



ADVANCED BIOCHEMISTRY (I)
CHE-444 SYLLABUS
Chemistry Department
Fall 2018: 8/27/2018-12/21/2018

I. PRE-REQUISITES:

Successful completion of **CHE 232,234 (Organic chemistry)** -Essentials of Organic/Biological Chemistry Lectures, **CHE 120**.

II. INSTRUCTOR:

Professor: Cristina Clement Ph.D.

Email: cristina.clement@lehman.cuny.edu;
clement.cristina624@gmail.com

Office: Davis Hall 318

Telephone: 3472439023

III. LECTURE SCHEDULE:

CHE 444 meets Tue TH: 6:00-7:50PM; room: Davis Hall 337

Office hour: after class

IV. TEXT

The required textbook:

David L. Nelson• Michael M. Cox; Lehninger, Principles of Biochemistry, 5e, 6e,7e-any of these editions are OK.

EBooks were ordered for the Bookstore at Lehman College.

The Following are the recommended textbooks:

- *Biochemistry a Short Course, Second Edition, John L. Tymoczko, Jeremy M. Berg and Lubert Stryer*
- *Lippincott's Illustrated reviews: Biochemistry Denise R. Ferrier*
- *Or the following On Line resource: <http://www.ncbi.nlm.nih.gov/books/NBK21154/>*

Website resources required:

<http://www.ncbi.nlm.nih.gov/books/NBK21154/>

Other recommended Websites for Biochemitry ebooks:

Biochemistry Online by Henry Jakubowski 2009.

<http://employees.csbsju.edu/hjakubowski/classes/ch331/bcintro/default.html>

Biochemistry, 2e by Reginald Garrett and Charles Grisham - Brooks Cole.

<http://www.web.virginia.edu/Heidi/home.htm>

The Structures of Life- National Institutes of Health, 2007

<http://publications.nigms.nih.gov/structlife/>

PROTEIN DATA BANK (PDB): <http://www.rcsb.org/pdb/home/home.do>;

The Structural Biology Knowledgebase: <http://sbkb.org/>

<http://www.elmhurst.edu/~chm/vchembook/5900verviewmet.html>

BRENDA: <http://www.brenda-enzymes.org/>

The Amino Acid Game—to help you learn their structures!

<http://www.wiley.com/legacy/college/boyer/0470003790/animations/animations.htm>

Other web resources:

The National Center for Biotechnology Information <http://www.ncbi.nlm.nih.gov/>

The National Human Genome Research Institute <http://www.nhgi.nih.gov>

Biochemistry Online <http://biochem.arach-net.com/index.html>

BioChemNet (a directory of biology and chemistry educational resources) <http://schmidel.com/bionet.htm>

BioMolecules in the Classroom: Molecular Visualization with Chime and RasMol

Dolan DNA Learning Center of Cold Spring Harbor Laboratory <http://dnalc.org>

Harvard Biological Laboratories (huge list of Internet resources) <http://golgi.harvard.edu/genome.html>

Image Library of Biological Macromolecules <http://www.imb-jena.de/IMAGE.html>

JBC Online (some resources available without subscription) <http://www.jbc.org>

Medscape (one-line medical dictionary, drug information, clinical articles) <http://www.medscape.com>

The National Center for Biotechnology Information (PubMed) (free access to Medline databases)

National Library of Medicine (free access to Medline database) <http://www.nlm.nih.gov>

V. COURSE DESCRIPTION AND OBJECTIVES:

Course Description: This course constitutes one semester of a two-semester sequence in advanced biochemistry. Included are: protein structure, folding, and function; nucleic acid structure; protein-DNA interactions; carbohydrates & glycoproteins; lipids & membranes; enzymology; energetics & allosteric regulation; posttranslational modification of protein function and biochemical signaling; The metabolic pathways are covered in the separate CHE 446 course during the spring semester (CHE 446).

Most of the material is presented in formal lectures. Problems will be presented in some but not all classes. The course features access to on-line databases, such as Protein Data Bank (PDB), Nucleic Acids Databank (NDB), and NCBI, reading of the literature, and discussion sessions.

After completing this course students should be able to:

- Draw and describe the structure(s) of amino-acids, lipids, nucleotides and sugars
- Describe the physical-chemical properties of amino-acids, lipids, nucleotides and sugars
- Understand the physical-chemical factors that influence the activity of proteins
- Understand the kinetics of enzyme activity and how this can be regulated by covalent modifications, allosteric factors and gene expression
- Explain the molecular signaling pathways.

VI. COURSE REQUIREMENTS AND GRADING

REQUIRED HOME WORK:

Sapling homework assessment for each work will be based on the material covered in-class. Homework assignment will be averaged with 3 midterms and then with the final exam.

!!! *The Sapling registration provides you with the ebook of Lehninger, independent than the one provided by the Bookstore at Lehman College.*

How to set-up your Sapling account:

Students:

1. Go to <http://saplinglearning.com> and click on your country ("US Higher Ed" or "Canada") at the top right.
 - 2a. If you already have a Sapling Learning account, log in and skip to step 3.
 - 2b. If you have Facebook account, you can use it to quickly create a Sapling Learning account. Click the blue button with the Facebook symbol on it (just to the left of the username field). The form will auto-fill with information from your Facebook account (you may need to log into Facebook in the popup window first). Choose a password and timezone, accept the site policy agreement, and click "Create my new account". You can then skip to step 3.
 - 2c. Otherwise, click the "Create an Account" link. Supply the requested information and click "Create My Account". Check your email (and spam filter) for a message from Sapling Learning and click on the link provided in that email.
 3. Find your course in the list (you may need to expand the subject and term categories) and click the link.
 4. If your course requires a key code, you will be prompted to enter it.
 5. If your course requires payment, select a payment option and following the remaining instructions.
- Once you have registered and enrolled, you can log in at any time to complete or review your homework assignments. During sign up or throughout the term, if you have any technical problems or grading issues, send an email to support@saplinglearning.com explaining the issue. The Sapling Learning support team is almost always faster and better able to resolve issues than your instructor.

EXAMS:

For this class there will be 3 mid-session assessments and a final exam that will contain both multiple choice and longer questions. The final grade will be established as follows:

Completion of Sapling Home Work Assignment (14 homework assignments)	20%
Due date for completion: December 26 th , 2018	
Mid Term Exam 1	15%
Mid Term Exam 2	15%
Mid Term Exam 3	15%
Final exam (is not comprehensive)	20%
Quizzes and take home exams (every two weeks, announced on blackboard)	15%
Total	100%

No make-up exams will be given.

VII. ATTENDANCE POLICY

Students should be present during the quiz examinations.

A student cannot miss mid-term assessments.

For the final grade the presence at the final exam is compulsory.

A valid ID is required for exams.

IX. COURSE OUTLINE

Topic number	Topics	Homework Assignment
Week 1	Chapter 1: The Foundations of Biochemistry/Organic chemistry and molecular cell biology review Chapter 2: Water, buffers, pH, solutions	Sapling 1 & 2
Week 2	Chapter 3: Amino Acids and Peptides and Quiz 1	Sapling 3
Week 3	Chapter 4: Protein Structure (3D) and protein techniques PDB 101 (presentation of protein data bank and take-home exams)	Sapling 4
Week 4	Chapter 4: Protein Structure (3D) and protein techniques PDB 101 (presentation of protein data bank and term paper) and Quiz 2	Sapling 4/5
Week 5	<i>Midterm 1 and take-home exam1.</i> & lecture: Chapter 5: Protein Function (part 2)	Sapling 5
Week 6	Chapter 5: Protein Function (part 2) Chapter 6: Enzymes (part 1)	Sapling 5/6
Week 7	Chapter 6: Enzymes (part 2) and Quiz 3 Chapter 7: Carbohydrates	Sapling 6/7
Week 8	<i>Midterm Term 2 and take-home exam2.</i> & lecture: Chapter 8: Nucleotides and Nucleic Acids (part 1)	Sapling 7
Week 9	Chapter 8: Nucleotides and Nucleic Acids (part 2) and Quiz 4	Sapling 8
Week 10	Chapter 9: DNA-Based Information Technologies	Sapling 9
Week 11	Chapter 10: Lipids and Quiz 5	Sapling 10
Week 12	<i>Mid-Term 3 and take-home exam 3.</i> & lecture: Chapter 11 Biological Membranes and Transport	Sapling 11
Week 13	Chapter 11 Biological Membranes and Transport Chapter 12 Biosignaling (Signal Transduction) and Quiz 6	Sapling 12
Week 14	Chapter 13 Bioenergetics and Biochemical Reactions	Sapling 13
Week 15	Chapter 14: Glycolysis, Gluconeogenesis, and the Pentose Phosphate Pathway and Quiz 7	Sapling 14
December 22-27 st	Final Exam/Submission of Take home exams/Sapling homework	

X. CLASSROOM POLICY

Food policy: Food and drinks are not allowed in the classroom.

Cell Phone Policy. Cell phones are disruptive, even in vibrate mode. Make sure your cell phone is switched off before class starts. Text messaging during class is also highly disruptive and not allowed.

Other electronic devices Policy No electronic devices can be used or kept accessible during examinations; this includes, but is not limited to i-Phones, cell-phones, beepers, iPods, MP3 players, tape-recorders, PDAs, **Bluetooth** and other computing or music devices. Only **basic** calculators will be allowed.

XI. Grade Assignments:

100%-92% = A; 91.9%-88% = A-; 87.9%-80% = B+; 79.9%-75% = B; 74.9%-70% = B-

69.9%-65% = C+; 64.9%-60% = C; 59.9%-55% = C-; 54.9%-50% = D; Below 50% = F