Biochemistry I (CHE-307)

Fall 2008
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This is a 3 credit course. Prerequisites for the course are one year of general chemistry and one year of organic chemistry.

Required textbook: David L. Nelson and Michael M. Cox, Lehninger Principles of Biochemistry, 5th edition, W.H. Freeman and Co., NY, 2008.

Course Description

Biochemistry I, involves the study of the molecular composition of living cells, the organization of biological molecules within the cell, and the structure and function of these biological molecules. The biological macromolecules which this course focuses on are proteins, polysaccharides, and polynucleic acids (DNA and RNA), including the monomeric units of these macromolecules. In this semester we will concentrate on the structures of these molecules, their functions, and the strong relationship between structure and function. We will also examine the structure and function of lipids, a fourth important type of biological molecule and a major component of cell membranes. Along with the study of lipids, we will examine biological transport in membranes. Other topics to be examined in the course include the kinetics and catalytic mechanisms of enzymes. Methods and approaches used in biochemical research will be presented as will the biochemical basis of some disease states.

Course Outcomes

The overall goal of this course is for the student to gain a basic working knowledge of biochemical concepts and techniques which will be necessary for future scientific endeavors.

Upon completion of the course, the student should achieve an understanding of the following:

- basic cellular structure
- the special properties of water and how the aqueous environment influences the behavior of biological macromolecules
- the structures of amino acids, their chemical properties and their organization into polypeptides and proteins.
- methods for isolating and characterizing proteins
- the basic elements of protein structure
- key principles of protein function.
- enzymes and how they catalyze reactions as well as enzyme kinetics
- structure of fundamental monosaccharides and polysaccharides
- structure and basic function of nucleotides
- structure of different classes of lipids and their roles in biological systems

Course Objectives: Through problem sets, exams, and quizzes, students will demonstrate the ability to engage in scientific as well as quantitative and qualitative reasoning. Students will also demonstrate the ability to communicate science in writing.

Grading Policy: Final grade for the course will be based on the following:

a) Three one hour in class exams will be given and each will be worth 100 points. Examination dates are listed on the last page of the syllabus.
b) Five quizzes (15-20 min) will be given throughout the semester. Each will be worth 20 points. The quizzes may or may not be announced. They are designed to encourage the student to keep abreast of the material.
c) A final comprehensive exam worth 200 points.

At the end of the semester there is a possible total of 600 points. To compute the final grade, add points from all exam/quizzes, divide by 600 and multiply by 100. The grade will be some percentage between 0 and 100%.

Final letter grade will be based on the following scale:

93-100 %	A	80-82.9%	B-	67-69.9%	D+
90-92.9%	A-	77-79.9%	C+	60-66.9%	D
87-89.9%	B+	73-76.9%	C	Below 60%	F
83-86.9%	B	70-72.9%	C-		

Note: THERE ARE NO EXTRA CREDIT ASSIGNMENTS! In an effort to treat all students in a fair and equitable manner, I do not allow extra credit work.

Office hours: Regularly scheduled office hours will be posted on my office door. These are times when I will definitely be in my office, but I am happy to help at other times if my schedule permits. Anytime I am in my office, please feel free to stop by. If you want to be sure of my availability outside regular office hours, you can schedule an appointment.

Lecture Policy: Students are expected to attend all lectures. Lectures are a necessary supplement to the textbook. In the event of a missed lecture, the student is responsible for the lecture material, any assignments which were given, announcements or any other information that was provided in class.

Attendance at Exams: Students are required to attend class on exam days. Make-up exams will not be given without a valid excuse. Validity of the excuse will be up to the discretion of the instructor. Be forewarned; you will need to have a very good reason for missing an exam! I am not trying to be harsh. I am only trying to treat all students in a fair and equitable manner. If the student is aware of some responsibility which will interfere with an exam date, it must be discussed with the instructor in advance. If an exam is missed without advance notice due to illness or emergency, a valid written excuse will be required from the doctor/school nurse in the case of illness or from the Dean of Students'Office in the case of a family emergency. If a student does not have a valid excuse for missing an exam, the student will receive a zero for the missed exam.

Assignments: Students are expected to do assigned problems at the end of each chapter. It is essential for learning the material and performing well in the course. Additional problem sets will be handed out by the instructor periodically. Though these problem sets/homework will not be graded, the students understanding of the material and ability to do well in the course is dependent on completion of these assignments. I am relying on the student to be responsible enough to do homework without being forced to do so. It is imperative for a clear understanding of the material and for applying what was learned.

Honor Philosophy: The Cedar Crest College Honor Philosophy states that students should uphold community standards for academic and social behavior in order to preserve a learning environment dedicated to personal and academic excellence. Upholding community standards is a matter of personal integrity and honor. Individuals who accept the honor or membership in the Cedar Crest College community of scholars pledge to accept responsibility for their actions in all academic and social situations and for the effect their actions may have on other members of the College community.

Community Standards for Academic Conduct: Academic integrity and ethics remain steadfast, withstanding technological change. Cedar Crest College academic standards therefore apply to all academic work, including, but not limited to, handwritten or computer-generated documents, video or audio recordings, and telecommunications.

As a student at Cedar Crest College, each student shall:
• Only submit work which is his/her own.
• Adhere to the rules of acknowledging outside sources, as defined by the instructor, never plagiarizing or misrepresenting intellectual property.
• Neither seek nor receive aid from another student, converse with one another when inappropriate, nor use materials not authorized by the instructor.
• Follow the instructions of the professor in any academic situation or environment, including taking of examinations, laboratory procedures, the preparation of papers, properly and respectfully using College facilities and resources, including library and computing resources to ensure that these resources may be effectively shared by all members of the College community.
• Abide by the Cedar Crest Computer Use Policy.
• If a student perceives a violation of the Academic Standards, he/she will go to their instructor.
• If you are unable to resolve the problem with the instructor, you should go to the chair of the department. If you need further assistance after consultation with the instructor and the chair, you should see the Provost.

Academic dishonesty is a serious offense and a violation of the Cedar Crest Honor Code philospophy. The response to academic dishonesty rests with the instructor. Penalties for academic dishonesty can range from a request to redo an assignment, the assignment of an "F" for the assignment/exam, the assignment of a "F" for the course, to suspension or expulsion. The instructor is entitled to take into account the students degree of academic experience and any prior instances of academic dishonesty in the student's time at the college, in determining the penalty for the offense.

Classroom Protocol: Appropriate classroom behavior is defined and guided by complete protection for the rights of all students and faculty to a courteous, respectful classroom environment. That environment is free from distractions such as late arrivals, early departures, inappropriate conversations, cell phones/beepers and any other behaviors that might disrupt instruction and/or compromise students' access to the Cedar Crest College education. The instructor may request that a disruptive student leave class. Repeated disruptions can lead to class expulsion.

Disabilities: Students with documented disabilities who may need academic accommodations should discuss these needs with their professor during the first two weeks of class. Students with disabilities who wish to request accommodations should contact the Advising Center.

Note to students: Biochemistry is a very intensive course and as such requires a serious commitment on the part of the student. There is a wealth of information in the field of biochemistry and the study of biochemistry encompasses many areas of chemistry and biology. This makes Biochemistry challenging but also very satisfying. It is a course that contains different types of material and requires different skills. Principles learned in general and organic chemistry will be applied in this course. If these principles are lacking, please take it upon yourself to review and brush up on the necessary material as we proceed through the course. Because of the wealth of info, some memorization will be needed to acquire a solid background in biochemistry, but we will also need to learn to apply that assimilated knowledge. The chapter problems and problem handouts are designed to aid in that aspect. Try to complete these problems on your own before resorting to the posted solutions or solutions manual. I am not only interested in the material directly presented, but also that you develop the ability to apply concepts to situations not previously encountered. Do not treat this subject matter as a mere storehouse of facts. I do expect you to predict the outcome of a particular situation from the background you will obtain in the course. It is my goal to assist you in the development of critical thinking skills and to establish a scientific framework to give you the concepts and problem-solving techniques that are required to make decisions about major issues related to medicine, health, and the environment. Biochemistry is a challenging subject, but definitely worth the challenge. The more effort put into learning the material, the more rewarding the effort will be.

TENTATIVE LIST OF TOPICS FOR LECTURE

DATE	TOPIC	CHAPTER
Aug 25-27	Introduction to the course Review of cells	Syllabus Ch. 1
Aug 29- Sept 3,5	Water	Chapter 2
Sept 8-15	Amino acids, Peptides, and Proteins	Chapter 3
Sept 17-22	Three dimensional structure of proteins	Chapter 4
Sept 24	Protein Function	Chapter 5
Sept 26 (Fri)	**EXAMINATION #1 (Chapters 1-4)**	
Sept 29-Oct 3	Protein function	Chapter 5
Oct 6-17	Enzymes	Chapter 6
Oct 20-24	Carbohydrates	Chapter 7
Oct 27 (Mon)	**EXAMINATION #2 (Chapters 5-7)**	
Oct 29-Nov 5	Nucleotides and Nucleic Acids	Chapter 8

Nov 7-12	DNA based technologies	Chapter 9
Nov 14-21	Lipids	Chapter 10
Nov. 24 (Mon.)	**EXAMINATION #3 (Chapters 8-10)**	
Dec 1-8	Membrane Transport	Chapter 11
Dec 11-15	**FINAL EXAMINATION AS SCHEDULED BY THE REGISTRAR**	