

Chemistry 560
General Biochemistry
Fall 2015

- Instructor:** Tom Huxford
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- Course time:** 11:00 a.m. - 12:15 p.m., Tues. & Thurs., PG 242
- Office hours:** Tues. 1:00 - 2:00 p.m. & Thurs. 9:00 - 10:00 a.m., OR
Call or e-mail to make an appointment, OR
Drop by my office/lab (CSL 325)
- Textbook:** Fundamentals of Biochemistry, Fourth Edition (2012)
D. Voet, J. Voet & C.W. Pratt (John Wiley & Sons, Inc.)

The course:

Prerequisites-General Chemistry, Organic Chemistry, General Biology

Course description-Biochemistry is an attempt to describe the complex traits of biological systems in terms of the molecules that make up living things. It is an active area of experimental science. As such, its theories are constantly being reworked and refined as new biological systems are discovered and characterized. The goal of this course is to introduce to students of chemistry the basic concepts required for advanced study of biochemistry including metabolism, signal transduction, and molecular biology. Furthermore, students with interests in biotechnology, life sciences, and molecular medicine will gain a working vocabulary and understanding of the molecules that drive these fields.

Expected student learning objectives-

Students who successfully complete this course will be able to:

- (i) identify the structures and chemical properties of important biomolecules and biopolymers. These include nucleotides and nucleic acids; amino acids and proteins, carbohydrates and polysaccharides, and lipids and membranes;
- (ii) classify protein structural hierarchy and illustrate how it relates to protein function;
- (iii) describe the principles that drive membrane structure and function;
- (iv) quantitatively characterize enzymes (protein catalysts), calculate enzymatic constants, and classify types of enzymatic regulation.

Please note-To be successful in this course, you must develop a working familiarity with a vast amount of material. Be prepared to dedicate sufficient time each week to stay current with your reading and studying. You will need to read an average of 20-30 pages of text each week. However, not all of the chapters will be covered in their entirety. Please consult the “Reading” column in the lecture schedule on pages 3 and 4 of this syllabus to identify chapter pages from which quiz and exam material will be taken. This is not a course for which one can cram the night before an exam. However, neither is this the most complicated material with which you will be presented during your science education.

*Resources available to students-*Your textbook is the primary resource for this course. Lecture will closely follow the sequence and organization of the text. A concise list of “lecture goals” will be included with each lecture. The purpose of outlining the lecture goals is to aid students in studying for exams. The slides used in lectures will be posted to the Blackboard site 24 hours prior to lecture. This is to aid students in note taking and reinforce the lecture goals during study.

*Homework-*We will be making use of an online homework/study module prepared specifically for this course by Sapling Learning. All students are required purchase access to the online homework program. Instructions on how to enroll are at:

<http://bit.ly/saplinginstructions>

Select the course: “San Diego State University – CHEM 560 – Fall15 – HUXFORD”. Once you are enrolled, please take time to go through the “Introduction to Sapling Learning” and “Drawing Tips and Practice” tutorials. Completion of each tutorial is worth 1 point toward your final grade. Additional assignments will be made available as we proceed through each of the first twelve chapters in the Voet, Voet & Pratt text.

*Exams and grading-*There will be twelve online homework assignments, two quizzes, two mid-term exams, and a cumulative final. The point distribution is as follows:

Homework Assignments (12) 4 points each + 2 for tutorial **50** points total

Quizzes (2-20 min) 25 points each **50** points total

Midterms (2-75 min) 100 points each **200** points total

Final exam (145 min) 150 points **150** points

Total 450 points

Chemistry 560, Fall 2015

SCHEDULE

Date	Topic (Lecture number)	Reading
Aug 25	Introduction Biochemistry is chemistry of life (1)	
Aug 27	Energy in biological systems (2)	Ch. 1 (1-19)
Sep 1	Water, acids, bases, and buffers (3)	Ch. 2 (22-37)
Sep 3	Nitrogenous bases, nucleosides, and nucleotides (4)	Ch. 3 (40-43)
Sep 8	Nucleic acids and the Central Dogma (5)	Ch. 3 (44-51)
Sep 10	Quiz 1 (Lectures 1-4; last 20 minutes of class) Polymerases and nucleic acid synthesis (6)	Ch. 3 (51-62)
Sep 15	Recombinant DNA technology (7)	Ch. 3 (62-72)
Sep 17	Amino acids (8)	Ch. 4 (76-90)
Sep 22	Protein purification and analysis (9)	Ch. 5 (93-105)
Sep 24	Protein sequencing and evolution of proteins (10)	Ch. 5 (106-122)
Sep 29	Exam 1 (Lectures 1-10)	
Oct 1	Protein secondary structure (11)	Ch. 6 (127-141)
Oct 6	Protein tertiary and quaternary structure (12)	Ch. 6 (142-156)
Oct 8	Protein stability and folding (13)	Ch. 6 (156-172)
Oct 13	Protein function: Myoglobin and hemoglobin (14)	Ch. 7 (176-196)
Oct 15	Protein function: Antibodies (15)	Ch. 7 (208-213)
Oct 20	Monosaccharides (16)	Ch. 8 (217-223)
Oct 22	Polysaccharides and glycoproteins (17)	Ch. 8 (224-238)
Oct 27	Quiz 1 (Lectures 11-16; last 20 minutes of class) Catch up/Review	

Oct 29	Lipids (18)	Ch. 9 (241-254)
Nov 3	Lipid bilayers and membrane proteins (19)	Ch. 9 (255-264)
Nov 5	Biological membranes (20)	Ch. 9 (265-285)
Nov 10	Facilitated transport across membranes (21)	Ch. 10 (288-303)
Nov 12	Active transport across membranes (22)	Ch. 10 (304-311)
Nov 17	Catch up/Review	
Nov 19	Exam 2 (Lectures 11-22)	
Nov 24	Enzyme catalysis (23)	Ch. 11 (315-323)
Nov 26	NO CLASS—THANKSGIVING DAY HOLIDAY	
Dec 1	Catalytic mechanisms: Serine Proteases (24)	Ch. 11 (323-332) (339-351)
Dec 3	Enzyme kinetics (25)	Ch. 12 (355-366)
Dec 8	Enzyme inhibition and bisubstrate mechanisms (26)	Ch. 12 (366-376)
Dec 10	Catch up/Review	
Dec 15	Final Examination (Lectures 1-26) 10:30 a.m. - 12:55 p.m. PG 242	