

# Principles of Biochemistry

## Chemistry 5710 Spring 2008

Section 1, M W F, 10:30-11:20 AM, OLD MAIN 119  
Professor Joanie M. Hevel  
Widtsoe 235, 797-1622 [jhevel@cc.usu.edu](mailto:jhevel@cc.usu.edu)

- Office Hours:** Mon, 1:00PM-2:00PM, Wed, 1:00PM-2:00PM, Thurs.10AM-11AM, other times by appointment.
- Text:** “Lehninger Principles of Biochemistry”, 2005, Nelson and Cox, 4th ed. or a comparable two semester text (e.g. Voet and Voet, Garrett & Grisham)
- BlackBoard Vista** I will be using BlackBoard Vista for the management of Chem 5710. All reserve materials (class standings, current exam keys, previous exams, problem set solutions, lecture overheads, and other material relevant to the course) will be posted on BBV. The reserve materials will be provided to you as downloadable PDF files, which require AcrobatReader, a free program available for both IBM and mac platforms at the Adobe web site. Importantly, *you will take your weekly practice quizzes using BBV*. I will also establish a BBV bulletin board where students can post questions and I will be able to answer them for the entire class to see.
- Lecture Overheads** Copies of my lecture overheads will be posted on BBV. I strongly recommend downloading and printing the appropriate overheads BEFORE lecture and using them to take your notes in class.
- Prerequisites:** A full year of organic chemistry (Chem 2310-2320, or equivalent) and Chem 5700
- Course Withdrawal:** Withdrawal from the course after Jan 28 will result in a “W” notation being placed on your transcript. No withdrawal is permitted after Mar 30.
- Provisions:** The administration of Chem 5710 will adhere strictly to the regulations outlined in the Spring Semester Schedule of Classes, pp. 110-115. Per recent instructions from the Dean’s office, no assignments will be accepted or graded from students not formally enrolled in the course. Students not enrolled in the course may sit in only with instructor approval.
- Course Content:** Chemistry 5710 is the second of a two semester course sequence in Biochemistry. The intent of this sequence is to provide a thorough and comprehensive survey of biochemistry for science majors (undergraduates and graduates). Chemistry 5710 will focus on anabolism, signaling and information pathways. On the following pages is a tentative outline of the topics to be covered in the M W F 10:30 AM class meetings.
- Practice Quizzes** Practice quizzes will cover material presented in the previous week’s lecture **OR** in the reading material. The quizzes are to be taken on-line using BBV. The quizzes are open book but should be worked individually (i.e. no help from

classmates, etc). The intent of the quizzes is to keep you on top of the course material- i.e. not waiting until exam time to cram. These practice quizzes will require you to spend time **READING** the text. Quizzes can be taken as many times as needed. You will have 15 minutes to answer 5 questions.

**Problems:** Study questions will be periodically distributed during the course of the semester. I also recommend that you work the study questions and problems found at the end of each chapter of your textbook. These are to keep you up to date with the material. You will also have three problem sets totaling 150 points.

**Exams:** Three hourly exams (100 points each) will be given during class on the dates indicated on the course schedule. The final exam counts 150 points (75 points on material presented since exam 3; 75 points comprehensive). The exam formats (i.e. short answer, short essay, problem solving, matching) will be similar to the exams given in past years. The *comprehensive section only* of the final exam will be multiple choice. I strongly encourage you to work the past years exams as part of your exam preparation. Make-up exams will only be allowed for students that can demonstrate a documented birth or death in the family or a documented illness or presence at a scientific conference. Family vacations do NOT apply. Since I have incorporated time in the syllabus for review before an exam, I will not be holding extra review sessions outside class.

**Assessment** Gain scoring will be used to address if learning objectives are being met. Every student will take a short quiz on the first day of class. This quiz will be graded, but the score will have no impact on the student's grade. The same (or very similar) quiz will be given to students on the last day of classes. The per cent increase in correct answers will be used to assess the class.

**Grading:** \*\*There will be **NO EXTRA CREDIT** awarded in this class.

Problem Set #1 DUE 1/23	50 points
Problem Set #2 DUE 2/22	75 points
Problem Set #3 DUE 4/18	25 points
Three hourly exams .....	300 points
Comprehensive Final exam .....	150 points
<b>Total .....</b>	<b>600 points</b>

General breakdown of grading scale is as follows:

100-91%	A through A-
90.9-78%	B+ through B-
77.9-68%	C+ through C-
67.9-59%	D+ through D-

*In accordance with the Americans with Disabilities Act, reasonable accommodations will be provided for all persons with disabilities in order to ensure equal participation in Chem 5710. In cooperation with the Disability Resource Center, reasonable accommodation will be provided for students with disabilities. Please meet with the instructor during the first week of class to make arrangements. Alternative format print materials, large print, audio, diskette or Braille, will be available through the Disability Resource Center.*

## Class schedule

Week	Day	Date	Lecture	Topic	Chapter, Lehninger	Quiz
1	M	1/7	1	Introduction to the course; photosynthesis	19	none
	W	1/9	2	Photosynthesis	19	
	F	1/11	3	Carbohydrate biosynthesis	20	
2	M	1/14	4	Carbohydrate biosynthesis	20	1
	W	1/16	5	Carbohydrate biosynthesis	20	
	F	1/18	6	Lipids	21	
3	M	1/21	--	Holiday--no class	--	2
	W	1/23	7	Lipids PROBLEM SET #1 DUE	21	
	F	1/25	8	Amino acids	22	
4	M	1/28	9	Amino acids	22	3
	W	1/30	10	Amino acids	22	
	F	2/1	11	Review for exam		
5	<b>M</b>	<b>2/4</b>		<b>Exam 1: covers Lectures 1-11</b>		none
	W	2/6	12	DNA Technologies	9	
	F	2/8	13	DNA Technologies	9	
6	M	2/11	14	DNA Technologies	9	4
	W	2/13	15	DNA Technologies	9	
	F	2/15	16	Biosignaling	12	
7	<b>T</b>	2/19	17	Biosignaling	12	5
	W	2/20	18	Biosignaling	12	
	F	2/22	19	Biosignaling PROBLEM SET #2 DUE	12	
8	M	2/25	20	Biosignaling/Hormonal Regulation	12/23	6
	W	2/27	21	Hormonal regulation/	23	
	F	2/29	22	Hormonal regulation	23	
9	<b>M</b>	3/3	23	Review for exam		none
	W	3/5		<b>Exam 2: covers Lectures 12-23</b>	24	
	F	3/7	24	Genes & Chromosomes	24	
10	M	3/10	--	SPRING BREAK		none
	W	3/12	--	SPRING BREAK		
	F	3/14	--	SPRING BREAK		
11	M	3/17	25	Genes & Chromosomes	24	7
	W	3/19	26	DNA metabolism	25	
	F	3/21	27	DNA metabolism	25	
12	M	3/24	28	DNA metabolism	25	8
	W	3/26	29	DNA metabolism/RNA metabolism	25/26	
	F	3/28	30	RNA metabolism	26	
13	M	3/31	31	RNA metabolism	26	9
	W	4/2	32	RNA metabolism	26	
	F	4/4	33	review		
14	<b>M</b>	4/7		<b>Exam 3: covers lectures 24-33</b>		none
	W	4/9	34	Protein metabolism- guest lecturer	27	

	F	4/11	35	Protein metabolism	27	
<b>15</b>	M	4/14	36	Protein metabolism	27	<b>10</b>
	W	4/16	37	Regulation of gene expression	28	
	F	4/18	38	Regulation of gene expression <b>PROBLEM SET #3 DUE</b>	28	
<b>16</b>	M	4/21	39	Regulation of gene expression-guest lecturer	28	<b>11</b>
	W	4/23	40	Applied biochemistry/catch-up		
	F	4/25	41	Catch-up/review for final		

**FINAL EXAM is scheduled for 4/30 WEDNESDAY 9:30-11:20am**

**Much of the raw information in this class you may have seen before, perhaps in another class. However, this is a 5000 level class, which means that you should begin to apply raw information to solve problems. Many times we will see that there is more than one right answer to a question.**

#### **Course Learning Objectives**

1. Describe the basic biochemical principles of photosynthesis: general features, light absorption and light-driven electron flow and ATP synthesis
2. Describe the biochemical basis for carbohydrate, lipid, nucleic acid, and protein synthesis: cellular location, functions of enzymes, regulation, and function of products
3. Explain the use of DNA technologies in the research laboratory, the clinic and in industry
4. Develop a comprehensive view of how higher organisms receive and respond to external stimuli at the biochemical level
5. Describe how mammalian metabolism is integrated as demonstrated by hormonal regulation
6. Describe the structure and topology of chromosomes and genes and how they are packaged and how this relates to gene expression
7. Explain how the expression of genetic information is regulated