

BIOSC 1000: BIOCHEMISTRY
The University of Pittsburgh
Summer 2016 (2167)

Instructor: Dr. Laura Zapanta

A355 Langley Hall (bridge between Clapp and Langley)
 Phone: 412-624-3256
 Email: zapanta@pitt.edu

Office Hours: Monday & Wednesday 12:00 PM – 1:00 PM
 Tuesday & Thursday 11:30 AM – 12:30 PM
 (No office hours on exam days.)

If you cannot make office hours, you may schedule an appointment at: <https://laurazapanta.youcanbook.me/>

Open Door Policy: If my door is open, please feel free to stop in. If my door is closed, it means that I am unavailable. Come back at a later time. My door will always be open during office hours.

Teaching Assistant:

Class Time and Location: Monday, Tuesday, Wednesday, Thursday
 9:00 AM – 10:45 AM
 169 Crawford Hall

Recitation Time and Location: Tuesday and Thursday
 Recitation A: 11:00 – 11:50 AM 169 Crawford Hall
 Recitation B: 12:00 – 12:50 AM 169 Crawford Hall

You must be enrolled in one recitation. The recitation for this class is required. During recitation, you will perform activities that expand upon course material and will be completed for credit. Please only attend the recitation for which you are enrolled.

Course Description

Biochemistry is the study of the chemistry of living things. At the end of the course, students will understand how the laws of chemistry and physics govern biological systems. The student will master new vocabulary and demonstrate an understanding of the molecular structure and function of biological molecules.

Prerequisites

Prior to taking Biosc 1000, students must have completed the following courses:

Biosc 0160 (Foundations of Biology 2)
Chem 0320 (Organic Chemistry 2)

Ideally, students should have achieved a grade of C or better in both of these courses.

General Course Objectives

At the end of the course, the student will:

- Understand acid base chemistry as it applies to biological molecules.
- Use the first and second law of thermodynamics to predict the direction of chemical reactions that occur in biological systems.
- Know the basic molecular structures of the four classes of biological molecules and the subunits from which they are formed, and recognize important bonds and functional groups of biological molecules.
- Explain how the structure of biological molecules dictates function and how changes in structure direct biochemical reactions.
- Describe the catalytic functions of enzymes, and perform enzyme kinetics calculations.
- Describe the network of chemical reactions that make up metabolism, and know the molecular structure of key metabolic intermediates.
- Explain how regulatory systems maintain homeostasis in biological systems and how disease and trauma disrupt these systems.
- Read and understand scientific literature pertaining to subject matter in biochemistry.

Course Materials

REQUIRED Text: Nelson & Cox. *Lehninger Principles of Biochemistry*. 6th Edition, W. H. Freeman and Company © 2013.

This text (in loose-leaf form) is available in a package at the bookstore that includes access to Sapling Learning. Or you can purchase access to the ebook through Sapling Learning (see below).

Supplemental student resources and study aids are available for free from the publisher at: www.whfreeman.com/lehninger6e

A copy of the textbook is on reserve at the Langley Library.

REQUIRED Online Homework: Sapling Learning

Your graded homework will be completed with the Sapling Learning system. You must register for this system online and complete the homework online. If you purchased your book on campus, you will have an access code for Sapling Learning included in the package. If you purchased your book elsewhere, the cost to register for access to this course in Sapling Learning is \$40.

Instructions for registering for Sapling Learning can be found at <http://bit.ly/saplinginstructions>

REQUIRED Online Response System: Top Hat

In-class activities during lecture and recitation assignments will be completed with Top Hat. You must register for this system online and will complete activities and assignments online using a phone, tablet, or laptop. If you already have Top Hat for this semester in another class, there is no additional charge. If not, the cost to register is \$24. You can access Top Hat through the link in the invitation email you received.

Recommended Text: Osgood & Ocorr. *The Absolute, Ultimate Guide to Lehninger Principles of Biochemistry, Sixth Edition Study Guide and Solutions Manual*, W. H. Freeman and Company © 2013.

This workbook provides chapter summaries, self-assessment problems, and solutions to problems from the textbook. A copy of this study guide is on reserve at the Langley Library.

Assignments

Sapling Homework Problems

There will be nine graded homework assignments over the course of the semester. The problems in the assignments will cover material that will be on the exams. The due dates for these assignments are listed on the course schedule. **No extensions will be given on the due dates.** These assignments will be completed online and will each be worth 10 points. The homework is graded automatically. You will have unlimited attempts to get an answer correct, with a 5% penalty per attempt (per question). For example, a student that answers a question correctly on the third attempt would receive 90% for that question. A student that answers a question correctly on the first attempt would receive 100% for that question. The grades for all the questions are then averaged for that assignment's grade. The lowest homework grade for the term will be dropped.

Group Assignments in Recitation

Each recitation session will consist of an active-learning activity that students will work on in a group with guidance from the TA and UTAs. Working in a group will enable students to learn from each other, draw from each other's expertise, and provide valuable experience for the peer interactions required in any future career. Each group will consist of 3-4 students and will remain the same throughout the semester.

Although you will work in groups on the assignments, each individual is responsible for entering his/her own answers to the online recitation assignment through Top Hat. **Students should bring a laptop or tablet to recitation to complete the assignments (smart phones may not work well, depending on your phone).** Each assignment will be due at the end of the recitation period and will be worth 10 points. Each student's lowest two group assignment scores for the term will be dropped. **If you do not complete the recitation assignment during recitation time, you will receive a 0 for that day's assignment.** There are no make-ups for recitation assignments.

In-Class Activities

This class relies heavily on active learning. You will be completing problems, analyzing data, using scientific literature, etc. each day in lecture. These activities are designed to supplement the material being discussed in lecture and will be completed through Top Hat using a laptop, tablet, or phone. Some of the questions will be graded for accuracy, but the majority will receive credit solely for completion. The purpose of these activities is to help you learn and apply the class material, not to penalize you for making mistakes. **Students should bring a laptop, tablet, or smart phone to lecture for in-class activities.**

If you are not in class, you will receive a 0. There are no make-ups for in-class activities. At the end of the semester, your final percentage on the in-class activities will be determined. To account for missed lectures or possible connection failures, 5% will be added to the total percentage. You will receive this adjusted percentage of the 40 possible in-class activity points towards your final grade.

Pre-Class Assignments

There will be pre-class assignments posted on CourseWeb for each lecture. These will include essential vocabulary terms and content that you should review PRIOR to lecture. It will be assumed that you have worked through this material before coming to class, and you will be expected to use this material in class and on exams. These assignments are not collected or graded, but they are provided as a learning tool to help you prepare for and get the most out of each lecture.

Textbook Problems and Sample Problems

Suggested problems from the textbook are listed on each lecture handout. Most lecture handouts will also have sample exam problems. Although these problems will not be collected or graded, it is to your benefit to work through them. You are encouraged to help each other work through the material. Please seek help from the instructor or TA if you are having difficulty with the problems.

Quizzes

There will be two quizzes. Dates for the quizzes are listed in the course schedule. Each quiz will be worth 30 points. Quizzes will be given at the beginning of lecture. If you arrive late, while the quiz is in progress, you will be able to take the quiz but will not be given any additional time. **If you arrive after the quiz, you will not be able to take the quiz and will receive a score of 0. There are no make-up quizzes.**

Exams

There will be three exams given during normal class time over the course of the semester. Dates for the exams are listed in the course schedule. Each exam will cover assigned lectures. Although the three in-class exams are not cumulative, later material does tend to build on concepts taught earlier in the semester. **There will be no make-up exams.**

Each exam is 75 points, consisting of 35 multiple-choice questions and 40 points worth of short answer questions. There will be 1 hour 30 minutes for each exam. After exams are turned in, the entire class will convene during Recitation A time (11-11:50 AM). Students will work in their recitation groups and complete selected short answer questions from the exam. The points earned by the group on these questions will be added to each student's exam score.

When exams are returned, the answer key and grading rubric will be posted on CourseWeb **for 3 days only**. The instructor will not answer questions about the exam for 24 hours after exams are returned. This will enable the students to look at the answer key and see how their grades were determined prior to seeing the instructor with questions.

Challenging an exam question: If you believe that the answer you gave is more correct than the answer listed on the answer key, you may challenge one question per exam. The challenge must be *in writing* using the form provided on CourseWeb. You must include a detailed justification for the correctness of your answer, including references to either the lecture notes (by date) or to the text used in the course (page, paragraph). You should refer to the color of your exam, the question number, and then present your case. All challenges must be received by Dr. Zapanta no

later than 1 week after the exam is returned. Challenges to Exam 3 questions must be received by Mon. June 27 by 9 AM. Challenges will be kept on file until the end of the term. If your final grade is close to or on the borderline between two grades, any exam challenges on file will be considered when calculating your final course grade.

Grading

Final grades will be computed using the following point scale. The course grade will be calculated as a percentage.

Exams 1-3 (75 points each)	225 points
Quizzes 1-2 (30 points each)	60 points
Online Homework (10 points each, drop lowest)	80 points
In-Class Activities	40 points
Group Assignments (10 points each, drop lowest 2)	<u>70 points</u>
Total Possible Points	475 points

The following is a minimum grading scale. The instructor reserves the right to curve the scale upward (so that the average class grade is C), but will not curve the scale to grades below the following:

A+ : 99-100%	B+ : 89%	C+ : 79%	D+ : 69%
A : 92-98.9%	B : 82-88.9%	C : 72-78.9%	D : 62-68.9%
A- : 90-91.9%	B- : 80-81.9%	C- : 70-71.9%	D- : 60-61.9%

For example, a student who has a final average of 78% will get at least a C, but the student may earn a higher grade based on the total class performance. However, do not depend on a curve, as grades have not been curved in the last 5 semesters of this course.

Class Procedures

Attendance

Class attendance is extremely important, as large amounts of material will be presented during each class. Lectures will supplement the material from the text and may include material that is not found in the book. Recitations will expand on lecture material. The course outline lists the chapters (or parts of chapters) that pertain to each class. Students are responsible for obtaining material from missed lectures and recitations. Students who are not in class for quizzes, group assignments, or in-class activities will receive no credit for those assignments, as detailed earlier in the syllabus

Lecture Handouts

Handouts containing outlines of the lectures and any supplemental information will be posted on CourseWeb prior to each lecture. It is recommended that you print the handouts and use the handouts as you take notes in lecture.

Lecture Notes

Dr. Zapanta's lecture slides will NOT be available online. However, the lecture slides will be available in Dr. Zapanta's office for students to review. You may sign out the lecture slide binder for one half hour. It is the student's responsibility to obtain any notes from missed lectures.

CourseWeb

All registered students can access the course website on CourseWeb. The class files on CourseWeb will contain all of the handouts from class, pre-class assignments, announcements, exam answer keys, and useful Internet links to supplement course material. Students should check CourseWeb at least twice a week for course announcements and other information. Although the instructor will make every effort to keep the gradebook on CourseWeb up to date, all graded exams will be returned in class, and Sapling Homework and Top Hat grades are always available on those platforms, therefore students should easily be able to monitor their progress in the course on their own.

Class Decorum

Each class period will begin promptly at 9:00 AM. Please arrive on time so that disruptions are kept to a minimum.

As research on learning shows, unexpected noises and movement automatically divert and capture people's attention, which means you are affecting everyone's learning experience if your cell phone, pager, laptop, etc. makes noise or is visually distracting during class. For this reason, mobile devices (cell phones, tablets, etc.) should only be used for Top Hat activities. You may take notes on your laptop or tablet, but please turn the sound off so that you do not disrupt other students' learning. If you are doing anything other than taking notes or using Top Hat on your devices, you will be asked to turn the device off.

Recording Lectures

With the approval of Dr. Zapanta, classroom activities may be recorded (audio only, no video) by a student for the personal, educational use of that student only. Recordings may not be further copied, posted online, distributed, published or otherwise used for any other purpose without the express written consent of Dr. Zapanta. If you wish to record lectures, a permission form for class recording is available on CourseWeb. Please submit this form to Dr. Zapanta at the beginning of the term prior to recording any lectures. All students are advised that classroom activities may be audio recorded by students for this purpose.

Email Procedures

When emailing the instructor or TA, students should send email from pitt.edu accounts. Email addressed from other sources (for example: hotmail, gmail, or yahoo accounts) may not make it through junk mail filters. **When emailing the instructor, be sure to sign the email and put the course name or number in the subject line.** The instructor will answer all emails within 24 hours during the week. Emails received after 4 PM on Friday will not be answered until Monday morning.

The Pitt E-mail Communications Policy states:

Each student is issued a University e-mail address (username@pitt.edu) upon admittance. This e-mail address may be used by the University for official communication with students. Students are expected to read e-mail sent to this account on a regular basis. Failure to read and react to University communications in a timely manner does not absolve the student from knowing and complying with the content of the communications. The University provides an e-mail forwarding service that allows students to read their e-mail via other service providers (e, g., Hotmail, AOL, Yahoo). Students that choose to forward their e-mail from their pitt.edu address to another address do so at their own risk. If e-mail is lost as a result of forwarding, it does not absolve the student from responding to official communications sent to their University e-mail address. To forward e-mail sent to your University account, go to <http://accounts.pitt.edu>, [logintoyouraccount](#), click on Edit Forwarding Addresses, and follow the instructions on the page. Be sure to log out of your account when you have finished. (For the full E-mail Communication Policy, go to www.bc.pitt.edu/policies/policv109/09-i-0-01.html.)

Telephone Procedures

When phoning the instructor or leaving voicemail, be sure to identify yourself and the class you are taking. When leaving voicemail, be sure to give a phone number so that your call can be returned.

Students with Disabilities

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the Office of Disability Resources and Services, 140 William Pitt Union, 412-648-7890/412-624-3346 (Fax), as early as possible in the term. Disability Resources and Services will verify your disability and determine reasonable accommodations for this course.

For more information, visit www.studentaffairs.pitt.edu/drsabout.

Students are reminded that they must schedule testing center services 72 *business* hours prior to the exam. Students who miss the deadline must take the exam in class and will **NOT** receive any additional time or accommodations.

Religious Observances

Unfortunately, it is impossible for the University to design a calendar that respects all calendars of all faiths. However, I am quite willing to work with you on an individual basis if a significant course event (such as an exam) presents a conflict for you. Please contact me privately **at least two weeks ahead of the date**, and we will work something out.

Study Groups

Students are encouraged to form study groups to help each other learn the material and work through problems. To be effective, study groups should have 3-5 students and meet weekly. Additional info on successful study groups can be found on CourseWeb.

Assistance

Feel free to ask questions during lecture. Ask questions of the TA during recitation. Meet with the TA to review problems. Take advantage of TA and instructor office hours. **Make an appointment if you cannot make office hours.**

The Academic Support Center, 311 William Pitt Union (648-7920) can help you improve your basic study and test-taking skills. This service is free for University students, faculty & staff. Call them for more information.

Previous students and UTAs for Biosc 1000 are also available for extra assistance if you would like. Please contact Dr. Zapanta for more information.

Withdrawal from Class

Students are expected to do all assigned work and stay current in their studies. If circumstances arise that prevent a student from staying current with the material, the student should consider withdrawing from the course. Please note the following dates:

Wednesday, May 18 – Add/Drop period ends

Friday, June 10 – Deadline to submit Monitored Withdrawal forms

Academic Integrity

Cheating/plagiarism will not be tolerated. Students in this course are expected to comply with the University of Pittsburgh's Policy on Academic Integrity:

(<http://www.as.pitt.edu/faculty/policy/integrity.html>)

Student Obligations

A student has an obligation to exhibit honesty and to respect the ethical standards of the academy in carrying out his or her academic assignments. Without limiting the application of this principle, a student may be found to have violated this obligation if he or she:

1. *Refers during an academic evaluation to materials or sources, or employs devices, not authorized by the instructor.*
2. *Provides assistance during an academic evaluation to another person in a manner not authorized by the instructor.*
3. *Receives assistance during an academic evaluation from another person in a manner not authorized by the instructor.*
4. *Engages in unauthorized possession, buying, selling, obtaining, or using of any materials intended to be used as an instrument of academic evaluation in advance of its administration.*
5. *Acts as a substitute for another person in any academic evaluation process.*
6. *Utilizes a substitute in any academic evaluation procedure.*
7. *Practices any form of deceit in an academic evaluation proceeding.*
8. *Depends on the aid of others in a manner expressly prohibited by the instructor, in the research, preparation, creation, writing, performing, or publication of work to be submitted for academic credit or evaluation.*
9. *Provides aid to another person, knowing such aid is expressly prohibited by the instructor, in the research, preparation, creation, writing, performing, or publication of work to be submitted for academic credit or evaluation.*
10. *Presents as one's own, for academic evaluation, the ideas, representations, or words of another person or persons without customary and proper acknowledgment of sources.*
11. *Submits the work of another person in a manner that represents the work to be one's own.*
12. *Knowingly permits one's work to be submitted by another person without the instructor's authorization.*
13. *Attempts to influence or change one's academic evaluation or record for reasons other than achievement or merit.*
14. *Indulges, during a class, examination session, or any other academic setting, in conduct that is so disruptive or disrespectful as to infringe upon the rights of the instructor or fellow students.*
15. *Fails to cooperate, if called upon, in the investigation or disposition of any allegation of dishonesty pertaining to another student, or any other breach of a student's obligation to exhibit honesty.*

Students suspected of violating the University of Pittsburgh Policy on Academic Integrity will be required to participate in the outlined procedural process as initiated by the instructor. A minimum sanction of a zero score for the quiz, exam or paper will be imposed.

Collaboration vs. Cheating: Collaboration is defined by Merriam-Webster's Collegiate Dictionary (10th edition) as: "to work jointly with others or together, especially in an intellectual endeavor." Students are encouraged to work and study together to assist each other in learning the material. However, each student is expected to submit his/her own unique work on assignments. If any collaboration was used to complete an assignment, record the names of the collaborators and the nature of the collaboration. Any attempt to submit work that is not the student's own work is a violation of academic integrity and will be severely punished.
(*adapted from Conrad M. Zapanta, Ph.D. – used with permission*)

Plagiarism: Plagiarism includes, but is not limited to, failure to indicate the source with quotation marks or footnotes where appropriate if any of the following are reproduced in the work submitted by a student:

- A phrase, written or musical.
- A graphic element.
- A proof.
- Specific language.
- An idea derived from the work, published or unpublished, of another person.

Any attempt to submit work that is not the student's own work is a violation of academic integrity and will be severely punished.

How to Succeed in this Course

- Have confidence – you can learn the material!
- In general, students in upper level science courses should plan on spending at least 3-4 hours of additional time with course material per hour of class time.
- Look over the textbook pages that will be covered in class **before** the lecture. You don't have to read everything the first time through, but familiarize yourself with the vocabulary terms, read the figure captions, and examine the illustrations.
- Complete the pre-class assignments and participate in all in-class activities.
- Review your notes as soon after class as possible (the same day is best). Fill in any gaps with information from the book, etc.
- Study with a partner or small study group.
- Do **not** study for long periods of time without a significant break. Two half hour or 45 minute study sessions are better than one marathon 1-2 hour session.
- Complete the assigned questions at the end of the chapter, and use the text website for additional problems and self-tests.
- Ask for help when necessary - **before** you fall behind. Meet with the TA as often as necessary – or see Dr. Zapanta (contrary to the nasty rumors – she does not bite).
- Take advantage of the Academic Support Center, 311 William Pitt Union (648-7920) if you need help with basic study skills or test-taking skills.

Course Outline and Schedule

Date	Lecture	Topic	Recitation	Text Reference (Chapter:Sections)	Assignment Due
M 5/16	1	Course Intro Water and Acid/Base Chemistry		1:1-2, 2:1-5	
T 5/17	2	Thermodynamics	Group Assignment: Properties of Water	1:3, 2:1, 13:1	Sapling Online Homework 1 (Lectures 1-2) due by 11 PM
W 5/18	3	Protein Structure & Chemistry		pp. 15-19. 3:1-4, 4:1-3	
Th 5/19	4	Protein Folding Non-Enzymatic Protein Functions	Group Assignment: Protein Structure & Function	4: 3-4, pp. 157-162, 5:2-3	Please read Anfinsen paper before class
F 5/20					Sapling Online Homework 2 (Lectures 3-4) due by 11 PM
M 5/23	5	Quiz 1 – Amino Acids & Peptides (beginning of class) Hemoglobin		5:1	
T 5/24	6	Enzymes: Kinetics & Inhibition	Group Assignment: Enzymes	6:1-3	Sapling Online Homework 3 (Lectures 5-6) due by 11 PM
W 5/25	7	Enzymes: Mechanisms & Regulation		6:3-5	
Th 5/26	Exam 1 – Lectures 1-7 (After exam, all students attend 11 AM Recitation for group exam)				
M 5/30	Memorial Day – NO CLASS			Please view online energy molecule videos prior to Lecture 8 (see CourseWeb) – Ch 7:1-2, 8:1, 8:4, 10:1	
T 5/31	8	Introduction to Metabolism: Glycolysis and Gluconeogenesis	Group Assignment: Glucose Metabolism	pp. 501-504, 13:2-3, 14:1, 14:3-4, 15:1-3	Sapling Online Homework 4 (Energy molecules and Lecture 8) due by 11 PM)
W 6/1	9	Production of AcetylCoA, Citric Acid Cycle, and Oxidative Phosphorylation		16:1-3, 19:1-3	
Th 6/2	10	Photophosphorylation, Calvin Cycle, and Pentose Phosphate Pathway	Group Assignment: Oxidative Phosphorylation & Photophosphorylation	19:6-9, 20:1, 14:5	
F 6/3					Sapling Online Homework 5 (Lectures 9-10) due by 11 PM

Course Outline and Schedule (cont.)

Date	Lecture	Topic	Recitation	Text Reference (Chapter:Sections)	Assignment Due
M 6/6	11	Quiz 2 – Glycolysis & CAC (beginning of class) Glycogen Metabolism		15:4-5	
T 6/7	12	Lipid Metabolism	Group Assignment: Glycogen and Lipid Metabolism	17:1-3, 21:1, 21:4	Sapling Online Homework 6 (Lectures 11-12) due by 11 PM
W 6/8	13	Nitrogen Metabolism		18:1-3, 22:1-4	
Th 6/9	Exam 2 – Lectures 8-13 (After exam, all students attend 11 AM Recitation for group exam)				
M 6/13	14	Membrane Structure and Function		10:2, 11:1-3	Please read Frye Paper before class
T 6/14	15	Signal Transduction and Biosignaling	Group Assignment: Signaling	12:1-4, 12:6, 12:10-11	Sapling Online Homework 7 (Lectures 14-15) due by 11 PM
W 6/15	16	Hormonal Control and Integration of Metabolism		12:8, 23:1-5	
Th 6/16	17	Nucleic Acid Chemistry and Function	Group Assignment: DNA/RNA Review	8:1-4, 9:1	
F 6/17					Sapling Online Homework 8 (Lectures 16-17) due by 11 PM
M 6/20	18	DNA Replication and Transcription		25:1-2, 26:1-2	
T 6/21	19	Protein Synthesis	Group Assignment: From Gene to Protein	27:1-2	Sapling Online Homework 9 (Lectures 18-19) due by 11 PM
W 6/22	20	Principles of Gene Regulation Eukaryotic Gene Regulation		24:3, 28:1, 28:3	
Th 6/23	Exam 3 – Lectures 14-20 (After exam, all students attend 11 AM Recitation for group exam)				

This schedule is tentative and subject to change at the instructor’s discretion.