Solving Techniques in Bioengineering Topic 11: Self-Directed Inquiry in Bioengineering Topic 12: Engineering Ethics and Social Constraints Assessments: Assignment #2 Midterm Exam
Module 4	Topics: Topic 13: Project Management in Bioengineering Topic 14: Entrepreneurship in Bioengineering Topic 15: Regulatory Affairs in Bioengineering Topic 16: Compliance and Quality Assurance Assessments: Quiz #2
Module 5	Topics: Topic 17: Emerging Technologies in Bioengineering Topic 18: Synthetic Biology and Genetic Engineering Topic 19: Biomedical Ethics Topic 20: Industry Trends and Career Paths in Bioengineering Assessments: Final Exam

ATTENDANCE

1) Class attendance is required. Missing classes without permission will lead to decrease in overall grade.

Missing less than two classes: no penalty.

Missing more than two classes: 7% will be taken off from the overall grade.

If the instructor reports a student's frequent missing of class to the Soochow University Academic Administration Office, the student might get a written warning and might be prohibited from attending final exam.

2) Participants in this course are expected to arrive in class promptly and adequately prepared. The primary objective of this course is to critically engage with the readings and the subject matter. Therefore, course participants are expected to have completed the reading prior to class and prepare thoughtful reflections/commentaries to share with fellow colleagues.



LEARNING REQUIREMENTS

- 1) Late assignments are not acceptable and are subjected to grade deductions.
- 2) Assignments submitted in the wrong format will be counted as not submitted.
- 3) Failure to submit or fulfill any required course component results in failure of the class.
- 4) Make-up for midterm and final exams only with valid excuses, as defined by the University.
- 5) In order to earn a Certificate of Completion, participants must thoughtfully complete all assignments by stated deadlines and earn an average quiz score of 50% or greater.

TECHNOLOGY POLICY

The use of electronic devices in class is distracting, both for the user and for the rest of the class. Only non-programmable calculators can be used in the tests and exam. Any attempts to use cell phones and other electronic communication devices will be seemed as cheating. Laptops are discouraged, unless you use them for activities DIRECTLY related to the course (eg., note taking, reading course documents).

ACADEMIC INTEGRITY POLICY

Soochow University highly values the academic integrity and aims to promote the academic fairness, honesty and responsibility. Any academic dishonesty behaviors and any attempts to cheats and plagiarism will be reported to the university administration office. A written warning and the relevant penalties will be imposed. The record might be shown on the official university transcript.

DISABILITY ACCOMMODATION

Soochow University is committed to maintaining a barrier-free environment so that students with disabilities can fully access programs, courses, services, and activities at Soochow University. Students with disabilities who require accommodations for access to and/or participation in this course are welcome.

Note:

Please contact the University Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from



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seeing you have learned the course material.