

CHEMISTRY 330 BIOCHEMISTRY I

Fall, 2011-12

MTThF 6th hour, B-108

INSTRUCTOR:

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TEXTBOOK:

Lehninger Principles of Biochemistry, 5th edition, David L. Nelson and Michael M. Cox, Freeman & Co., 2008

EXAMS: The course will have at least two mid-term exams, and a comprehensive final exam. Missed exams require an Institute Official Notice (from the student affairs office) or a signed diagnosis from a physician to allow scheduling of a make-up exam. Unexcused absences for in class exams will result in an excruciatingly difficult oral examination.

HOMEWORK: There will be frequent homework assignments, and occasional **unannounced** in-class assignments. Late homework will be subject to a grade penalty, and its return is likely to be delayed.

Grade Breakdown:

Exams	75%
Problem Sets/Quizzes	20%
Participation	5%

COMMENTS AND PHILOSOPHY: a single quarter (or even three quarters, with the inclusion of CHEM 331 Biochemistry II and CHEM 430 Advanced Biochemistry) is not sufficient time to allow a full exploration of a field as broad as biochemistry. The goal for CHEM 330 is to provide orientation and background information, and to discuss the rationale for biochemical reactions and processes. Ideally, by the end of the course, you should be able to read and understand any chapter from a biochemistry textbook, although some of the specific information would be new to you, and will be on your way to being able to read and understand articles in the biochemical literature.

CHEM 330 Biochemistry: Content Objectives

The student will develop the ability to . . .

1. Apply knowledge of the principles of organic chemistry to the understanding of biological molecules.
2. Apply knowledge of amino acid functional groups and water properties to the rationalization of observations about protein three-dimensional structures.
3. Apply knowledge of amino acid functional groups and the principles of organic chemistry to the analysis of enzyme function, enzyme mechanisms, and enzyme regulation.
4. Analyze metabolic pathways to understand the logical organization of biochemical systems, including the thermodynamics of pathways and their regulation.

CHEM 330 Biochemistry: Overall Objectives

The student will develop the ability to . . .

Evaluate and analyze information to formulate logical conclusions about novel systems and then extend the conclusions to propose hypotheses that are consistent with the available information.

HELPFUL HINTS: You will find your life much easier and this course far more useful if you read the material in the textbook prior to class. To assist you with this, the chapters from the textbook we should be covering are included on the tentative schedule.

Biochemistry is highly integrated, and many of the concepts covered in one class will be used extensively in subsequent classes. If you fall behind, you will find it extremely difficult to catch up. Studying for the course should be an ongoing process; if you only study during the week of the exam, you are unlikely to do well. One additional advantage inherent in keeping up is that you will know what it is you do not understand; this allows you to ask questions in class, which is something that everyone will find useful.

The problem sets are designed to help you stay caught up with the material. Working together on

these problem sets is encouraged; remember, however, that ***each individual is responsible for turning in their own work. Copying the work of others without proper attribution is both unethical and a form of Academic Misconduct***; in addition, if you allow others to do your work for you, you will find yourself at a severe disadvantage on the exams. This means that you should understand the answers you write on your problems sets, and not merely copy answers from your friends or from other sources.

The problem sets may include study questions for which answers do not need to be submitted. I strongly recommend, however, that you make sure that you understand the questions and have at least attempted to answer the questions. I also recommend that, if you do not understand any of the study questions, you ask for clarification, either inside or outside of class.

You will be required to memorize the twenty amino acids used for protein synthesis. Other than this, however, the course will emphasize understanding and analysis of biochemical systems, rather than simple internalization of information. It is likely that exams 2 and 3 will be take-home exams, in which you will be expected to use the concepts discussed in class as you evaluate and analyze the new information found in the questions.

CHEM 330 TENTATIVE CLASS SCHEDULE

Week	Topic	Chapter
0-1	Introduction	1
	Thermodynamics	
	pH and buffers	2
	Amino acids	3
	Peptides	
2	Protein structure	4
3	Carbohydrates	7
	Nucleotides & nucleic acids	8
Exam 1 – Friday, September 23, 2011		
4	Introduction to enzymes	6
	Enzyme kinetics and mechanisms	5
5	Enzymes (continued)	
	Bioenergetics	13
	Membranes	11
6	Signal transduction	12
	Introduction to metabolism	23
	Exam 2 (date TBA)	
7	Glycolysis	14, 15
8	Citric acid cycle (tricarboxylic acid [TCA] cycle)	16
9	Gluconeogenesis, glycogen	
	Exam 3 (date TBA)	
10	Electron transport	19
	Oxidative phosphorylation	
	Overview of normal and abnormal metabolism	

Final exam – TBA