

Biochemistry of the Cell II
BC 368
Spring 2010

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Course Goals:

This course is a continuation of BC 367. In that course, we concentrated on protein structure, enzyme kinetics and mechanisms, and the structure and function of lipids, carbohydrates, and nucleic acids. This course will focus on the deployment and use of these biomolecules throughout the cell. Membrane phenomena, metabolism, and bioenergetics will be of particular interest. We will examine individual reactions and pathways while investigating how cells and organisms integrate and regulate these reactions and metabolic pathways to accomplish specific tasks. While we will focus on human examples, other animals and plants will be considered, too.

Text: Nelson and Cox (2008) Lehninger's Principles of Biochemistry; 5th Edition

Course Webpage: <http://www.colby.edu/chemistry/BC368/368index.html>

Lecture Topics:

The topics to be covered and the corresponding readings are listed below.

<u>Topic</u>	<u>Relevant Reading</u>
Biological Membranes and Transport	CH 11
Biosignaling	CH 12
Principles of Bioenergetics	preface to Part II, CH 13
Glycolysis and Pentose Phosphate Pathway	CH 14 (pp 527-551; 558-end)
The Citric Acid Cycle	CH 16
Oxidative Phosphorylation	CH 19 (pp. 707-742)
Photophosphorylation	CH 19 (pp. 742-end)
Carbon Fixation	CH 20
Other Carbohydrate Biosynthesis	CH 14 (pp. 551-558), CH 15
Fatty Acid Oxidation & Synthesis	CH 17, 21
Nitrogen Metabolism	CH 18, 22
Integration and Regulation of Metabolism	CH 23

Exams:

Exams will be given according to the following tentative schedule:

- Exam 1 –Wednesday, March 10 through Friday, March 12.
- Exam 2 – Friday, April 16 through Tuesday, April 20 (excluding the weekend).

The format of these exams will be discussed in class and will follow the CMBB Honor System. Please plan accordingly, as there are no make-up exams. If you miss an exam for a medical reason, you must request communication from your medical professional directly to Prof. Millard. The final exam will be given at the time designated by the Registrar.

Some students may have approval from the Dean of Students Office for time extensions on exams. Please have Dean Moore contact Prof. Millard to discuss an appropriate time extension prior to the first exam.

Discussion Section:

Good communication, both written and oral, is an essential scientific skill. You will have ample opportunities to communicate your biochemical knowledge both in class and in the weekly discussion section. Most weeks, you will receive a problem set that you are to complete for the Friday meeting. Please neatly write or type out each problem separately on its own sheet of paper: some weeks you will be asked to turn in one or more problems, so you should always be prepared for this possibility. You should get together with other people in the class to begin working through these problems shortly after they are assigned. The principal goal of these problem sets is to stimulate discussion, not necessarily for you to obtain the “right answers,” so please do not try to “check your answers” with Prof. Millard or Prof. Greenwood before discussion section. You will be graded primarily on your effort and your ability to communicate effectively. We realize the discussion section is large, and you may not be called upon to present the problem, but there is ample opportunity to ask questions, provide additional details to a problem, or to present a slightly different viewpoint on a problem. Merely sitting in class and raising your hand is not enough for the top discussion grades. While there are no excused absences from discussion section, if you know you are going to be absent because of a planned event such as an interview or athletic competition, you must turn in the entire written problem set *before* discussion section.

Class Participation and Intellectual Responsibility:

You are expected to come to class each period prepared to participate. You are responsible for all material presented in each class, as well as all assigned readings, which should be done before the relevant class. Attendance is mandatory; unexcused absences will be penalized at our discretion.

Any work submitted in your name is to be your work alone, except that throughout the course each student may of course exchange experimental details and data with her/his lab partner and classmates. You may discuss material for problem sets and labs with others but merely copying answers is prohibited. Laboratory papers are also to be individual efforts, including finding primary literature for your papers. Any violation will result in an F in the course.

Grading:

	with laboratory	without laboratory
Hour Exams	35%	50%
Discussion & Participation	20%	20%
Final Exam	20%	30%
Laboratory	25%	---