



蘇州大學  
Soochow University

# BIO 314 General Intermediary Metabolism

Summer 2024

**Course Credits:** 4

**Contact Hours:** 56 hours

**Instructor:** TBA

**Email:** TBA

## COURSE OBJECTIVES

This course introduces participants to enzymes and their vital role in life-sustaining chemical reactions. It covers fundamental enzyme characteristics, including their function as catalyst proteins to accelerate reactions. Topics such as enzyme kinetics, control of enzyme activity, and enzyme inhibition are explored. The course also delves into intermediary metabolism pathways, focusing on biochemical transformations and energy extraction from nutrients. Specific attention is given to the tricarboxylic acid cycle and oxidative phosphorylation in aerobic metabolism. Additionally, the course covers animal pathways for carbohydrate and fat catabolism and biosynthesis, with a discussion on their regulation. Finally, adaptive metabolic responses to survive starvation in humans will be addressed.

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

1. Comprehensive understanding of enzymes and fundamental enzyme characteristics.
2. Develop proficiency in analyzing enzymatic reactions, explore the intricacies of controlling enzyme activity and understand the phenomenon of enzyme inhibition.
3. Acquire specialized knowledge regarding the tricarboxylic acid cycle and oxidative phosphorylation, with a focus on their central roles in aerobic metabolism and energy production.
4. Gaining insights into metabolism of animal pathways and adaptive metabolic responses.

## PREREQUISITES



BIO 110 Introduction to Biochemistry Major. CHM 111 General Chemistry II

## GRADING

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

ITEM	POINTS
Quizzes	30 Points
Assignments	20 Points
Midterm Exam	20 Points
Final Exam	30 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:**

David L Nelson, Michael M. Cox, *Lehninger Principles of Biochemistry*, 6<sup>th</sup> Edition, W.H. Freeman, 2012.

### **Recommended (Optional) Texts or Other Materials:**

None

## COURSE TOPICS

MODULE	TASKS
Module 1	<b>Topics:</b> Topic 1: The Foundations of Biochemistry. Topic 2: Water, Amino Acids, Peptides, and Proteins. Topic 3: The Three-Dimensional Structure of Proteins. Topic 4: Protein Function. <b>Assessments:</b>



	Quiz#1 Assignment#1
Module 2	<b>Topics:</b> Topic 5: Enzymes, Carbohydrates and Glycobiology. Topic 6: Nucleotides and Nucleic Acids. Topic 7: DNA-Based Information Technologies. Topic 8: Lipids. <b>Assessments:</b> Quiz#2
Module 3	<b>Topics:</b> Topic 9: Biological Membranes and Transport. Topic 10: Biosignaling. Topic 11: Bioenergetics and Biochemical Reaction Types. Topic 12: Glycolysis, Gluconeogenesis, and the Pentose Phosphate Pathway. <b>Assessments:</b> Midterm#1
Module 4	<b>Topics:</b> Topic 13: Principles of Metabolic Regulation. Topic 14: The Citric Acid Cycle. Topic 15: Amino Acid Oxidation and the Production of Urea. Topic 16: Oxidative Phosphorylation and Photophosphorylation. <b>Assessments:</b> Quiz#3 Assignment#2
Module 5	<b>Topics:</b> Topic 17: Biosynthesis. Topic 18: Hormonal Regulation and Integration of Mammalian Metabolism. Topic 19: Metabolism. Topic 20: Regulation of Gene Expression. <b>Assessments:</b> 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**

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- 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**

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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**

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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.



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## **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 seeing you have learned the course material.