



CHEM376LC: General Biochemistry I

Note: there are some variations from instructor to instructor, but the content and pedagogy of the course is consistent

INSTRUCTORS:

CLASS MEETINGS (LECTURE): two 1 hour 15 minute lectures per week

Recitations: mandatory 1 hour recitation per week

COURSE EMAIL:

RECITATION INSTRUCTORS/TAs:

PEER TAs:

REQUIRED TEXT: *Biochemistry*, Garrett and Grisham, 6th edition (ISBN-10:1305882407/ ISBN-13:97813058824090 or 5th edition (ISBN-13: 978-1- 133-10629-6). **Please have a copy (or electronic copy) before the first class!!!**

NOTE: earlier editions of the text are acceptable, but there are useful updates and additional problems in the newer editions. The softcover International edition and electronic version have the same content as the hardcover version of the same edition. Students are welcome to use other texts as their main resource if they prefer, but are still responsible for the types of end-of-chapter problems and the level of coverage of topics in G&G.

HOMEWORK: *Mastering Chemistry*. Obtaining the mastering homework access code is mandatory, as 10% of total course credit is assigned to the homework. The subscription can be acquired through www.masteringchemistry.com or through the Hunter College bookstore (\$65.95; course ID BIOCHEMISTRYxxxxx).

EXAM DATES:

Midterm 1:

Midterm 2:

Midterm 3:

FINAL EXAM: 2 hours

SCOPE OF THE COURSE: This is the first course of a two-semester program recommended for chemistry, biochemistry, and pre-health-professional students, or for graduate students requiring a broad introduction to biochemistry. The major objective is to develop the tools to analyze biological function in chemical terms – the physical, chemical, and biological principles by which a biomolecule, reaction, or pathway operates – and to provide a comprehensive overview of the chemical concepts that govern biological processes. Topics to be covered include properties of water; principles of bioenergetics; structure, chemical properties, and function of proteins, nucleic acids, carbohydrates,

and lipids; principles of recombinant DNA technology; membrane properties and transport; enzyme kinetics, mechanism, and regulation; and fundamentals of metabolism.

COURSE LEARNING OUTCOMES: Upon completion of this course, students should:

- Develop comprehensive knowledge of physical and chemical features that govern reactivity and behavior of metabolites and macromolecules within living systems, including the role of acid-base properties, electrical charge, thermodynamics, and kinetics of biological systems, and their application to understand certain cellular phenomena;
- Be proficient in relating the structure and chemical/physical properties of biological macromolecules with their biological function;
- Acquire skills to quantify biochemical parameters such as the relationship between pH, pK_a , and charge of a biomolecule; kinetic properties, reaction rates, and chemical mechanism; and thermodynamic parameters and chemical activity.

PREREQUISITE COURSES AND BACKGROUND: Students should have completed two semesters each of biology, general chemistry, and organic chemistry – and be able to **apply** the information from those disciplines. More specifically, students should have knowledge of fundamental biological principles (e.g. cellular structure, function, and activity) and the structures and chemical reactivity of organic functional groups, and should be facile with mathematical calculations involving exponents, logarithms, and basic algebraic equations. It is your responsibility to be familiar with the background material, and to review background skills and information as necessary.

EXPECTATIONS OF STUDENTS AND INSTRUCTORS: It is the responsibility of students to come to class prepared to learn, stay current with the material, and review background material as necessary. The best way to be prepared is to keep up with lectures, reading, recommended or assigned problems, and skills (more under “**Strategy**”, ahead). CHEM 37600/64000 has a required recitation session each week, during which we will review lecture material, practice skills, and hold quizzes. Practice questions for recitations will be assigned in advance; in order to make the best use of recitation sessions and to earn class credit, it is highly recommended that you work the problems before the recitation. It is expected that you attend the recitation for which you are registered, but you are welcome to attend additional sections to get extra practice.

It is the responsibility of the instructors (professor and graduate teaching assistants) to facilitate student learning during lectures and recitations, respectively, and to assist students in applying information and skills to solve problems. However, you are responsible for developing and applying the necessary skills and integrating individual lectures into a comprehensive picture. Graduate teaching assistants, several undergraduate/postbacc volunteer assistants, and I will be available on a regular basis for office hours to assist you with course material. Please make use of this resource, and come to us with specific questions (*i.e.* not simply asking to have lectures repeated or for extended tutorials). If you cannot meet during these times, contact one of us – *by phone, by email, or in person* – to arrange an alternate appointment time that fits your schedule. Do not wait until examination time – worse yet, until the end of the semester – to resolve topics that are unclear to you or to brush up on skills to solve problems. Students learn best when there is a climate of respect among students and between students and instructors. Every effort should be made by all involved, at all times, to foster a productive, positive, communicative, and respectful environment.

CLASS ATTENDANCE: Your presence in class – both in lecture and recitation – is important, as some material will be covered that is not included in the book, different topics may be emphasized, and quantitative skills will be practiced. There will be brief bonus quizzes (announced or unannounced) given during class or recitation to encourage you to remain current in your studying. *Note:* there are NO MAKE-UPS on quizzes under ANY conditions. Please arrive on time, stay until the end, and make sure your cell phone (including texting functions) is turned OFF.

RESOURCES: In addition to the textbook required for this course, you will be provided with PowerPoint-based note sets on Blackboard before the class. These materials are designed to facilitate your note taking by emphasizing important discussion points, structures, or figures – but they are only “templates” to assist with taking notes in class and by no means replace the need to attend lectures, nor do they cover all material discussed in class. In addition, recitation questions will be posted on the Blackboard website. Students are required to complete post-lecture homework on Mastering Chemistry (MC), an online homework platform. The access code to MC can be purchased on on-line through www.masteringchemistry.com (\$65.95), using the course ID **BIOCHEMISTRYFALL2016**. You can also buy the access code through the Hunter College bookstore.

GRADING: Final course grades will be assigned based upon performance on quizzes and exams. **Any material covered in class, recitation, in the PowerPoint notes, or that you have been assigned to read in the text (whether covered in class or not) may be included on an exam.** Exams are scheduled in advance (see first page and calendar). Quizzes may be given in lecture or recitation, announced or unannounced, and given at any time. Final scores are calculated as follows:

Recitation problems/quizzes	50 points
Exam 1	100 points
Exam 2	100 points
Exam 3	100 points
Final Exam (cumulative)	150 points
<u>Mastering homework</u>	<u>50 points</u>
Total	550 points

In accordance with the Hunter College policy on grading, the following letter grades will be assigned based upon total points accrued for all course work:

- A**-495-550 pts (90-100%)
- B**-440-494 pts (80-89%)
- C**-385-439 pts (70-79%)
- D**-330-384 pts (60-69%)
- F**- below 330 pts (<60%)

At the discretion of the instructors, we may “curve” final grades to adjust for variation of grades from one year to the next or for other variations. In EXTREME cases of scheduling conflicts or illness, if a documented absence is deemed excusable, one midterm exam can be missed. In these cases, you are required to notify Dr. Greenbaum or Dr. Banerjee of the need to miss the exam in ADVANCE of the scheduled exam – if you are too sick to take an exam, you (or someone else) must contact us **before** the exam period, **not after** the exam. There is no make up exam; the mean of the remaining scores will be counted as the score of the missed exam. *There are NO make-ups for missed quizzes or for the FINAL EXAM regardless of the reason.*

*****STRATEGY FOR SUCCESS:** The study of biochemistry builds on principles of general and organic chemistry, biology, and fundamental math skills, in order to analyze the chemistry and physics of living systems – and thus you will need to integrate knowledge from several disciplines in order to develop a thorough comprehension of biochemistry. A great deal of information will be covered this semester, and it is essential that you keep up if you want to do well in the course.

As a basic recipe for success, we strongly suggest that you:

- 1) READ assigned chapters (even if only a quick perusal) so that you come to class prepared with basic concepts and terminology of the material to be covered – you will then be able to listen more carefully in class and limit your note-taking to enhance, rather than recapitulate, information in the textbook;
- 2) After the class is over, LOOK OVER your notes and revisit the chapter, preparing yourself for the next lecture;
- 3) PREPARE for quizzes (the specific material to be covered on each quiz will be announced in class, although the dates will not);
- 4) WORK the recitation problems in advance of recitation, and keep up with the review and practice problems before exams;
- 5) REVIEW material from previous biology, chemistry, and math courses as necessary.
- 6) Stick to the Mastering hand-in deadlines. Deadlines are never moved for homework whatsoever may be the reason. I usually drop the two lowest scores.

In summary: this course covers a great deal of material involving application of chemical and physical principles to biological systems. It requires that you integrate skills, information, and concepts from previous coursework. In order to do well, it is important to adopt a consistent strategy of study and practice, rather than cramming before exams.

HONOR CODE: The Academic Honor System of CUNY is based on the premise that each student has the responsibility to: (1) uphold the highest standards of academic integrity in his/her own work; (2) refuse to tolerate violations of academic integrity in the University community; and (3) foster a high sense of integrity and social responsibility on the part of the University community. *This means that you will not give or receive information during an exam, not consult unauthorized sources of information during an examination, and not tolerate violations of this code by others.* Students should review the Academic Honor System outlined in the Hunter College Student Handbook. Violations of the Honor Code will not be tolerated and will result in zero points being awarded for the course work in question and in the violation being reported to the appropriate office, where it will remain on permanent record.

STUDENTS WITH DISABILITIES: Students with disabilities needing academic accommodations should: 1) register with and provide documentation to the Student Disability Resource Center (SDRC); and 2) bring the approval letter/ accessibility card to me and the recitation instructor from the SDRC indicating that you need academic accommodations. *Please do this within the first two weeks of the class.*

Sample Course Calendar

Date	Lecture Topic	Relevant Chapter(s)
	Introduction; Chemistry of Biological Systems	1
	Physical/Chemical properties of water	2
	<i>No class</i>	
	Acid-base properties of water, buffers, Thermodynamics of Life	2,3
	Thermodynamics of Life, con't	3
	Peptides; Proteins I	5
	Proteins I, con't	5
	Proteins II: Sequencing; Structure of Proteins	5-6
	Midterm Exam #1 (up to, but not including, Sequencing)	1-5
	<i>No Class</i>	
	Protein Structure, con't	6
	<i>Classes follow a Monday schedule!</i>	10
	Nucleotides; Chemistry & Structure of Nucleic acids I	
	<i>No Class</i>	
	<i>No Class</i>	
	Nucleic Acids II: Structure of Nucleic Acids	10-11
	Structure/Function of Nucleic Acids	10-11
	RNA Structure and Ribozymes; Recombinant DNA and Cloning Technology	11-12
	DNA Editing Technology	12
	Carbohydrates I	7
	Carbohydrates II; Lipids	7-8
	Midterm Exam #2	5-7;10-12
	Lipids and Membranes	8
	Membrane Transport	9
	Enzyme Characteristics and Kinetics	13
	Enzyme kinetics, Inhibition, Mechanism	13-14
	Enzyme Mechanisms and Regulation	14-15
	Enzyme Regulation; Hemoglobin	15
	Midterm Exam 3	7-9;13-14
	Logic of Metabolism	17
	Vitamins and Coenzymes	17
	Overview of Glycolysis; Summary and Review	18
	Cumulative Final Exam	1-17

Hunter College required statements for syllabi

1. Academic Integrity Statement: “Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The College is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures.”
2. ADA Statement: “In compliance with the ADA and with Section 504 of the Rehabilitation Act, Hunter College is committed to ensuring educational access and accommodations for all its registered students. Hunter College’s students with disabilities and medical conditions are encouraged to register with the Office of AccessABILITY for assistance and accommodation. For information and appointment contact the Office of AccessABILITY located in Room E1214 or call (212) 772-4857 /or VRS (646) 755-3129.”
3. Hunter College Policy on Sexual Misconduct “In compliance with the CUNY Policy on Sexual Misconduct, Hunter College reaffirms the prohibition of any sexual misconduct, which includes sexual violence, sexual harassment, and gender-based harassment retaliation against students, employees, or visitors, as well as certain intimate relationships. Students who have experienced any form of sexual violence on or off campus (including CUNY-sponsored trips and events) are entitled to the rights outlined in the Bill of Rights for Hunter College.
 - a. Sexual Violence: Students are strongly encouraged to immediately report the incident by calling 911, contacting NYPD Special Victims Division Hotline (646-610-7272) or their local police precinct, or contacting the College's Public Safety Office (212-772-4444).
 - b. All Other Forms of Sexual Misconduct: Students are also encouraged to contact the College's Title IX Campus Coordinator, Dean John Rose (jtrose@hunter.cuny.edu or 212-650-3262) or Colleen Barry (colleen.barry@hunter.cuny.edu or 212-772-4534) and seek complimentary services through the Counseling and Wellness Services Office, Hunter East 1123.

CUNY Policy on Sexual Misconduct Link: <http://www.cuny.edu/about/administration/offices/1a/Policy-on-Sexual-Misconduct-12-1-14-with-links.pdf>”