

CHEMISTRY 351L: BIOCHEMISTRY LABORATORY

Instructor: Sajith Jayasinghe
Semester: Fall 2007
Location: Science Hall 1 room 316
Date & Time: Tuesday 12:00 noon -12:50 p.m. & 1:00 p.m.- 5:45 p.m.
Instructor Contact: ***E-mail communication will be via WebCT (CHEM 351). E-mails sent to the instructor's campus e-mail address will NOT be returned (unless in the case of an emergency). Use the instructor's campus e-mail (sjayasin@csusm.edu) only in the case of an emergency.***
Tel: 760-750-4180
Office Hours: Mondays and Wednesdays from 1:00 p.m. to 2:30 p.m. or at any other time with appointment.
Corequisite: Chemistry 351: Biochemistry

The goal of this laboratory course is to teach the following aspects of experimental biochemistry: experimental design and execution, and data recording, analysis, interpretation and presentation. No textbook or laboratory manual is required. The instructor will provide the experimental procedures.

You are required to keep a bound laboratory notebook.

Lab	Date	Title
1	08/28/07	Use of Micropipettors and Protein Concentration Determination
2	09/04/07	Crystal Growth of Lysozyme
3	09/11/07	Ammonium Sulfate Fractionation in the Purification of Rhodanese
4	09/18/07	Conclusion of Fractionation and Dialysis & Preparation of Chromatographic Columns
5	09/25/07	Cation-Exchange Chromatography in the Purification of Rhodanese
6	10/02/07	Hydrophobic Interaction Chromatography in the Purification of Rhodanese
7	10/09/07	Evaluation of the Purification of Rhodanese by SDS-PAGE and Enzyme Specific Activity
8	10/16/07	Conclusions of Crystal Growth of Lysozyme
9	10/23/07	TBA
10	10/30/07	TBA
11	11/06/07	TBA
12	11/13/07	Determination of the Rate of a Trypsin-Catalyzed Reaction as a Function of the Enzyme Concentration
13	11/20/07	Determination of the Kinetic Parameters, K_m and V_{max} , of a Trypsin-Catalyzed Reaction
14	11/27/07	Determination of the Inhibition Type and Inhibition Constant for Benzamidine of a Trypsin-Catalyzed Reaction
15	12/04/07	

INSTRUCTIONS FOR PREPARING LAB NOTEBOOKS:

You should not try to copy the entire experimental protocol from the handouts into your report. Instead, the goal is to record all of the information that, along with the handouts, would allow someone to reproduce your experimental protocol exactly.

Before coming to the lab, you should enter, in your lab notebook, the following: your name and your lab partner's name, the date, the experiments to be carried out, the title of the lab, and a brief (two-three sentences) summary of the objective(s) of the experiments. Try to describe as clearly and specifically as you can the goal of the experimental procedure. For instance, "The objective of this lab is to separate the individual proteins in a protein mixture using a cation exchange column with the HPLC instrument" is much more informative than "The objective of this experiment is to learn to do chromatography". Also include a flow chart summarizing the major steps in the experimental procedure. Major steps would include the preparation of key solutions, separation steps, individual assays or kinetic runs, etc.

As you work in the laboratory, you should record in your notebook all of your measurements and observations. Measurements that should be recorded include weighed quantities, absorbance readings, pH values, water bath temperatures, etc. Some data will be plotted directly from the spectrophotometer or using a computer printer. These should be carefully labeled and pasted into your notebook. Your notebook should also contain clear records of all of the calculations that you perform as you do the experiment. Dimensional analysis of all quantities is an important way to make sure that your calculations make sense and to spot errors. Also, you should carefully record any deviations from the protocol, whether deliberate or otherwise. Data analysis will also involve plotting data with a computer. The resulting plots are to be included with the report. The axis of all plots should be carefully labeled with the correct units. For each laboratory exercise, there is also be a set of discussion questions. Answer them in your notebook.

While a neat lab notebook does not guarantee that a student has understood and correctly executed an experiment, a messy, illegible notebook makes it nearly impossible to tell. Thus, points will be deducted for poor presentation.

INSTRUCTIONS AND GRADING POLICY FOR LABORATORY REPORTS:

Four laboratory reports are due on the respective dates indicated below. Although there is no report due for the first laboratory you are required to show your results and calculations to the instructor as recorded in you notebook.

The reports are to be written in the form of a formal journal article (as if you are sending your results for publication) that you would find in *Biochemistry*, or the *Journal of Biological Chemistry*. Your report should contain the following sections: Abstract, Introduction, Methods, Results, Discussion and References. All relevant figures (graphs, images, etc) must be included in your report. You may inline figures (i.e. in flow with the text) or you may attach the figures to the end of the report in a section titled "Figures". All figures must contain a figure legend.

If you are not familiar with writing this form of laboratory report please consult the instructor. Please familiarize your self with a published article (or two) from the journals mentioned above. Pay particular attention to the use of the proper tense.

Your laboratory reports will be graded with special attention to clarity and completeness. If something goes wrong during the execution of an experiment, you should be able to explain what happened and how you dealt with the difficulty as you completed the experiment and analyzed your results.

Report	Labs	Points	Due Date
Growth of Lysozyme Crystals	2,8	20	10/23/07
Protein Purification	3,4,5,6,& 7	20	10/16/07
TBA	9,10&11	20	11/13/07
Enzyme Kinetics	12,13,14	20	12/04/07

25% of your report grade will be deducted for each day the report is turned in late. That is, your report is worth zero points if you turned it in 4 days after the date the report was due.

QUIZZES:

There will be five (5) surprise quizzes during the semester. There will be NO MAKE-UP QUIZZES. Students who miss any quiz will be given 24 hours to contact me, otherwise they will be assigned a grade of zero on that exam.

COURSE GRADING:

Attendance & Overall Lab Performance*	70 points	(5 pts each lab)
5 "Surprise" Quizzes	30 "	(6 pts each quiz)
4 Lab Reports	80 "	(20 pts each report)
Notebook	20 "	
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Total	200 "	

* Attendance refers not only to showing up to the lab at the beginning of the experiment, but also to remaining in the lab during the execution of the experiment. Do not plan to perform any activity during the time period assigned to the biochemistry lab or to plan to leave early unless you have completely finished working in the experiment. If working in teams, all students are fully responsible for the execution and completion of the experiment. Since some of the experiments are long, repetitive, and tedious you can take short breaks any time you want and remain in the hall by the lab or go to the restroom. Make sure to inform your partner(s) that you are leaving the lab. Never leave unattended any of the experiments in progress, i.e., a running chromatographic column, an electrophoresis apparatus, etc.

Lab performance refers not to the ability to quickly finish an experiment, but rather to the ability to:

1. Follow the experimental procedure in handout & on blackboard
2. Work in a safe manner
3. Make an efficient use of the equipment and materials
4. Leave all the equipment, scales, chemicals and supplies the same clean and ordered way you found them at the beginning of the experiment
5. Leave your area completely clean before you leave the experiment

WRITING REQUIREMENT:

The University Writing Requirement will be satisfied upon completion of the four formal laboratory reports.

STUDENTS WITH DISABILITIES:

Students with disabilities who require accommodation must be approved by the Office of Disabled Student Services (DSS). Please contact this office as soon as possible and meet with the instructor during office hours (or at some other mutually agreeable time). The DSS office is located in Craven hall 5205. Their telephone number is (760) 750-4905 or TTY (760) 750-4909.

ACADEMIC HONESTY:

All students are expected to maintain academic honesty. This is especially true with regards to the completion of laboratory reports. Although you may work with your partner(s) to analyze and discuss your data, **all submitted work must be your own and must be written in your own words.**

All students should be familiar with the university policies and procedures concerning academic honesty as detailed in the university catalog. An online version of these policies and procedures can also be found at: http://lynx.csusm.edu/policies/procedure_online.asp?ID=187

Cheating, plagiarism, and other forms of academic dishonesty will not be tolerated. If you are caught cheating on an exam you will receive a grade of zero. All cases of academic dishonesty will be reported to the dean of students for appropriate action.

MESCELLANEOUS:

Do not take and use materials/chemicals/supplies from the shelves, drawers or anywhere else in the room. If you need more supplies ask the lab instructor. You should be able to do the experiments with the materials/chemicals that have been provided to you.