

**MCB 122**  
**Structure and Function of Proteins**  
**WINTER 2006**

Instructor:

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There is a web page available at <http://stahlberglab.ucdavis.edu/teaching/mcb-122>

**Course Format:** There will be three lectures per week scheduled from 9:00-9:50 am in Storer 1322. The CRN for the course is 61098. The purpose of the course is to continue the development of protein biochemistry; material first introduced in the BIS 102 course. There will be some review of that material, some attempts to describe the systems in greater detail and with greater sophistication, and the introduction of new techniques and problems associated with understanding and dealing with proteins.

Office hours will be offered by the instructor and the teaching assistant to help you with your understanding of the course work. This course will seem easier to you if you have already had the laboratory course MCB 120L. If you are taking it concurrently you may have to do a little extra reading to catch up with your fellow students.

**Texts and Readings:** The main text for the course is *Proteins*, 2nd Ed., T.E. Creighton, W.H. Freeman and Co. 1993. Additional reading material will be offered on the course webpage for download during the course.

Still, there will be some material covered in lecture that is not discussed adequately in any of the above references. Here, you will have to find some readings on your own; to be able to do so is a vital part of the scientist's repertoire. This can be done by searching Melvyl (<http://melvyl.cdlib.org>) for the topic of interest and finding the appropriate reference in the library, or by turning to journal articles or reviews in journals. They are available in several libraries on campus, and they are usually available online as well through the electronic journal service of the library (<http://libcf.ucdavis.edu/ejournals/>). Click on the letter of the alphabet that starts the name of the journal and proceed from there. The last several years are available. Look through these, they are well indexed to help you find a review on the topic that is troubling you,

and if that review is not specific enough, it will contain scores of references to other reviews and to other papers on the subject.

**Course Content:** We will try to describe the nature of proteins. In particular, we will discuss their components, how they are synthesized, how they fold in *supramolecular* details, how they assemble in *supermolecular* complexes, their function, and how they are destroyed. We will also discuss the ways they are purified, how they are sequenced, and how their three dimensional structure and function is determined.

**Grading:** There will be one midterm, covering the first part of the course and one final examination, which will cover the second part of the course and some material from the first part as well. The first midterm will be worth one third of your grade and the final will fill out the remaining two thirds. Any regrade requests for the midterm must be handed in within one week from the time that the tests are returned. A key will be published online on the course website. The regrade request should be turned back to Dr. Stahlberg accompanied by a note containing a clear statement of your request. The request should represent your thoughts only. There should be no prior discussion of regrade requests with your faculty or the TA. Be sure to pick up and retain your tests, they are your receipts for the work done.

## TENTATIVE COURSE OUTLINE

Date	Titel	Resources
Wed 1/4	Amino Acids.	Creighton, Ch. 1, 1-23
Fri 1/6	Amino Acid Composition, Protein Sequencing, Edman degradation	Creighton, Ch. 1, 28-35
Mon 1/9	Physical Interactions	Creighton, Ch. 4, 139-160
Wed 1/11	Geometry of Peptide Chains, Secondary Structure of Proteins	Creighton, Ch. 5, 171-188
Fri 1/13	Protein Synthesis	Creighton, Ch. 2, 49-58.
<i>Mon 1/16</i>	<i>Martin Luther King Jr. Day</i>	
Wed 1/18	Site Directed Mutagenesis	Creighton, Ch. 2, 59-64
Fri 1/20	Protein Classes	Creighton, Ch. 2, 64-77
Mon 1/23	Post-Translational Modifications	Creighton, Ch. 2, 78-97
Wed 1/25	Stability of the Folded Conformation	Creighton, Ch. 7, 287-308
Fri 1/27	The Ribosome	
Mon 1/30	Protein Degradation	Creighton, Ch. 10, 463-472
Wed 2/1	Protein Purification, HPLC.	Creighton, Ch. 1, 23-28
Fri 2/3	2D Electrophoresis, Proteomics	
Mon 2/6	<b>Midterm Exam</b>	
Wed 2/8	MS – Mass Spectrometry, Sequencing	Creighton, Ch. 1, 35-40.
Fri 2/10	Fourier Series	
Mon 2/13	XRD – X-Ray diffraction. The hardware	Creighton, Ch. 6, 201-216.
Wed 2/15	XRD – Applications	
Fri 2/17	TEM – Transmission Electron Microscopy	
<i>Mon 2/20</i>	<i>Presidents' Day</i>	
Wed 2/22	TEM – Applications	
Fri 2/24	AFM – Atomic Force Microscopy	
Mon 2/27	NMR – Nuclear Magnetic Resonance	Creighton, Ch. 6, 238-244
Wed 3/1	ATP Synthases	
Fri 3/3	Potassium Channels	
Mon 3/6	Water Channels	
Wed 3/8	Protein Transporters	
Fri 3/10	Motor Proteins	
Mon 3/13	The Nuclear Pore Complex	
<b>Fri 3/17</b>	<b>Final Exam</b>	<b>8:00 am – 10:00 am</b>