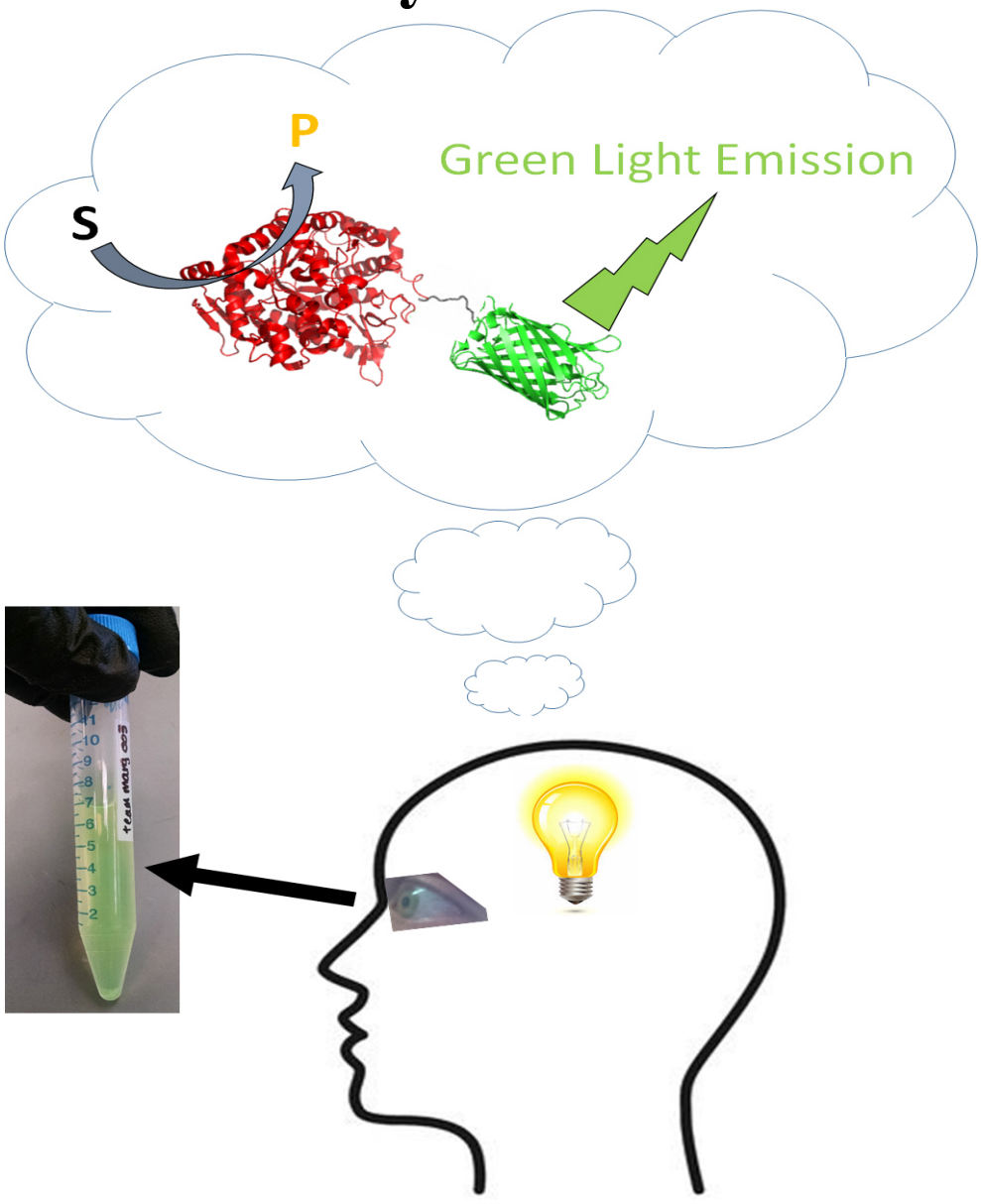
CHEM 4135
Biochemistry Laboratory
Syllabus



Let's see some biochemistry!!

CHEM 4135 Biochemistry Laboratory Spring 2024
Section 001

Instructor: Dr. Jiyong Lee
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Office Hours: Monday and Tuesday 11 am - 1 pm and by appointment.
Lab Meeting: Monday 1:00-6:00 pm in Ratliff Building South, Room 4007
Text: The lab manual is provided through the Canvas website for the course.

Required Equipment:
1) A bound notebook with index and carbonless copies
2) A scientific calculator
3) 12 inch ruler with metric scale
4) Close toed shoes
5) Safety goggles

Course Resources: Additional materials will be provided as either handouts or through the course Canvas site.

Course Content:
The course is designed to give students hands on experience in modern experimental biochemistry. Students will learn proper techniques in pipetting, buffer preparation, spectroscopy, protein and enzyme purification, gel electrophoresis, column chromatography, immunoblotting, enzyme kinetics, protein crystallization, and protein molecular modeling.

Course Learning Objectives:

1. Provide thorough understanding of fundamental techniques in modern experimental protein biochemistry
2. Develop problem solving skills in experimental biochemistry
3. Encourage both collaborative and independent experimentation by students
4. Provide a learning environment where students are free to inquire and explore to gain a better understanding of the techniques and underlying principles

Grade Distribution:

The grades will be calculated according to the following scheme:

Pre-Lab Assignments	10%
Communication Lab Reports	60%
Comprehensive Lab Report	30%

Final grades will be determined on a standard grading scale of A 90-100%, B 80-89%, C 70-79%, etc. Incentive points may be added, based on initiative, class participation, and improvement in the course.

Lab Reports:

Two types of lab reports will be due during the semester, 1) **communications** and 2) **comprehensive reports**. The differences are explained as follows:

1) **Communications** summarize the results for a single lab or short sequence of experiments and are limited to a **maximum of 3 pages**, not including references and attached notebook pages. Each communication is worth 10% of your final grade.

2) **Comprehensive reports** encompass the findings from an entire series of experiments and are limited to a **maximum of 7 pages**, not including any references and attached notebook pages. Each comprehensive article is worth 15% of your final grade.

Lab reports should provide a clear, well thought out presentation of the data in its final, processed form (see lab report example). There will be 6 regular lab reports and 2 comprehensive lab report due and they are as follows:

Communications-	Due Date
Exp. 1 Quantitative Pipetting	01/29/24
Exp. 2 Theory and Measurement of pH and pKa	02/12/24
Exp. 4 Introduction to Spectroscopy	02/19/24
Exp. 5a Protein Purification and Quantitation of CelB-GFP	02/26/24
Exp. 5b and 5c SDS-PAGE and Western Blotting of CelB-GFP	03/07/24
Exp. 5d Enzyme Kinetics of CelB	03/25/24

Comprehensive Reports-	
Exp. 5 Comprehensive CelB-GFP Purification and Characterization	04/01/24
Exp. 6 Comprehensive LDH Purification and Characterization	04/15/24

Comprehensive reports will be a compilation of all results from an experimental series into a single, cohesive lab report.

Lab reports must be turned in by the end (11:59 pm) of the due date by online submission via the submission folder on the Canvas webpage for the course. Lab reports that are submitted late will receive the following deductions from the total possible points:

Late 1 day: 10% points deduction
Late 2 days: 20% points deduction

Late 3 days: 30% points deduction
Late 4 days: 40% points deduction
Late 5 days: No credit

All lab reports must be submitted electronically to the turn in folder on the course Canvas site.

Pre-lab Assignments. Pre-lab questions will be posted as handouts to Canvas the week before the experiment is to be carried out. The Pre-lab will require calculations and answers to questions that will prepare students for the upcoming laboratory session.

Attendance and make-up policy:
Course attendance is required. Students who do not attend will not be able to carry out experiments and obtain data for their lab reports, which is required to receive full credit. The instructor should be notified of any expected absences according to the University of Texas at Tyler guidelines and may be excused for reasons allowed by the university. Make-ups will be allowed only for reasons outlined in the University of Texas at Tyler bylaws.

Census and Withdraw Dates:
The Census Date is January 29, 2024 and the Last Day to Withdraw is March 25, 2024.

Laboratory Schedule (Note this is only a tentative schedule and is subject to change)

01/22/24	Exp. 1: Quantitative Pipetting Skills & Statistical Analysis
01/29/24	Exp. 2: Theory and Measurement of pH and pK_a
02/05/24	Exp. 3: Buffer Preparation
02/12/24	Exp. 4: Introduction to UV-Vis Spectroscopy
02/19/24	Exp. 5a: Protein Purification: Lysis, Centrifugation, and Affinity Chromatography of CelB-GFP
02/26/24	Exp. 5b: SDS-PAGE (CelB-GFP) and begin 5c: Western Blotting
03/04/24	Finish Exp. 5c: Western Blot of CelB-GFP
03/11/24	Spring break
03/18/24	Exp. 5d: CelB Enzyme Kinetics
03/25/24	Exp. 6a: Purification of Lactate Dehydrogenase (LDH) from Bovine Heart by Homogenization and Ammonium Sulfate Precipitation
04/01/24	Exp. 6b: Purification of LDH by Ion Exchange Chromatography
04/08/24	Exp. 6c: SDS-PAGE and Enzyme Kinetics of LDH
04/15/24	Exp. 7: Protein Crystallization Set Up
04/22/23	Exp. 7: Protein Crystallization Evaluation

Final Exam: No written exam will be administered.

***I reserve the right to make modifications as needed to the course. This will be done in accordance with university bylaws.**