

COURSE SYLLABUS
BIO 3822
CELL BIOLOGY LABORATORY
All sections – Spring 2009

Instructor:

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Course Objectives: BIO 3822 is a companion laboratory course to the Cellular Biology lecture course (BIO 3813). However, not everything discussed in the lecture class will be covered in the laboratory, and due to time constraints, topics in the laboratory may not follow the same order as topics covered in the lecture. BIO 3822 is intended to introduce the student to some of the techniques of cellular biology. Modern cell biology is the product of a merger between the older scientific fields of biochemistry, cytology, and genetics, fields that were once almost completely independent of each other. Cell biologists use some of the techniques of the older sciences, and many new ones. Biochemical and physical analysis of molecules, mathematics and computers, light and electron microscopy, plant and animal cell culture, genetic crosses, and many other technical approaches are now used in cell biology to investigate cells and how they work. In this laboratory, we will introduce you to working with cells and some of the microscopic, biochemical and molecular approaches used to study them. Emphasis will be on the practical details of the technique/topic being studied that week, the power of the techniques used, and the theory behind that week's experiment. By the end of the semester, the student should have accomplished the following objectives: 1) informed and safe operation of routine laboratory instruments, 2) practical experience in modern cell biology techniques, 3) aseptic cell culture technique, 4) exhibit problem solving skills in the laboratory environment, 5) a deeper understanding of material presented in BIO 3813, through practical experience.

Course Prerequisites: Physiology or Biochemistry, concurrent or previous enrollment of BIO 3813 suggested. Concurrent enrollment in BIO 3820 is required.

Required Text: None. Handouts will be given out weekly, normally in electronic format via WebCT. It is quite possible that changes will be made to the lab manual handouts prior to an experiment, so you may not want to print out handouts too early. It is recommended that you use your BIO 3813 lecture text as a reference.

GRADING:

<u>Grading System</u>	<u>Assignment</u>	<u>% of total grade</u>
A = \geq 90%	Quizzes	20
B = 80-89%	Homework	20
C = 70-79%	Laboratory research notebook	10
D = 60-69%	Abstracts	10
F = \leq 59%	Group Presentation	5
	Final Exam	20
	Participation	5
	Attendance in 3822	5
	Attendance in 3820	5

Laboratory Policies:

- 1) **Attendance is NOT OPTIONAL.** Only University excused absences will be considered for lab makeup. If you must miss a lab, it is YOUR responsibility to make proper arrangements with your TA and lab partners.
- 2) **Quizzes will be given at the beginning of each laboratory period.** If you are late to class you will not get more time to complete the quiz. No quiz can be made up. Quizzes may cover all material from previous lab session as well as introductory material for that day's experiment. At least one quiz grade will be dropped. If you miss class with an unexcused absence, you will receive a zero for that day's quiz. Please note that these quizzes represent a significant portion of your laboratory grade.
- 3) **The Final exam will be cumulative.** It will cover all material presented in laboratory (experiments, handouts, lectures, etc.). Makeup exams will be allowed for students with a legitimate University excuse, accompanied by documentation (emergency room, military). **It is the student's responsibility to arrange for the make-up exam.** The final will be given during your normal lab time this week. It will be a two-hour exam.
- 4) **There will be no outside projects for extra credit work or make-up work in this class.**
- 5) **Laboratory notebook.** Students will be required to keep a bound laboratory research notebook as a record of all work done in the lab. Both experimental procedures and data should be placed in this notebook. The notebook used needs to have duplicate pages. Completed daily work needs to be signed by your instructor at the end of each laboratory period for you to get credit. Duplicate copies of your finished lab write-up (to include calculations, tabulated data and summary/conclusions) are due at the beginning of the lab period exactly one week after you finish the experiment. Your notebook grade will be based on the unannounced, random grading of 3-6 lab write-ups by your instructor (10% will be deducted for one week late, 20% for two weeks late, and 50% thereafter for late papers). **The last day to turn in late work with a 50% deduction is December 5, 2009.** More details on how to prepare your lab notebook can be found in the lab notebook guidelines and from your instructor.

The notebook grade is broken down as follows:

Purpose	10%
Introduction	10%
Materials and Methods	15%
Results	30%
Conclusion	30%
Miscellaneous	5%

- 6) **Homework:** Due dates for homework will be announced in BIO 3820. The worksheets will be distributed through WebCT. Deductions will be made for homework turned in late (10% will be deducted for one week late, 20% for two weeks late, and 50% thereafter for late papers). **The last day to turn in late work with a 50% deduction is December 5, 2009.**
- 7) **Abstracts:** You will be required to write three abstracts throughout the semester on selected experiments. Due dates and topics will be announced in BIO 3820.
- 8) **Group presentation:** Towards the end of the semester, each group will be required to give a presentation on a different experiment (or topic related to experiments) done during the semester using the scientific literature as background reference material. All presentations must be done on Powerpoint and be no longer than 20 minutes including time for question and answer session. Your instructor will discuss further the specific requirements for this presentation during the semester.
- 9) **Participation:** This portion of your grade will be based both on your participation during the day's experiment and whether you clean up your area after your experiment. Please leave things the way you found them. Also, it is important to be courteous to everyone else in the laboratory.
- 10) **Attendance:** This is not a lecture course so you must be present for each laboratory experiment in order to pass this course (C or higher). As mentioned in section (4) there will be no outside make-up work or extra-credit work in this class. Attendance will be taken in BIO 3820.
- 11) **Appropriate attire:** Choose clothes to wear on the assumption that they will get stained or damaged (a laboratory coat is recommended). Wear only closed-toe shoes during the laboratory. No opened toed shoes will be allowed. Do not wear dangling jewelry or very loose clothing as either could get caught in electrical or mechanical instruments. Students not appropriately attired will be asked to leave the lab. Food or drink is NOT permitted in the lab at any time.
- 12) **Academic dishonesty:** According to the *Rules and Regulations of the Board of Regents*, chapter VI, 3.(17), "scholastic dishonesty" includes, but is not limited to cheating on a test or other class work, plagiarism, and collusion (the unauthorized collaboration with another person in preparing college work for credit). For detailed information regarding

the university's position on scholastic dishonesty, please read the section on "scholastic dishonesty" in the *UTSA Information* handbook. Submission of any work for a grade will be taken as your agreement that you understand and have abided by these rules. All graded assignments except the group presentation should be done independently.

13) Lab safety: Lab safety cannot be taken too lightly. There is a risk to be taken even in most menial tasks. Knowing how to look for these risks allows us to prevent most accidents. The most important safeguard in a lab is to **THINK** – don't become complacent about safety. There are several basic procedures that will minimize the potential hazards to individuals and prevent damage to the equipment in the lab.

- 1. DO NOT TOUCH ANYTHING** unless told to do so by your instructor.
- If you are not familiar with the equipment/chemicals set out for your use, wait until your instructor gives you direction. **DO NOT** take instruction from fellow classmates.
- Store backpacks in designated area. Only take your notebook, protocols and pen to work area.
- Dispose of all experimental waste only in the manner directed by your lab instructor.
- Locate the 2 exits from the lab. When in doubt, leave the building in an orderly but quickly manner.
- In case of spillage or other accidents: **CONTACT YOUR INSTRUCTOR IMMEDIATELY.** Do not try to clean up or deal with the accident yourself.
- Wear appropriate clothing (including lab coat, goggles, gloves, etc.) when working in the lab.
- Clean up your area at the end of your experiment. Throw out liquid and solid waste as per your instructor's instructions, clean used glassware and return area to the way you found it.
- NO FOOD OR DRINK IN THE LABORATORY!!!**
- Locate the MSDS/Safety notebook in the lab. This notebook contains laboratory safety procedures and Material Safety Data Sheets for all chemicals used in this lab (Also locate MSDS search engines on the internet).

COURSE OUTLINE: (SUBJECT TO CHANGE BY COORDINATOR AS NECESSARY)

DATE

EXPERIMENTS

Aug 25-29

Labs will not meet. BIO 3820 will meet.

Sept 1-5

Lab 1: Cell culture: Introduction to sterile cell culture technique.

Sept 8-12

Lab 2: Cell culture continued: Introduction to cell counting using hemocytometers.

Sept 15-19	Lab 3: Cell culture continued: Cell attachment (adhesion) and growth.
Sept 22-26	Lab 4: Cell staining techniques.
Sept 29-Oct 3	Lab 5: Analysis of membrane proteins: Competition assays
Oct 6-10	Lab 6: Isolation and Purification of lectin, Concanavalin A.
Oct 13-17	Lab 7: Analysis of purified Concanavalin A: Hemagglutination
Oct 20-24	Lab 8: Analysis of purified Concanavalin A: SDS-PAGE
Oct 27-31	Lab 9: Cell Fractionation: Differential Centrifugation
Nov 3-7	Lab 10: Cell Fractionation continued: Enzyme analysis.
Nov 10-14	Lab 11: Signal Transduction Assay
Nov 17-21	Group Presentations
Nov 24-28	No labs
Dec 1-5	Final Exam The final will be given during your normal lab time this week It will be a two-hour exam.