

The University of Texas at San Antonio

SPRING 2008 BIO 3522 (BIOCHEMISTRY LABORATORY) COURSE SYLLABUS

LABORATORY Schedule:

| | Section | Lab Time | Lab Instructor | Office Hours | Contact information |
|--------------------|---------|------------------|-------------------|--------------|---------------------|
| Campus-1604 | | | | | |
| Tuesday | 001 | 07:20 - 12:20 PM | Pramod Kumar | | |
| Tuesday | 002 | 01:00 - 06:00 PM | Isaac Pena | | |
| Wednesday | 003 | 07:20- 12:20 PM | | | |
| Wednesday | 004 | 01:00- 06:00 PM | Solomon Nfor | | |
| Thursday | 005 | 07:20- 12:20 PM | Madhulika Jupelli | | |
| Thursday | 006 | 01:00- 06:00 PM | Isaac Pena | | |
| Friday | 007 | 07:20- 12:20 PM | Emmanuel Akwar | | |
| Friday | 008 | 01:00- 06:00 PM | | | |
| Saturday | 009 | 08:30- 01:30 PM | | | |
| Downtown | | | | | |
| Wednesday | 901 | 08:00- 01:00 PM | Hector Hernandez | | |
| Friday | 902 | 08:00- 01:00 PM | Emmanuel Akwar | | |

LABORATORY/CLASS ROOM: SB 2.01.42 (Campus 1604); _____ (Downtown)

COORDINATOR: Pramod Kumar, Ph. D.

Email: pramod.kumar@utsa.edu

WebPages: <http://WEBCT.utsa.edu>

TEXTBOOK: SELECTED EXPERIMENTS IN BIOCHEMISTRY : This book is available on WebCT.

COURSE OBJECTIVE: The objective of this course is to provide you with a basic understanding of biochemical techniques, including buffer preparation, electrophoresis of amino acids, chromatography, protein fractionation, and gel electrophoresis and western blotting. Concurrent enrollment in BIO 3513 is recommended.

GRADING POLICY:

| Grades to be allocated | Items | Weight | Your Grade Points |
|---|---------------------------------------|--------|-------------------|
| A = 90 or more B = 80 – 89 C = 70 – 79 D = 60 – 69 F = less than 60 | Quizzes | 20% | ___ X 0.20 = ___ |
| | Lab Report | 10% | ___ X 0.1 = ___ |
| | Mid Term | 20% | ___ X 0.2 = ___ |
| | Finals | 20% | ___ X 0.2 = ___ |
| | Group Report/ Portfolio/Participation | 10% | ___ X 0.1 = ___ |
| | Homework | 10% | ___ X 0.1 = ___ |
| | Presentation | 10% | ___ X 0.1 = ___ |
| | Total | | 100% |

EXAMINATION SCHEDULE: Please see course outline. Examination time will be announced later.

Laboratory Rules & Safety: While in the laboratory, everyone is required to wear closed-toe shoes and a lab coat all the time. Some of the chemicals used are toxic or mutagenic. If you believe that you have a health condition that puts you at exceptional risk, or believe yourself to be pregnant, please see your instructor in private to discuss the issue. If you have questions or concerns about exposure to chemicals, please feel free to go to the coordinator (SB 2.03.14) or visit Chemical and Safety Office.

CLASSROOM BEHAVIOR EXPECTATION-Students are expected to assist in maintaining a classroom environment that is conducive to learning. To assure all students have the opportunity to gain from time spent in class, students are prohibited from engaging in any form of distraction. Inappropriate behavior in the classroom shall result, minimally, in a request to leave class.

There will be no make-up quizzes. Make-up examinations are given only under certain extenuating circumstances and are generally difficult than the regularly scheduled exams. Please see Lab Manual for policy details.

Scholastic Dishonesty

Cheating is a very serious academic offense and cannot be tolerated in any form. Information related to this issue can be found on the university website <http://www.utsa.edu/osja/scholastic.cfm> (Sec. 203. Scholastic Dishonesty)

COURSE OUTLINE*

| Year 2008 | EXPERIMENT | CH | NOTES | Grades |
|------------------|---|---------------------------|--------------------------------|--|
| 01/15 - 01/18 | Introduction and Lab policy discussion Use of pipetting and calculations | 1 | | |
| 01/22 - 01/25 | Protein Determination** | 2 | | No quiz |
| 01/29 - 02/01 | Preparing a buffer: Measurement of pH | 3 | Quiz 1 HW 1 Assigned | Quiz 1 ____ HW 1 ____ |
| 02/05 - 02/08 | Isolation and fractionation of albumin**Ψ | 5 | Quiz 2 HW 1 Due | Quiz 2 ____ |
| 02/12 - 02/15 | Determination of molecular weight of a protein by gel filtration** | 6 | Quiz 3 | Quiz 3 ____ |
| 02/19 - 02/22 | Electrophoretic analysis of an unknown amino acid mixture | 7 | Quiz 4; MIDTERM REVIEW | Quiz 4 ____ |
| 02/26 - 02/29 | MIDTERM (Ch 1 – 7) | MIDTERM Grade ____ | | |
| 03/04 - 03/07 | Polyacrylamide gel electrophoresis (SDS-PAGE)** | 8 | | No Quiz |
| 03/11 - 03/14 | SPRING BREAK | NO LAB MEETING | | |
| 03/18 - 03/21 | Western blotting- detection of proteins on blot transfer matrix | 9 | Quiz 5 | Quiz 5 ____ |
| 03/25 - 03/28 | **Enzyme kinetics-Egg White Lysozyme | 10 | Quiz 6 | Quiz 6 ____ |
| 004/01 - 04/04 | Kinetics of enzyme inhibitors-Wheat Germ <i>Acid phosphatase</i> | 11 | Quiz 7 HW 2 Assigned | Quiz 7 ____ HW 2 ____ |
| 04/08 - 04/11 | Enzymatic Determination of Total Cholesterol in Serum | 12 | Quiz 8 HW 2 Due | Quiz 8 ____ |
| 04/15 - 04/18 | Group Presentation (participation is required) Final Exam Review | | | |
| 04/22 - 04/25 | FINAL EXAM (Ch 8 – 12); | Final ____ | | |

MARCH 25, 2008: Last day to drop an individual course and receive an automatic grade of "W"

* The course outline is subject to change if needed. ** Individual lab report write-up

Ψ This experiment will be completed in two periods. Students writing lab report for this experiment are required to attend the second part of the lab, which takes approximately 2 – 2.5 hours. Your instructor will explain more details during lab session.

Policies and Procedures for Biochemistry Laboratory

Quizzes -Quizzes will be given as shown in the lab schedule **that will cover the material from last lab(s) and the lab to be done that day.** These quizzes will generally include fill in the blank, matching, problems, and short answer questions. They will cover the experiments performed and the theory behind them as presented in the manual and in the laboratory class introduction.

Quizzes will be given at the beginning of each lab period. You will have approximately 15 minutes to complete the quiz. If you arrive late to class, you will not be given extra time to complete the quiz.

Missed quizzes and Labs -If you miss a quiz due to absence or late arrival you will receive a zero. You may make up a lab by attending one of the other lab sections after coordinating such attendance with your instructor. No quiz can be made up.

Dropping Grades-One lowest grade of each weekly quiz and lab report will be dropped in the calculation of final grade. Retain all graded work in the event a question arises regarding your grade.

Midterm and Final exams -Each of these exams will be comprehensive and cover material up to the time of the exam. Each is based on the lab manual, experiments, and all material presented or assigned during class. The questions will be of the same type as are on the quizzes. See your instructor to coordinate a make-up midterm if you cannot be present for the exam for excusable reasons.

Postponed or missed Final exam-To postpone the final exam due to dire circumstances such as personal illness or family emergency, you must follow the procedures outlined in the UTSA Undergraduate Catalog. You must receive permission from the instructor for Postponement at least 24 hours before the beginning of the final exam. If you follow these procedures, you will receive a grade of "IN" and will have an opportunity to take the final later as

stated in the catalog. It is your responsibility to make up the final exam according to the procedure in the UTSA Undergraduate Catalog.

Attendance and Class participation -Attendance and full participation in every lab meeting is expected. If you have two absences on or before the last date for dropping the course with a 'W', and have not contacted your instructor about these absences, he may decide to drop you from the course for non-attendance. It remains your responsibility to withdraw before the drop date if that is your intention.

You will be counted as excessively absent if you miss more than 25% of the course any times in the semester including the day of the final exam. In such a case your instructor will recommend to the Dean of the College that you receive an "F" for the course for excessive absences.

Waste-Place wastes in their proper containers.

Broken glassware goes in the container marked for such. Liquids go down the sink, after approval from your instructor, with plenty of water. Other waste materials go into the general trashcan.

Clean-Up Procedure -At the completion of your experiment, you are required to clean up your work area and a portion of the general work area. Be sure that:

- I. assigned areas are wiped down with a damp paper towel.
- II. electrical equipment has been turned off, unplugged, and its cords coiled.
- III. soiled equipment, such as glassware, instrument has been cleaned or put in the proper place.
- IV. chairs are tucked in.
- V. your entire lab bench is toweled down. After your team has been checked out, you may leave.

DO NOT LEAVE BEFORE THEN, UNLESS YOU HAVE PERMISSION FROM THE INSTRUCTOR.

Lab Report Write-up Guidelines

Lab reports are an essential part of this course and represent the major mechanism for grading your work!

Only one lab report is required for this course and should be turned in on the schedule provided. Lab reports must be prepared on a computer using a word processor (Microsoft Word etc.). All graphs must be drawn on a computer using a graphing program such as a spreadsheet program (*i.e.*, Excel etc.) or Sigma Plot. Some tables may be prepared by handwriting since these are sometimes difficult to prepare on a computer. Be sure that all graphs are properly labeled and represent the data well.

The main purpose of the lab report is to show me that you understand what you did in the lab and that you know how to do the calculations associated with the experiment, which is presented in the report!

If many of the same type of calculations are being done, it is OK to show just one example of such a calculation. Be sure that the lab report includes all aspects of the experiment, some of which may be changed from what is described in the text. I also want you to demonstrate in the lab report that you thought about the experiment and have made an intelligent assessment of your results. Since some of your results will probably come out differently than you think they should, you should report the results you find and then explain what you think might have caused them to be in error *etc.* But try to avoid constantly making excuses why you have no logical way to know if you did something wrong or not.

LONG LAB REPORTS ARE NOT NECESSARY AND SHOULD BE AVOIDED!

LAB REPORT STYLE:

- The style of your lab report is important since it sets a framework for your presentation.

- The lab report must have the following sections: I will give you review for each assigned lab report at the end of lab period. (Write your group number assigned to your group in the corner of first page.)

Style vs. Substance:

- A fixed format or style is required for the Lab Report.
- Introduction, Methods, Results, Discussion (Summary)
- Similar to style used in writing a scientific manuscript for a journal

While style is necessary, substance is what really counts

- The four part style of the Lab Report is required but is only the framework for a top lab report
- Substance is what gets the Lab Report the higher grade and Most Points.
- Show me in the Lab Report: 1) what you intended to do (Introduction), 2) how you did it (Methods), 3) what you found out (Results), and 4) what you think it means (Discussion)
- A final Summary is a good finishing touch to show that you can say it all in a few short words (do not include references)

TITLE: can be obtained from syllabus.

I. Introduction

(What you intended to do?) 15 points

- Why are you doing the experiment?
- What is unique about the Experiment?
- Briefly explain principles underlying the Experiment.
- Present Equations and Chemical Structures for this Experiment, if any

- Are there any special things about this Experiment that help you to understand it
- What do Biochemists with the methods studies in this Experiment
- In Summary: INTRODUCTION should be short, to the point and well illustrated with equations/structures.

II. Methods (How you did the Experiment?)
10 points

- Guidelines you followed in doing the Experiment (text citation and pages used/exp # etc)
- What you did differently than the text description (special instructions from your instructor etc)
- Identify anything you did that was different than what was expected (mistakes in your lab work)
- Summary: METHODS should be very short with only enough detail to make it clear what protocols you followed -just enough to allow someone else to reproduce your work from the same written sources.

III. Results (What you found out in the lab and analysis of the data using Tables and figures)
25 points

- Present your Data here -every bit of it -even if you think it is not correct
- Think about the layout of the Results to best present the data
- It's OK to mix raw data and analysis -like the data for a graph and then the graph illustrations (graphs and tables) can be separated from the main text -just be sure to refer to them in the text part
- Graphs should be computer drawn -be sure to label graphs well and identify different data sets with different symbols
- Tables need to have clear column heading and proper units attached to them, but can be done by hand if your word process does not support tables very well.
- State which part of the experiment is

performed by you

- Summary: Don't interpret the Results, leave that to the Discussion. Be sure to cover all aspects of the Experiment, even those done by your partners. Do identify special problems you had, *i.e.*, mention places where you know you screwed up.

Discussion

(What you think it means)

30 points

- Start discussion with a statement of what were you trying to do in the experiment and review the results, step by step by stating what you found and what that means to the overall experiment. Use result outcomes to describe steps.
- Avoid catch-all excuses such as 'we probably made some pipetting errors'-but do discuss the impact of known mistakes-'like it appears that we added the wrong amounts of reagent X to the reaction, thus all the absorbance for the standard curve were in error.'
- How does the experiment fit in your contextual understanding of the biochemical usefulness, *i.e.*, why would a biochemist do this experiment and what it mean to him/her in understanding the properties of a biochemical (such as protein or enzyme) and the function of the biochemical in the organisms from which it was isolated. This way your discussion coordinates with introduction.

V. Summary and Conclusion (Say it all in few words)
10 points

- This is a good way to wrap up your Lab Report and bring to an end.
- Summary writing is a difficult task.
- A good summary (include calculated end results) represents that you have understanding what happened in the experiment.
- A good conclusion shows you that what objective of the experiment was and how you achieved it.

VI. Bibliography/ References 5 points

- Literature cited in the lab report should be listed here.
- References should be complete, *i.e.*, author (s), title, volume, page numbers, and year of publication.
- Each report should contain at least 5 references.

Note- The actual report write-up weighs 95 points and 5 points for neatness and format.

General Hints on writing-

- Capitalize and abbreviate correctly.
- Remove all dangling phrases.
- Do not start a sentence with a number in numerical form. If you want to start a sentence with a number, write in word(s). If you want to emphasize the number, write the word then put the figure in parentheses, *e.g.* Eight (8) tubes.
- A decimal number should always have a

figure before the decimal point, *e.g.*, 0.6 (not as .6),

- Write most information in past tense except introduction.
- Use present tense only if you are generalizing or stating facts.
- If in doubt about the format, consult *Journal of Biochemistry* or *Analytical Biochemistry* in the library.
- In notebooks, reports, or in speaking, use units that do not require exponents unless there is a good reason for doing otherwise, *e.g.*, write or say 5 μ moles rather than 5×10^{-6} moles.
- Important-whenver a concentration term is used anywhere, including tables and figures, always identify what solution the concentration refers to, *e.g.*, do not write "6.0 mg of protein/ml", but rather "6.0 mg of protein/ml of original protein solution" so both you and any other reader know it does not refer to a dilution of the original enzyme solution or to some other solution, but to the original protein solution.