

General Biochemistry II Syllabus
Chemistry 464/564
3 Credits

Required Text: Lehninger Principles of Biochemistry, 6th Ed., D. Nelson and M. Cox

Prerequisites: Completion of CHEM 463/BIOL 483 with a C or better

Course Description: This is the second semester of a two-semester general biochemistry sequence that will introduce the student to the rapidly changing subject area of biochemistry. We will begin the course by exploring three of life's most important processes: DNA replication, transcription, and translation. This topic will also include an introduction to DNA-based technologies and mechanisms of gene regulation. The next module of the course will focus on techniques used by scientists in modern day biochemistry laboratories. Finally, we will examine the biological roles and mechanisms of several historically and clinically pertinent enzymes. This section may rely on handouts in addition to the text.

Course Goals:

The goals of this course are:

1. Explore the role of biomolecules in cellular information storage, transfer, and regulation.
2. Illustrate how principles of protein structure and function learned in the first semester apply to understanding detailed enzyme mechanisms.
3. Become familiar with modern experimental techniques utilized in biochemistry research.
4. Develop an awareness of how biochemical principles apply to various cross-disciplinary areas of research.

Biochemistry is a broad and complicated subject with a unique language, which adds to the difficulty. You should be forewarned that it takes time and dedication to earn a good grade in this class. You should not expect to pass simply by showing up every day, and you should not expect to pass the class if you do not show up every day. It is important that each student commit to spending significant hours outside of lecture reviewing the material and working through problems. **If you are unable to make this commitment you are unlikely to perform well in the class and may want to consider taking it at another time.**

CHEM 564: Students taking this class at the graduate level will be required to complete the same requirements as undergraduate students. In addition, they will be required to read papers from the primary literature and turn in written summaries due on the date of each exam. The paper summaries will be worth 25% of your exam grade. The papers and rubric can be accessed via Blackboard.

Grading and Examination Policy: There will be three in class exams. The exams will cover the material discussed in lecture as well as the assigned reading. I reserve the right to ask questions on material assigned in the reading but not covered in lecture. Graduate students and undergraduates will be graded separately.

In the event of an emergency, you must contact me **before** missing an exam. In the event of an illness, you must also present a doctors note explicitly stating that you were too ill to take the exam.

<u>Grading 464</u>	
Exam 1	25%
Exam 2	25%
Exam 3	25%
Final Project	15%
Quizzes/problems	10%
	<hr/>
	100%

Plus and minus grades will be assigned, however, an absolute grading scale will not be determined until all scores have been compiled and evaluated. As a general rule, the following scale will be followed: 90-100: A, 80-89: B, 70-79: C, 60-69: D, < 60: F

Attendance: 10 percent of the course grade is derived from in-class quizzes/problems. There will be no make up opportunities if you miss these exercises. Students with an excused absence (sick with a doctors note, death in the family, religious observance) should contact the instructor as soon as possible to receive instructions for completing any missed assignments. Car/transportation trouble, traffic, routine doctors appointments, vacations, and any avoidable conflicts are not considered excused absences. Excused absences are at the discretion of the instructor.

Class will begin promptly at 9:00 am. If you are late, please come in quietly and have a seat. **Do not make a habit of being late,** as this is a distraction for both the instructor and your classmates. Please do not get up in the middle of class unless it is an emergency.

Extra credit: Extra credit *may* be given periodically throughout the semester. There will be no major extra credit assignments given at the end of the course period. Therefore, you should diligently study and keep your grade up over the course of the semester.

Honor Code: GMU is an Honor Code university; please see the University Catalog for a full description of the code and the honor committee process. Academic integrity is taken very seriously and violations are treated gravely. You may not have any electronic devices other than a non-graphing calculator (if necessary) during exams and you also may also not change or check your exam after leaving the room. **No grade is important enough to justify academic misconduct!!!!**

Email and Blackboard: Students must use their MasonLive email account to receive important University information, including messages related to this class. See <http://masonlive.gmu.edu> for more information.

A file containing the lecture slides will be posted to Blackboard before each class. Also check Blackboard for additional readings and up to date grades.

Electronic Devices: **Electronic devices should not be out during class.** I reserve the right to ask you to leave if they are acting as a distraction. If you wish to voice record the lecture you may do so, but you do not have permission to distribute recordings online or to other students.

Students with Disabilities: Students with physical or learning disabilities should contact the Office of Disability Services for specific information and assistance regarding their needs. If you have a documented disability that requires accommodation, you must meet with me in the first two weeks of class to discuss your accommodations and their implementation. Chemistry faculty and staff work cooperatively to assist students with disabilities with their educational objectives.

In-class paper discussions: There will be a total of three in-class paper discussions. You are responsible for reading the paper before coming to class and looking up any material/techniques that are new to you. **A series of questions need to be answered before coming to class and turned in before the paper discussion begins. You must be present to receive credit.** These points will go towards your problems/quizzes grade. The papers and questions can be accessed via Blackboard.

Snow days: In the event of University wide class cancellation, we will follow instructions from the administration for make-up days. It is possible I will record the lecture and post it to Blackboard if we cannot meet. You will be responsible for viewing and bringing any questions to the next class meeting period. If the cancellation falls on an exam date, the exam will be given at the next scheduled meeting.

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Text: Lehninger Principles of Biochemistry, 6th Ed.

LECTURE	TOPIC	DUE	TEXT
1	Biochemistry Re-introduction		
2	DNA Basics		Ch 24
3	DNA Replication		Ch 25: 1009-1027
4	DNA Recombination/Repair		Ch 25: 1027-1052
5	Paper Discussion #1	Reading Questions	
6	Transcription		Ch 26
7	Transcription		Ch 26
8	Translation		Ch 27
9	Translation		Ch 27
	Exam 1		
10	Gene Regulation Principles		Ch 28: 1155-1174
11	Gene Regulation, cont.		Ch 28: 1175-115
12	DNA-Based Technologies		Ch 9: 314-331
13	DNA-Based Technologies		Ch 9: 331-351
14	Working with Proteins		TBA
	<i>Spring Break</i>		
15	Structure Determination		TBA
16	Paper Discussion #2	Reading Questions	
	Exam 2		
17	Enzyme Mechanism: Proteases	Project: Partner	214-219, handouts
18	Enzyme Mechanisms: Lysozyme		220-224, handouts
19	<i>Final Project: Tools</i>		
20	Enzyme mechanisms: Kinases and Phosphatases	Project: Topic	515-516, handouts
21	Kinases: Signaling		Ch 12: 473- 495
22	Enzyme Mechanisms: Cyclooxygenases		845-847, handouts
23	Enzymes Mechanisms: Histone Acetyltransferases	Project: References	1175-1176l, handouts
24	Paper Discussion #3	Reading Questions	
	Exam 3		
25	<i>Work on Project</i>	Submit by 11:59 PM on May 1	
	Final Project Presentations	Partner Review, Project, Summary	