

Syllabus for Biological Chemistry I

CHEMISTRY/BIOLOGY 3510

Fall Semester 2012

INSTRUCTOR: Professor Kenneth Woycechowsky
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LECTURES: M, W, F; 10:45-11:35 AM; HEB 2008

COURSE MATERIALS: Lehninger PRINCIPLES OF BIOCHEMISTRY, 5th Edition, by David L. Nelson & Michael Cox
The text (multiple copies) is on reserve in the library.
The Study Guide and Solutions Manual is an *optional* text for this class. For those interested in consulting the Study Guide and Solutions Manual, copies are available on reserve in the library.

OFFICE HOURS: Office hours for Professor Woycechowsky are Tuesday 4:00-5:00 PM, Friday 12:00-1:00 PM, or by appointment.

TEACHING ASSISTANTS: There are two teaching assistants for this class.

Leon Catrow	Harriet Greenlee
Email: LeonC@whitefrogstudio.com	Email: hldinky@comcast.net
Office hours: to be announced	Office hours: to be announced

DISCUSSION SECTIONS: Eight discussion sections with the Teaching Assistants are scheduled for each week to answer questions and to complete Problem Sets related to the material covered in class. Attendance at these sessions is required. The teaching assistant will also be available for individual assistance. (See Office Hours listed above.)

<u>Section</u>	<u>Day</u>	<u>Time</u>	<u>Room</u>
002	Tuesday	9:40-10:30 AM	BEH S 104
003	Wednesday	6:00-6:50 PM	HEB 2006
004	Thursday	7:30-8:20 AM	HEB 2006
005	Friday	3:05-3:55 PM	HEB 2006
006	Tuesday	12:55-1:45 PM	WEB L122
007	Thursday	3:05-3:55 PM	HEB 2006
008	Tuesday	3:05-3:55 PM	HEB 2006
009	Wednesday	3:05-3:55 PM	HEB 2006

COURSE OBJECTIVES:

- 1) To examine structure-function relationships in biomolecules.
- 2) To apply fundamental energetic and mechanistic principles (from general and organic chemistry) towards the understanding of chemical phenomena in biological systems.
- 3) To develop chemical reasoning skills that enable scientific problem-solving.

EXPECTED LEARNING OUTCOMES:

Over the course of this semester, students in this class should gain the following:

- An understanding of the chemical basis for biological phenomena and cellular structure
- An understanding of how physiological conditions (esp. the chemistry of water) influence the structures and reactivities of biomolecules
- Knowledge of the chemical properties of amino acids, cofactors, and sugars
- Knowledge of the basic principles of protein and polysaccharide structure
- An understanding of enzyme kinetics and its application to the elucidation of catalytic mechanism
- The ability to draw reasonable electron-pushing mechanisms for enzyme-catalyzed reactions
- Insight into the chemical logic of metabolism
- An appreciation of how health, disease, and modern medicine are all rooted in biological chemistry

GRADES:	Exam I	100 points
	Exam II	100 points
	Exam III	100 points
	Exam IV	200 points
	Problem Sets	100 points
	<u>Pop Quizzes</u>	<u>60 points</u>
	Total	660 points

Final letter grades will be assigned based on your cumulative point total over the semester.

It is difficult to predict with certainty the exact correlation between a given point total and a particular letter grade. Grade assignments will be made based on the class average and distribution at the end of the semester. Last year, the average cumulative point total corresponded to a C+ and the median cumulative point total corresponded to a B-. Using last year's final letter grades as a guide, the following is a rough estimate of how the cumulative point totals might translate into letter grades : >587 points = A; 574-586 = A-; 561-574 = B+; 528-560 = B; 502-527 = B-; 469-501 = C+; 436-468 = C; 370-435 = C-. Please keep in mind that these letter grade breakdowns can vary substantially from year to year! The exact assignment of letter grades for this class will be made based on the overall class performance and cumulative point total distribution at the end of the semester. **There is no guarantee that the letter grade distribution for this semester will match the breakdown given above!!**

EXAMINATIONS: The class has four (4) exams which will be given in HEB 2008.

Exam I:	10:45 – 11:35 AM; Friday, September 14
Exam II:	10:45 – 11:35 AM; Friday, October 19
Exam III:	10:45 – 11:35 AM; Wednesday, November 14
Exam IV:	10:30 AM – 12:30 PM; Thursday, December 13

The final exam will be comprehensive. The dates and times of the exams are within normally scheduled hours for this class and will not be changed. **Do not make commitments that conflict with these dates.** Students who are traveling for **University-approved** reasons (*i.e.*, student athletes) or students with disabilities must make arrangements with Professor Woycechowsky **10 days** before the examination date to arrange for an alternate testing site. Students who miss a scheduled examination for an emergency (sickness, death in family) and provide appropriate documentation (signed letter from physician, obituary) can arrange to have an oral examination.

PROBLEM SETS: During the Discussion sessions, selected problems will be assigned, completed, and graded. During these Discussion sections, you will work together with your nearest neighbors. The Problem Sets are designed to integrate different concepts covered in the lecture and textbook as well as to stimulate critical thinking about the material covered in the course. When working on the Problem Sets, you are encouraged to use your lecture notes, the textbook, and collaborative discussion within your small group. Be sure to bring your lecture notes and textbook to Discussion! A Teaching Assistant will be available during each session to help you as necessary. Turn in your worksheet along with the names of your group members at the end of the period *even if you don't finish*. The worksheet and answers will be posted at the end of the week so that you can keep working on it and finish it if necessary. Each of these exercises will be worth 10 points. Scoring for the worksheet will be as follows: 10 points for showing up punctually and making a reasonable effort, 5 points for showing up a few minutes late, 2 points for making a really lame effort, and zero points for not showing up or arriving way too late. A maximum of 100 points may be earned over a total of 11 Problem Sets. To get credit for these exercises, you must attend the Discussion to which you have registered unless you have the approval of Prof. Woycechowsky in advance. **Discussions begin on Aug. 28.**

POP QUIZZES: Unannounced quizzes (worth 10 points each) will be given periodically during lecture over the course of the semester. In the event of a quiz, make sure you bring a sheet of 8.5" by 11" paper and a pen to each lecture. A maximum of 60 points may be earned over a total of eight (8) quizzes. There will be no make-up quizzes!

HOMEWORK: There is no graded homework for this class. However, you are expected to complete the textbook readings and solve additional problems outside of class. The best way to prepare for the exams is to work through as many problems as possible. It is highly recommended that you do all of the end-of-chapter problems from the textbook. In addition, extra practice problems will be posted for each chapter. Practice exams will also be posted prior to each exam.

ACADEMIC DISHONESTY: By submitting an assignment, you are representing that it is your own work and that you have followed the rules associated with the assignment. Incidents of academic misconduct (including cheating, plagiarizing, misrepresenting one's work, and/or inappropriately collaborating on an assignment) will be dealt with severely, in accordance with the Student Code (<http://www.regulations.utah.edu/academics/6-400.html>). A single instance of academic misconduct may result in a failing grade for the course. Multiple instances of academic misconduct may result in probation, suspension or dismissal from a program, suspension or dismissal from the University, or revocation of a degree or certificate.

WITHDRAWALS/ CHANGES: Students may drop (delete) this class with no tuition penalty or permission until **Wednesday, August 29, 2012** (the class will not appear on the student's transcript). **Friday, October 19, 2012** is the final day students can withdraw from this course (a "W" will appear on the students transcript and the student will be responsible for paying tuition for the class). **Tuesday September 4, 2012** is the last day to register for this class or elect the CR/NC option. **Friday, November 30, 2012** is the last day to reverse the CR/NC option.

- INCOMPLETES:** The official University policy regarding incomplete course work an assignment of the grade “I” will be followed: The mark "I" (incomplete) shall be given and reported for work incomplete because of circumstances beyond the student's control. The grade of "I" must be used only for a student who is passing the course and who needs to complete 20% or less of the course. An "I" must not be used in a way that will permit a student to retake the course without paying tuition. If the student attends the course during a subsequent semester as part of the effort required to complete the course, he/she must be registered (either as a regular student or for audit) in the semester in which he/she attends. An UNEXCUSED absence at an exam cannot be used as a reason to get an “I” grade.
- EQUAL OPPORTUNITY:** The University of Utah seeks to provide equal access to its program, services, and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability Services.
- AUDITING:** To receive an official audit, you must sign up as an "audit" and you must attend lectures and take the exams. The exams will be graded and returned to you.
- SNOW CLOSURE:** Prof. Woycechowsky will be available by e-mail in the event of any snow closure.
- TUTORING:** Tutoring is available through the University of Utah Tutoring Center in the Student Services Building, Room 350. Students are given a list of tutors to contact and schedule for day, evening, or weekend appointments. Low-income students may qualify for free tutoring. For more information call 581-5153 or visit www.sa.utah.edu/Tutoring/
- TEXTBOOK WEBSITE:** The textbook has its own web site with helpful study guides and additional exercises. You can register for access at the following URL: <http://bcs.whfreeman.com/lehninger/>
- CANVAS:** The syllabus, lecture notes, Problem Set solutions, grades, etc. will be posted on CANVAS. The URL is: <https://utah.instructure.com/>

CHEMISTRY/BIOLOGY 3510 Tentative Lecture Schedule

Lecture	Day	Date	Topic	Chapter
1	M	AUG 20	Introduction to Biological Chemistry	1
2	W	AUG 22	Foundations of Biochemistry	1, 2
3	F	AUG 24	Water	2
4	M	AUG 27	Amino Acids	3.1
5	W	AUG 29	Peptides & Proteins	3.2, 3.3
6	F	AUG 31	Proteins: Primary Structure	3.4
<i>HOLIDAY</i>	<i>M</i>	<i>SEPT 3</i>	<i>Labor Day</i>	
7	W	SEPT 5	Proteins: Secondary Structure	4.1
8	F	SEPT 7	Proteins: Tertiary Structure	4.2
9	M	SEPT 10	Proteins: Quaternary Structure	4.3
10	W	SEPT 12	Protein Folding	4.4
EXAM I	F	SEPT 14	Chapters 1, 2, 3, and 4	
11	M	SEPT 17	Protein Function: Oxygen Binding	5.1
12	W	SEPT 19	Protein Function: Antibodies	5.2
13	F	SEPT 21	Protein Function: Motor Proteins	5.3
14	M	SEPT 24	Enzymes	6.1
15	W	SEPT 26	Enzymes	6.2
16	F	SEPT 28	Enzymes	6.3
17	M	OCT 1	Enzymes	6.4
18	W	OCT 3	Enzymes	6.5
19	F	OCT 5	Monosaccharides	7.1
<i>HOLIDAY</i>	<i>M</i>	<i>OCT 8</i>	<i>Fall Break</i>	
<i>HOLIDAY</i>	<i>W</i>	<i>OCT 10</i>	<i>Fall Break</i>	
<i>HOLIDAY</i>	<i>F</i>	<i>OCT 12</i>	<i>Fall Break</i>	
20	M	OCT 15	Di- and Poly-Saccharides	7.2, 7.3
21	W	OCT 17	Glycoconjugates & Sugar-Protein Interactions	7.4, 7.5

Lecture	Day	Date		Chapter
EXAM II	F	OCT 19	Chapters 5, 6, and 7	
22	M	OCT 22	Bioenergetics	13.1, 13.2
23	W	OCT 24	ATP	13.3
24	F	OCT 26	Redox Reactions	13.4
25	M	OCT 29	Glycolysis	14.1
26	W	OCT 31	Glycolysis	14.2
27	F	NOV 2	Glycolysis	14.3
28	M	NOV 5	Glycolysis	14.4, 14.5
29	W	NOV 7	Metabolic Regulation	15.1, 15.2
30	F	NOV 9	Metabolic Regulation	15.3, 15.4
31	M	NOV 12	Metabolic Regulation	15.5
EXAM III	W	NOV 14	Chapters 13, 14, and 15	
32	F	NOV 16	Citric Acid Cycle	16.1
33	M	NOV 19	Citric Acid Cycle	16.2, 16.3
34	W	NOV 21	Citric Acid Cycle	16.3, 16.4
<i>HOLIDAY</i>	<i>F</i>	<i>NOV 23</i>	<i>Thanksgiving</i>	
35	M	NOV 26	Fatty Acid Catabolism	17.1
36	W	NOV 28	Fatty Acid Catabolism	17.2
37	F	NOV 30	Fatty Acid Catabolism	17.3
38	M	DEC 3	Metabolism of Amino Groups	18.1
39	W	DEC 5	Urea Cycle	18.2
40	F	DEC 7	Amino Acid Degradation	18.3
Exam IV	H	DEC 13	Final Exam 10:30 AM – 12:30 PM	