

Biochemistry II (CHE 308)

Spring 2008

Dr. Marianne Staretz

Chemistry & Physical Sciences

Cedar Crest College

Office: Oberkotter 7

Phone: Ext. 3608; E-mail: Mestaret@cedarcrest.edu

This is a 3 credit course. It meets MWF at 10 AM in Miller 33.

Required textbook: David L. Nelson and Michael M. Cox, Lehninger Principles of Biochemistry, 4th edition, Worth Publishing, NY, 2004. .

Course Description

Chemistry 308, Biochemistry II, will focus on central metabolic pathways. Before diving into these pathways, we will review some of the principles of bioenergetics. Following this, the reactions of these metabolic pathways will be presented in detail along with the enzymes that catalyze the reactions and their mechanism of action. The regulation of these pathways will also be discussed. The focus will be on mammalian metabolism allowing material to be related to human health and disease.

In addition, we will start the course by examining the structure and properties of lipids, a biological macromolecule not covered in Biochemistry I. In conjunction with lipids, we will also talk about membrane structure and transport through membranes. Hopefully, there will be enough time near the end of the course to examine DNA replication, transcription and translation.

Course Objectives: Students will be introduced to the chemistry occurring in biological systems. Students will see the integration and regulation associated with this chemistry. This basic knowledge of Biochemistry will prove useful in future scientific endeavors. Through problem sets and exams, students will practice applying their biochemical knowledge to novel problems/situations. This will contribute to the development of scientific and quantitative reasoning skills.

Course Outcomes

The overall goal of this course is for the student to gain a basic understanding of modern biochemical concepts and principles necessary for future scientific endeavors.

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

- structures of different classes of lipids and their roles in biological systems
- membrane architecture, mechanisms of membrane transport and energetics of membrane transport
- basic principles of bioenergetics and metabolism
- building blocks, reactions, mechanisms of major metabolic pathways including: glycolysis, TCA cycle, glycogen metabolism, electron transport/oxidative phosphorylation, gluconeogenesis, pentose phosphate pathway, fatty acid metabolism, amino acid metabolism, the urea cycle and nucleotide metabolism
- how metabolic pathways are controlled and the integration between these major metabolic pathways
- how lesions in metabolism can result in disease
- biological information flow

Grading Policy:

The grade for this course will be determined as follows:

- a) Four one hour in class examinations will be given and each will be worth 100 points.
- b) Four quizzes will be given throughout the semester. Each will be worth 25 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 will be given worth 200 points.

At the end of the semester, there is a possible total of 700 points. To compute the lecture grade, add points from all exams/quizzes, divide by 700 and multiply by 100. The grade will be some percentage between 0 and 100%. Letter grades will be assigned 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-		

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. Your obligations for this course include attendance at the final exam, on the day and time scheduled by the Registrar's Office. You should not make travel arrangements until the final exam schedule is published; if you must make plans early, you should schedule your travel after the last final exam day.

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 learning to apply 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.

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 and any other behaviors that might disrupt instruction and/or compromise students' access to the Cedar Crest College education. Inappropriate classroom protocol may lead to removal from the classroom and a lowering of the lecture grade. If continuous, it can lead to forced withdrawal from the class.

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 many different types of material and requires many 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. 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 SYLLABUS

DATE	TOPIC	CHAPTER
Jan 14-18	Introduction to the course Lipids	Syllabus Chapter 10
Jan 21-25	Biological Membranes and Transport	Chapter 11
Jan 28-30, Feb 1	Bioenergetics	Chapter 13
Feb. 4	Glycolysis	Chapter 14
Feb. 6	EXAM #1- Chapters 10, 11, 13	
Feb. 8, 11	Glycolysis	Chapter 15
Feb. 13-18	Glycogen metabolism and gluconeogenesis	Chapter 15
Feb 20-25	Citric Acid Cycle	Chapter 16
Feb 27	Electron transport and oxidative phosphorylation	Chapter 19
Feb 29	EXAM #2- Chapters 15, 16	
Mar 10, 12	Electron Transport and oxidative phosphorylation	Chapter 19
March 14-19	Lipid Metabolism	Chapters 17 and 21
Mar 26-31	Amino acid metabolism	Chapters 18 and 22
April 2	Genes and Chromosomes	Chapter 24
April 4	EXAM #3- Chapters 17-19, 21, 22	
April 7-9	Genes and Chromosomes	Chapter 24
April 11-18	DNA metabolism	Chapter 25
April 21	RNA metabolism	Chapter 26
April 23	EXAM #4- Chapters 24-25	
Apr 25-29	RNA metabolism	Chapter 26

**FINAL EXAM AS SCHEDULED BY
REGISTRAR (April 30-May 7)**

