CHEMISTRY 350 – MOLECULAR PRINCIPLES OF BIOCHEMISTRY

FALL 2014

COURSE OVERVIEW	This course is designed to help students master the fundamental knowledge they need in order to understand the key molecular processes in biology. Instead of learning a large number of facts and observations, students are challenged to develop a deeper insight into the primary molecular principles operating behind biochemistry. The course will train students to use these concepts to understand how cells leverage fundamental chemical forces to perform important biological functions, emphasizing the interpretation of facts and the synthesis of knowledge by deduction, over memorizing details and specifics. Main topics include: biomolecular structures, protein and nucleic acid chemistry and functions, carbohydrates, lipid membranes, enzyme catalysis and kinetics, and biochemical signaling. In addition, a concise overview of molecular biology will be given, highlighting the key molecular processes central to metabolism and to gene expression and replication.				
FACULTY	Professor Chi H. Mak Office: SSC 704 (213) 740-4101 <u>cmak@usc.edu</u>				
OFFICE HOURS	T 11-12 (Other times by appointment)				
LECTURE	TTh 9:30-11 in SOS B46				
DISCUSSION	F 11-12 or F 12-1				
TA	Paul Henke SSC 705 phenke@usc.edu				
PREREQUISITE	BISC-220 or BISC-221				
	Co-requisite: CHEM-322a or CHEM-325a				
TEXTBOOKS	Required:				
	1. <i>Fundamentals of Biochemistry: Life at the Molecular Level</i> , 4 th Edition, by Voet, Voet and Pratt, 2013, Wiley. ISBN:978-0-470-54784-7				
	Recommended:				
	 Student Companion to Accompany Fundamentals of Biochemistry by Uzman, Johnson, Widger, Eichberg, Voet, Voet and Pratt, 2012, Wiley. ISBN: 978-1-118-42474-2 				
WEBSITE	http://chemmac1.usc.edu/499				
	The Web will be used extensively in this course for instructions, homework, discussions and for distribution of information. Make sure you have access to the web.				
LECTURES	Chapters 1 through 13 will be covered in detail this semester. Overview of the topics in rest of the book (Chapters 14 through 18 and 20 through 28) will be given towards the end of the course to highlight some key metabolic pathways, gene expression and regulation mechanisms, as well as DNA replication. Reading and problem assignments are assigned every lecture.				
	<u>Full attendance at all lectures is expected</u> . You are responsible for any announcements made in lecture and all material presented whether or not it is in the textbook. Your responses to PRS questions (see Participation below) will be used to measure your attendance.				

DISCUSSION	A weekly discussion section will be led by the TA to go over the homework and lecture materials.					
HOMEWORK	Homework consists of weekly problem sets. Homework is assigned after every lecture. <u>Weekly</u> <u>homework is collected during lecture every Thursday</u> .					
READING ASSIGNMENT	The lectures will not necessarily revisit every section in the textbook, especially the basic ones. It is therefore critical that you do the reading assignments thoroughly. Reading assignment for each lecture is posted on the web. You should complete the reading assignment <u>before</u> you come to class.					
GRADING	One-Hour Exams Problem Sets Final Exam Participation Total:	3 @100 points 12 @20 points 1 @200 points 35 points	300 240 200 35 775			
	An approximate letter grade will be assigned by the end of the seventh week to give you an idea of your status in the course. The letter grade you receive at mid-term is no guarantee of your final grade. There is no strict grading curve for this course.					
EXAMS	There will be three 1-hour exams given during the semester. The materials covered on each exam will be announced in lecture prior to the exam. The exams will be given during the leture time. The one-hour time period will be strictly enforced. No one will be allowed to enter the exam late or leave early. Bring your student I.D. to all exams.					
PARTICIPATION	In-class discussions will be used to encourage students to actively engage in the learning process. Discussion will be conducted in small groups and/or through a web-based peer response system (PRS) which you can assess on any web-enabled device such as a cell phone or a tablet. Students are encouraged to actively participation in all in-class discussions.					
FINAL EXAM	A comprehensive two-hour final exam will be given on December 11, 2014 at 11:00 am to 1:00 pm. This is the <u>only</u> time the final exam may be taken. No early or makeup final will be given.					
ABSENCES	All unexcused absences from an exam will result in a zero. Individuals with excused absences will be given special consideration at the end of the semester. Absences will be excused on the basis of official university policy. To secure an excused absence, bring verification to Prof. Mak prior to the absence, or in case of illness, immediately upon your return. All excuses will be verified.					
TEACHING ASSISTANTS	You are strongly encouraged to see any of the TAs during their office hours for questions or assistance on homework or the lecture materials.					
COPYRIGHTED MATERIALS	All course materials, homework solutions, Any student who tran the course is in viola	including notes, slides, ex discussion questions and nsmits any of these materi tion of USC student condu	exams, exam keys, PRS questions, homework, nd case studies are considered copyrighted materials. erials to unauthorized users who are not registered in nduct code and will be reported to SJACS.			

Statement for Students with Disabilities:

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. Website and contact information for DSP:

http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html, (213) 740-0776 (Phone), (213) 740-6948 (TDD only), (213) 740-8216 (FAX) ability@usc.edu.

Statement on Academic Integrity:

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. *SCampus*, the Student Guidebook, (<u>www.usc.edu/scampus</u> or <u>http://scampus.usc.edu</u>) contains the University Student Conduct Code (see University Governance, Section 11.00), while the recommended sanctions are located in Appendix A.

Emergency Preparedness/Course Continuity in a Crisis:

In case of a declared emergency if travel to campus is not feasible, USC executive leadership will announce an electronic way for instructors to teach students in their residence halls or homes using a combination of Blackboard, teleconferencing, and other technologies.

LECTURE AND EXAM SCHEDULE

Week	Торіс	Reading	Problem Set Due	Exams & Special Dates
1	Essential Chemistry Background Water	Ch. 1 Ch. 2		
2	Nucleotides, Nucleic Acids and Genetic Information	Ch. 3	#1	
3	Amino Acids Protein Primary Structures	Ch. 4 Ch. 5	#2	
4	Protein Tertiary Structures Protein Functions	Ch. 6 Ch. 7	#3	
5	Carbohydrates	Ch. 8	#4	Exam 1
6	Lipids and Biological Membranes	Ch. 9	#5	
7	Membrane Transport	Ch. 10	#6	
8	Enzyme Catalysis	Ch. 11	#7	
9	Enzyme Kinetics, Inhibition and Control	Ch. 12	#8	Exam 2
10	Biochemical Signaling	Ch. 13	#9	
11	Overview on Metabolism (I)	Ch. 14, 15, 16	#10	
12	Overview on Metabolism (II)	Ch. 17, 18, 20	#11	
13	Overview on Metabolism (III)	Ch. 21, 22, 23	#12	Exam 3
14	Overview on Gene Expression and Replication (I)	Ch. 24, 25		Thanksgiving
15	Overview on Gene Expression and Replication (II)	Ch. 26, 27, 28		
Final				Final Exam