Fall 2012 Syllabus for CHEM 437

General information

CHEM 437 is a team taught course. Prof. Elsa Garcin (EG) will teach the first half of the course and Prof. C. Allen Bush (AB) will teach the second half.

Instructor information

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Prerequisites for the course

You must have received a grade of C or better in CHEM 352 in order to take CHEM 437. If you do not have the prerequisite, then you cannot take the course.

Overview of the course and details of the lectures

CHEM 437 provides the basic information required to understand cellular processes at the molecular level. A large range of material is covered since this will prepare the students for study in a wide variety of biochemical areas. CHEM 437 in particular prepares the students for the more complex topics given in CHEM 438, which goes into more detail about the intricacies of molecular processes in the cell.

Lectures will be in **Lecture Hall: Engineering 027** on Tuesday and Thursday between 5.30 p.m. to 7.30 p.m. The format of the course is primarily lecture based, but the students are strongly encouraged to ask questions during class. The aim of the course is to encourage understanding, not to cover as many topics as possible (although a lot of topics do need to be covered). It is the student's responsibility to inform the lecturer if they are going too fast.

The following outline is not fixed and is subject to change depending on how much material we get through:

Schedule

1. Chapter 2.	Properties of water	Aug. 30	EG
2. Chapter 3.	Thermodynamics in biochemistry	Sept. 4, 6	EG
3. Chapter 4.	Amino acids	Sept. 11,13	EG

Quiz 1 (Sept 13th)

4. Chapter 5.	Protein primary structure	Sept. 18, 20	EG
5. Chapter 6	Protein 3D structure	Sept. 25, 27, Oct 2	EG

Quiz 2 (Sep 27th)

7. Chapter 10.	Nucleotides and Nucleic acids	Oct 2, Oct 4	EG
8. Chapter 11-12.	DNA/RNA structure, recombinant DNA	Oct. 9, 11	EG

Exam 1 (Oct 16)

6. Chapter 7.	Carbohydrates and glycoconjugates	Oct. 18, 23	AB
7. Chapter 8.	Lipid structure	Oct. 25, 30	AB
8. Chapter 9.	Membrane Structure	Nov. 1, 6	AB
13. Chapter 13.	Enzyme kinetics and specificity	Nov. 8, 13, 15	AB
15. Chapter 14.	Enzyme Mechanism	Nov. 20, 27	AB
16. Chapter 15.	Enzyme Regulation	Nov. 29, Dec. 4	AB
12. Chapter 16	Molecular Motors	Dec. 6, 11	AB

Quiz 3 & Quiz 4 (TBA), Exam 2 (December exam week, TBA)

Text

"Biochemistry" by Garrett and Grisham, 4th Ed. is the required text for this course. This is a good all round biochemistry textbook that covers the material discussed in both CHEM 437 and CHEM 438. There is also an accompanying paperback Solutions Manual and Study Guide that is recommended but not officially required.

Handouts

Handouts will be given where necessary. While they will cover key points, THE HANDOUTS ARE NOT COMPREHENSIVE. You will still have to take notes during class. Do not just rely on the handouts and the book. Exams will be based on the material in the lectures. Handouts will be posted on blackboard.

Grading and exams

There will be ***four in-class 30 minutes QUIZZES***, each worth 5% of total. There will be **two semi-comprehensive 2-hour exams,** each worth 40% of total. The 1st exam will cover classes taught by EG; the second exam will cover classes taught by AB. Note that programmable calculators are ***not*** allowed in the exam, only simple scientific calculators.
In general, if you score 85% or higher you will receive a grade A, 75-85% a grade B, and 60-75% a grade C.

Important: For questions involving calculations, please put the final answer to two decimal places, rounding up/down appropriately. The rounding up/down should really only be done on the final answer. If you round up or down too early in the calculation, it may make the final answer wrong.

Example: When you end up with an answer such as 0.04567 M, 0.04567 moles, or 0.04567 Liters. These should be written as 45.67 mM, 45.67 mmoles, and 45.67 mL respectively. It is not appropriate to round these values to give, in this case, 0.05 M, 0.05 moles, 0.05 liters respectively.

Written questions in exams

You will have several questions in the exams in which you have to explain a concept or provide an explanation of some data. This is your opportunity to show what you have learnt. An important consideration when you have written an answer is to look at the question and ask yourself "does this answer the question" or "if I started with the answer, could I figure out the question". Grading of written questions is dependent on the clarity, depth and breadth of the answer. The following is an example of a 4-point question and four potential answers along with how they would be graded.

Question *Give one reason why it is energetically favorable for a polypeptide chain to form an alpha-helix?*

Answer 1. Hydrogen bonds stabilize the helical structure (1 point)

Answer 2. Hydrogen bonds between the mainchain atoms promote stability in the helix (2 points)

Answer 3. Hydrogen bonds between the mainchain carbonyl oxygen and amide hydrogen atoms promote stability in the helix (3 points)

Answer 4. The folding of the polypeptide chain into an alpha-helix allows hydrogen bonds to form between the mainchain carbonyl oxygen and amide hydrogen of residues located 4 amino acids from each other in the polypeptide sequence. The hydrogen bonds stabilize the helical structure. (4 points)

Suggestions for studying for exams and quizzes

CHEM 437 provides the basic foundations with which students can go on to study cellular processes at the molecular level. The unfortunate side to CHEM 437 is that a large amount of information has to be memorized, such as the name, structure and properties of amino acids, carbohydrates, lipids, nucleotides and their derivatives. The earlier you practice identifying and drawing these structures, the better. Memorization is not sufficient to do well in the course though. You will have to be able to explain concepts, which means you have to understand the concepts. Several questions on quizzes and exams will test whether you can apply what you have learned to explain phenomena or interpret experimental data.

Students should try all the questions suggested from the textbook as these are similar to what will be asked in the exams. Questions will be given during lectures for students to try and homework will be given.

Setting up a study group is a great idea. Within the group you can discuss the information in the lectures, quiz each other, and answer questions from the book and lectures.

You can also discuss answers to questions with the Professor by arranging a meeting, either individually or as a group. Don't come expecting to be just given the answer, we will expect you to have tried the question and will try, where possible, to have you figure out the answer on your own.

Additional help

For additional assistance, a free biochemistry tutor will be available (TBA). The tutor will be more than happy to guide you while doing your homework, for example, and help you review your lecture notes. The tutorial center also has textbooks and answer keys for reference

Blackboard website

This course will have a website on blackboard, where students will receive announcements, find copies of the lectures slides, quizzes, and their grades for each quiz/exam. The website is accessed through the myUMBC portal. **UMAB students** will need to set up a myUMBC account to gain access to Blackboard. This can be done by going to the following link http://www.umbc.edu/oit/sans/helpdesk/accounts/myUMBC/myumbccreate.html

Class conduct

By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behaviour are held to the highest standards of honesty. Cheating, fabrication, plagiarism and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. To read the full Student Academic Conduct Handbook, the Faculty Handbook, or the UMBC policies section of the UMBC directory.