Course syllabus for Chemistry W 142A

Biochemistry

Class meets: Mon, Tue, Wed, Thu TBA Online, Session B

Instructor: Professor Kalju Kahn, Office: PSB-N 2623
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Office Hours: Mon, Thu 3 – 4 PM, or by appointment
Course website:

Lecture Textbooks:
Required: David L. Nelson and Michael M. Cox, Lehninger Principles of Biochemistry
Recommended: Marcy Osgood and Karen Ocorr (study guide)
The Absolute, Ultimate Guide to Lehninger Principles of Biochemistry
Textbook website: http://www.whfreeman.com/lehninger/

The Course:

CHEM 142A is the first course of a three-course sequence (CHEM 142ABC) and serves as an introduction and prerequisite for the two following courses. The CHEM 142 sequence provides the students fundamentals of biochemistry and molecular biology, and is mainly intended for students in the field of chemistry and biology.

The current course, CHEM W 142A, has two main focuses:

1) Understanding of life via study of structures, properties, and reactions of biological macromolecules, such as proteins and nucleic acids.

2) Understanding biological macromolecules via study of structures and properties of small biological molecules, such as amino acids, nucleotides, saccharides, and lipids.

Online Learning:

CHEM W 142A is offered as an online course during the Summer Session B in 2012. The material covered in the online course is equivalent to what will be covered during the Fall quarter CHEM 142A.

Your course instructor has taught CHEM 142A as a traditional lecture class every Summer since 2004. In 2011, he was part of the team of instructors who, with the supported of the UCSB Summer Sessions and the Instructional Development Program, developed the online course you are taking now. Your instructor firmly believes that the online format offers some significant advantages over the traditional face-to-face format. First, you will have access to a unique collection of on-line lessons, quizzes, and forum activities that were developed for this course and will help you in learning the material. Second, our synchronous online discussions each day allow virtual interaction with your instructor and fellow students; these sessions are meant to stimulate your curiosity about topics we cover while allowing you to demonstrate your problem solving skills. Third, and foremost, the online format allows for constructive alignment of course activities such that they promote active learning and reward your timely progress. I believe that the online format encourages more systematic and in-depth exploration of topics, which will translate to better understanding of central concepts in biochemistry. However, the online format may also present new challenges to learners and in order to be successful, you need to adapt to overcome these challenges.

How Not to Study in this Class: Students in traditional lectures often follow a natural pattern of listening to the lecture/discussion and taking notes, then going home and working with the textbook in supplementing these notes as they study for the exams. This study pattern is not ideal for online learning. It encourages procrastination and inactivity in online settings: you log on, listen to the lecture, and then move on to other things because the exam is still a week away. On the night before the exam that you realize that you did not get much out from that lecture, and that the textbook has the exam material spread over 220 pages. You spend the night playing back all the lectures, trying to stay awake while your roommates rightfully comment “bo-oo-ring” about what you are trying to absorb. You excuse your poor performance on the exam with “I had no idea what to study for.”
Some Ideas How to Study in this Class: Each day of the online course presents you with a set of online activities. The main challenge to you is to do your daily work in a timely manner!!! The recommended order of study is:

1) Download the PDF’s of the lecture notes. You will be taking notes on the space allocated on the right. For example, your notes could reflect what you heard me saying in the subsequent interactive lecture presentation, or something that you read in the textbook and thought as relevant to that slide. In general, you want to look up any word or phrase that you are not familiar with: among other things you will be tested on terminology. Depending on your preference, you can print these out or annotate them on the computer.

2) Work with your textbook and your favorite online resources on the topic that will be discussed. You are not required to read and understand everything in the textbook; it is safe to focus on topics that were outlined in the lecture slides. The textbook is one of your most valuable study aides. It is magnificently well illustrated, and presents the material in a lucid, yet succinct manner. There is a reason why it is “valued” so highly by bookstores. Depending on your learning style, you can take notes on the side of lecture slides, or do a more comprehensive rewrite the material as you study from the book.

3) Go over the interactive lecture slides on the course website. These are the same slides you downloaded earlier but they are interactive, and contain some lecture audio as well as brief non-graded quizzes that test your ability to gather information that was presented in the lecture. If you are a visual learner, this may be sufficient to give you an idea on what your instructor emphasizes. If you are an auditory learner, you want to take an additional look at the recorded lectures from Summer 2011.

4) Complete an online graded lesson and earn your first set of points. The lessons usually focus on a few select topics that you just studied. The lessons present additional information about these topics, and guide you to extra material if it appears that you have not mastered some of the concepts. Lessons sometimes contain interactive mini-activities that help you to solidify your understanding of material, and have nice embedded 3D molecular structures and videos. You will have a chance to re-answer the embedded quiz questions once if you do not get it right the first time. You want to do the lesson a few hours before the scheduled synchronous discussion session.
5) Complete an online graded quiz. You have a chance to answer each question only once this time. If you have paid attention so far, it should not be too difficult to get a perfect score. Total of 100 points toward your grade comes from all online lessons and quizzes.

6) Be well prepared by the time we meet for online lectures/discussion sessions. The discussion sessions are your main opportunities to get a validation that you have learned the material well, and offer an easy (open-book) opportunity to earn some points for showing off your knowledge and critical thinking skills. I will briefly review the key ideas from the lecture slides. However, I will not be giving a full lecture at this time. Instead, I will present a series of questions and problem-solving tasks that you will be answering with the help of your study material. Your answers may be written or verbal, and they may be critically analyzed by students in the class. You may remain anonymous from other students if you wish. Your answers to questions and problem solving tasks earn you up to 6 points per session; your thoughtful participation in the discussion may earn you an extra point. There are 20 discussion sessions, but your regular points will max out at 100. Note that even if you miss three discussions, you can still earn maximum number of discussion points. In summary, you will get between 0 and 100 points (plus extras) from all 20 discussions in the course.

7) The weekend is a time for homework assignments. The homework assignments in this class focus on analysis of scientific publications. Some papers describe how biochemists pursue their research goals. Other papers present findings of scientific research. Some papers may provide the review of a particular field. Some homework assignments involve group work. You will be answering questions about these papers, and will earn between 0 and 20 points per homework assignment. In summary, you will earn 100 points from five homework assignments that you submit electronically.

8) There will be two 50-minute midterms (100 points each) and an 80-minute final exam (400 points). The midterms are open-book, but proctored via student’s web camera. The final is closed-book, proctored exam. If you are physically in Santa Barbara, you can take the paper exam on Campus. If you are not in Santa Barbara, you will need to take the exam in one of the designated exam centers. You need to earn at least 180 in the final exam to pass the class.

Expectations of Students:

1) Honesty and academic integrity must be always preserved. While working with others is encouraged throughout the course, you must answer the weekly homework, discussion session, and exam questions individually. No supplemental material should be used during an exam. Please see “Academic Integrity at UCSB: A Student Guide” for details.

2) No student shall give, sell, or otherwise distribute to others or publish any electronically available course materials or recordings made during any course presentation without the written consent of the instructor.

3) Do not miss exams; there are no make-ups. If you must miss a test for a medical reason, contact the lecturer in advance and provide a verifiable doctors excuse.

4) Consult your departmental advisor about drop deadlines. In general, late drops will not be granted.

5) The grade is based on the number of points out of 900 points total. Grading will be based on the curve but you have to meet a certain level to get grade higher than F. Students who have earned over 360 points through the online work and midterms but get between 150 and 180 points on the final will be given an opportunity to re-take the final on the following day and may receive grade no higher than C in the course.
Schedule for Summer 2012

**Week 1: Aug 6-Aug 9**
Chapter 1: Foundations of Biochemistry: The Molecular Logic of Life
Chapter 1: Foundations of Biochemistry: Cells and Evolution
Chapter 2: Chemical Foundations: Biomolecules and Reactions
Chapter 2: Water, Interactions

**Week 2: Aug 13-Aug 16**
Chapter 2: Weak acids and bases, Ionization, pH
Chapter 3: Amino Acids
Chapter 3: Peptides and Proteins: Primary Structure and Study Methods

**Week 3: Aug 20-Aug 23**
- Mid-term I on Monday: Chapters 1-3
- Chapter 4: Secondary Structure of Proteins
- Chapter 4: Fibrous Proteins: Structure and Function
- Chapter 5: Membraneous and Globular Proteins: Structure and Function, Protein Folding

**Week 4: Aug 27-Aug 30**
Chapter 5: Proteins of the Immune System
Chapter 5: Proteins that do Mechanical Work: Actin, Myosin, and Molecular Motors
Chapter 7: Carbohydrates
Chapter 7: Glycobiology

**Week 5: Sep 3-Sep 6**
- Labor Day (Sep 3)
- Mid-term II on Tuesday: Chapters 4-5-7
Chapter 8: Nucleotides and Nucleic Acids
Chapter 8: DNA Structure and Function
Chapter 9: DNA Technologies: Cloning

**Week 6: Sep 10-Sep 13**
Chapter 9: DNA Technologies: Gene Chips
Chapter 10: Lipids
Chapter 11: Biological Membranes
Final exam on Thursday: Chapters 1-5, 7-11.

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*Good luck! — Kalju*