

**Brown/Pfizer Master of Arts in Biology Program**  
**Biol2270 S02: Advanced Biochemistry**  
**Fall 2024**  
**Course Syllabus**

**INSTRUCTOR**

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**CLASS MEETINGS**

We will meet for one session every week on Wednesday from 3pm to 6pm.

**COURSE DESCRIPTION**

In this course, we will review fundamental principles of biochemistry and study how biochemistry shapes current biomedical research. In each session, we will review a topic in biochemistry and discuss one or two recent research publications. The in-class discussion will examine experimental techniques used in the papers and evaluate how the reported results integrate with prior knowledge and move the field forward.

**LEARNING OBJECTIVES**

At the conclusion of this course, students will be able to:

- Outline major topics in biochemistry.
- Summarize biochemical principles in intermediary metabolism and information pathways.
- Search the scientific literature and evaluate publications based on title and abstract.
- Analyze publications in terms of their experimental approach and scientific impact.
- Explain how biochemical experiments contribute to the findings of a research study.
- Describe how selected experimental methods are used in biomedical research.

**COURSE MATERIALS**

Required reading (research publications and review articles) will be made available for download on the course website.

Recommended textbook: Lehninger Principles of Biochemistry, Nelson & Cox, Eighth Edition, Macmillan.

**WORKLOAD**

Over 14 weeks, students will spend 36 hours in class (11 lectures/discussions + 2 exams). Specific out-of-class time commitment will vary on an individual basis and is expected to take about 8 hours per week (112 hours). Preparation for assessments and writing the final paper is expected to take about 30 hours.

**GRADING**

Discussion participation	15%
Oral presentation of a research publication	20%
Peer feedback for oral presentations	5%
Final paper	20%
Two written assessments	2 x 20%

### Oral presentation of a research publication

Each student will give an oral presentation that provides context for a publication assigned in class. The presenter will select up to three research publications that are relevant for the assigned paper, summarize the results and main conclusions of these publications, and explain how these results relate to the assigned reading.

### Final paper

Explore a biochemistry topic of your choice beyond our discussion in class. The paper could focus on (1) one of the papers covered in class: discuss the relationship of this paper with earlier work in the field or discuss additional papers published from the same group. (2) a publication not discussed in class that you are interested in: discuss the paper and draw connections to course content. (3) an enzyme or molecule we discussed in class: examples from previous years include coenzyme Q, carnitine, phosphocreatine, or taurine.

### **ACADEMIC HONESTY**

We refer students to the Brown University Academic Code:

<https://www.brown.edu/academics/college/degree/policies/academic-code>

### **RESPECT FOR DIVERSITY**

It is the instructors' intent and desire that this course will serve students of diverse backgrounds, aspirations, and perspectives. Our diversity in gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, and worldviews is a source of strength and inspiration, so everyone in the class must be able to talk, hear, and respect each other. We are committed to creating a learning environment that allows all our students to thrive, contribute to class discussions, and ask questions. We recognize that LGBTQ students, Black students, Indigenous students, Latinx students, and other students of color face particular sets of challenges in our academic environment because of bias and exclusionary academic policies and practices. Our goal is to develop an inclusive and anti-racist culture for our course. We also recognize that many students will be participating from countries outside the United States and that this could pose challenges for access to course materials. Please let us know about our mistakes and how we can advance the work of creating a culture that allows all of our students to succeed. It is vital to our work together that everyone knows they are respected and that we value your contributions. We will solicit your feedback throughout the semester by asking you to complete brief surveys. Please take this opportunity to let us know whether you feel included and how we can improve the course climate.

### **ACCESSIBILITY AND ACCOMMODATIONS**

Brown University is committed to full inclusion of all students. Please inform an instructor early in the term if you have a disability or other conditions that might require accommodations or modification of any of these course procedures. For more information, please contact Student and Employee Accessibility Services (<https://www.brown.edu/campus-life/support/accessibility-services/>) at 401-863-9588 or [SEAS@brown.edu](mailto:SEAS@brown.edu).

## **COURSE SCHEDULE**

Week 1	Sept 4	Protein structure and folding
Week 2	Sept 11	Enzymes and catalysis
Week 3	Sept 18	Carbohydrates and glycolysis
Week 4	Sept 25	Citric acid cycle
Week 5	Oct 2	Oxidative Phosphorylation
Week 6	Oct 9	Glycogen and regulation of metabolism
Week 7	Oct 16	Assessment 1
Week 8	Oct 23	Lipids and lipid metabolism
Week 9	Oct 30	Amino acid metabolism
Week 10	Nov 6	DNA and RNA
Week 11	Nov 13	Replication and Transcription
Week 12	Nov 30	Transcription
Week 13	Dec 4	Translation 1: ribosome assembly, phase separation
Week 14	Dec 11	Translation 2: protein synthesis, antibiotic resistance
Week 15	Dec 18	Assessment 2