

Course Code: CHEM 480
Course Title (credits): Special Topics: Biochemistry Lab
Term and Year: Spring 2015
Course Ref. No. (CRN): 10010

Instructor: Sean Ryland
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Office: TCES Second Floor
Office hours can be arranged by appointment

Meeting Time: Tuesday 4:00 PM - 6:45 PM
Location: TCES202

Corequisites: CHEM 471: Biochemistry

Course Description:

Study of the structure and flow of gene expression, oxygen transport proteins, enzyme dynamics, membranes, energy metabolism and muscle contraction. The lab portion of this class will focus on modern laboratory and computational techniques used to characterize and purify proteins and other biological molecules.

Student Outcomes:

Students successfully completing Biochemistry and Lab will demonstrate the following:

- Sufficient understanding of the structure, function, and regulation of biological molecules (protein, DNA, and RNA) to successfully answer related questions on pre-professional exams (MCAT, GRE, etc.)
- Sufficient understanding of the structure, function, and regulation of biological molecules (protein, DNA, and RNA) to take related graduate courses.
- Competence in laboratory techniques and ability to write laboratory reports.
- Skill at critical analysis, logic, and problem solving involving facts and concepts of biochemistry, biology and experimental data.

Methods for Assessing Student Outcomes:

Weekly homework assignments, two hour exams and a comprehensive final exam will be used to assess student knowledge and competence. Written laboratory reports will be assigned to evaluate student mastery of laboratory techniques and concepts.

Learning Strategies:

Organic Chemistry II and Lab will use texts oriented to understanding concepts and problem solving, lectures, assigned homework problems for each chapter, class problem solving sessions. In laboratory exercises, students must prepare a laboratory plan, keep a notebook of laboratory results, and compile a laboratory report to communicate a body of knowledge, concepts, and skills related to organic chemistry and scientific research. Student study groups outside of class time are highly encouraged.

Instructional Texts:

No additional texts are required for the lab portion of the class.

Attendance:

Attendance will not be graded. HOWEVER, any higher education course demands a substantial time commitment, science classes more than most. Missing a laboratory exercise will result in forfeiture of credit for any in-class work. Laboratory reports will only be accepted from students who have completed the lab exercise. Laboratory exercises can be made up at the discretion of the instructor. Acceptable excuses include, but are not limited to, illness (of the student or a dependent) with a physician's note, military duty or family bereavement. Oversleeping or conflicting employment schedules are NOT acceptable excuses.

Sanctions for Academic Dishonesty:

For a comprehensive definition of what is considered cheating or plagiarism, please refer to the Sierra Nevada College Course Catalog. In short, academic dishonesty is representing another's work or thoughts as your own or fabricating results. For the first offense, the student receives a zero for assignment/exam and/or a determination by the faculty if the student should fail the course is made. Counseling with faculty on the honor code, consequences for violating the honor code, and the value of academic honesty in learning are provided. In the event of a second offense, the student will be expelled.

Special Accomodations (ADA) Statement:

"In accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, students with a documented disability are eligible for support services and accommodations. If a student wishes to request an accommodation, contact the Director of Student Services (Prim Library room 323) at (775) 831-7799 x7534 within the first week of the semester."

Grading Policy:

Separate letter grades will be awarded in CHEM 471 and CHEM 480 according to standard grading conventions as follows. A: >90%, B: 80-90%, C: 70-80%, D: 60-70%, F: <60%. Plus and minus grades will awarded accordingly. Grades in CHEM 480 will be determined as follows:

Laboratory Reports:	70%
Laboratory Final:	30%

Lab Reports: The format of Lab Reports will be discussed during the first lab session. Students will be allowed to drop the scores of two lab reports from their final grade in order to account for absences and unforeseen circumstances. Please, DO NOT skip lab exercises just because you can; you might end up needing to skip lab for unforeseen circumstances later in the semester. Students who complete all lab reports will be allowed to average the percentage of their two worst lab report scores instead of taking the laboratory final.

Laboratory Final: The Lab Final will consist of a take home final that emphasizes the use of problem solving skills in chemical settings. Any material previously covered in lab or in lecture may be covered, as well as questions regarding proper use of glassware, lab safety and instrumental analysis.

Due Dates and Late Work: Assignments are due at Midnight on the day they are due. However, the student is responsible for finding a way to turn in the assignment if the instructor has already left the school. Assignments will be accepted via email **ONLY IN PDF FORMAT**. Once the due date has passed, assignments are docked 10% of the total points possible. Every day following, the assignments lose an additional 10%. Assignments more than 5 days late may not be accepted.

Advice from a Former Student: Be present and awake in class and lab. I know it's not possible to pay attention every minute of every lecture, but I will provide plenty of opportunities for students to discuss material during class, which should help you absorb the material and stay awake. Try not to fall behind, as that will impact your ability to comprehend the new material being presented. Do not be afraid to ask me or others for help with difficult concepts, but put a significant amount of time into the problem before you come to office hours if you want to get anything out of it.

Acknowledgements:

Thanks to Dr. Tom Clarke for the use of his syllabi in crafting this syllabus.

The instructor reserves the right to change this syllabus at any time if it is in the best interests of the students.

Tentative Course Schedule:

WEEK	DAY	DATE	Lecture Topics	CHAPTERS	Lab
1	T	Jan 20	Biochemistry Foundations	Ch. 1	Introduction and Basic Lab Skills
	TH	Jan 22			
2	T	Jan 27	Chemistry and Physics Review	Ch. 2	Titrating Weak Acids
	TH	Jan 29			
3	T	Feb 03	Amino Acids and Protein Structure	Ch. 3	Protein Folding Game
	TH	Feb 05			
4	T	Feb 10	Tertiary and Quaternary Structure	Ch. 4	Gel Electrophoresis
	TH	Feb 12			
5	T	Feb 17	Immunoglobins and Molecular Motor Proteins	Ch. 5	PCR and DNA Identification
	TH	Feb 19			
6	T	Feb 24	Exam 1		Planning Protein Purification
	TH	Feb 26			
7	T	Mar 03	Enzyme Case Studies	Ch. 6	Extraction of Lactate Dehydrogenase from Chicken
	TH	Mar 05			
8	T	Mar 10	Energy in the Cell	Ch. 13, 19	Purification of Lactate Dehydrogenase
	TH	Mar 12			
	T	Mar 17	Spring Break		
	TH	Mar 19			
9	T	Mar 24	Membrane Transport Proteins and Signals	Ch. 11-12	Bradford Protein Assay
	TH	Mar 26			
10	T	Mar 31	Glycolysis and Gluconeogenesis	Ch. 14-15	Electrophoresis of LDH
	TH	Apr 02			
11	T	Apr 07	Exam 2		Measuring Enzymatic Constants of LDH
	TH	Apr 09			
12	T	Apr 14	Nucleotides and Nucleic Acid Functions	Ch. 8-9	LDH Inhibition Mechanisms
	TH	Apr 16			
13	T	Apr 21	DNA Replication, Repair and Recombination	Ch. 25	Pharmacokinetics Modeling (Bring computer with Excel)
	TH	Apr 23			
14	T	Apr 28	Transcription and RNA Processing	Ch. 26	Final Assignment
	TH	Apr 30			
15	T	May 05	Exam 3		Final Preparation or Review Session for Lecture
	TH	May 07	No Class (Final Prep)	N/A	
16	T	May 12	3:00 PM - 6:00 PM		Final Presentations