

Biochemistry 330
Fall 2008

Instructor: Laura Moore **Extension:** x2209 **Office:** HT303
Office hours: 9-10 M, W, F; 1-2 Th (or any time my door is open.)

Web page: **Email:** lmoore@monm.edu

Text: Lehninger Principles of Biochemistry, 4th ed., by Nelson and Cox

Time: 10:00-10:50 AM MWF **Location:** HT 120

Course Description: This course will cover the basic topics of biochemistry. The first part of the course will focus on the structure and function of proteins. The latter half of the course will include material on oxidative phosphorylation, ATP synthesis, nucleic acid chemistry, genetic engineering, and, if time permits, glycolysis and the Krebs cycle. (In depth analysis of the metabolic pathways are topics that are reserved for Advanced Biochemistry.) I will try to make the lecture and laboratory exercises coincide as closely as possible. I have also set aside some class periods in which we will discuss some applications of the principles we have covered and if time permits, some articles from the primary literature.

Readings: Reading assignments will be provided on the class web page for each lecture. Use the textbook--there's a reason that I have you buy it! You will find it helpful if you read the each assigned section before it is discussed in class. To aid your reading, I will provide reading/study questions on the web page for some of the assignments. We will discuss these questions at the beginning of class or they may appear in a pop quiz. Additionally, these questions may appear on the exams. You are responsible for all of the assigned reading, even if I do not talk about it in lecture. (You are always welcome to ask me questions in or out of class about any of the material.) Additional readings (case studies) may be provided as handouts in class. We will discuss these handouts in class, so please be prepared by reading them and any additional material in your book (or outside source) that may be helpful for understanding them thoroughly before you come to class. I *may* require you to turn in questions from these assignments; this will count as part of your participation grade. You may also have other short assignments, such a brief presentations.

Quizzes and Exams: You will have three midterm exams. These exams will focus on the material studied since the last exam; however they are comprehensive because you will be expected to be able to utilize the knowledge that was tested on earlier exams. The exams will consist of problems and short answer/essay questions that test your ability to apply the facts that you have learned (i.e. memorization is only a small part of what you are tested on). Quizzes may be given at any time. Unannounced quizzes will be short (10 min), focusing on the material from the previous class period or the reading. There also may be take home quizzes. You will be allowed to drop the one or two lowest quiz scores (the number depends on how many quizzes we have). There will also be a couple

of announced quizzes that will be longer and worth more points. The final exam will be cumulative.

Attendance: You are expected to attend class each day and to be on time. If you miss class, you are responsible for any material covered in class and for obtaining any handouts that were given. If you miss a quiz, there will be no make up given (and it will be counted as one of your dropped quizzes.) If you miss an exam there will be no make up given unless you present a valid excuse (such as a medical excuse from a doctor).

Problem sets: Practice problems will be given for you to do; some of these will be graded. Many of these problem sets will ask you to review the chemistry you learned in previous classes. The answer to these questions will be posted on the web. There are also additional problems in the back of the chapter; the answers for the questions are in the back of the book. It is highly recommended that you do these problems since similar questions will appear on the quizzes and tests. (Also, the report sheets that you will do for the laboratory will give you additional practice.)

Outlines and slides on the Web: I will set up a web page in which I will put the current schedule and the Powerpoint slides that I use in lecture so you do not have to draw them in class. The slides that are used include structures of proteins, graphs or complicated mechanisms that you will not be able to draw in the time allotted. The availability of these slides is not meant to be a substitute for attending lecture as these slides are only a part of the lecture. The slides will be available (at least) the day before the lecture is given. These can be downloaded using Powerpoint. If you wish to print these slides out, please do so before class has started.

Grading: Grades for the course will be derived as follows

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|--------------------------|-----|
| Quizzes/assignments: | 15% |
| Midterm exams | 50% |
| Final exam | 25% |
| Attendance/participation | 10% |

I typically set the grades as follows:

- A: 85-100%
- B: 70-85%
- C: 60-70%
- D: 50-60%

Biochem 414 Tentative Schedule Fall 2008

| Date | Topic | Chapter |
|-----------------|--|----------------|
| Aug. 27 | Brief review of chemistry (and biology) | 1 |
| Aug. 29 | Molecular forces in biology | 2 |
| Sept. 1 | Buffers and aqueous systems | 2 |
| Sept. 3 | Buffers | 3 |
| Sept. 5 | Properties of amino acids | 3 |
| Sept. 8 | Peptide bonds and primary structure of proteins | 3 |
| Sept. 10 | Proteins: Experimental techniques | 3 |
| Sept. 12 | Proteins: Experimental techniques | 4 |
| Sept. 15 | Secondary structure of proteins and fibrous proteins | 4 |
| Sept. 17 | Globular proteins (3° structure) | 4 |
| Sept. 19 | Ligand binding and allostery | 5 (pp157-174) |
| Sept. 22 | Ligand binding and allostery | 5(pp 157-174) |
| Sept. 24 | Exam I | |
| Sept. 26 | Principles of Enzymatic catalysis | 6 |
| Sept. 29 | Enzyme kinetics I | 6 |
| Oct. 1 | Enzyme kinetics II | 6 |
| Oct. 3 | Enzyme mechanism | 6 |
| Oct. 6 | Enzyme mechanism | 6 |
| Oct. 8 | Enzyme regulation | 6 |
| Oct. 10 | Enzyme regulation | 6 |
| Oct. 15 | Carbohydrates: structure and nomenclature | 7 |
| Oct. 17 | Carbohydrate: structure and nomenclature | 7 |
| Oct. 20 | Exam II* | |
| Oct. 22 | Nucleic Acid chemistry | 8 |
| Oct. 24 | Nucleic Acid chemistry | 8 |
| Oct. 27 | Nucleic Acid chemistry | 8 |
| Oct. 29 | Recombinant DNA technology | 9 |
| Oct. 31 | Recombinant DNA technology | 9 |
| Nov. 3 | Microarrays | 9 |
| Nov. 5 | Lipid structure and function | 10 |
| Nov. 7 | Lipid structure and function | 10 |
| Nov. 10 | Transport across Membranes | 11 |
| Nov. 12 | Transport across Membranes | 11 |
| Nov. 14 | Thermodynamics in biochemistry | 13 |
| Nov. 17 | Exam III | |
| Nov. 19 | Glycolysis (quick overview) | 14 |
| Nov. 21 | Glycolysis and the Krebs cycle | 14,16 |
| Nov. 24 | The Krebs cycle | 16 |
| Dec. 1 | Oxidation-reduction | 13 |
| Dec. 3 | Mitochondrial electron transfer | 19 |
| Dec. 5 | Mitochondrial electron transfer | 19 |
| Dec. 8 | ATP synthesis | 19 |
| Dec. 10 | ATP synthesis | 19 |

*Exam II will be on ligand binding, enzymes and enzyme kinetics. Carbohydrate structure will be on Exam III. The exam is scheduled so that the enzyme kinetics lab report is due prior to Exam II and so that you have ample time to digest this complex and broad topic.