

## Chemistry 256 – Biochemistry

### Course Description:

During the past century scientists have developed the technology to study biology with increasingly fine resolution. Biochemistry is the study of biology at molecular resolution. We will draw on your background in both biology and chemistry to understand the structure, function and interplay of the organic molecules responsible for life. Biochemistry is a burgeoning field that evolves rapidly in response to technological advances and we will discuss tools used by contemporary biochemists to unravel the molecular details of life.

### Instructor and Resources:

Instructor: Dr. John Hofferberth  
Email: hofferberthj@kenyon.edu  
Office: 312 Tomsich Hall  
Office Hours: M-R 2:00-3:30 PM (to reserve an office hour visit <https://hofferberthj.youcanbook.me/>)  
Lecture Hall: 101 Tomsich  
Class Time: 10:10-11:00 AM, MWF  
Text: Lehninger Principles of Biochemistry 6<sup>th</sup> Edition (study guide recommended)  
Materials: HGS Molecular Structure Model (Kit C) (recommended)  
Website: moodle.kenyon.edu (search for Chemistry 256)

### Course Policies and Expectations

*Course Grade:* Your grade will be determined by your performance on the items tabulated below:

Quizzes (12 × 10 pts)	120 pts
Seminar Synopses (2 × 25 pts)	50 pts
Special Topic Poster	50 pts
Midterm Exams (3 × 100 pts)	300 pts
Final Exam	200 pts
Notebooks (14 × 10 pts)	140 pts
Challenges (39 × 5 pts)	195 pts
<b>Total Points</b>	<b>1055 pts</b>

The instructor will assign fair grades at the conclusion of the term. To estimate your grade during the semester use the following grade scheme.

<b>Grade</b>	<b>Percent of Total Points Earned</b>
A (+/-)	100% - 90%
B (+/-)	89% - 80%
C (+/-)	79% - 70%
D (+/-)	69% - 60%
F	< 60%

*Attendance:* Your attendance at every lecture and the class poster session (see below) is expected.

*Preparation:* The material in this course builds on itself. For that reason it is imperative that you keep up with the course material. Biochemistry is a subject that requires the memorization of facts, the understanding and application of concepts, and the integration of knowledge from all parts of the course and prerequisite courses. To be successful, students will need to employ a variety of study

tactics and strategies. The instructor will highlight good strategies for the different kinds of material we study. An understanding of how we best learn is a valuable asset in this course (and others). An excellent guide to understanding how best to learn is the following text and is *highly recommended reading* prior and throughout the course: “Make it stick: the science of successful learning”, Brown, Roediger, and McDaniel, ©2014 Harvard University Press. In brief, **ACTIVE** learning strategies are far more valuable than passive ones. The course is structured to encourage the use of effective learning strategies that can be transferred to other courses as you learn how to use them.

A study guide with learning goals has been linked to the Moodle page to help you understand the structure, goals, and expectations of different parts of the course. Consult this document regularly.

*Homework:* Active preparation is essential for your success in *Biochemistry*. Prior to each class session (excepting the first day and prior to exam days), your job will be to expose yourself to the material and concepts that will be focus of the *next* session and to consolidate and organize that information into your course notebook. During class, using only your notebook as a resource, you will participate in a small group that will take on challenges that will apply and extend your knowledge of the topic. Your personal work on the challenges will be recorded in your notebook while the product of the group effort will be turned in at the end of class.

In addition to preparation for the next class meeting, you should complete any challenge problems you did not finish in class *and* as many of the suggested problems for previous topics as possible.

A daily HW assignment will be emailed and texted (register for Remind texting service if you would like to get course information via text) to you following each class session. The assignment may include preparation work, suggested problems, and other out-of-class activities. If you are ever unclear about what you need to do to prepare for the next session please email the instructor.

*Notebooks:* Your notebook for this class will be your location to summarize, consolidate, organize, and process information that is contained in material you study prior to each class session AND it will contain your personal work on daily in-class challenges.

You are required to bring your prepared notebook to class each session. Notebooks will be checked-in each day when you are assigned to a challenge team and collected and graded each Friday at the conclusion of class. Notebooks will be returned before 5 PM each Friday outside my office so you can prepare for the following class session.

*Quizzes:* Quizzes are an important learning tool that will enable you to calibrate your own understanding of course material prior to exams. Quizzes have also been shown to help students consolidate their memory of a topic and allow them to build durable knowledge (read “Make it Stick” for details). Quizzes will be given in the final 10 minutes of class on Fridays and submitted with your notebook prior to leaving class.

*Exams:* Three cumulative 50-minute midterm examinations will be given during the semester on the dates indicated on the syllabus. If you have a conflict with any of the exam times you must notify Dr. Hofferberth by email **at least one week prior to the exam to schedule an alternate exam time.**

*Final:* The final exam will be held on May 11<sup>th</sup> from 8:30 to 11:30 AM. The exam will be cumulative for the semester.

- Seminars:* You will attend two seminars during the semester that relate to the course material and prepare a one-page synopsis of each seminar that clearly describes the motivation for and the significance of the results presented in the seminar. It should be clear from your synopsis how the topic relates to this class. You should indicate your name, the title and date of the seminar clearly at the top of the page. Synopses will be typed and submitted electronically on the course Moodle page. An example synopsis is linked to the Moodle page. If you don't know if a particular seminar relates to the class, just ask during class (so all might benefit). *You must submit your synopsis within 24 hours of each seminar you attend.*
- Poster:* Small teams of students (2-3 members) will prepare and present a poster on a special topic related to the course material. The posters will be presented during a poster session on the date indicated on the syllabus (May 2<sup>nd</sup>, 11:10-1:00 PM). Each team will prepare a 5-minute presentation of their poster that will be presented to Dr. Hofferberth and small groups of classmates during the poster session. Posters will be prepared using a template file (on the Moodle page) and printed in the Chemistry Department. One member of your team will submit the topic of your poster and the names of all individual team members using the Google Form linked to the Moodle page by 4/10 by 11 PM. The final draft of the poster must be saved as a .pdf file and submitted one week before (on 4/24 by 11 PM) the presentation date to allow time for printing. Criteria for evaluation of the poster and presentation will be: topic selection (is it related/relevant to the class), presentation quality (professional, in the time limit, ability to respond to questions, level of pitch), poster quality (free from errors, accurate, original voice, quality/utility of graphics, style, organization).
- Accommodations:* In accord with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990: If you anticipate you may need accommodation in order to fully participate in this class, please identify yourself to Erin Salva, Director of Student Accessibility and Support Services (PBX 5453, [salvae@kenyon.edu](mailto:salvae@kenyon.edu)). The instructor must receive information regarding the nature of the accommodation directly from Erin Salva and you must speak to the instructor about the accommodation at least one week in advance of using the accommodation for the class.
- Title IV:* Kenyon College and the instructor of this course seek to provide an environment that is free of bias, discrimination, and harassment. If you have been the victim of sexual harassment/misconduct/assault we encourage you to report this. If you report this to the instructor, he must notify our college's Title IX coordinator. For more information about your options at Kenyon, please go to: <http://www.kenyon.edu/directories/offices-services/office-of-equal-opportunity/sexual-assault-and-harassment/>
- The instructor of this course will respect the privacy of all personal conversations with his students. In the case that he learns of activities or incidents that violate Title IX (sexual discrimination and/or harassment) or otherwise violate the law he is required to report such information to the Title IX coordinator or campus law enforcement, respectively.
- Integrity:* Academic integrity is expected in all aspects of this course. A detailed description of academic integrity and the College policy regarding academic dishonesty can be found at the following link: [www.kenyon.edu/directories/offices-services/registrar/course-catalog-2/administrative-matters/academic-integrity-and-questions-of-plagiarism/](http://www.kenyon.edu/directories/offices-services/registrar/course-catalog-2/administrative-matters/academic-integrity-and-questions-of-plagiarism/)
- Devices:* Full engagement with the in-class portion of this course will be a key component of success. All electronic devices should be turned off before the beginning of every class session.



**Tentative Schedule:** (see the Course Outline and Study Guide on Moodle for more detailed information)

<b>Date</b>	<b>Topic</b>	<b>Reading Sections</b>	
1/16	Introduction	(1.1 – 1.5)	
1/18	C2 – Water, IM Forces, Acid-Base Chemistry	2.1 – 2.3 (2.4, 2.5)	
1/20	C3 – AA's, Peptides, Proteins	3.1 – 3.4	
1/23			
1/25			
1/27	C4 – 3D Structure of Proteins	4.1 – 4.4	
1/30	C5 – Protein Function	5.1 – 5.3	
2/1			
2/3			
2/6			
2/8	C6 – Enzymes	6.1 – 6.5	
2/10			
2/13	<b>Exam 1</b>		
2/15	C6 – Continued		
2/17			
2/20			
2/22	C7 – Carbohydrates	7.1, 7.2, (7.3 – 7.5)	
2/24	C13 – Bioenergetics	pp 501-504, 13.1 – 13.3	
2/27			
3/1			
3/3	<b>Exam 2</b>		
3/20	C14 – Glycolysis, Gluconeogenesis and the PPP	14.1 – 14.5	
3/22			
3/24			
3/27			
3/29			
3/31	C15 – Regulation	15.2, 15.3	
4/3			
4/5	C16 – The Citric Acid Cycle	16.1 – 16.3	
4/7			
4/10			<b>Poster Topic Submitted by 4/10 11 PM</b>
4/12			
4/14			
4/17	C19 – Oxidative Phosphorylation	19.1 – 19.3	
4/19			
4/21			<b>Exam 3</b>
4/24			<b>Poster File Submitted by 4/24 11 PM</b>
4/26			
4/28			
5/1	C10 - Lipids	(10.1-10.4)	
5/2	<b>Class Poster Session 11:10 AM-1:00 PM</b>		
5/3	C17- Fatty Acid Catabolism	17.1-17.2	
5/5	<b>No Notebook Check on 5/5</b>		
5/11	<b>Final Exam, Tom 101, 8:30 – 11:30 AM</b>		