

Rutgers University | Camden
Biochemistry I & Essent Biol Chem I
56:115:511:01 & 56:121:510:01, Fall 2024
Wednesday 6:00 pm-8:50 pm
Classroom: Science Lecture Hall

Instructor:

Dr. Youwen (Warren) Zhang

Office: Science Building (SCI) #202A

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Office Hours: Tuesday, Wednesday and Thursday, Sign-up via: <https://calendly.com/warren-zhang/15-min-meeting>

Course Description:

Biochemistry I is a graduate-level lecture course that introduces the major macromolecules found in living organisms and explores the practical applications of biochemistry. The course enables students to build on their chemistry background to understand the molecular mechanisms driving cellular functions, while also establishing connections between biochemistry and biotechnology.

Biochemistry I will cover these major themes from biochemistry, with an emphasis on the molecular basis of these topics: (1) Aqueous solutions, pH, and buffers; (2) Nucleic acids, DNA, and RNA structure; (3) Amino acids and proteins; (4) Protein folding and structure; (5) Enzyme mechanisms, kinetics, and regulation; (6) Carbohydrates, (7) Lipids and membranes, membrane transport; (7) Application of biochemistry; and (8) Specific topics in the fields of biochemistry.

Course Objectives:

After this course, students should be able to: (1) Understand the principles of protein and nucleic acid structure; (2) Apply the understanding of protein structure to enzyme mechanism and kinetics; (3) Calculate values important to biochemistry like pH and K_d; (4) Understand the structure and importance of carbohydrates; (5) Understand the structures of lipids and their roles in cellular membranes; (6) Apply the principles of protein and lipid structure to understand the molecular basis of membrane transport; (7) Explore the applications of biochemistry; (8) Conduct a literature review and present findings on chosen topics.

Recommended Textbook:

1. Biochemistry, 4th Edition (Donald Voet and Judith G. Voet)
2. Lehninger Principle of Biochemistry book 8th edition (MacMillan Learning).

The textbook is NOT required, but this will be the guide of the course.

Required Materials:

1. Access to Canvas – Students will need access to Canvas for course information, announcements, class materials, and to upload problem sets. Please contact me if you do not have consistent internet access or Canvas access.
2. Calculator – there will be some math in class, on problem sets, and on exams. Students will not be permitted to use cell phones as calculators during exams. Please contact me if you do not have access to a scientific (at least a log function) calculator

Assessments and Grading:

	Total Percent
Pre-lecture quizzes	10 %
Problem Sets	10 %
Mid-term I	20 %
Mid-term II	20 %
Presentation	20 %
Term paper	20 %
Total	100 %

This course will include **two midterm exams** but **no final exam**. Instead, students will complete several pre-lecture quizzes, one term paper, and one presentation.

Pre-lecture quizzes are used to help students to review and prepare the contents that are going to be discussed in the coming week. Quiz question will be posted on the Canvas 48 hours prior the lecture. Students are required to complete the quizzes questions and submit the printed copy to the instructor on every Wednesday lecture. Fail to submit the quiz on time will result in the loss of points no matter what the excuse is.

Problem sets (PSETs) will be available on Canvas and students will submit their answers on Canvas by 11 PM on the assigned due date.

Presentations are required by every student. Each student will present one time during the semester. The instructor will assign the articles to students.

Term paper is required for graduate students. The class will hold in-class sessions to discuss the topics of the term papers. **The term paper is around 5-page, 12-font size, and single space.** It should include: A title, an abstract (less than 300 words), introduction, discussion section, conclusion and future perspective. Figures should be cited appropriately with indicating the original source. At least **20** references should be cited in the term paper. Reference must be formatted carefully, ACS (American Chemical Society) format is recommended.

Cheating is strictly prohibited from the class: If a cheating case is confirmed (either in exams or term paper), it will be reported to the Dean and result immediate failure of the class.

Academic Plagiarism: You cannot copy verbatim from any source, including other individuals in the term paper. Any infractions to this rule are considered as academic plagiarism. You must cite any references that you have used in preparing your term papers.

Absences from exams: If student has an emergency that prevent him or her from taking the exam, Dr. Zhang must be notified **48-hour in advance**. Valid excuses include medical emergency (physician's approval of absence), family funeral, and other compelling circumstances. Proofs must be submitted to the instructor for validating the excuse. **Unexcused absence from exams will result in 0 point.**

Cell Phones: Please keep cell phones turned to silent/ during class time. If students need to receive calls during class time (i.e the student has a child in day care, other emergencies)

please keep your phone on your desk face down and step out of the classroom when making calls. **Cell phone use is prohibited during exams.**

Audio/Visual Recordings: Neither audio nor video recordings of lectures or recitations are allowed without the explicit consent of the instructor. Also, listening to any audio or video recordings during class meetings is not allowed.

Grading Guideline:

Grade	A	B+	B	C+	C	D	F
Final Percent Range	≥ 90	≥ 85	≥ 80	≥ 75	≥ 65	≥ 55	< 55

Schedule of Topics, Material Covered and Exams:

These are tentative dates for topics to be discussed in class and are subject to change. Any changes to the schedule will be discussed in class, and subsequent assignment dates will be adjusted accordingly. **Exam dates will occur on the dates shown.**

Date	Lecture Topic	Material Covered
9/4	Syllabus, Biochemistry I Review	Lecture 1
9/11	Aqueous Environment, Buffers, pH	Lecture 2
9/18	Nucleic Acids	Lecture 3
9/25	Amino Acids and Peptide	Lecture 4
10/2	Protein Structure, Function and Isolation	Lecture 5
10/9	Term Paper Topic Arrangement + Exam #1	
10/16	Enzymes, Enzyme Kinetics and Inhibitors	Lecture 6
10/23	Carbohydrates	Lecture 7
10/30	Lipids	Lecture 8
11/6	Membranes Proteins	Lecture 9
11/13	Presentation Topic Assignment + Exam #2	
11/20	Specific Topic: Drug Discovery + Extracellular Vesicles	Lecture 10
11/27	TBD- Thanksgiving	
12/4	Presentation	
12/13	Last day of class, due of term paper	TBD
No Final Exam		