CHEMISTRY 3438
Introductory Biochemistry
Fall 2017
CFS 121, TuTh 8:00-9:20

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Office hours: Tuesday, Thursday 9:30-11:00; and 2:30-5:30pm; Wednesday 2:00-4:00; (others by appointment)
Text: *Biochemistry, 7th Edition*, Berg, Tymoczko and Stryer

Lab: *All supplementary protocol, handouts, instructions, and materials available on the Blackboard*

CHM 3438 is the first semester of a two semester course designed for science majors and students in preprofessional programs. This course will count as advanced hours in Chemistry for either the major or the minor. The second semester CHM 3439 course is offered in the spring semester of odd-numbered years. Four-hour laboratory. Writing Enhanced. Prerequisites: A minimum grade of C in CHM 2325. Fall. Credit 4.

Biochemistry is the study of the molecules and chemical reactions of life. Physical laws which apply to natural processes also apply to living organisms. Looking at life's processes on the molecular level, one finds that the basic principles of biochemistry are common to all living organisms. Fundamental molecules of life - proteins, carbohydrates, lipids and nucleic acids - are similar in structure and function in all living organisms. The major areas we will focus on in this course will involve the molecular structure of proteins and how function is related to structure, catalytic molecules and their controls, and the transfer of genetic information. Understanding the complex yet efficient biological molecules and processes that involve them is the basis for treatment of diseases. Current "hot" research areas related to enzymes (enzymes in drug antidotal therapy, enzyme mechanism, enzyme delivery systems) will also be discussed.

Objectives:

- Understand the nature of amino acids and proteins, and how their structures support their functions
- Understand and be able to perform and analyze enzyme kinetic experiments
- Become familiar with the fundamental lab techniques used in the field of biochemistry
- Understand the detailed organic chemistry of how enzymes catalyze chemical reactions
- Become familiar with the role of genetics and bioinformatics in modern biochemistry, and be able to find, read, interpret, and apply bioinformatics data
- Understand the basic features of drug (enzyme) delivery systems; enzymes in drug antagonism and drug metabolism

Writing Enhancement

This is a writing enhanced course, and as such a significant portion of the course is designed to help you improve your writing. The majority of your lab grade (which is 25% of the course grade) is awarded for your formal lab reports, of which there are **four**. A portion of the points are also awarded for your written laboratory notebook and discussions you will write there after each experiment. You will receive written comments on your writing so that you may improve for the subsequent reports and notebook discussions. You will also have lecture assignments requiring you to write posts in the discussion board in Blackboard. Very detailed requirements for formal reports and the notebook will be provided in writing in lab and discussed the first day of lab.

Tentative Schedule: (*The schedule above is subject to change).*

DATE	SUBJECT	CHAPTERS
8/24 - 9/14 **9/19**	Introduction; *Background Review; Amino Acids; Protein Composition and Structure; Protein Purification **Exam #1**	1; 2, 3A *(handouts will also be provided on the background review)
9/21 – 10/03 **10/05**	Protein Sequence; Protein synthesis; Protein Calculations; Background Review C; Protein Characterization; Protein Function: Hemoglobin **Exam #2**	3B; 7
10/10– 10/19 **10/24**	Protein Function: Enzyme Catalysis; Enzyme Mechanism: Enzyme kinetics; Enzyme inhibition; Vitamins and Coenzymes Enzyme regulation **Exam #3**	8; 9, 10
10/26 – 11/02 **11/07**	Nucleic Acid Structure and Function; Ribosomal Protein Synthesis; Gene Regulation; DNA Fingerprinting; DNA Sequences; Solid Phase DNA Synthesis; *Recombinant Biotechnology; Gene Manipulations Molecular Motors **Exam #4**	4; 5; 34 *(handouts on topics on recombinant biotechnology will be provided)
11/09 – 11/14 **11/16** 11/21-11/28 11/30	*Current Research in “Enzymes in Drug Antidotal Therapy” and “Enzyme Delivery Systems” *Enzymes of Drug Metabolism (Phase I and Phase II) **Exam #5** Student Presentation days (I;II) Final preparation	*(handouts will be provided on current research topics and Phase I and Phase II Enzymes)

You are expected to attend all lectures and labs. No points will be awarded or subtracted based on lecture attendance. A grade of zero will be given for any missed labs.

During the semester there will be 5 tests and the final. Test with the lowest grade will be dropped automatically. The final will be a comprehensive test. Your grade in the class will be based on the average of your four highest exam grades (50%) + the final grade (20%) and any quizzes or other assignments, presentation, given during the semester (5%) and laboratory grade (25%).

Grading:

Average of four exams (4 x 125 =500 points)	50 % of course grade
Final Exam (200 points)	20 % of course grade
Quizzes/Assignments/Bonus Points Presentation (max 50 points)	5 % of course grade
Laboratory grade (250 points)	25 % of course grade

Grade scale:	90 – 100 %	A
	80 - 89 %	B
	70 - 79 %	C
	60 - 69 %	D
	Below 60 %	F

Some assignments/quizzes will be given via on the Blackboard. Sample test questions after each chapter will also be provided as a help for preparing for the tests. It is your responsibility to check the Blackboard site for this course on a regular basis. Before each exam, there will be a class assignment activity to help with deeper understanding the covered material. During the class assignment activity you can ask the professor/your classmates if you need help, or have any question. Everybody must submit their own class assignment sheet.

Attendance at exams is mandatory. Since I will drop the lowest test grade, if you miss one test that will be the dropped one. (You don't need to explain the reason why you dropped the test). However, if you miss more than one test, you must notify the professor (providing satisfactory evidence) as soon as possible, but no later than one week after the absence in order to ensure full rights (to be able to have a make-up test at the end of the semester).

Re-grades: If you have questions concerning the grading of your exam, quiz or problem set, you have one week after the date the exam, quiz or problem set was handed back to submit the work in question without any modification of it for re-grading along with a written statement explaining your reasoning. After one week all scores are final.

Student Syllabus Guidelines: You may find online a more detailed description of the following policies. These guidelines will also provide you with a link to the specific university policy or procedure:

http://www.shsu.edu/syllabus/

Academic Dishonesty: Students are expected to maintain honesty and integrity in the academic experiences both in and out of the classroom. *See Student Syllabus Guidelines*. Cheating will not be tolerated. Any student caught cheating on an exam or quiz will receive zero points on that quiz or

exam and will be reported for scholastic dishonesty. The use of a programmable calculator on an exam or quiz is considered cheating.

Classroom Rules of Conduct: Students are expected to assist in maintaining a classroom environment that is conducive to learning. Students are to treat faculty and students with respect. Students are to turn off all cell phones while in the classroom. Under no circumstances are cell phones or any electronic devices to be used or seen during times of examination.

Student Absences on Religious Holy Days: Students are allowed to miss class and other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. Students remain responsible for all work. *See Student Syllabus Guidelines*.

Students with Disabilities Policy: It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance should register with the Office of Services for Students with Disabilities located in the Lee Drain Annex (telephone 936-294-3512, TDD 936-294-3786, and e-mail disability@shsu.edu). They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired.

SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I encourage you to register with the SHSU Services for Students with Disabilities and to talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: No accommodation can be made until you register with the Services for Students with Disabilities. For a complete listing of the university policy, see:

http://www.shsu.edu/dept/academic-affairs/documents/aps/students/811006.pdf

Visitors in the Classroom: Only registered students may attend class. Exceptions can be made on a case-by-case basis by the professor. In all cases, visitors must not present a disruption to the class by their attendance. Students wishing to audit a class must apply to do so through the Registrar's Office.

Fun with Benefit: Based on the covered material on this course, student will be able to understand many human diseases/medical problems, *e.g. Mad Cow Disease; Alzheimer Disease; Diabetes; Vitamin Deficiency; Bacterial Infections and Treatment; General Viral Infection; Hemochromatosis; Thyroid Disease; Metabolic Acidosis; Enzyme Deficiency Diseases; Blood Clot, Stroke, Hematuria.* Students can choose from the above mentioned topics for short discussion / presentation / written assay for bonus points. Due date of signing up: November 19.