CHEM 3753: Introduction to Biochemical Methods - Fall 2017

Instructor: Dr. Christina Bourne
Email: cbourne@ou.edu (please use "CHEM3753" in subject)
Action Center: Wednesdays 3:30-5:30pm (PHSC 114)
Office Hours: Fridays 11am-1pm (CHB 204)
Also available by appointment if you are unable to make scheduled hours

Classroom Lecture: Wednesdays, Fridays 2:30 pm – 3:20 pm, Neilson Hall 170
Online Content: canvas.ou.edu
Laboratory Sections: CHB 204 (You must check in for the first lab session)

Section	Date & Time	TA
011	Mon., 10:30 am – 1:20 pm	Mason Van Orden (Contact: masonvo@ou.edu)
012	Mon., 1:30 pm – 4:20 pm	Skyler Hebdon (Contact: shebdon@ou.edu)
013	Tues., 8:30 am – 11:20 pm	Ryan Bensen (Contact: rcbensen@ou.edu)
014	Tues., 1:30 pm – 4:20 pm	Ryan Bensen (Contact: rcbensen@ou.edu)
015	Wed., 11:30 am – 2:20 pm	Key Tse (Contact: keymtse@ou.edu)
016	Thurs., 8:30 am – 11:20 pm	Priya Parameshwaran (Contact: hpriyaparam@ou.edu)

Required Materials:

- Laboratory Notebook
- Safety Goggles (not safety glasses, if you don't know the difference check on-line for pictures) – you will not be permitted in the lab without them - **Safety goggles must be worn at all times while in the laboratory - this is a state law, and there will be no exceptions to this rule.** If you have any questions, come to the first lab before buying an unsuitable pair of goggles.
- A calculator for each class and lab (sharing will not be acceptable).
- TopHat app (at Tophat.com to purchase, please download and install before the first class)
- "Principles and Techniques of Biochemistry and Molecular Biology", 7th Ed., Cambridge University Press (ISBN 978-0521731676) – Strongly Recommended!

Prerequisites:

CHEM 3653 or concurrent enrollment

Course Description:

This is a one-semester survey of current and routinely used methods in biochemistry. The course will explain the theory of each technique in lecture (2 hours per week) and the execution of these through hands-on lab work (3 hours per week).

Course Goals:

The course is designed to give students an intermediate level of competency in understanding and performing common biochemical experiments. This knowledge provides a foundation for future studies in biochemistry-related careers and medical fields.

Learning Outcomes:

Upon completion, the student should be able fulfill these statements about the experiments used in the lab/lecture:

- Evaluate the basis of why you would do certain experiments
- Explain what physical phenomena is being tested
- Extrapolate from experimental results back to starting material properties
- Troubleshoot why experiments would give unclear (or wrong!) results

In particular, students should know how to:

- Make up solutions to a given molarity and to calculate dilutions
- Use Excel and the Solver plug-in, line fits
- Be able to calculate pH using the Henderson-Hasselbalch equation
- How PCR reactions work
- Design of protein expression vectors and how they work
- How to quantify DNA and proteins
- How to purify proteins using chromatographic methods
- How to characterize proteins and small molecules by spectrophotometry
- How to measure and analyze the kinetic activity of selected proteins
- How to assess the mode of inhibition in enzymatic activity assays
- Michaelis-Menton kinetics

Breakdown of Course Grading Policy

A = 90 to 100% of points earned
B = 80 to 89%
C = 70 to 79%
D = 60 to 69%
F = below 60%

Check your grades carefully when they are posted! If you feel a mistake has been made you must bring it to my attention within the first week of posting – no corrections will be made beyond this point.

Upon calculation of final grades rounding will be applied from 0.5% up to the next whole number, ie., an 89.5% will qualify as an "A"; HOWEVER, an 89.4% will NOT qualify as an "A". Please do not ask me to "give" you points or increase your grade beyond this rounding.

Course point distribution	Details	points	% of total
In class/online quizzes	10 quizzes, drop the lowest, 5 points each	= 45	7.5%
Homework sets	8 sets, drop the lowest, 10 points each	= 70	11.6%
In class participation	TopHat attendance and answering Q's	= 10	1.7%
Mid-term Exam	Wed. Oct. 11th 2:30pm-3:20pm	= 75	12.5%
Final Exam	Thurs Dec. 14th 4:30pm–6:30pm	= 150	25%
Lab section	See table below for distribution	= 250	42%
		= 600	

Point distribution for lab sections

	Week of	
Activity: Pipette Calibration	8/21-8/24	= 5
Lab 1: Spectrophotometry	8/28-8/31	= 15
Lab 2: pK_a of Fluorescein	9/11-9/14	= 15
Lab 3: Ion-Exchange Chromatography	9/18-9/21	= 15
Lab 4: Gel Filtration Chromatography	9/25-9/28	= 15
Performance Quiz #1		= 5
Lab 5: Purify genomic DNA, PCR amplification of *adhP*	10/2-10/5	= 15
Lab 6: Visualize PCR product, TOPO cloning, Transformation	10/9-10/12	= 15
Performance Quiz #2		= 10
Lab 7: Minipreps, Restriction Digest Analysis	10/16-10/19	= 15
Lab 8: Purification of AdhP enzyme, concentration determination	10/23-10/26	= 15
Lab 9: SDS-PAGE and Western Blotting	10/30-11/2	= 15
Lab 10: Western Blotting continued, Enzyme Activity Assay	11/6-11/9	= 15
Lab 11: Kinetics of AdhP – determine K_m, V_{max}, k_{cat}	11/13-11/16	= 15
Lab 12: Kinetics of Inhibition of AdhP	11/27-11/30	= 15
Check-out of labs (reserved for weather make-up if needed)	12/4-12/7	
	Total for labs	**= 200**
TA discretionary points (this is just for showing up and following directions – it equals 8.3% of the lab grade!)		**= 50**

Examinations, Quizzes and Homework

- In-class/online quizzes and (outside of class) homework assignments will be held throughout the semester, at the instructor's discretion, as detailed above.
- The instructor reserves the right to add "bonus point" quizzes or homework questions.
- There are no "curves" on any work, including exams
- You should come to class prepared for *every lecture*,
- This includes bringing *your own* calculator.
- There will be no make-up quizzes
- Consult with Canvas / TopHat prior to each meeting date to stay current with class requirements
- The mid-term and final exams will be <u>comprehensive to-date</u>.
- Make-up exams will only be allowed only with prior approval and/or appropriate documentation per university guidelines.
- The quizzes, homework assignments, and any action center problem sets are all designed to assist the student's understand of the concept(s) and calculation(s) associated with each of the biochemistry techniques that are being covered in this course. These questions/problems will help the student tremendously to prepare for the exams, especially to be able to solve the problems within the allotted exam time.
- While group work is encouraged, EACH STUDENT SHOULD BE VERY CAREFUL TO ENSURE THEY ARE DOING THEIR OWN WORK. (I do utilize plagiarism checkers and expect students to adhere to the academic integrity proscribed for OU students).

Adjustments for Pregnancy/Childbirth Related Issues
Should you need modifications or adjustments to your course requirements because of documented pregnancy-related or childbirth-related issues, please contact me as soon as possible to discuss. Generally, modifications will be made where medically necessary and similar in scope to accommodations based on temporary disability. Please see www.ou.edu/content/eoo/faqs/pregnancy-faqs.html for commonly asked questions.

Title IX Resources
For any concerns regarding gender-based discrimination, sexual harassment, sexual misconduct, stalking, or intimate partner violence, the University offers a variety of resources, including advocates on-call 24.7, counseling services, mutual no contact orders, scheduling adjustments and disciplinary sanctions against the perpetrator. Please contact the Sexual Misconduct Office 405-325-2215 (8-5) or the Sexual Assault Response Team 405-615-0013 (24.7) to learn more or to report an incident.

Academic Integrity
All students are expected to conform to college-level standards of ethics, academic integrity, and academic honesty. By enrolling in this course, you agree to be bound by the Academic Misconduct Code published in The University of Oklahoma Student Code (http://studentconduct.ou.edu/). Please see http://integrity.ou.edu for more information.

All members of the community recognize the necessity of being honest with themselves and with others. Cheating in class, plagiarizing, lying and employing other modes of deceit diminish the integrity of the educational experience. None of these should be used as a strategy to obtain a false sense of success. The need for honest relations among all members of the community is essential.

Religious Observance
It is the policy of the University to excuse the absences of students that result form religious observances and to reschedule examinations and additional required classwork that may fall on religious holidays. Schedule conflicts such as these should be brought to the instructor's attention at the beginning of the semester.

Reasonable Accommodation Policy
Students requiring academic accommodation should contact the Disability Resource Center for assistance at (405) 325-3852 or TDD: (405) 325-4173. For more information please see the Disability Resource Center website http://www.ou.edu/drc/home.html.

Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.